

Smithville Transportation Master Plan

Township of West Lincoln

Project Reference: Smithville Master Community Plan
Project number: 60619866

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Table of Contents

Executive Summary	8
1 Introduction.....	19
1.1 TMP Overview.....	19
1.2 Vision.....	19
2 Municipal Class EA Process.....	23
3 Existing Conditions.....	25
3.1 Study Area.....	25
3.2 Background Review: Studies and Demographics.....	25
3.3 Existing Transportation Conditions	30
4 Future Transportation Needs.....	44
4.1 Urban Boundary Expansion and Forecasted Growth	44
4.2 Planned Regional Projects.....	47
4.3 Active Transportation Methodology.....	48
4.4 Community Engagement.....	53
4.5 Opportunities and Challenges.....	56
4.6 Standards and Guidance	58
4.7 Complete Streets	58
5 Recommended Transportation Infrastructure and Programs.....	65
5.1 Infrastructure Measures	65
5.2 Non-Infrastructure Measures	87
5.3 TMP Goals and Objectives Alignment	90
6 Implementation and Monitoring.....	96
6.1 Implementation.....	96
6.2 Monitoring Program.....	108
Appendix A	A1
1. Model Methodology	A1
2. Existing Conditions Model.....	A2
2.1 Model Development.....	A2
2.2 Travel Demand Estimation.....	A5
2.3 Model Calibration and Validation	A7
2.4 Summary.....	A19
3. Phase I Model	A20
3.1 Model Assumptions.....	A20
3.2 Forecasted Traffic Demand.....	A21
3.3 Future Scenarios Overview.....	A22
3.4 Results	A25
3.5 Conclusion	A44
4. Phase II Model	A45
4.2 Results	A47
4.3 Sensitivity Testing.....	A51
5. Recommendations	A53

Figures

Figure 1: Preferred Concept for Urban Boundary Expansion area.....	10
Figure 2: Outline of Smithville TMP.....	19
Figure 3: MCEA Planning Process Diagram.....	23
Figure 4: Location of Smithville Within Niagara Region and the Township of West Lincoln.....	25
Figure 5: 2016 Population of Smithville by Age Group (Left); 2016 Smithville Population 15 Years and Older by Labour Force Status (Right).....	28
Figure 6: Main Methods of Commuting (Left) and Duration of Commutes (Right) for Smithville Residents.....	29
Figure 7: Existing Road Classifications.....	31
Figure 8: Approximate Driving Times from Smithville to Surrounding Municipalities.....	33
Figure 9: Existing Parking Locations in Downtown Smithville.....	37
Figure 10: Trails and On-Street Cycling Facilities (Indicated by Pavement Markings and/or Signage) within Smithville.....	40
Figure 11: Crosswalk and Sidewalk Locations of Arterial and Collector Roadways in Smithville.....	42
Figure 12: Smithville Urban Boundary Expansion Study Area.....	45
Figure 13: Smithville Population and Employment - 2022 and 2051.....	46
Figure 14: Density Targets and Housing Growth Forecasts.....	47
Figure 15: Connections of Existing Destinations to Existing Trails/On-Street Cycling Facilities.....	51
Figure 16: Connection of Destinations to Sidewalk Network.....	52
Figure 17: Key Themes of PIC Feedback.....	54
Figure 18: Transportation Network Opportunities and Challenges for Smithville.....	56
Figure 19: Township Arterial (Arterial B) Streetscape Cross Section.....	61
Figure 20: Collector Road Streetscape Cross Section.....	62
Figure 21: Local Road Streetscape Cross Section.....	63
Figure 22: Rural Route Streetscape Cross Section.....	64
Figure 23: Updated Road Classifications.....	78
Figure 24: Proposed New Roads and Road Upgrades.....	79
Figure 25: Planned Junction Improvements.....	80
Figure 26 Potential Roads for Jurisdiction Transfer.....	81
Figure 27: New Cycling and Trail Network – With Gaps.....	84
Figure 28: New Cycling and Trail Network – Without Gaps.....	85
Figure 29: Implementation Plan – Trails.....	86
Figure 30: Schedule E-14: Smithville MCP Development Staging Plan.....	97
Appendix A Figure 1: Three Stage model process, high level inputs and outputs.....	A2
Appendix A Figure 2: StreetLight Data “Gate” Locations.....	A4
Appendix A Figure 3: Smithville Sub-Traffic Analysis Zones Map.....	A5
Appendix A Figure 4: Static O-D Adjusted AM Peak Hour Original Demand.....	A10
Appendix A Figure 5: Static O-D Adjustment vs. AM Peak Hour Observed Turn Volumes.....	A10
Appendix A Figure 6: Static O-D Adjustment vs. AM Peak Hour Original Trip Length Distribution.....	A10
Appendix A Figure 7: Manually Corrected vs. Aimsun Adjusted AM Peak Hour Demands.....	A11
Appendix A Figure 8: Manually Corrected vs. AM Peak Observed Turn Volumes.....	A11
Appendix A Figure 9: Manually Corrected vs. Aimsun Adjusted AM Peak Hour Trip Length Distribution.....	A12
Appendix A Figure 10: Observed vs. Modelled AM Peak Hour Turning Movement Volumes.....	A13
Appendix A Figure 11: Existing Conditions - Simulated Flow.....	A15
Appendix A Figure 12: Existing Conditions - Simulated Link V/C.....	A16
Appendix A Figure 13: Existing Conditions - Simulated Speed.....	A18
Appendix A Figure 14: Planned transportation projects modelled in Aimsun.....	A20
Appendix A Figure 15: Proposed new links for each bypass option.....	A24
Appendix A Figure 16: 2051 Future Do-Nothing - Simulated Flow.....	A27
Appendix A Figure 17: 2051 Future Do-Nothing - Simulated V/C.....	A28
Appendix A Figure 18: 2051 Future Do-Nothing - Simulated Density.....	A29
Appendix A Figure 19: 2051 Future Do-Nothing - Simulated Delay Time.....	A30

Appendix A Figure 20: Zone 7989 access on Townline Road (far-left), added signalized control plan at Regional Road 20 & South Grimsby Road 7/BP1 (middle), and combined intervention (far-right)	A33
Appendix A Figure 21: Bypass options - Simulated Flow and Screenlines	A34
Appendix A Figure 22: Bypass options - Simulated Volume-to-Capacity Ratio	A35
Appendix A Figure 23: Bypass options - Simulated Density	A36
Appendix A Figure 24: Bypass options - Simulated Delay Time	A37
Appendix A Figure 25: Updated zones.....	A45
Appendix Figure 26: 2051 Baseline road network	A47
Appendix A Figure 27: 2051 Base scenario simulated flow	A48
Appendix A Figure 28: Base scenario simulated delay time	A49
Appendix A Figure 29: Identified road network improvement locations	A50
Appendix A Figure 30: Sensitivity testing locations.....	A51

Tables

Table 1: List of On-Street Parking – With Spaces in Smithville	35
Table 2: List of On-Street Parking - With Parking Lanes in Smithville	36
Table 3: Parking Lots for Public Use Within Smithville	36
Table 4: On-Street Bike Lanes within Smithville	38
Table 5: Trails in Smithville.....	41
Table 6: Connections of Existing Destinations to the Existing Active Transportation Network	50
Table 7: Summary of PICs	55
Table 8: Streetscape Summary	60
Table 9: Summary of Recommendations - New Roads, Road Upgrades, and Junction Improvements (Niagara Region Projects)*	72
Table 10: Summary of Recommendations - New Roads, Road Upgrades, and Junction Improvements (Township Projects)*	75
Table 11: Summary of Recommendations – Proposed Trails (Township Projects)*	82
Table 12: Alignment of TMP Goals and Objectives with Recommendations	91
Table 13: Phasing Timeframes.....	98
Table 14: Estimated Capital Costs for Recommendations (Niagara Region Projects).....	99
Table 15: Estimated Capital Costs for Recommendations (Township Projects).....	100
Table 16: Infrastructure Measures – Phasing and Cost Estimates – Niagara Region Projects.....	101
Table 17: Infrastructure Measures - Phasing and Cost Estimate - Township Projects	103
Table 18: Non-Infrastructure Measures – Phasing and Cost Estimate – Regional Projects	106
Table 19: Non-Infrastructure Measures - Phasing and Cost Estimates - Township Projects	106
Table 20: Key Performance Indicators	110
Appendix A Table 1: Modelled Road Types.....	A3
Appendix A Table 2: Calibration Acceptance Targets.....	A7
Appendix A Table 3: Aimsun Key Model Inputs.....	A8
Appendix A Table 4: Original and Static OD Adjusted GEH Statistics Summary	A12
Appendix A Table 5: Turn Volumes Comparison Results	A14
Appendix A Table 6: Link flows comparison results	A17
Appendix A Table 7: Summary of Calibration Acceptance for Traffic Volumes	A17
Appendix A Table 8: Auto Travel Times on Regional Road 14 and 20.....	A18
Appendix A Table 9: Summary of Calibration Modelling Results	A19
Appendix A Table 10: Future estimated number of trips in 2051	A22
Appendix A Table 11: Bypass descriptions.....	A24
Appendix A Table 12: Bypass options - link volume comparison	A38

Executive Summary

Master Community Planning Integration

The Master Community Plan (MCP) is a 30-year plan for accommodating growth in Smithville to 2051 through both intensification and greenfield development to achieve a complete community. To achieve the level of growth planned in a well designed, balanced and inclusive manner, while ensuring minimal disruption to the existing community it is necessary to develop an orderly and aligned staging program for the provision of the necessary infrastructure, transportation improvements and community facilities. The development rational and identification of infrastructure to support the development of Smithville are detailed in a series of supporting Master Plans.

Policy 6.11.7.6.3 h) of Official Plan Amendment 63 (OPA 63) provides that “The Township may, at its sole discretion, revise the Development Staging Plan without an amendment to this Plan where circumstances warrant, such as, but not limited to, unreasonable delay by landowner(s), in order to facilitate the planned progression of growth and development in a manner that supports the implementation of the MCP.” The policies provide for an appropriate level of flexibility and provide a solid framework for implementation through more detailed Block Plans, MESP’s and EA addendums, while acknowledging that future updates and changes may be needed over the 30-year time period of the plan.

Although the various Master Plan documents set out anticipated timescales and staging program for the design and implementation of various infrastructure requirements within Smithville. The flexibility provisions of OPA 63 have been specifically designed to reflect the need to accommodate changes and adjustment that can occur over the 30-year planning horizon of the Master Community Plan. OPA 63 recommendations were presented to the public, Council, and the landowners on multiple occasions including: the Public Meeting, Council adoption of OPA 63, and TAC meetings as late as December 16, 2022. As part of the Township’s Official Plan, additional flexibility is provided through periodic review and updating of the plan and policies over the 30-year planning horizon of the plan.

The transportation recommendations for the Smithville Area have been developed based on several key elements and considerations:

- The infrastructure recommendations of the TMP have been developed based on the proposed Block Plan approach developed and adopted in OPA 63.
- The Township of West Lincoln and the Niagara Region represent the two municipal tiers of highway responsibility that own and manage assets within the study area. As such both municipalities have been involved and consulted throughout the development of the TMP.
- In developing the staging of the proposed transportation network, the recommendations were collaboratively assessed and integrated with other planned municipal and regional infrastructure as part of the MCP and Master Plan development process.
- In developing the proposed road network, consideration of the Township and Regional existing, planned, and programmed infrastructure improvements and policies were also considered.

The recommendations have been staged in a manner as to support the planned timelines envisioned for the block plan process detailed in OPA 63. As such there are three main phases for the transportation program:

Within the next 10 years:

- Primarily located in the northwestern area of Smithville, upgrades to both Spring Creek Road and Regional Road 14 will be required to support development during this period.
- Development in the North and East of Smithville will be supported by improvements to Industrial Park Road and Young Street.

- In addition to these local improvements, a Regional examination of the alignment of the Smithville Bypass will have been conducted and the new northern connector will be constructed either as a municipal road or a Regional bypass.

10 – 20 years:

- During this time development to the South and southeast of the existing Smithville Urban Area will be occurring. To support the development the upgrading of Townline Road will need to occur in advance of development.
- Additionally to support the development of these blocks, upgrades to a series of connecting and local roads will be needed, including the improvement of the junction of Townline/Canborough/Port Davidson, and the realignment of Tober Road.

Greater than 20 years:

- To support the development of the western area of the urban boundary expansion, improvements to South Grimsby Road 6, and a new supporting western link will be required.
- As the volume of westbound traffic also increases, improvements to intersections along Regional Road 20 will also be required to support the increased demand.

Transportation Master Plan Summary

The town of Smithville located in the Township of West Lincoln, in the Niagara Region is currently planning for future development and growth out to 2051 and beyond as part of the MCP process.. A key feature of the planned growth will be the development of a transportation system that supports the uses and needs of existing behaviours while supplying the future capacity and options to support the growth of the area. The development of a Transportation Master Plan is a key document in supporting the growth of the Smithville area and represents one of the Regional Master Plans being developed to support the MCP process. The TMP provides an understanding of the existing transportation infrastructure and patterns, the potential demand of proposed development and the infrastructure and programs recommended to mitigate the impact and support the new requirements of the town.

Smithville is located on a key east west corridor in the Niagara peninsula (Regional Road 20), while also being home to about six thousand people and a number of industries and businesses. Trip mode choice is currently dominated by private vehicle, although a small proportion of trips mostly within town are made by bicycle or walking. The town has not previously had a Transportation Master Plan (TMP) to provide oversight to the transportation network, travel patterns and future growth, although as a lower tier municipality major transportation infrastructure has previously been identified in the various iterations of the Niagara Region transportation master plan. In addition to the regional transportation master plan, provincial and township policies and guidance have been utilised to develop a vision and a series of objectives that the TMP should aim to follow:

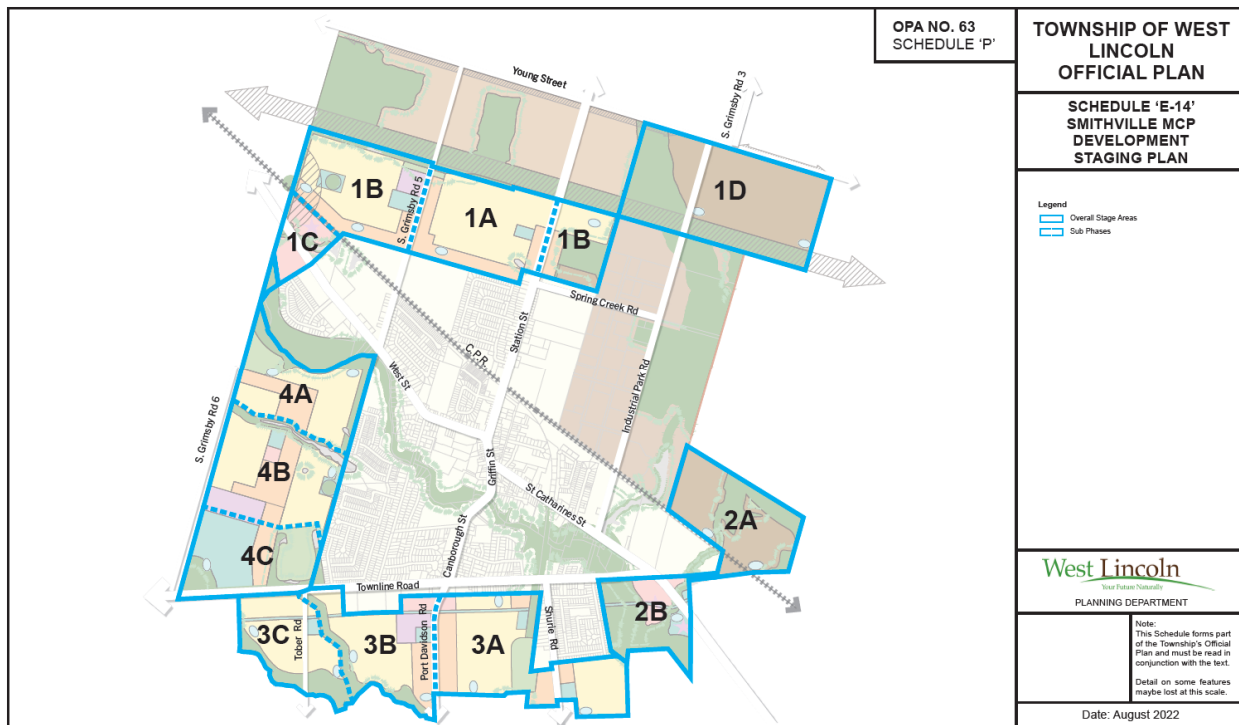
- **Create a complete transportation network**
- **Incorporate both local and regional economic growth**
- **Sustainably grow the community**
- **Provide convenient mode choices**
- **Improve health and safety**

Smithville currently has a transportation network that is developed around two regional roads, Regional Road 20 running east/west and Thirty Road which provides a connection to the QEW to the north. In addition to these roads the CP rail line also runs through the town in an east/west alignment, which currently includes three at grade crossings. The town has additional secondary arterial roads providing connections around town including Townline Road and Canborough Street. In addition to the road

network there are a series of off street trails that provide cycling and pedestrian connections to some of the existing facilities across the town, although there are a number of gaps in this network. Current trip patterns show a significant number of journeys involve private vehicles heading west to and from Hamilton, and secondly heading north to Grimsby and the QEW.

The urban boundary expansion and associated development will bring an additional 540 hectares within the town limits, effectively doubling the size of the town, and leading to a forecast population of about 22,000 by 2051. This level of growth requires an assessment of the existing road network to understand what the possible impacts of the new development are, this exercise was conducted using a traffic model which replicates existing traffic conditions on the towns road network and then forecasts the growth in trips across the network as a result of the new development. This assessment forms the primary method for assessing possible mitigation measures which can include upgrades to existing corridors as well as the development of new connections. In assessing the existing road network it was identified that almost all roads operate at less than 50% of available capacity and that congestion was a rare occurrence usually created by non-reoccurring events. The proposed development planned out to 2051 and presented in **Figure 1** when modeled indicate that the existing road network was insufficient to provide a similar level of service to existing conditions. Forecasts for 2051 suggested that the performance of several intersections would fall below acceptable standards, creating significant delays. It also highlighted that several constraints existed including north/south crossing of the CP rail corridor, movements west towards Hamilton become congestion as existing roads are over capacity, and areas around the downtown also become constrained as additional local traffic is impacted by increases in regional traffic.

Figure 1: Preferred Concept for Urban Boundary Expansion area



In support of the modeling exercise a series of public and stakeholder engagement exercises were conducted to gain feedback and understand some of the challenges and opportunities facing Smithville. The information gathered from these exercises was reviewed and a series of mitigation measures that aligned with the stated objectives were developed and tested. In assessing the impacts of the proposed development across the town, it was determined that there were several key measures that were required to mitigate the impacts of the new development on the transportation system.

- The assessment indicated that a new bypass of Smithville is required to addresses the growth of both internal and regional movements that conflict with each other and create congestion within the town.
- A significant amount of development is planned on either side of Townline Road which results in the level of traffic on this corridor becoming greater than the available capacity. To address this the widening of Townline Road to a three lane profile is required.
- The support of alternative modes of transportation will be a key part of reducing the impact of the new development on the road network. To support this a series of streetscape standards have been developed that provide dedicated space for alternative modes.

In addition to these mitigations measures, a series of other measures have been planned including signalization of certain intersections, development of new river crossings for active transportation modes and recommendations regarding a number of road safety and other educational programs. These measures packaged together will provide the required infrastructure and programs to minimize the impact of the new development on the existing transportation network in Smithville.

The TMP has developed a program to support the phased implementation of the various transportation infrastructure programs which is tied to the block plan process proposed under official plan amendment 63 (OPA 63). In developing the options and measures for implementation, the TMP has addressed the phase 1 and 2 requirements of the Municipal Class Environmental Assessment process, and has also identified high-level cost estimates for each of the proposed measures.

Refer to **Table E-1** and **Table E-2** for summaries of phasing and capital cost estimates for Niagara Region and Township recommendations, respectively. **Table E-3** through **Table E-6** provide a detailed breakdown of the infrastructure and non-infrastructure recommendations.

The Smithville TMP represents a key document for the future development of the town, providing a roadmap to support the growth and development of the town, while maintaining the needs and expectations of existing residents and business to move freely around the town and connect to services and entertainment. The TMP also supports the growth of sustainable transportation modes such as transit and active transportation and promotes continued economic development and prosperity.

Table E-1 Estimated Capital Costs for Recommendations (Niagara Region Projects)

Phasing Timeframe	Roads & On-Street Cycling Facilities	Non-Infrastructure Measures
Within the next 10 years	\$74.2M - \$87.7	\$40,000
10 – 20 years	\$14.3M	\$40,000
Greater than 20 years	\$5.4M	\$40,000
Total	\$93.9M - \$107.4M	\$120,000

Table E-2 Estimated Capital Costs for Recommendations (Township Projects)

Phasing Timeframe	Roads & On-Street Cycling Facilities	Trails	Non-Infrastructure Measures
Within the next 10 years	\$79.8M - \$105.3M	\$8.875M - \$11.175M	\$320,000 - \$465,000
10 – 20 years	\$45.5M - \$49M	\$8.775M - \$10.575M	\$245,000 - \$265,000
Greater than 20 years	\$27.2M - \$48.7M	\$4M - \$5.3M	\$245,000 - \$265,000
Total	\$152.5M - \$203M	\$21.65M - \$27.05M	\$810,000 - \$995,000

Table E-3 Infrastructure Measures – Phasing and Capital Cost – Niagara Region Projects

TMP ID	Project Name	Project Description	Phasing Timeframe	Estimated Capital Cost (2022 CAD)
RR/TWL-Road-02	New Northern Connector	New Road - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years (based on Regional Bypass Study)	\$17,500,000-\$25,000,000
RR-Road-03	New Western Link	New Road - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years (based on Regional Bypass Study)	<i>To be determine through additional study (assume will be over \$10 Million construction cost)</i>
RR-Road-04	New Eastern Link	New Road - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years (based on Regional Bypass Study)	<i>To be determine through additional study (assume will be over \$10 Million construction cost)</i>
RR-Road-11	Regional Road 14 (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit - Arterial B	Within the next 10 years	\$5,000,000
RR-Road-12	Regional Road 14 (between New Northern Connector and Spring Creek Road)	Road Upgrade/ Retrofit - Arterial B	Within the next 10 years	\$5,000,000
RR-Road-13	Regional Road 14 (between Spring Creek Road and Regional Road 20)	Road Upgrade/ Retrofit - Arterial B	Within the next 10 years	\$10,000,000-\$13,000,000
RR/TWL-Road-15	Industrial Park Road (between New Northern Connector and New Eastern Link)	Road Upgrade/ Retrofit - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years	\$7,000,000-\$10,000,000
RR-Road-17b	Townline Road (between Regional Road 14 (Canborough Street) and New Western Collector 1)	Road Upgrade/Retrofit - Arterial B	10 – 20 years	\$10,000,000
RR-Road-18	Townline Road (between New Western Collector 1 and South Grimsby Road 6)	Road Upgrade/ Retrofit - Collector	Greater than 20 years	\$4,500,000
RR-Junction-01	Regional Road 14 (Station Street) and Spring Creek Road	Junction Improvement	Within the next 10 years	\$2,000,000
RR-Junction-03	Regional Road 20, South Grimsby Road 8, and New Western Link	Junction Improvement	Within the next 10 years (based on Regional Bypass Study)	\$900,000
RR-Junction-04	Regional Road 20 and South Grimsby Road 7	Junction Improvement	10 – 20 years	\$900,000
RR/TWL-Junction-05	Spring Creek Road Extension and New Western Link/New Northern Collector	Junction Improvement	Within the next 10 years	\$700,000
RR/TWL-Junction-06	South Grimsby Road 5 and New Northern Connector	Junction Improvement	Within the next 10 years	\$900,000

TMP ID	Project Name	Project Description	Phasing Timeframe	Estimated Capital Cost (2022 CAD)
RR-Junction-07	Regional Road 14 (Station Street) and New Northern Connector	Junction Improvement	Within the next 10 years	\$900,000
RR/TWL-Junction-08	Industrial Park Road and New Northern Connector	Junction Improvement	Within the next 10 years	\$900,000
RR/TWL-Junction-09	Industrial Park Road and Spring Creek Road	Junction Improvement	Within the next 10 years	\$900,000
RR-Junction-10	Regional Road 20 (St. Catharines Street) and Industrial Park Road	Junction Improvement	Within the next 10 years	\$900,000
RR-Junction-11	Regional Road 14 (Canborough Street)/Port Davidson Road and Townline Road	Junction Improvement	10 – 20 years	\$2,500,000
RR-Junction-12	South Grimsby Road 6 and Townline Road	Junction Improvement	Greater than 20 years	\$900,000
RR-Junction-13	New Eastern Link and Industrial Park Road	Junction Improvement	Within the next 10 years (based on Regional Bypass Study)	\$900,000
RR-Junction-14	Regional Road 20 and New Eastern Link	Junction Improvement	Within the next 10 years (based on Regional Bypass Study)	\$700,000
RR-Junction-15	Townline Road/New Western Collector 1/Tober Road Realignment	Junction Improvement	10 – 20 years	\$900,000

Table E-4 Infrastructure Measures – Phasing and Capital Cost – Township Projects

TMP ID	Project Name	Project Description	Phasing Timeframe	Estimated Capital Cost (2022 CAD)
TWL-Road-01	Spring Creek Road Extension	New Road - Collector	Within the next 10 years	\$7,000,000
RR/TWL-Road-02	New Northern Connector	New Road - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years	\$17,500,000-\$25,000,000
TWL-Road-05	Tober Road Realignment/New Southern Collector 2/New Southern Collector 1	New Road - Collector	10 – 20 years	\$14,000,000-\$17,500,000
TWL-Road-06	New Western Collector 1	New Road - Collector	Greater than 20 years	\$15,500,000-\$24,000,000
TWL-Road-07	Spring Creek Road (between Spring Creek Road Extension and Regional Road 14)	Road Upgrade/ Retrofit - Collector	Within the next 10 years	\$9,000,000-\$13,500,000
TWL-Road-08	South Grimsby Road 5 (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit- Collector	Within the next 10 years	\$4,500,000
TWL-Road-09	South Grimsby Road 5 (between New Northern Connector and Spring Creek Road)	Road Upgrade/ Retrofit - Collector	Within the next 10 years	\$4,500,000
TWL-Road-10	South Grimsby Road 5 (between Spring Creek Road and Regional Road 20)	Road Upgrade/ Retrofit -Collector	Within the next 10 years	\$4,500,000-\$7,000,000
TWL-Road-14	Industrial Park Road (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit- Collector	Within the next 10 years	\$4,500,000
RR/TWL-Road-15	Industrial Park Road (between New Northern Connector and New Eastern Link)	Road Upgrade/ Retrofit - Collector at minimum - range represents Collector to Regional Road	Within the next 10 years	\$7,000,000-\$10,000,000
TWL-Road-16	Industrial Park Road (between New Eastern Link and Regional Road 20)	Road Upgrade/ Retrofit – Arterial B	Within the next 10 years	\$10,000,000
TWL-Road-17a	Townline Road (between Regional Road 20 and Regional Road 14 (Canborough Street))	Road Upgrade/Retrofit - Arterial B	10 – 20 years	\$20,000,000
TWL-Road-19	Port Davidson Road (between Townline Road and New Southern Collector 2)	Road Upgrade/ Retrofit - Collector	10 – 20 years	\$4,500,000
TWL-Road-20	Shurie Road (between Townline Road and New Southern Collector 1)	Road Upgrade/ Retrofit - Collector	10 – 20 years	\$4,500,000
TWL-Road-21	South Grimsby Road 6 (between New Western Collector 1 and Townline Road)	Road Upgrade/ Retrofit - Rural Edge Route	Greater than 20 years	\$7,000,000-\$15,000,000
TWL-Road-22	South Grimsby Road 6 (between Regional Road 20 and New Western Collector 1)	Road Upgrade/ Retrofit - Collector	Greater than 20 years	\$4,500,000-\$9,000,000

TMP ID	Project Name	Project Description	Phasing Timeframe	Estimated Capital Cost (2022 CAD)
TWL-Road-23	Young Street (between Regional Road 14 and South Grimsby Road 2)	Road Upgrade/Retrofit - Rural Edge Route	Within the next 10 years	\$7,000,000-\$15,000,000
TWL-Junction-02	South Grimsby Road 5 and Spring Creek Road	Junction Improvement	Within the next 10 years	\$900,000
RR/TWL-Junction-05	Spring Creek Road Extension and New Western Link/New Northern Collector	Junction Improvement	Within the next 10 years	\$700,000
RR/TWL-Junction-06	South Grimsby Road 5 and New Northern Connector	Junction Improvement	Within the next 10 years	\$900,000
RR/TWL-Junction-08	Industrial Park Road and New Northern Connector	Junction Improvement	Within the next 10 years	\$900,000
RR/TWL-Junction-09	Industrial Park Road and Spring Creek Road	Junction Improvement	Within the next 10 years	\$900,000
TWL-Junction-16	Tober Road/New Southern Collector 2	Junction Improvement	10 – 20 years	\$900,000
TWL-Junction-17	Port Davidson Road/New Southern Collector 1/New Southern Collector 2	Junction Improvement	10 – 20 years	\$900,000
TWL-Junction-18	Shurie Road and New Southern Collector 1	Junction Improvement	10 – 20 years	\$700,000
TWL-Junction-19	South Grimsby Road 6 and New Western Collector 1	Junction Improvement	Greater than 20 years	\$700,000
TWL-Trail-01	Hydro Corridor Trail	New Trail*	Within the next 10 years	\$3,250,000
TWL-Trail-02	South Creek Trail Extension	New Trail*	Greater than 20 years	\$1,500,000
TWL-Trail-03	South Grimsby Road 5 Trail	New Trail*	Greater than 20 years	\$1,500,000
TWL-Trail-03a	South Grimsby Road 5 Trail – Pedestrian Bridge	Pedestrian Bridge	Greater than 20 years	\$1,000,000 - \$2,300,000
TWL-Trail-04	Enbridge Trail	New Trail*	10 – 20 years	\$3,200,000
TWL-Trail-05	South Loop Trail	New Trail*	10 – 20 years	\$3,000,000-\$3,500,000
TWL-Trail-06	Old Rail Trail	New Trail*	10 – 20 years	\$1,200,000
TWL-Trail-07	Northwest Rail Trail – North	New Trail*	Within the next 10 years	\$1,500,000-\$2,300,000
TWL-Trail-08	Industrial Park-Townline Connector Trail	New Trail*	10 – 20 years	\$375,000
TWL-Trail-08a	Industrial Park-Townline Connector Trail – Pedestrian Bridge	Pedestrian Bridge	10 – 20 years	\$1,000,000 - \$2,300,000

TMP ID	Project Name	Project Description	Phasing Timeframe	Estimated Capital Cost (2022 CAD)
TWL-Trail-09	Southeast Rail Trail	New Trail*	Within the next 10 years	\$750,000-\$1,500,000
TWL-Trail-10	Margaret-McMurchie Trail	New Trail*	Within the next 10 years	\$375,000
TWL-Trail-11	Southeast River Trail 2	New Trail*	Within the next 10 years	\$750,000
TWL-Trail-12	Southeast River Trail 1	New Trail*	Within the next 10 years	\$750,000
TWL-Trail-13	Southwest Rail Trail	New Trail*	Within the next 10 years	\$750,000-\$1,500,000
TWL-Trail-14	North Creek Trail	New Trail*	Within the next 10 years	\$750,000

*All new trails costed as 3 m wide asphalt trails. Midblock trail crossings factored where applicable; trail crossings at intersections not included.

**Pedestrian bridge estimated cost range represents a span of between 4.5 m -100 m and a width of 3 m. To be determined as part of future study.

Table E-5 Non-Infrastructure Measures – Phasing and Capital Cost – Niagara Region Projects

Project ID	Project Name	Phasing Timeframe	Estimated Annual Cost (2022 CAD)	Estimated Total Capital Cost (2022 CAD)	Notes
RR-AT-01	Support Region in Strategic Cycling Network Implementation	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.
RR-AT-02	Supporting Region in Installing Pavement Markings and Signage in Missing Links	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.
RR-Transit-01	Promote Existing NRT OnDemand Services	Within the next 10 years	\$4000	\$120,000	Annual collaboration with NRT, covers 2023-2051.
RR-Transit-02	Partnership to Develop Transit in Smithville	Within the next 10 years	-	-	Ongoing collaboration with NRT, non-financial investment.
RR-Safety-02	Support Niagara Region for Vision Zero	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.

Table E-6 Non-Infrastructure Measures – Phasing and Capital Cost – Township Projects

Project ID	Project Name	Phasing Timeframe	Estimated Annual Cost (2022 CAD)	Estimated Total Capital Cost (2022 CAD)	Notes
TWL-AT-03	Supporting Cycling Equipment	Ongoing	\$2,000	\$60,000	Total capital cost covers 2023-2051.
TWL-AT-04	Incorporation of Trail Crossing Standards	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
TWL-AT-05	Transition Facilities for Terminating Trails	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
TWL-AT-06	Align Pedestrian Facilities with Smithville Cross Section Standards	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
TWL-AT-07	Complete Pedestrian Facilities at Intersections	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
TWL-Safety-01	Collision Analysis Task	Within the next 10 years	-	\$25,000 - \$150,000	Cost subject to safety studies undertaken.
TWL-Safety-03	Safety Programs for Schools	Ongoing	\$2,500 - \$4,500	\$75,000 - \$135,000	Total capital cost covers 2023-2051.
TWL-Safety-04	Traffic Calming Programs	Ongoing	\$20,000	\$600,000	Total capital cost covers 2023-2051.
TWL-TDM-01	Parking Strategy	Within the next 10 years	-	\$50,000	Total capital cost represents one-time investment.
TWL-TDM-02	Thresholds for Travel Plans	Ongoing	-	-	-
TWL-TDM-03	School Incentive Program	Ongoing	-	-	Ongoing collaboration, non-financial investment.
TWL-TDM-04	Promoting Economic Vitality in Downtown Core	Ongoing	-	-	Ongoing collaboration, non-financial investment.

1 Introduction

The urban settlement area of Smithville is located within the Township of West Lincoln (Township) in the Niagara Region (Region). Outside of its current boundaries, Smithville is surrounded by lands that are primarily classified as rural and agricultural. With a 2022 population and employment of approximately 7,500 and 1,900, respectively, this community is anticipated to grow substantially in the coming years. It is forecasted that Smithville will have an estimated population and employment of approximately 22,000 and 5,500, respectively, by 2051. In response, an urban boundary expansion study was determined to be needed to address this forecasted growth and would be carried out through a Master Community Plan (MCP).

The MCP for Smithville envisions a community that is complete, healthy, compact, and resilient. Overall, the MCP assesses potential land for the urban boundary expansion and considers how this area could be developed for a variety of land uses and to what density target. This plan is comprised of multiple studies, including the Subwatershed Study, Agricultural Impact Study, Financial Impact Study, Water and Wastewater Master Servicing Plans, and the Transportation Master Plan (TMP).

This document outlines the TMP for Smithville; its overview and vision is outlined in the following subsections.

1.1 TMP Overview

The purpose of Smithville's TMP is to create an overall vision for transportation within the community; looking forward to the year 2051 and providing recommendations for the transportation network within that timeframe. It will determine that vision, along with goals and objectives, before examining the current and future transportation conditions within the community. Ultimately, solutions will be developed, evaluated, and recommended for the settlement area, outlining the implementation and monitoring that would need to occur. A simplified outline of the TMP is illustrated in **Figure 2**.

Figure 2: Outline of Smithville TMP



1.2 Vision

The MCP has the following vision statement to guide the growth of Smithville to 2051:

Smithville is a vibrant centre of community life and economic activity in western Niagara, offering a range of services and amenities to residents across the Township and as a memorable place to visit.

West Lincoln's diverse agricultural sector is strengthened by local access to supportive and complementary businesses in Smithville's north-east employment area and farm-related services nearby, and local food retailing opportunities. The movement of goods including agricultural products is efficiently accommodated by strong regional transportation connections and delivery routes, connecting local businesses to broader markets. Smithville's well-defined community edges provide certainty to the long-term protection of high-quality farmlands and investment in agricultural production.

Smithville retains its rural, small-town character, while using land, energy and infrastructure efficiently. Community and environmental health, sustainability and resiliency are protected by a linked system of natural features, water resources and open spaces, supported by environmental stewardship and watershed management. Urban places are framed and enhanced by connected natural landscapes.

Quiet residential neighbourhoods provide a range of housing to meet diverse needs. Local retail and services, parks, open spaces and community facilities are within convenient walking and cycling distances via safe, multi-modal streets and multi-use trails. A network of complete streets supports enhanced connectivity within neighbourhoods and throughout Smithville and provides access to local and regional transit and ride-sharing options.

In addition, a TMP-specific vision was also developed to guide the transportation network within the community to 2051, organized into three categories: the vision, the goals, and the objectives. To ensure they aligned with one another, the goals were based on the vision and the objectives were derived from the goals. The following is the vision for the Smithville TMP:

Smithville will consist of a connected transportation network that provides residents with safe and efficient mode choices, promotes economic growth, and will allow for the community to sustainably evolve with a small-town focus.

To support the TMP's vision, 5 goals were developed by identifying key categories that related to this statement. The goals for the TMP are as follows, and are further explained in the following subsections:

- 1. Create a complete transportation network;**
- 2. Incorporate both local and regional economic growth;**
- 3. Sustainably grow the community;**
- 4. Provide convenient mode choices; and**
- 5. Improve health and safety.**

1.2.1 Create a Complete Transportation Network

A component of the MCP vision for Smithville is that it will be a vibrant community with complete streets, and as such, the transportation network should be developed to support this. A complete transportation network would flow efficiently, provide multiple connections throughout, and would support the overall needs of residents, businesses, visitors, and the freight industry.

The objectives are as follows:

- Identify key connection points and continue to develop the transportation network to support all mode types;
- Support the efficient movement of residents, visitors, and goods within and through the community; and
- Develop a transportation network that is complete yet still provides flexibility for change beyond the course of the TMP in response to the evolving needs of residents, businesses, and visitors.

1.2.2 Incorporate Both Local and Regional Economic Growth

The transportation network within Smithville must be able to support the 3,600 additional jobs forecasted between 2022 and 2051. The Official Plan of the Township of West Lincoln acknowledges that growth for commercial and industrial industries will primarily occur within Smithville, meaning that a transportation network that can support this growth is critical for not only Smithville but the rest of the municipality. In

addition, this transportation network must also balance the economic priorities of the Region and the needs of the wider Southern Ontario area.

The objectives of this goal are:

- Support the growth of the local economy through the transportation network in key locations within the community;
- Through transportation projects and programs, support the further development of Smithville as the commercial and industrial centre for the municipality, along with considering the interaction with surrounding agricultural uses; and
- Identify ways for the regional economy to benefit from recommended transportation projects and programs.

1.2.3 Sustainably Grow the Community

As the proposed urban boundary expansion is a key component within the TMP, the transportation network must focus on sustainable growth as the new developments are planned and constructed. This requires careful considerations regarding the appropriateness of the transportation infrastructure being proposed for the various new land uses and must balance the phasing of development between transportation and services. Maintaining the small-town character of the Township is also an important element to tie into the growth of the community.

The following are the objectives:

- Implement an appropriate transportation network for the existing and proposed land uses within the community;
- Balance transportation-related development along with the wider development program; and
- Maintain the small-town character of Smithville through future transportation projects and programs, and examine ways to further compliment this quality.

1.2.4 Provide Convenient Mode Choices

Currently, the most convenient way to get around Smithville is in a private vehicle. Providing additional transportation mode choices that are just as convenient would promote new opportunities for residents, as well as visitors who may be attending local attractions within the community. A transportation mode could be considered convenient if it is easy and efficient to maneuver, is located in key origins and destinations sites, and has sufficient infrastructure for multiple connections. Additional mode choices for Smithville could include cycling, walking, and transit.

The objectives of this goal are:

- Strive for a balance of mode choices within Smithville to and from all locations within the community; and
- Aim to make active transportation and transit as convenient as private vehicle access within Smithville.

1.2.5 Improve Health and Safety

In addition to an efficient, connective, economically-supportive, and sustainable transportation network, the system should also continually strive to improve the level of safety for residents and those who are passing through the community. Promoting modes such as active transportation would also support a green community with a healthy lifestyle.

The objectives for this goal include:

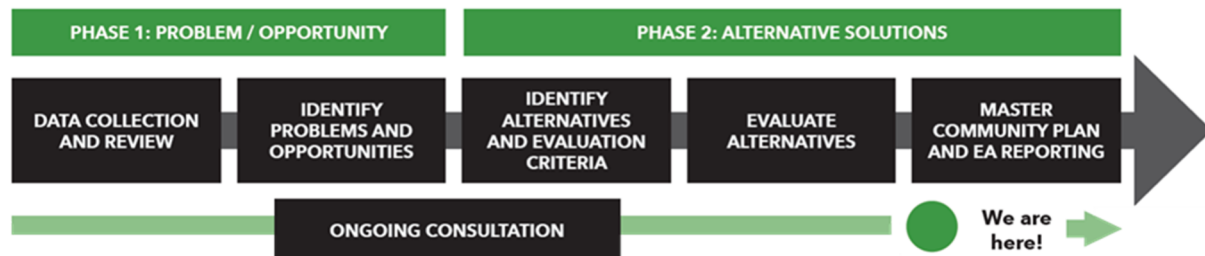
- Implement safety-related transportation programs for all modes in priority locations within Smithville;

- Identify and improve the level of safety for those passing through the community, such as for goods movement;
- Enhance existing and introduce new active transportation opportunities; and
- Develop an environmentally sustainable transportation network.

2 Municipal Class EA Process

In addition to guiding the MCP land use concept/policy planning and OPA process, the TMP also supported the Integrated Municipal Class Environmental Assessment (MCEA) planning process that followed specific steps outlined in the Municipal Engineers Association MCEA document (as recently amended in 2015) and outlined in Section A.2.9.3. The TMP study, including its early succession phased reports or analysis findings, provided inputs to the MCEA Phase 1 Problem/Opportunity Statement, and Phase 2 Alternatives evaluation in addition to identifying recommended transportation capital works projects as identified in **Section 5** in this report. The Phase 1 and 2 MCEA planning and consultation process is summarized in below **Figure 3** and is described in more detail in the Integrated MCEA Master Servicing Plan report that describes the full MCEA identification and evaluation of alternatives. It is important to note that the identification and evaluation of transportation improvements was guided by the land use concept road network which was subject to model testing to confirm performance and preference, however alternative Smithville Bypass options were identified and modelled.

Figure 3: MCEA Planning Process Diagram



The TMP considered the following MCEA document Appendix 1 Project Schedules (refer to **Table 16** and **Table 17** for the below-mentioned improvements):

- Municipal Road Project # 19 Reconstruction where the reconstructed road or other linear paved facilities will be for the same purpose, use capacity and same location (e.g. addition or reduction of cycling lanes/facilities or parking lanes, provided no change in the number of motor vehicle lanes) is designated as Schedule A+ (automatically approved, subject to public notice prior to construction). This would apply to the identified improvements for roads such as South Grimsby 5.
- No MCEA Schedule B projects (e.g. Municipal Road Project # 20 road reconstruction or widening not for same purpose, use, capacity or at same location having construction cost **less** than \$2.7 million) were identified.
- Municipal Road Project # 20 Road reconstruction or widening not for same purpose, use, capacity or at same location having construction cost **greater** than \$2.7 million. This would apply to the proposed Townline Road widening from two to three lanes, which is a Schedule C undertaking to be implemented in the future.
- Municipal Road Project # 21 Construction of new roads or other linear paved facilities having a construction cost greater than \$2.7 million is designated as Schedule C. This would apply to the Smithville Bypass.
- Municipal Road Project #22 Construction or removal of sidewalks, multi-purpose paths, or cycling facilities including water crossings outside of existing right-of-way is exempt from MCEA provided cost is less than \$3.5 million.
- Lastly, Municipal Road Project # 23 Construction of local roads which are a required as a condition of site plan, consent plan, plan of subdivision or condominium which come into affect under the Planning Act prior to construction of the works are automatically approved as Schedule A. This applies to many local roads that form the overall preferred land use concept road network.

The identified future MCEA Schedule C projects will build on TMP findings and include the evaluation of alternative solutions and design concepts.

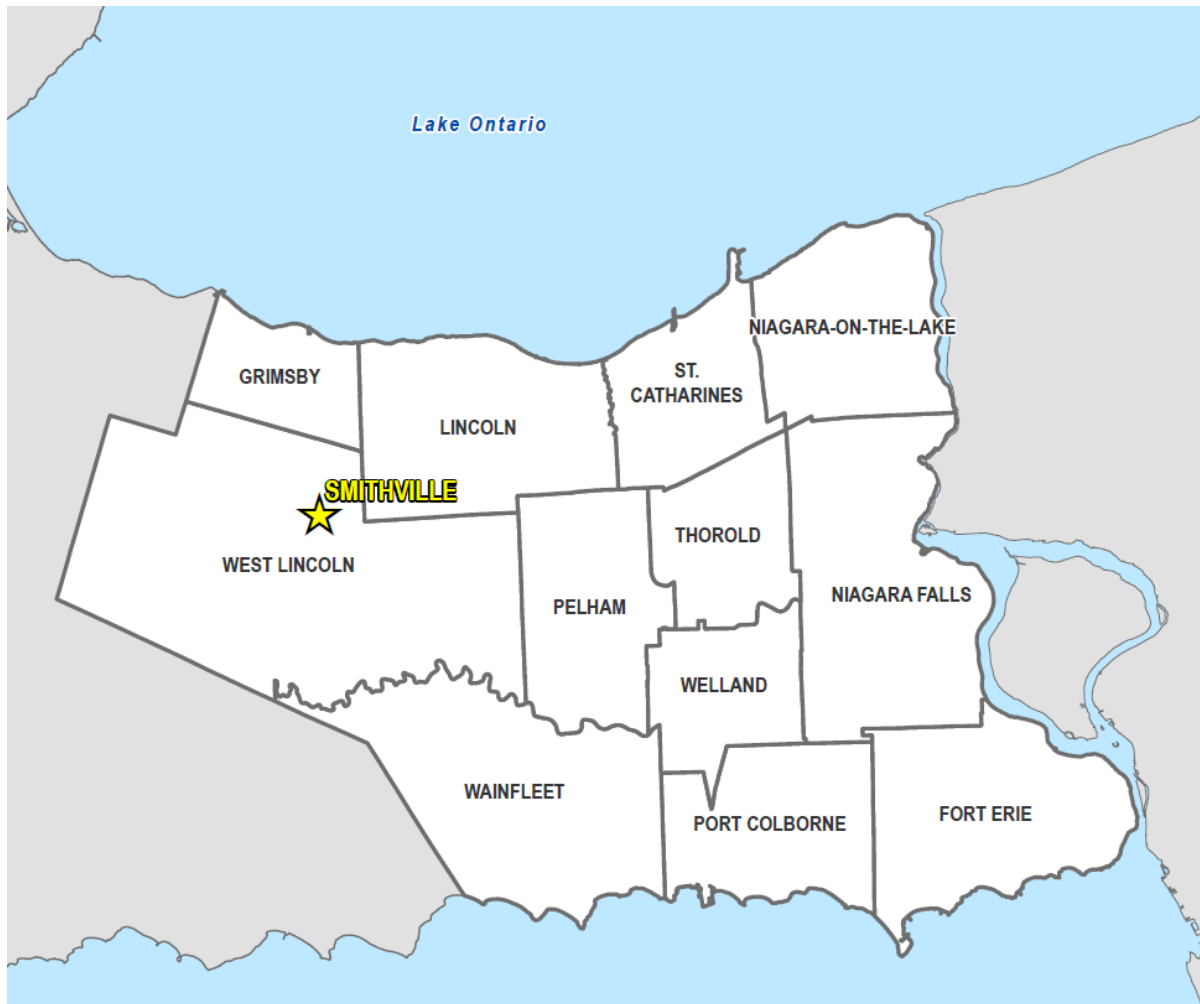
With respect to Planning Act and MCEA Integration consultation, in addition to coordinated public notices, public information centres and presentations to Township Council, agency and stakeholder consultation was also facilitated through a Steering Committee structure with representation from Township and Niagara Region public works and planning staff, Niagara Peninsula Conservation Authority, Landowner representatives, and consultant team. In addition to the Steering Committee, a Technical Advisory Committee was formed which further spawned sub TACs that also helped focus individual disciplines. This also included a number of meetings with landowner representatives and their consultants to review the recommended servicing strategies and staging.

3 Existing Conditions

3.1 Study Area

The urban settlement area of Smithville is located within the Township of West Lincoln in the Niagara Region (**Figure 4**). Outside of the current boundaries, Smithville is surrounded by land that is rural and agricultural. Smithville is the commercial and industrial centre for the Township, in addition to housing residential, institutional, and community facility land uses.

Figure 4: Location of Smithville Within Niagara Region and the Township of West Lincoln



3.2 Background Review: Studies and Demographics

3.2.1 Studies

A number of provincial, regional, and local studies, policies, and plans were reviewed with a focus on the transportation context that would apply to Smithville. An overview of the sources reviewed is provided in the following subsections.

3.2.1.1 Provincial Sources

Provincial Policy Statement, 2020

The Provincial Policy Statement (PPS) sets the foundation and direction for land-use and development policy in Ontario. It protects the environment, resources, and public health and safety. With regard to transportation systems, Policy 1.6.7.1 outlines that the systems “should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs”.

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Office Consolidation 2020)

A Place to Grow is enabled by The Places to Grow Act, 2005 and builds off of the PPS. It focuses on growth within the Greater Golden Horseshoe relating to the economy, housing, and quality of life. The minimum intensification target for the Region within the delineated built-up areas is a minimum of 50% of all residential development. Smithville has been identified as a “Built-up Area – Conceptual” on Schedules 2, 4, 5, and 6 of the plan. In addition, within the designated greenfield areas, the Region is identified to achieve not less than 50 residents and jobs combined per hectare as the minimum density target.

Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe (2022)

The Transportation Plan for the Greater Golden Horseshoe defines a 30-year vision to 2051 for the safe and efficient movement of people and goods around the region. In particular, action number 21 identifies the need to continuing working with freight rail partners to discuss the possibility of expanding GO Rail service into a number of areas, including Niagara.

Greenbelt Plan (2017)

The Greenbelt Plan identifies the framework for land-use planning within the Greater Golden Horseshoe to protect agricultural land and ecological and hydrological features. Currently, the existing urban boundary of Smithville is located outside of the Greenbelt Area. However, the closest section of the Greenbelt Area is located on the northside of Young Street, which the proposed urban boundary expansion would be adjacent to.

3.2.1.2 Niagara Region Sources

Highlighted Niagara Region Studies:

Official Plan (Consolidated 2014)

The Niagara Region Official Plan applies to the twelve municipalities located within the Region, including the Township of West Lincoln, and guides the long-term development of the Region using objectives and policies. In relation to transportation specifically, Policy 9.B.1 outlines that the implementation of a comprehensive transportation system will be encouraged through land use planning and infrastructure investments. A new Regional Official Plan was adopted by Regional Council in June 2022 and has been forwarded to the Province’s Ministry of Municipal Affairs and Housing for approval.

Transportation Master Plan (Final Report dated October 2017)

The Niagara Region Transportation Master Plan outlines the Region’s transportation policies and programs until the year 2041. It consists of the Final Report document along with 14 background reports, including the Strategic Cycling Network Development, Transit Strategy, and the Niagara-Hamilton Trade Corridor Technical Papers.

Other Niagara Region Studies:

- Urban Design Guidelines (2005);
- Smithville Safety Study Regional Road 20 Townline Road to South Grimsby Road 6 (2010);
- Complete Streets Model Policy Handbook (2013); and
- Strategic Plan 2019-2022 (2019).

3.2.1.3 Township of West Lincoln Sources

Highlighted Township of West Lincoln Studies:

Official Plan (Consolidated July 2021)

The Official Plan of the Township of West Lincoln details policies for land use and development within the municipality. As outlined by the Official Plan, Smithville is the only urban settlement area located within the Township and currently has four secondary plans in place: the Spring Creek Heights Secondary Plan, Northwest Smithville Secondary Plan, Wade Road Secondary Plan, and Northwest Quadrant Secondary Plan. With regard to transportation, Section 14.1 encourages a “safe, convenient, efficient, and useable transportation system for the movement of people and goods”.

Other Township of West Lincoln Studies:

- Sustainable Downtown Smithville Community Improvement Plan (2009);
- Township of West Lincoln Parks & Recreation Master Plan (2010);
- Brownfield Community Improvement Plan (2011);
- Smithville Trails and Corridors Master Plan (2012);
- Fairgrounds Master Plan & Arena Feasibility Study (2013);
- Smithville Urban Design Manual (2016);
- Township of West Lincoln Railway Grade Crossing Safety Assessment: Final Report (2017); and
- Corporate Strategic Plan 2019-2029 (2019).

As the Smithville TMP must align with the directions of the Township and the Region, the following five documents were reviewed, in particular, to develop the Smithville TMP vision statement outlined in **Section 1.2:**

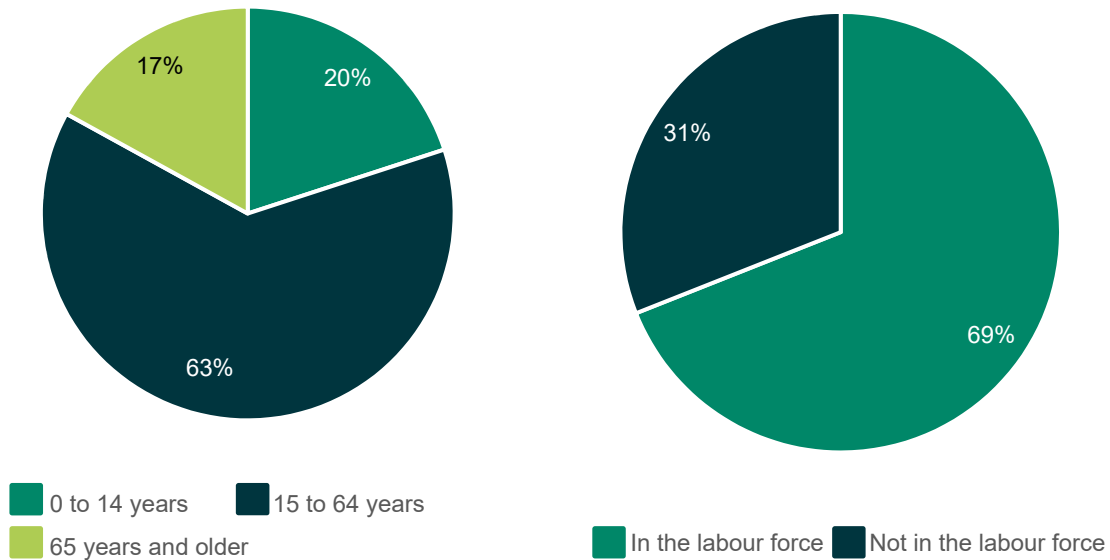
<u>Township of West Lincoln</u>	<u>Niagara Region</u>
Official Plan (Consolidated 2021)	Official Plan (2014)
Corporate Strategic Plan 2019-2029 (2019)	Transportation Master Plan (2017)
	Strategic Plan 2019-2022 (2019)

Through the review of the documents, key overlapping points in their visions and objectives were determined and then combined. While the directions from both the Township and the Region were consistent with one another, that of the Township had a heavier focus on the distinct elements of the Township, noting its small-town, rural, and community qualities specifically. These distinct elements were maintained when creating the vision, goals, and objectives for the TMP.

3.2.2 Demographics & Commuting Characteristics

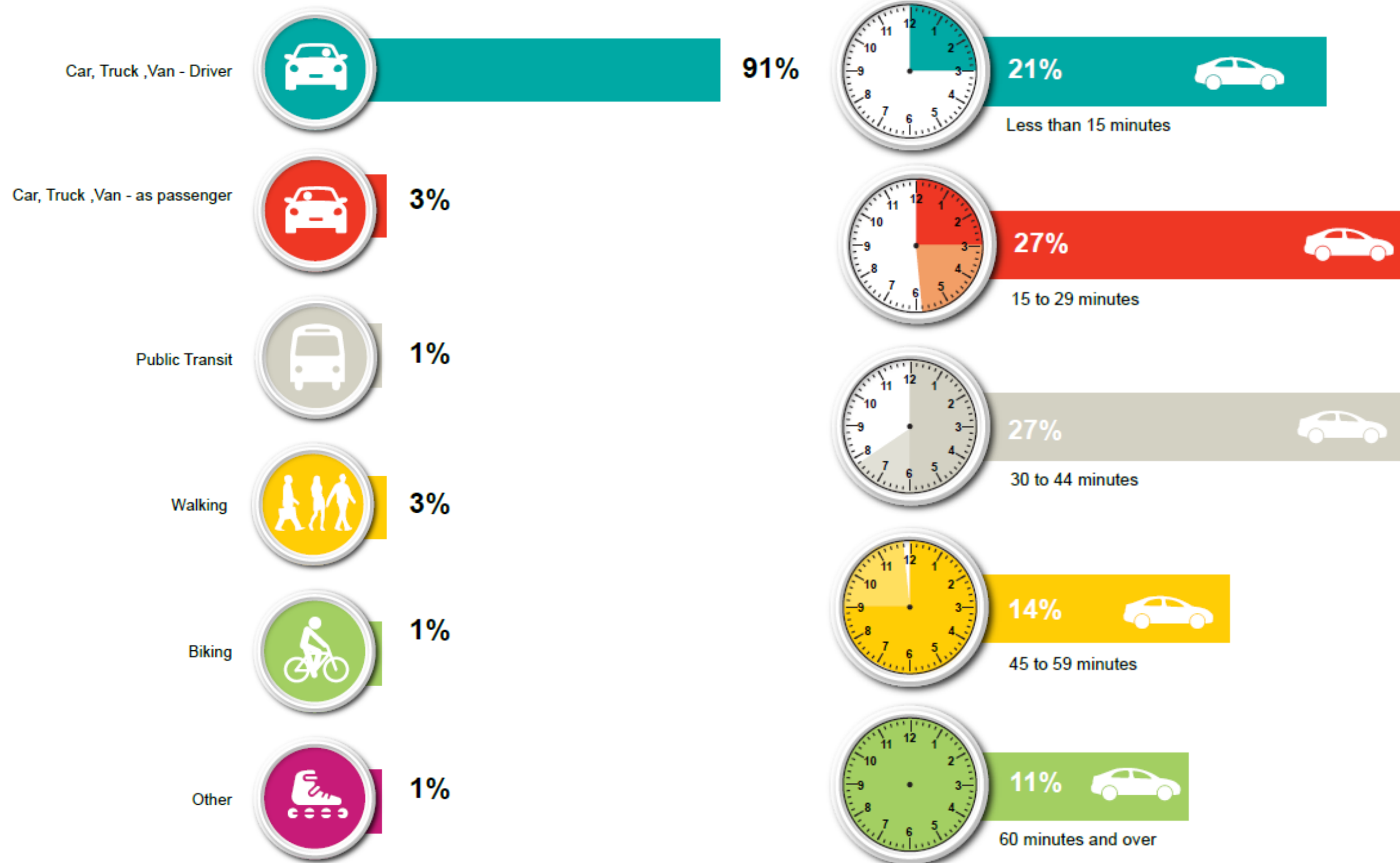
Smithville had a population of 5,489 residents in 2016. According to the 2016 census, the age group of 15-64 years old consisted of 63% of the population, followed by 0-14 years old at 20% and 65 years and older at 17%. Smithville had 1,975 jobs in 2016. The 2016 Census identifies that of the 4,435 Smithville residents that were 15 years of age and older, 3,075 were in the labour force (69%) and 1,360 were not in the labour force (31%) see **Figure 5**.

Figure 5: 2016 Population of Smithville by Age Group (Left); 2016 Smithville Population 15 Years and Older by Labour Force Status (Right)



91% of Smithville residents drive private vehicles as their main way to commute, followed by 3% as passengers within private vehicles, 3% walking, and 1% biking. Transit and other modes of transportation represent 1% of mode choices for each. While it is evident that the majority of commutes for Smithville residents are completed by driving a private vehicle, the duration of their commutes varies. Commutes less than 15 minutes and commutes 60 minutes and over accounted for 21% and 11% of the distribution, respectively. Commutes of 15-29 minutes and 30-44 minutes accounted for the majority of the distribution at 27% each. This information indicates that the majority of Smithville residents in the labour force commute outside of the community for work, assuming that all private vehicle trips that start and end within the urban boundary could be completed within 15 minutes (**Figure 6**).

Figure 6: Main Methods of Commuting (Left) and Duration of Commutes (Right) for Smithville Residents



3.3 Existing Transportation Conditions

3.3.1 Existing Roads

The main roadways into Smithville are Regional Road 20 and Regional Road 14, which intersect at the centre of the community. Within and outside of the current urban boundaries of Smithville, there are four roadway classifications present: arterial, township arterial, collector, and local roads. The roads within the existing urban boundary of Smithville are typically two-lane roads with stop-controlled or uncontrolled intersections. In addition, Canadian Pacific Railway's (CPR) Hamilton Subdivision, which currently carries freight services, also crosses through the settlement area. Within the community, there are:



Two Signalized Intersections

- Regional Road 20 (St Catharines Street), Regional Road 14 (Griffin Street), and Regional Road 14/Regional Road 20 (Griffin Street North); and
- Regional Road 20 (West Street), Regional Road 14 (Station Street), and Regional Road 14/Regional Road 20 (Griffin Street North)



Two Roundabouts

- Regional Road 20 and Townline Road; and
- Regional Road 20 and South Grimsby Road Six



Three At-Grade Rail Crossings

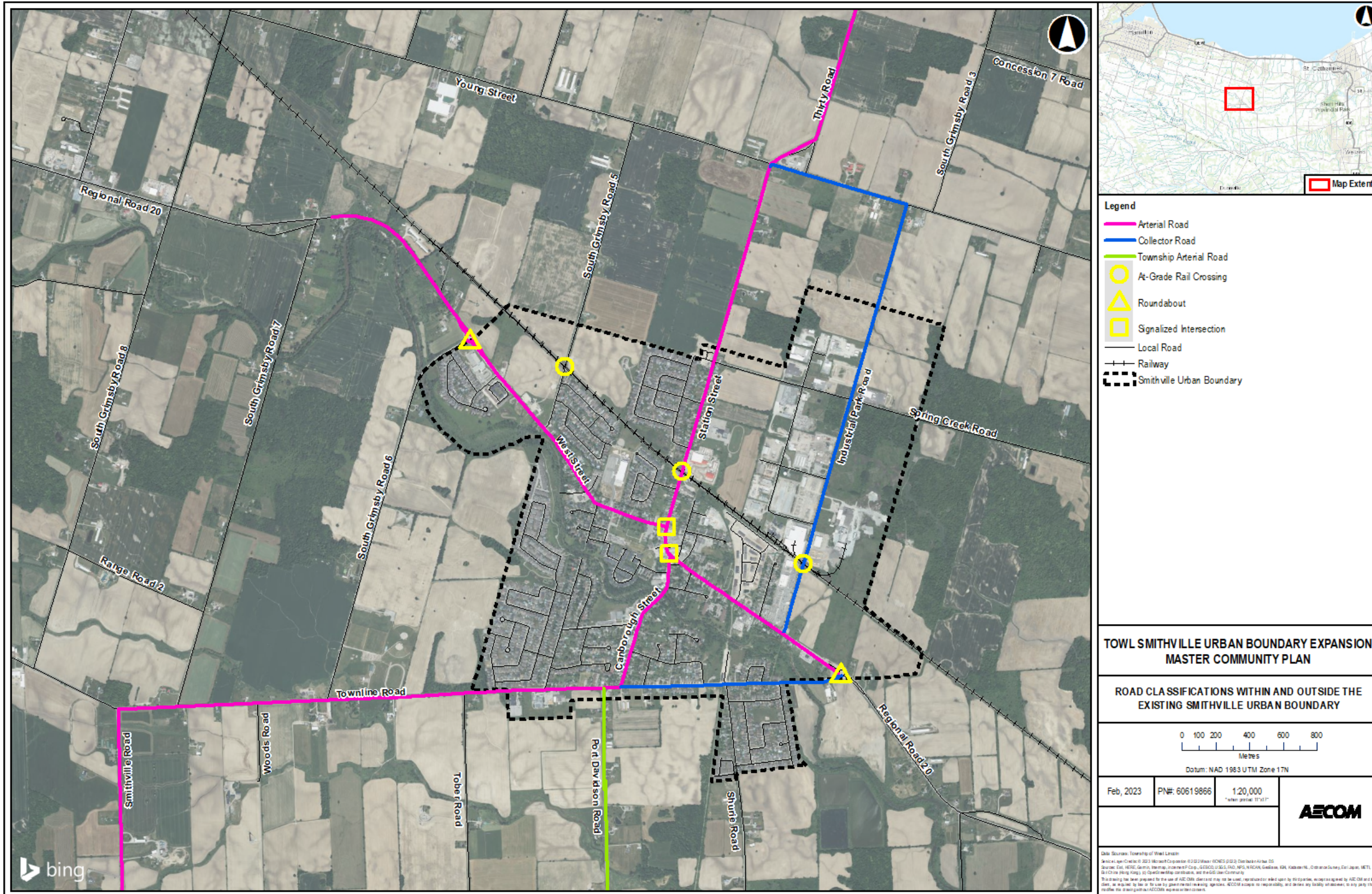
- South Grimsby Road 5 (Local Road);
- Regional Road 14 (Arterial Road); and
- Industrial Park Road (Collector Road)

Refer to **Figure 7** for the locations of arterial, township arterial, and collector roads within Smithville. All other roads within the Smithville urban boundary are classified as local roads.

Highlighted Studies - Roads

- ✓ Official Plan of the Township of West Lincoln
 - Section 14.5: Policies for roads and their different classifications
 - Schedule F: Infrastructure and Transportation
- ✓ Niagara Region Official Plan
 - Chapter 9.F: Policies for the regional road system
 - Road width allowances: Table 9-1

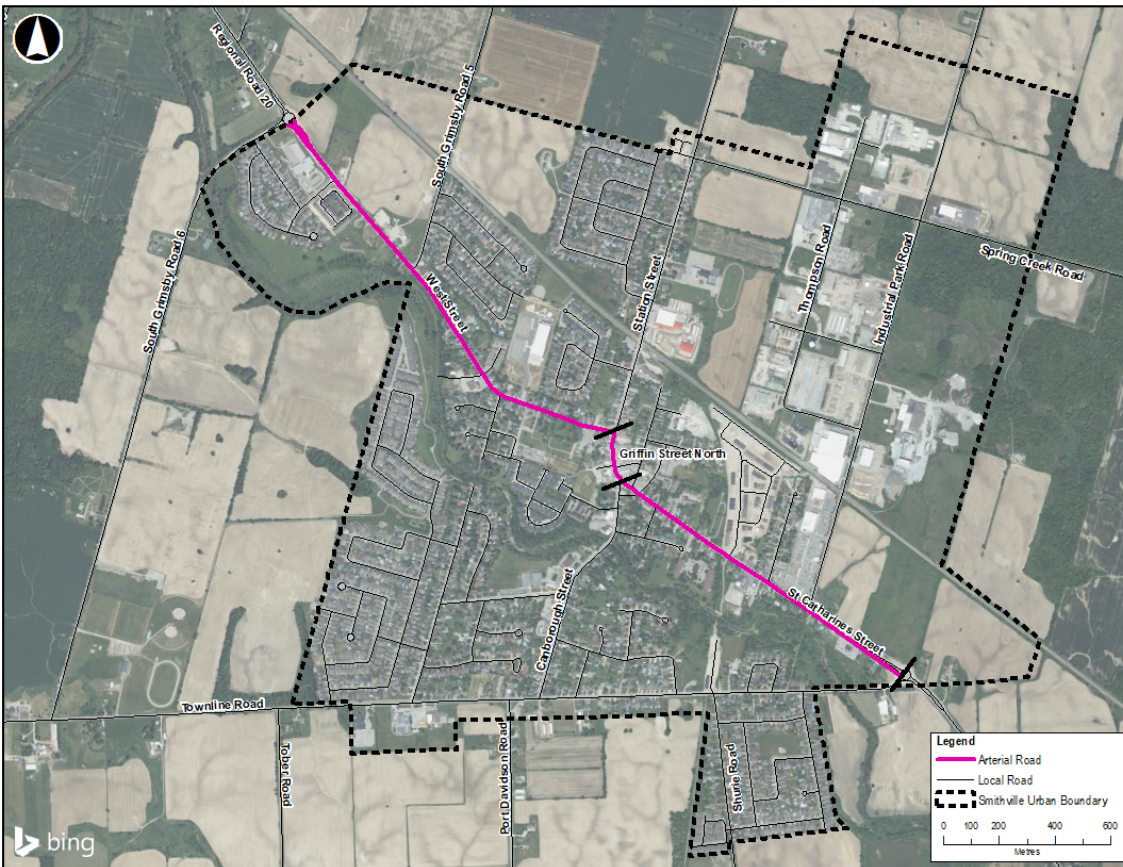
Figure 7: Existing Road Classifications



3.3.1.1 Arterial Roads

Inside Existing Urban Boundary Area

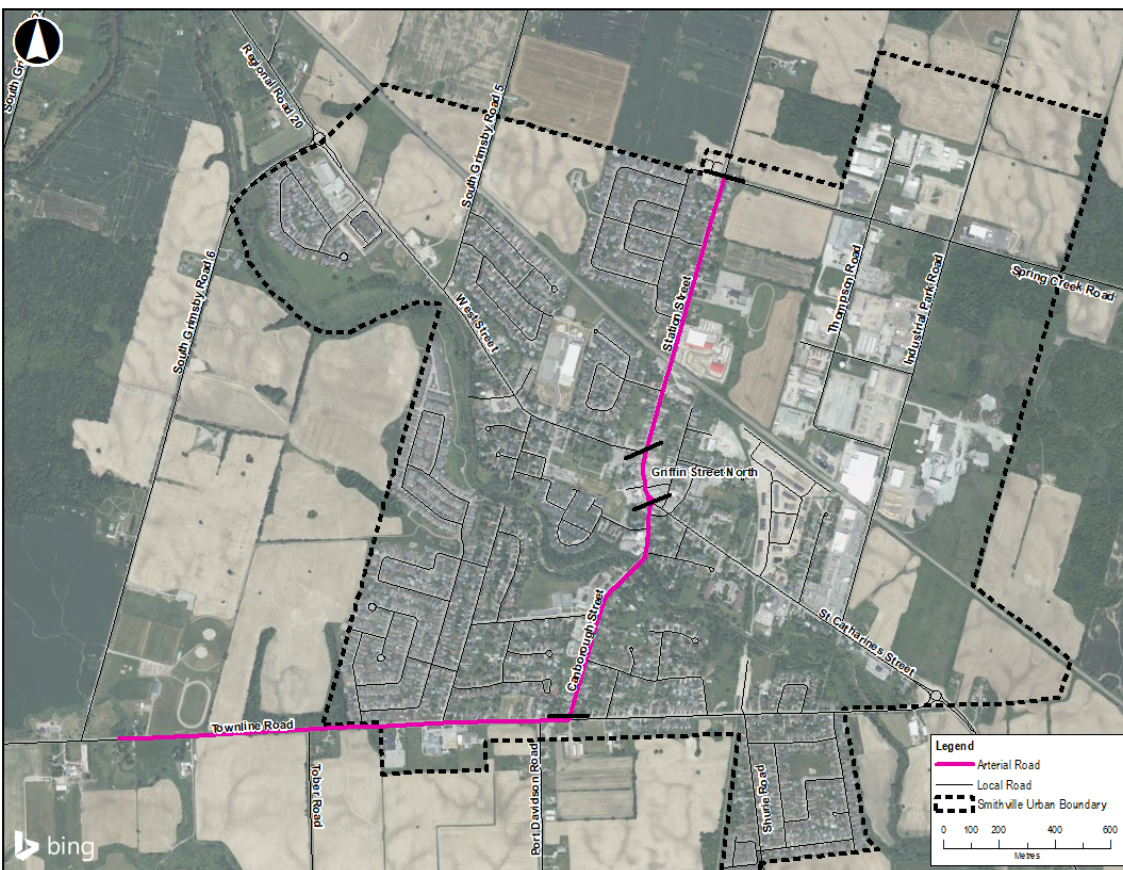
There are currently two arterial roads in Smithville, Regional Road 20 and Regional Road 14, and one township arterial road, Port Davidson Road.



Regional Road 20 Arterial Road

Regional Road 20 runs from the northwest to the southeast corner of Smithville and has a mixture of residential and commercial land uses running alongside the roadway.

Locally, Regional Road 20 is referred to as West Street, Griffin Street North, and St. Catharines Street.

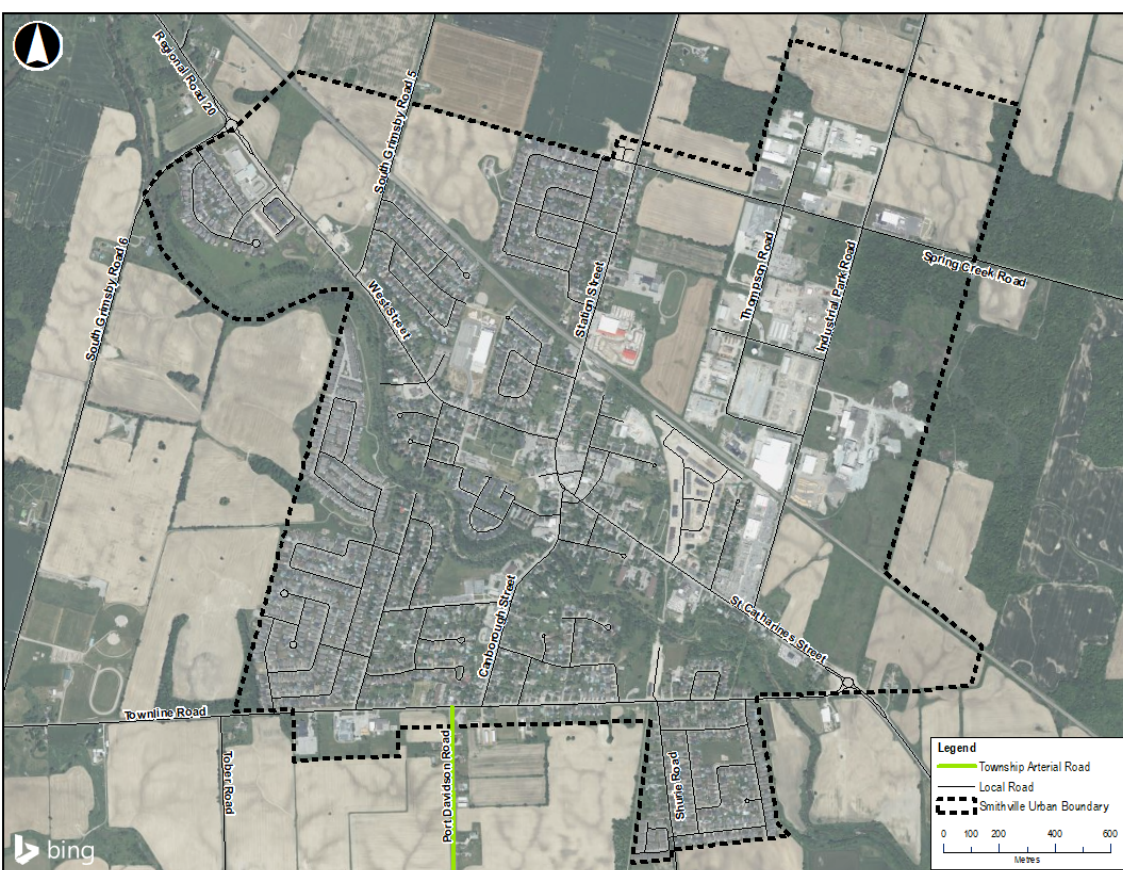


Regional Road 14 Arterial Road

Regional Road 14 runs from the north to the south of Smithville before turning west at Townline Road. Within the existing urban boundary, Regional Road 14 consists of residential, commercial, and institutional land uses.

There is an at-grade rail crossing on Regional Road 14 north of Regional Road 20.

Locally, Regional Road 14 is referred to as Station Street, Griffin Street North, Griffin Street, Canborough Street, Townline Road, and Smithville Road.



Port Davidson Road Township Arterial Road

Port Davidson Road originates at the southern edge of Smithville by connecting to Regional Road 14. Only a short section of Port Davidson Road is currently located within the existing urban boundary.

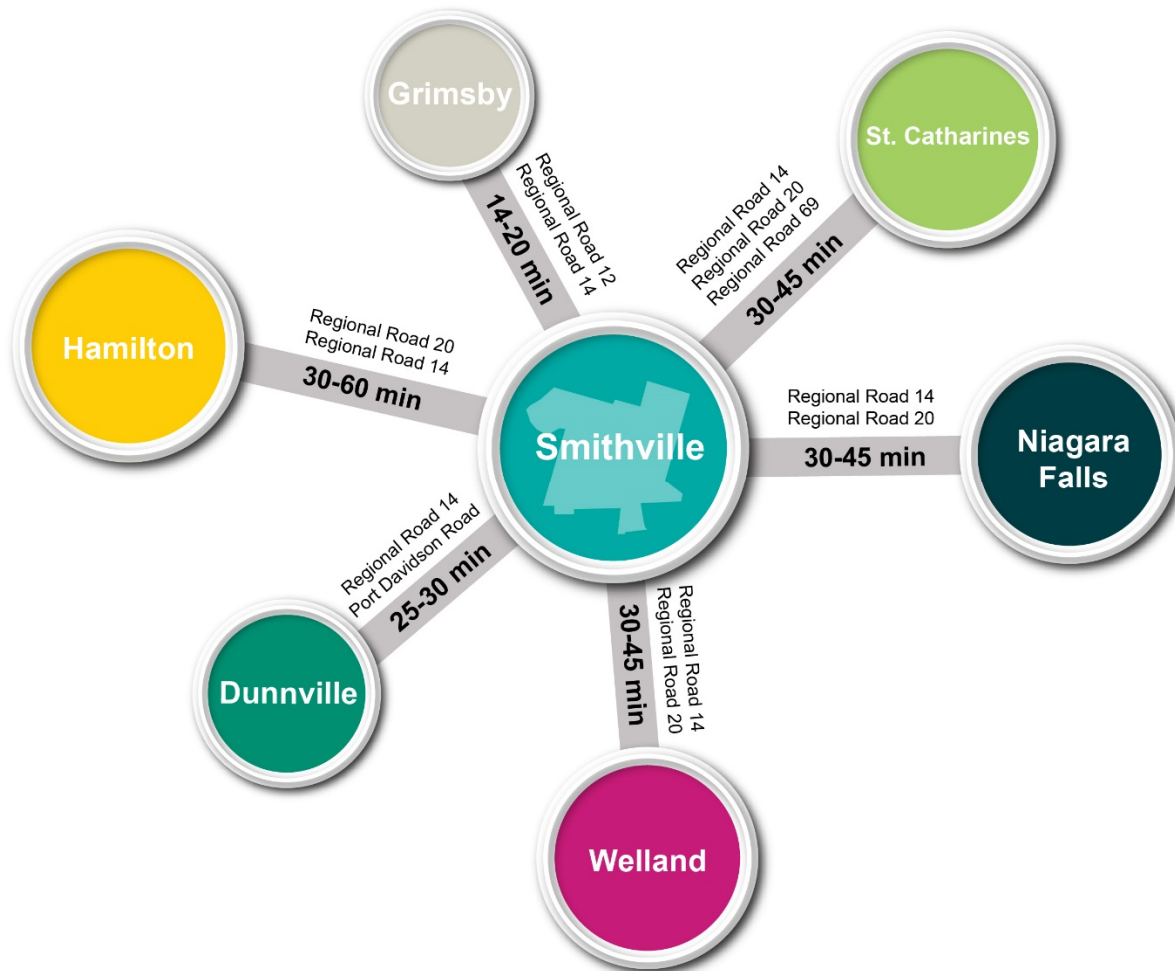
Agricultural land uses currently run alongside Port Davidson Road.

Outside Existing Urban Boundary Area

The three roads of Regional Road 20, Regional Road 14, and Port Davidson Road all continue throughout the Township with the same road classifications as within the existing Smithville Urban Boundary Area.

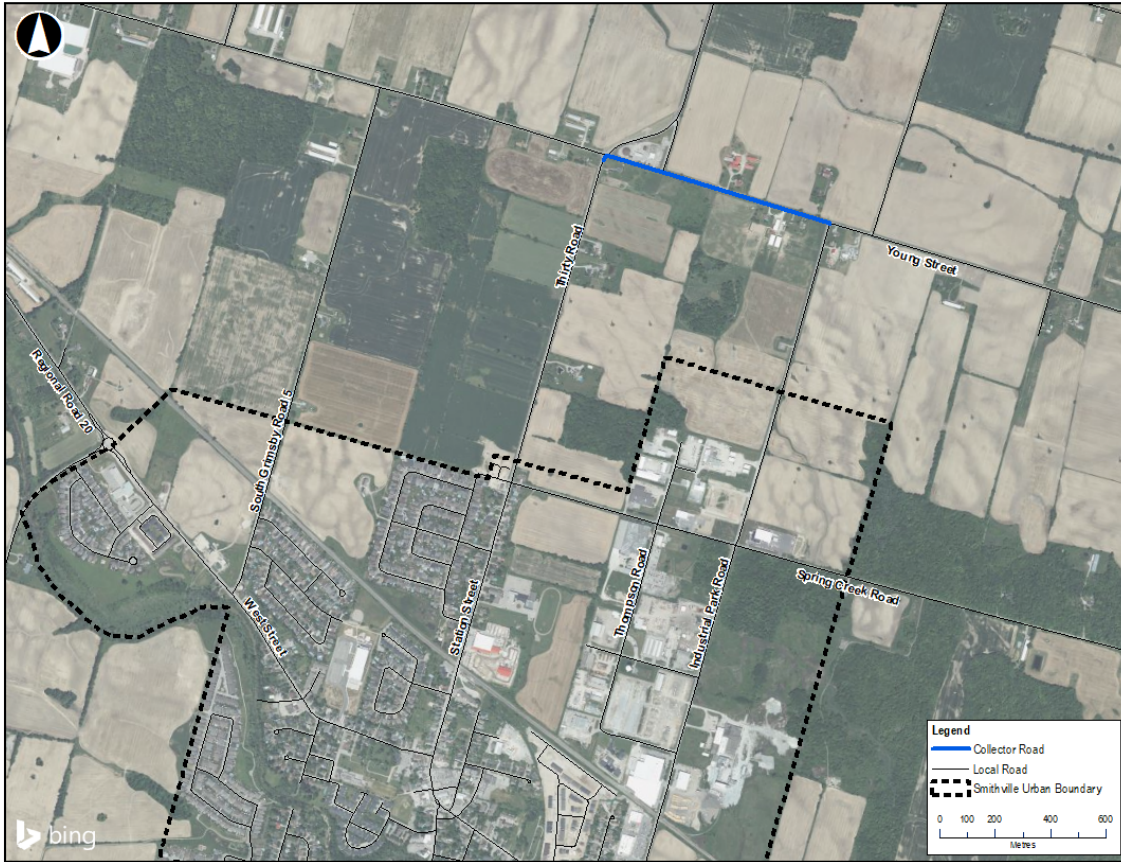
Port Davidson Road begins at the southern boundary of Smithville and runs to the southern boundary of the Township. Regional Road 20 connects Hamilton to Niagara Falls and Regional Road 14 runs from just south of Grimsby to Canborough in Haldimand County. **Figure 8** outlines the approximate driving times from Smithville to surrounding municipalities. This information was gathered from Google Maps and considered driving times for different hours of the day. As the figure shows, all of the destinations use at least one of the two arterial roads which run through Smithville.

Figure 8: Approximate Driving Times from Smithville to Surrounding Municipalities



3.3.1.2 Collector Roads

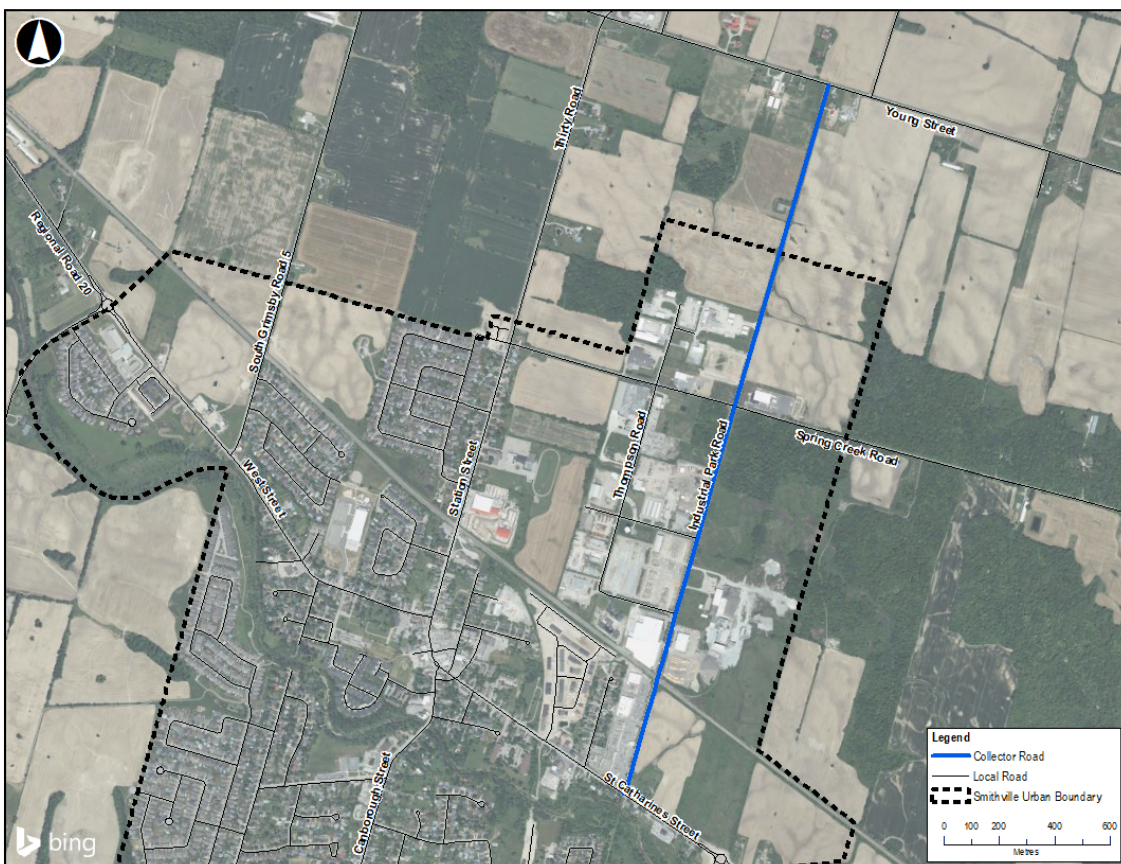
There are currently two collector roads within the existing Smithville urban boundary (Industrial Park Road and Townline Road) and one outside of the limits (Young Street).



Young Street Collector Road

Young Street runs east to west and is north of the Smithville's urban boundary expansion area for Smithville.

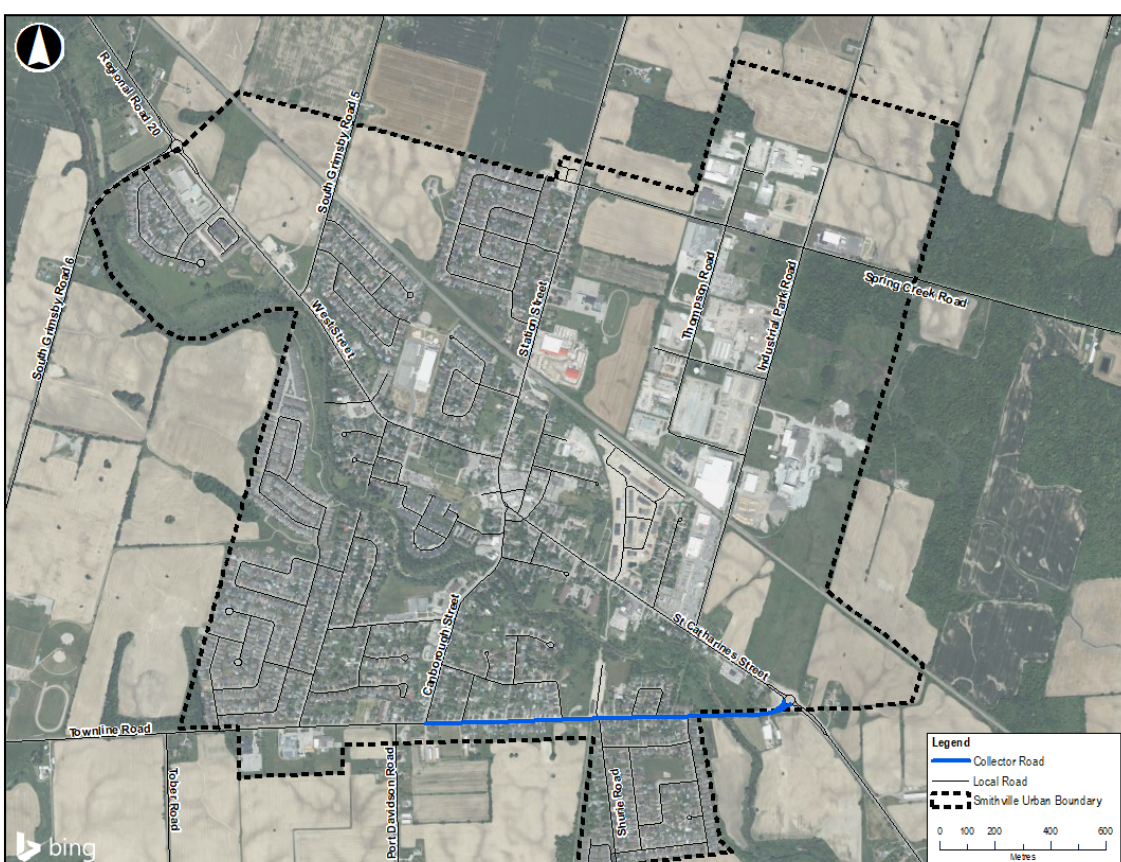
Agricultural land uses run alongside Young Street.



Industrial Park Road Collector Road

Industrial Park Road runs north to south on the eastern edge of Smithville. The majority of development along Industrial Park Road is on the western side of the roadway, consisting of industrial and commercial land uses.

There is an at-grade rail crossing on Industrial Park Road north of Regional Road 20.



Townline Road Collector Road

Townline Road is located in the southeastern corner of Smithville and runs east to west. Residential land uses line the length of the roadway.

West of Canborough Street, Townline Road turns into Regional Road 14 and is classified as an arterial road.

3.3.1.3 Local Roads

Aside from the arterial, township arterial, and collectors roads, all other roads within the existing Smithville urban boundary are classified as local roads. Most of the local roads have residential land uses that run alongside them.

3.3.2 Existing Vehicular Parking

Parking in Smithville currently consists of on-street parking and parking within municipal and private parking lots. The types of parking and their locations are outlined in this subsection.

3.3.2.1 On-Street Parking

Along select roads within Smithville, there are designated parking locations either as spaces or parking lanes along the roadway. **Table 1** outlines locations within Smithville where on-street parking is indicated by designated parking spaces. All of these designated parking spaces are in key community locations; including Downtown Smithville and in front of the Township of West Lincoln City Hall.

Table 1: List of On-Street Parking – With Spaces in Smithville

Road	Location on Road	Number of Spaces	Notes
Regional Road 14/20 (Griffin Street North)	Between West Street and McMurchie Lane	12 in total (8 on west side of street (2 of which are accessible parking spaces), 4 on east side of street)	2-hour parking signage posted.
Regional Road 14 (Griffin Street)	Between Frank Street and Smits Cove	9 total (4 on west side of street, 5 on east side of street)	2-hour parking signage posted. Spaces are provided through curb cut-outs
Smits Cove	South side of road	5	No signage
Regional Road 14 (Canborough Street)	South of Colver Street, in front of the Township of West Lincoln City Hall	6 (all on the west side of the street)	15-minute parking signage posted. Spaces are provided through curb cut-outs
Convenient Street	Full Length of Road	36 total (2 of which are accessible parking spaces)	No parking restriction signage. Angled parking spaces along the full length on this street

As noted, there are also designated parking locations within Smithville that are indicated by a solid white parking lane. This parking lane is predominately in front of residential dwellings. **Table 2** outlines the locations of the parking lanes within Smithville.

Table 2: List of On-Street Parking - With Parking Lanes in Smithville

Road	Location on Road	Notes
Regional Road 14 (Station Street)	In front of Smithville Canadian Reformed Church	Signage not identified.
Regional Road 20 (St Catharines Street)	North: College Street to Dennis Drive South: South Street to just east of Dennis Drive	2-hour on-street parking signage posted in front of Smithville Pharmacy, but no parking lanes
Townline Road	Between Canborough Street to just east of Alma Drive. Located on the south side of Townline Road.	Signage not identified.

3.3.2.2 Parking Lots

Compared to on-street parking which would be along the public roadway, many of the parking lots within Smithville are for private companies. There are, however, parking lots available to park at public recreation locations and for general public use, as outlined in **Table 3**. The Township of West Lincoln City Hall and Smithville Public School were not included within this table.

Table 3: Parking Lots for Public Use Within Smithville

Roadway	Location	Notes
Regional Road 20 (West Street)	West Lincoln Community Centre	N/A
Corner of South Grimsby Road Six and Regional Road 14 (Smithville Road)	Leisureplex Park	Currently outside of the Smithville Urban Boundary Area
Townline Road	Rock Street Park	N/A
Convenient Street	Convenient Street	Municipal Lot identified by a green parking circle sign
Corner of Regional Road 20 (St Catharine Street) and Brock Street	N/A	Municipal Lot identified by a green parking circle sign
Regional Road 20 (West Street)	Smithville United Church	Public parking permitted ¹

As evident, three of the six public parking lots are related to recreational uses, and five of the six border an arterial roadway. In addition, the parking lots range in size and type of infrastructure. For example, the parking lot at the West Lincoln Community Centre is large in area and paved, while the parking located at Rock Street Park consists of a small gravel lot. In addition, while not a municipal lot, members of the public can park at Smithville United Church, the entrance of which is located off of Regional Road 20 (West Street).

In comparison, the number of private parking lots within Smithville is much higher, ranging from large, paved lots to small parking areas behind retailers in the downtown core. Some of these lots are shared by

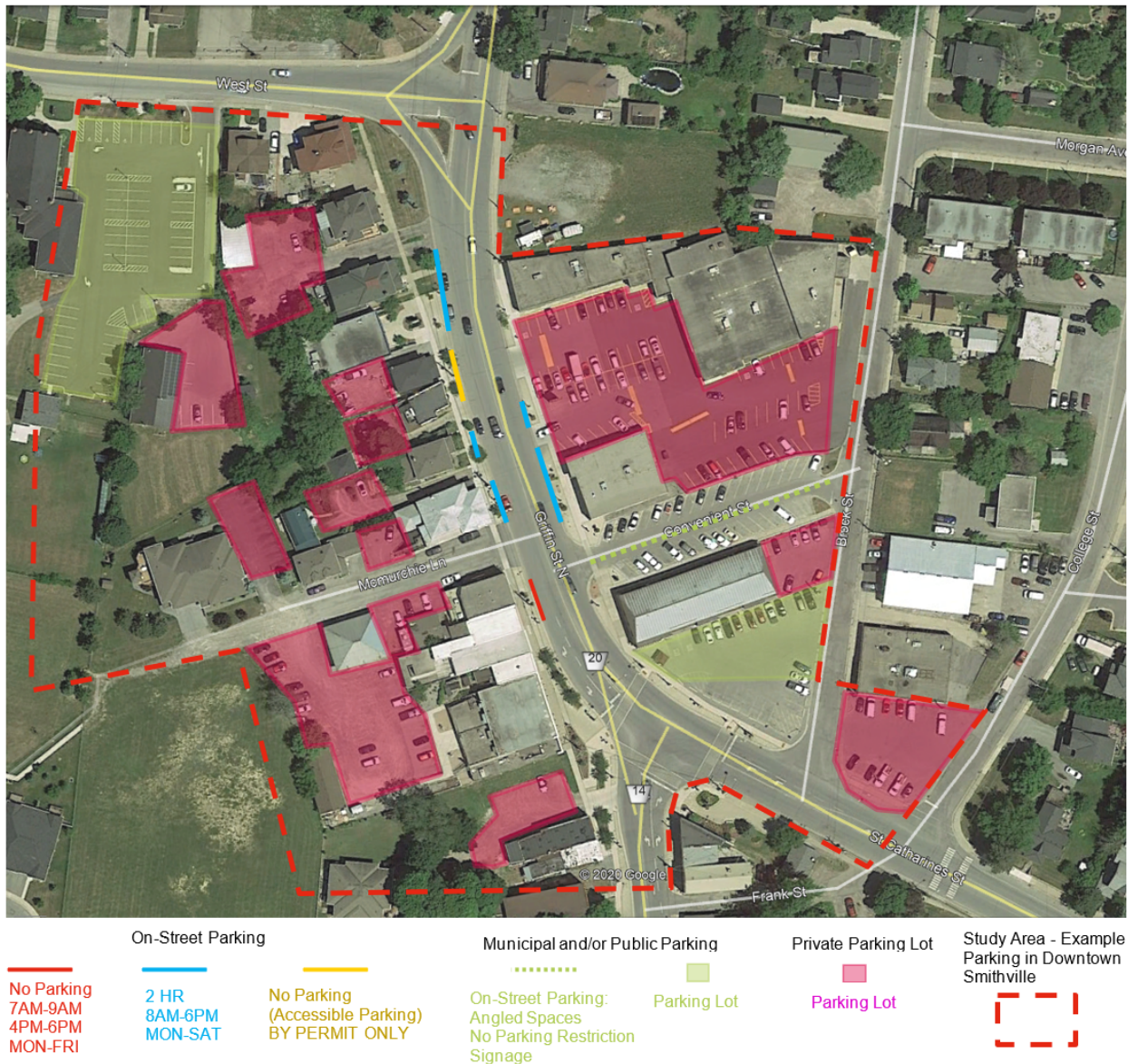
¹ Grimsby Lincoln News (2017). Smithville United Church lots opens as public parking. Retrieved from <https://www.niagarathisweek.com/news-story/7407784-smithville-united-church-lot-opens-as-public-parking/>

multiple businesses (such as in the Foodland plaza) while others have dedicated lots for individual businesses (such as the Smithville Animal Hospital at the corner of Regional Road 14 and Port Davidson Road).

3.3.2.3 Parking Example – Downtown Smithville

Figure 9 shows the location of parking facilities surrounding Griffin Street North in downtown Smithville, consisting of mixture of on-street parking and municipal and private parking lots. As evident, the majority of the parking facilities are at private properties which consist of commercial or residential land uses.

Figure 9: Existing Parking Locations in Downtown Smithville



3.3.3 Existing Active Transportation

This section outlines the existing active transportation infrastructure that is in place for cyclists and pedestrians within and just outside the current Urban Boundary Area for Smithville.

Highlighted Studies – Active Transportation

- ✓ Official Plan of the Township of West Lincoln
 - Section 14.7 “Alternative Modes of Transportation” and Section 14.8 “Pedestrian and Bicycle Trails”
- ✓ Niagara Region Official Plan
 - Chapter 9.D: Active transportation policies
 - Schedule E2: Strategic Cycling Network
- ✓ Niagara Region Transportation Master Plan
 - Strategic Cycling Network Development Technical Paper
 - Map 3 of the Final Report

3.3.3.1 On-Street Cycling Facilities

The on-street cycling facilities indicated by pavement markings and/or signage within Smithville are shown in **Figure 10** and summarized in **Table 4**. As outlined in Ontario Traffic Manual (OTM) Book 18 Cycling Facilities, pavement marks and signs are important to communicate regulatory information, assist in wayfinding, and delineate between shared and dedicated cycling space.

According to the Strategic Cycling Network that is outlined within the Region’s TMP Final Report, existing cycling facilities within Smithville extend beyond those marked with pavement markings and signs and include:

- Regional Road 20 west of the Township of West Lincoln Community Centre to just west of the existing urban boundary;
- Regional Road 14 from north of the rail corridor to Mud Street East outside of the urban boundary; and
- Regional Road 14 from Townline Road to Griffin Street North.

Table 4: On-Street Bike Lanes within Smithville

Street Name	Boundaries of Bike Lanes	Notes
Regional Road 20 (West Street)	From South Grimsby Road 6 to approximately 160m east of South Grimsby Road 5	Bike lanes on both sides of the road with pavement markings and signs indicating where bike lanes begin and end
Region Road 20 (West Street)	From Wade Road to Griffin Street North	Bike lanes on both sides of the road with pavement markings and signs indicating where bike lanes begin and end
Regional Road 20 (St Catharine Street)	North: Between Dufferin Street to Townline Road South: just east of Dennis Drive to Townline Road	Bike lanes on both sides of the road with pavement markings and signs indicating where bike lanes begin and end
Regional Road 14 (Griffin Street and Canborough Street)	Smits Cove to Townline Road	Bike lanes on both sides of the road, indicated by pavement markings

3.3.3.2 Trails

A total of five trails were identified to be located within, or just outside, of the current Smithville urban boundary. Refer to **Figure 10** for the locations of the trails within Smithville and **Table 5** for a summary of their lengths, access points, and destinations. The trails range from providing recreation opportunities, such as the South Creek Trail, to providing short connections between streets, such as between Regional Road 20 (West Street) and Autumn Circle).

3.3.3.3 Sidewalks

Refer to **Figure 11** for the sidewalk and crosswalk locations of arterial, township arterial, and collector roadways within Smithville. It was assumed that crosswalks were identified by white lines painted onto a roadway either at an intersection or at an independent location along a roadway to represent a midblock pedestrian crossing. The pink, yellow, and teal lines on **Figure 11** indicate the sections of roadways that were reviewed.

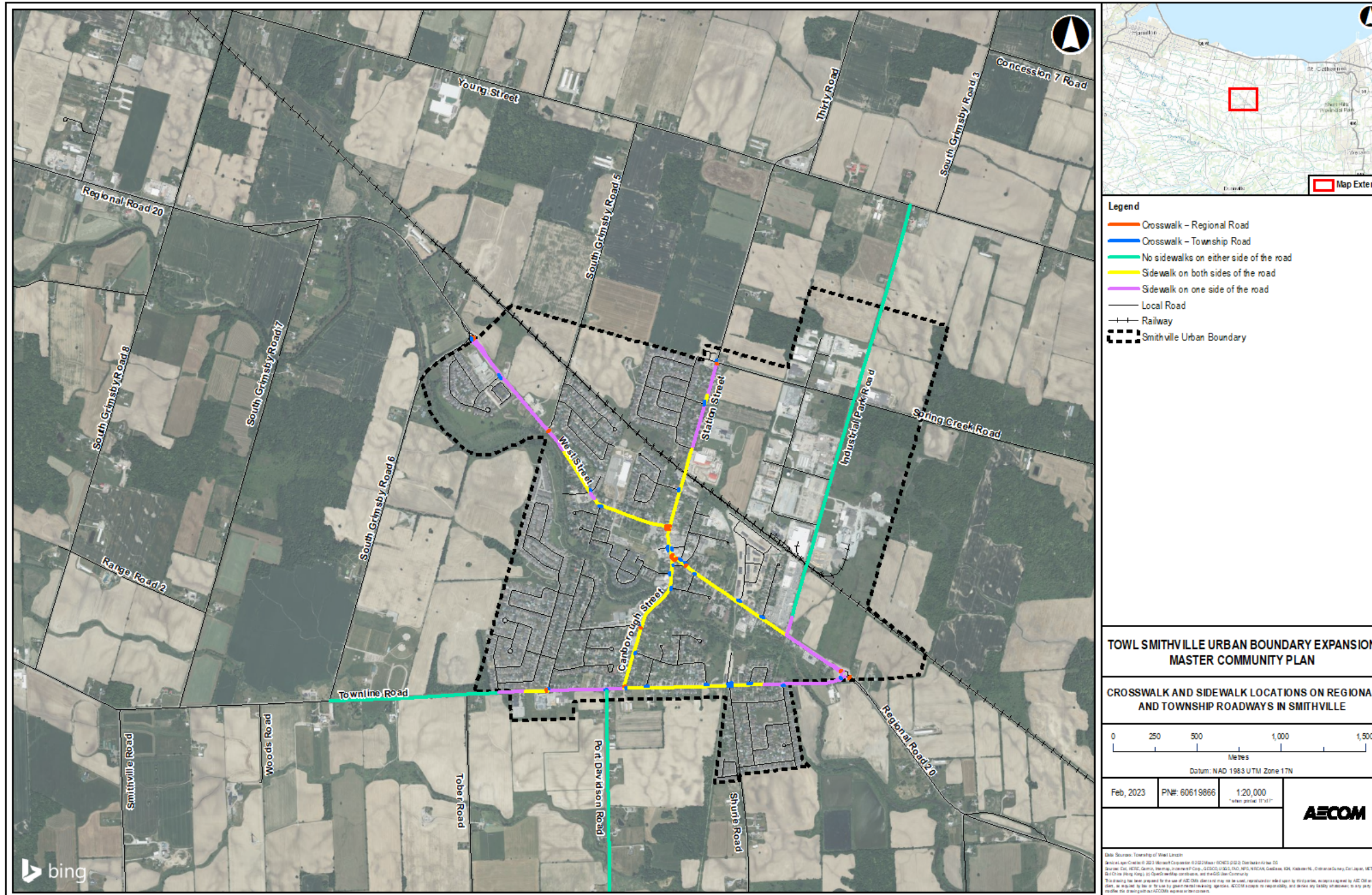
As evident, the inner area of Smithville primarily consists of sidewalks on both sides of the road, with most of the sidewalks on one side of the road being on the outer edges of the community. Industrial Park Road, Port Davidson Road, and Townline Road west of Harvest Gate do not have any sidewalks on either side of the road.

Crosswalks were not present at every intersection along the sections of arterial, township arterial, and collector roadways that were reviewed. In particular, Regional Road 14 north of Regional Road 20 and Regional Road 20 east of Regional Road 14 had almost no crosswalks present to allow pedestrians to cross from one side of the Regional roads to the other. Pedestrian crossings with push buttons included the crossings at the two signalized intersections within the community as well as the intersection of Regional Road 20 (West Street) and Grimsby Road 5 which had flashing lights and "Stop for Pedestrians" signage.

Table 5: Trails in Smithville

Trail	Estimated Total Length	Access Points	Destinations	Description
Leisureplex Trail	1 km	Forestview Court, Oakdale Boulevard, Leisureplex Park	Residential communities, Leisureplex Park, Anastasio Estates Park (playground)	Well-defined trail running through an open area in between agricultural fields, connecting residential area with Leisureplex Park. Few trees are in close vicinity. The trail is partially on private lands and is maintained as a trail through an agreement between the Township and property owner. Trail estimated to be 1.5m-2.5m in width, depending on section of trail.
South Creek Trail	950 m	Brookside Terrace (x2), Manorwood Drive / Oakdale Drive, Wade Road (x2)	Residential communities	Connects Wade Road by a bridge over Twenty Mile Creek. Trail is located between Twenty Mile Creek and the back of residential dwellings. Trail estimated to be 2m-4.5m in width.
Canborough Street- Ellis Street	200 m	Regional Road 14 (Canborough Street), Ellis Street	Residential communities	Signage is posted at the start of the trail on both ends. Trail estimated to be 2m-2.5m in width. Half of trail surrounded by large trees.
Swayze Court- Westlea Drive and West Lincoln Community Centre	150 m and 370 m	Swayze Court, Westlea Drive, West Lincoln Arena and Community Centre, Regional Road 20 (West Street)	Residential communities, West Lincoln Arena and Community Centre	Connector trail between Swayze Court and Westlea Drive. Trail from Swayze Court and Westlea Drive connector trail to Regional Road 20 (West Street).
West Street- Autumn Circle	80 m	West Street- Autumn Circle	Residential communities	Connector trail between West Street and Autumn Circle.

Figure 11: Crosswalk and Sidewalk Locations of Arterial and Collector Roadways in Smithville



3.3.4 Existing Transit

Smithville is not currently served by a conventional transit system, however, residents do have access to the Niagara Region Transit (NRT) OnDemand service, enabled by a partnership with Via transit system software. The NRT OnDemand service enables riders in Grimsby, Lincoln, Pelham, Port Colborne, Wainfleet, Niagara-on-the-Lake, and West Lincoln to travel around the Region by requesting a trip through the NRT OnDemand Transit App or by telephone. Riders within West Lincoln are only able to travel between other lower-tier municipalities and are unable to request trips within the Township at this time. However, this provides riders with an opportunity to connect with conventional transit systems to extend their journeys within the Region and beyond. In May 2022, Niagara Region Council voted to create a consolidated transit commission for the Region.

In addition, components of local and regional studies do support public transit in Smithville if and when it were to be implemented, as outlined in the below “Highlighted Studies – Transit” information box.

Highlighted Studies – Transit

- ✓ Official Plan of the Township of West Lincoln
 - Section 6.11.5.3.ii.b. acknowledges that transit-supportive development is a component of the Northwest Quadrant Secondary Plan
- ✓ Smithville Urban Design Manual
 - Defines Smithville as needing to become “transit-ready”
- ✓ Niagara Region Official Plan
 - Chapter 9.C: outlines public transit policies
- ✓ Niagara Region Transportation Master Plan
 - Transit Strategy Technical Paper

4 Future Transportation Needs

An overview of Smithville's future transportation needs is provided below. It includes discussion on the forecasted growth for the community, the interconnection between the urban boundary expansions and transportation, and planned regional projects. This section also provides a methodology for determining the gaps in the community's active transportation network, details the results of the community engagement process, and presents the opportunities and challenges associated with the urban expansion area for Smithville in relation to the transportation network.

4.1 Urban Boundary Expansion and Forecasted Growth

Smithville is anticipated to grow substantially in the coming years as a result of the growth planned in the Region's new draft Official Plan and the Growth Plan for the Greater Golden Horseshoe. The Township initiated an urban boundary expansion study, known as the Master Community Plan, to address this forecasted growth.

The MCP for Smithville envisions a community that is complete, healthy, compact, and resilient. Overall, the MCP assesses potential land for the urban boundary expansion and considers how this area could be developed for a variety of land uses and to what density target. This plan is comprised of multiple studies, including the Subwatershed Study, Agricultural Impact Study, Financial Impact Study, Water and Wastewater Master Servicing Plans, and the TMP (this document).

The MCP will be implemented through two amendments to the Official Plan of the Township of West Lincoln:

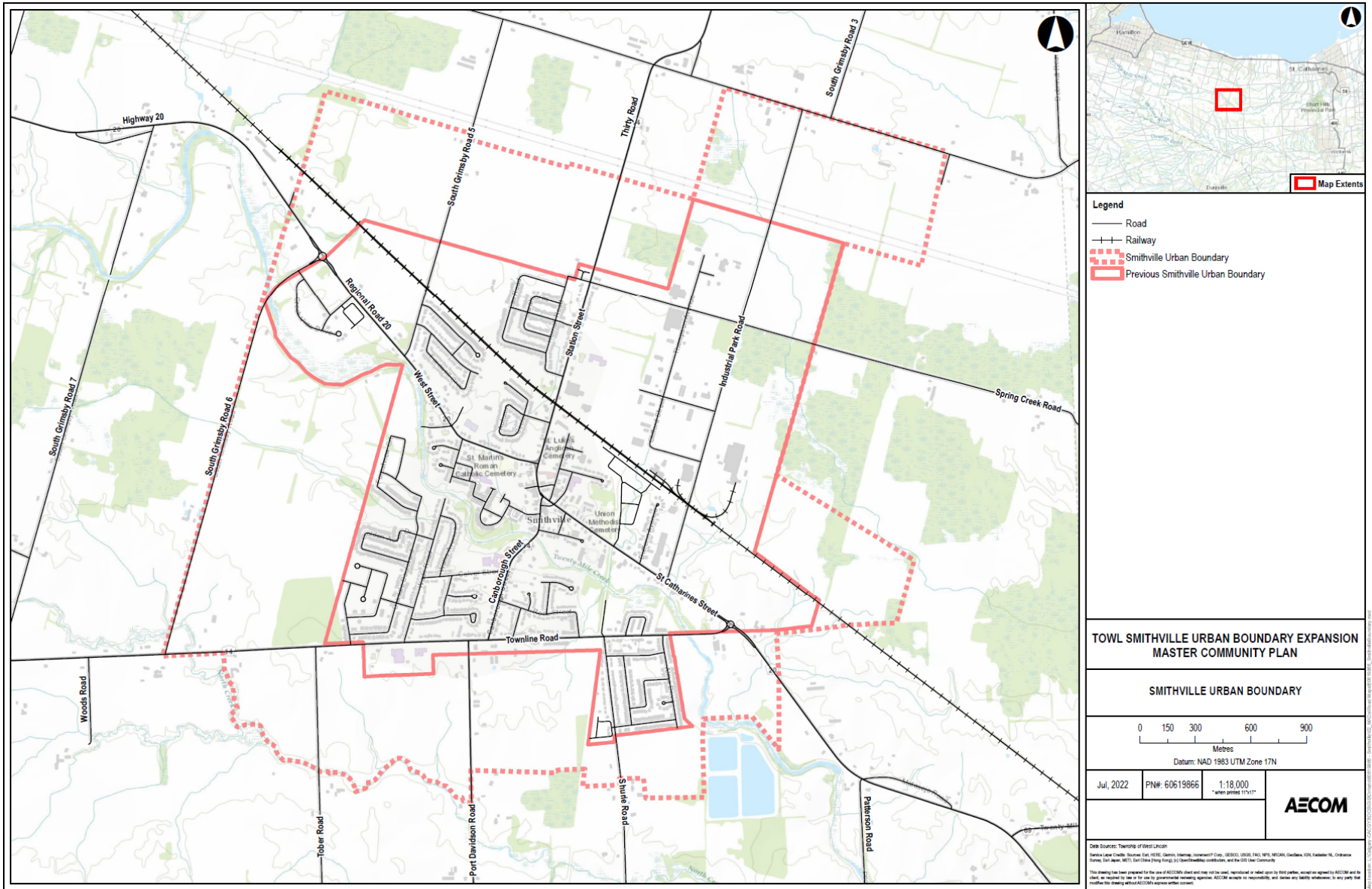
- **Official Plan Amendment No. 62 (OPA 62):** Implementing the policies and mapping updates in response to Smithville's urban boundary expansion and 2051 growth forecasts and targets; and
- **Official Plan Amendment No. 63 (OPA 63):** Implementing the objectives, policies, and mapping updates for the preferred concept for the community as well as in response to infrastructure and the natural heritage system.

An integrated Environmental Assessment (EA) Approach is being used to develop the MCP, allowing for efficiencies and for the Province's Planning Act and Environmental Assessment Act requirements to be met. As a type of Master Plan, the MCP must follow Phase 1 and Phase 2 of the Municipal Class EA process, utilizing Master Plan Approach #4. Phase 1 outlines the problem or opportunity, and Phase 2 determines the alternative solutions and preferred solution. Consultation with the public and stakeholders is required under the Municipal Class EA and was an ongoing process throughout the MCP's development, as outlined in **Section 4.4** and **Appendix A**. The TMP was submitted as a supporting study as part of the MCP.

4.1.1 Urban Boundary Expansion

The urban area of Smithville is currently 565 hectares in size. The land included in the urban boundary expansion areas consists of approximately 540 hectares and would extend Smithville's urban boundary out to South Grimsby Road 6 in the west, Young Street to the north, and along North Creek and south of Townline Road to the south. In total, the expanded Smithville Urban Boundary would total 1,105 hectares, as shown in **Figure 12**.

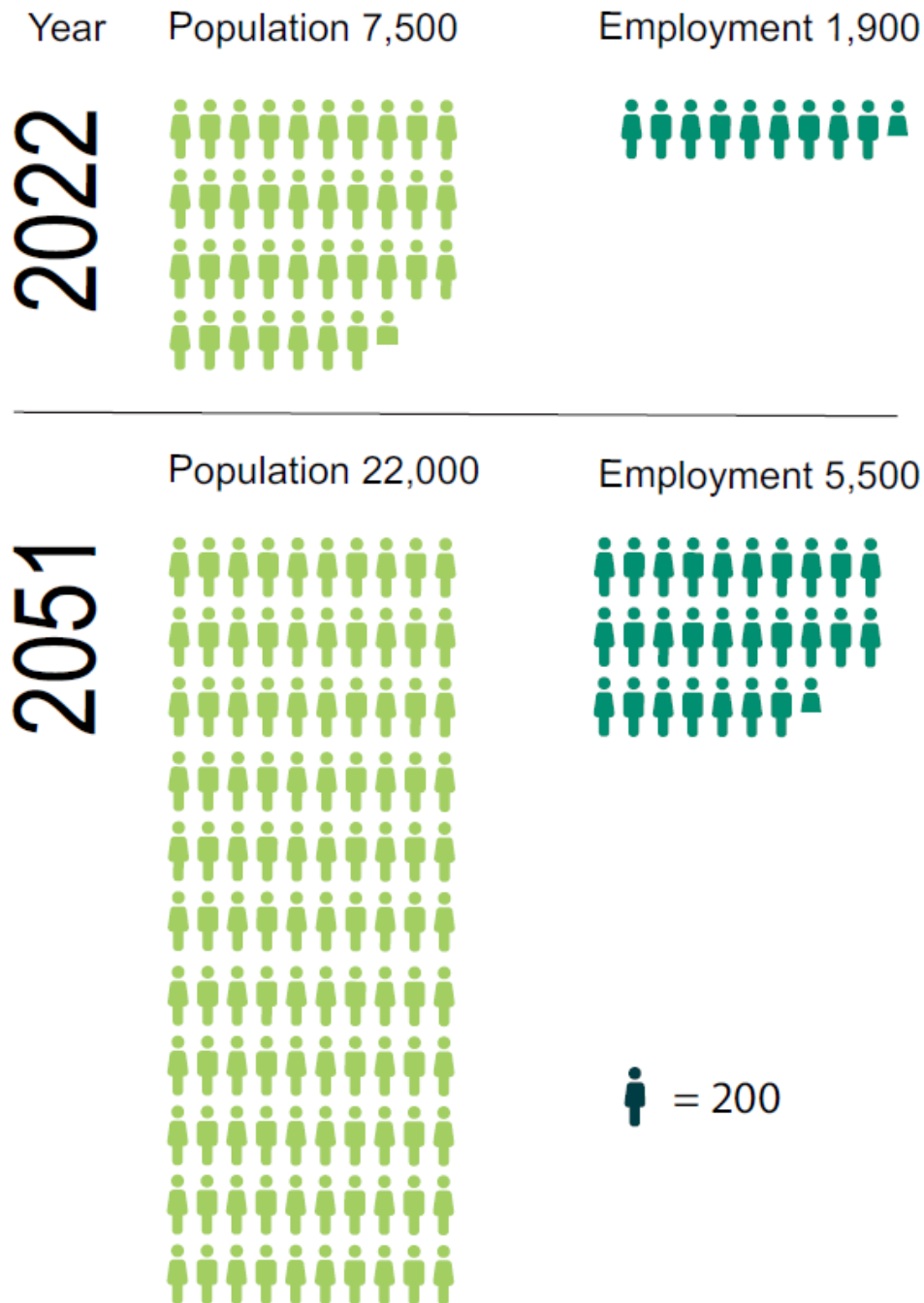
Figure 12: Smithville Urban Boundary Expansion Study Area



4.1.2 Forecasted Growth and Targets

Smithville’s urban boundary expansion study has been driven by 2051 population and employment forecasts. The forecasted population and employment of Smithville is based on growth planned in the Region’s new draft Official Plan and the Growth Plan for the Greater Golden Horseshoe. The 2022 population and number of jobs are both anticipated to increase by almost 300% by 2051; with the 2022 population of approximately 7,500 forecasted to climb to approximately 22,000 by the year 2051, and the 1,900 jobs in 2022 is estimated to grow to 5,500 jobs in 2051 (**Figure 13**). This will support the overall population for the Township, with a population of approximately 15,000 in 2022 that is expected to grow to approximately 29,000 by 2051.

Figure 13: Smithville Population and Employment - 2022 and 2051



The density target and housing growth forecasts for Smithville are summarized in **Figure 14**. The targets and forecasts influence the transportation network and the mode of travel residents and visitors select to complete their trips, concentrating new developments around the community. Transportation networks are heavily influenced by density and urban form. The denser a community is, the more compact it is; making it easier to promote sustainable modes of transportation such as active transportation and transit. The resulting impact the transportation network has on land use is also critical; for instance, parking facilities, whether it be for motorized vehicles or bicycles, are the end point of a trip or trip segment. Land is required to house such facilities and the greater the increase in population and employment, the greater the competition to secure such land.

Figure 14: Density Targets and Housing Growth Forecasts



4.2 Planned Regional Projects

4.2.1 Roads

The following are the key regional projects which could have an influence on the transportation network within Smithville.

4.2.1.1 Smithville Bypass

Within the Regional TMP Final Report, the Regional Road 20 Smithville Bypass is listed as project number 20.1 and identified for a 2022-2031 phasing. The Region has identified they would contribute approximately \$9,834,000 to the project, with the remaining two-thirds of the funding coming from alternative sources. Maps 6, 7, and 8 of the Regional TMP Final Report show the new connection being implemented north of the settlement area. In comparison, Schedule F of the Official Plan of the Township of West Lincoln identifies that the bypass may be implemented south of the settlement area.

4.2.1.2 Niagara Escarpment Crossing

To improve the operational efficiency of heavy trucks crossing the Niagara Escarpment, a 2016 study completed by the Region (Niagara Escarpment Crossing Transportation Study) included a series of recommendations for new and existing crossings. One recommendation was an extension of Bartlett Avenue, outlined in the Region's TMP Final Report as new road from Muscat Drive to Park Road in Grimsby and the escarpment crossing improvements would be through capacity improvements from the Bartlett Avenue extension to Mud Street. The two projects, with project numbers 14.1 and 14.2 respectively, are forecasted for 2022-2031. The Region would contribute approximately \$38,733,000 to the projects, which is one-third of the estimated capital cost.

The Niagara Escarpment Crossing initiatives are important to Smithville as they would support efficient north-south connections to the Queen Elizabeth Way (QEW) for goods movement and people who live and work in the community.

4.2.1.3 Niagara-Hamilton Trade Corridor

The Niagara-Hamilton Trade Corridor, as outlined in the Regional TMP Niagara-Hamilton Trade Corridor Technical Paper, would link the Canada-United States border and the Greater Toronto and Hamilton Area (GTHA). The corridor was deemed necessary to accommodate forecasted traffic on the Queen Elizabeth Freeway (QEW), providing an alternative route at the provincial level to support tourism and the movement of goods.

The Niagara-Hamilton Trade Corridor is identified as project number 461.1 in the Regional TMP Final Report and would consist of a new highway, identified for phasing between 2032-2041. In addition, while not a committed project, it is identified in Exhibit 6 of the Regional TMP Niagara-Hamilton Trade Corridor Technical Paper and Map 7 of the Regional TMP Final Report that an interim trade corridor could run through Smithville. This project would be a temporary trade corridor before the Niagara-Hamilton Trade Corridor were to be implemented, with a timeframe in the short/medium term.

4.2.2 Active Transportation

The Strategic Cycling Network identified with the Regional TMP identifies Regional capital road projects, infill links, and long-term cycling facilities within and outside of the Smithville urban boundary. Overall, the identified locations within the Strategic Cycling Network would result in the full length of arterial roads Regional Road 20 and Regional Road 14, as well as township arterial road Port Davidson Road, having cycling facilities. In particular, the Regional TMP Final Report identifies active transit infill projects to have an estimated capital cost of \$7,900,000 between 2022-2031.

4.2.3 Transit

Within the Regional TMP Final Report and Transit Strategy Technical Paper (Map 4 and Exhibit 4, respectively), it is identified that there could be inter-municipal transit that is fixed-route between Grimsby, Smithville, and Port Colborne by the year 2041. Smithville is also identified as being an area for transit connection improvements.

4.3 Active Transportation Methodology

The following subsections outline the assessment conducted to determine where gaps exist in Smithville's current active transportation system. This assessment will help to inform recommendations made later in the report, as active transportation connections to existing destinations are important to ensure the community can expand to a sustainable network.

4.3.1 Methodology

As the 2016 Census outlines, the percentage of the population using active transportation is low within Smithville, with only 3% and 1% of residents walking and cycling, respectively, as part of their main method of commuting. The following methodology will unpack the user groups within Smithville making active transportation trips, including where they are travelling to (destinations) and why (purpose).

4.3.1.1 User Groups

All ages, genders, and abilities need to be considered when planning active transportation infrastructure. According to the 2016 Census, the age group of 15-64 years old consisted of 62% of Smithville's population, followed by 0-14 years old at 20% and 65 years and older at 17%.

For cyclists specifically, OTM Book 18 defines cyclists into a number of categories:

- 1/3 of a population: Those unable to cycle or have no desire to cycle, categorized as “no way no how”; and
- 2/3 of a population: Can be either categorized as “interested but concerned” (51-56% of population); “somewhat confident” (5-9% of the population); or “highly confident” (4-7% of the population). OTM Book 18 recommends that the “interested but concerned” group be the “design group” for facilities as it consists of the largest percentage of the population and considers all ages, genders, and abilities.

4.3.1.2 Purpose of Trip

Residents of and visitors to Smithville will make active transportation trips for a number of reasons. In particular, OTM Book 18 identifies that a cycling network can be comprised of three main systems:

- **Recreational/Touring Cycling:** Key components include trails, parks, neighbourhood streets, and rural roads, all with few intersections. High-volume arterial and collector roads are typically avoided. There is less focus on destinations and more focus on the experience;
- **Local Neighbourhood Cycling:** Includes both purpose and recreational trips and connect to community amenities such as schools, libraries, and community centres; and
- **Commuter/Spine Cycling:** Directness and connectivity are key for this system which includes higher-volume roads, goes beyond the local neighbourhood, and focuses on destinations.

Overall, connectivity is important in developing active transportation networks as well as providing the shortest, most direct route for destination-focused trips.

4.3.1.3 Destinations

As outlined, travel throughout local neighbourhoods and for commuting purposes is more destination focused, whereas recreational trips are typically for the experience. The following connections between destination and purpose classifications can be made:

- **Recreational:** Parks;
 - Routes to parks can be indirect and should avoid arterial and collector roads.
- **Local neighbourhood:** Community centre, Schools; and
 - Routes to local neighbourhood attractors may be indirect or direct.
- **Commuter:** Employment area, commercial plaza, commercial core/downtown.
 - Routes to commuter destinations should be short and direct.

4.3.2 Analysis

Figure 15 and **Figure 16** outline key destinations within Smithville in relation to the existing trail, on-street cycling facilities, and sidewalk networks. **Table 6** summarizes the active transportation connections available to access the existing destinations. Overall, the majority of the destinations are accessible by the sidewalk network but not through cycling infrastructure or the trail system. This represents that while pedestrians are able to access most destinations through the sidewalk network, there is a gap in connection opportunities available to cyclists for all types of destinations.

Table 6: Connections of Existing Destinations to the Existing Active Transportation Network

Destination	Connected to Existing Cycling/Trail Network	Connected to Existing Sidewalk Network
Recreational Destinations		
Streamside Park	✗	✓
Anastasio Park	✓	✓
Harvest Gate Park	✗	✓
Hank MacDonald Park	✗	✓
Rock Street Park	✗	✓
Alma Acres Park	✗	✓
Dennis Drive Park	✗	✓
Committed Recreational Destinations in Existing Urban Boundary		
Station Meadows West Park	✓	✓
Thrive Park	✓	✓
Local Neighbourhood Destinations		
St. Martin Catholic Elementary School	✓	✓
John Calvin School	✗	✓
Smithville Public School	✓	✓
Cairn Christian School	✗	✓
Smithville Christian High School	✗	✓
West Lincoln Community Centre	✓	✓
Leisureplex Township Park	✓	✗
Commuter Destinations		
Employment Area – Industrial Park Road	✗	✗
Foodland Plaza	✓	✓
Commercial Core/Downtown Smithville	✓	✓

Such analysis represents the physical barriers that may deter users from using active transportation as a means of completing their trips. Gaps in the cycling and pedestrian network may prohibit users from reaching their destinations through active transportation, who then turn to alternative modes such as private vehicles to conduct their journeys. In addition, users may also not participate in active transportation for a variety of reasons, such as safety concerns, lack of incentives, or equity considerations (such as not being able to afford a bicycle and helmet).

The percentage of Smithville's population using active transportation as their main method of commuting is low, with only 3% and 1% of residents walking and cycling, respectively, according to the 2016 census. However, as the vision for the Smithville MCP, as outlined in **Section 1.2**, is a place where "community and environmental health, sustainability and resiliency are protected", the encouragement of increasing the modal shift to active transportation would only contribute to the overall sustainability of the community that offers a healthy lifestyle for its residents. Feedback received as part of the public information centres (PICs), as outlined in **Section 4.4**, indicated that respondents value green space with cycling and pedestrian networks, also supporting the shift to increase use of active transportation.

Figure 15: Connections of Existing Destinations to Existing Trails/On-Street Cycling Facilities

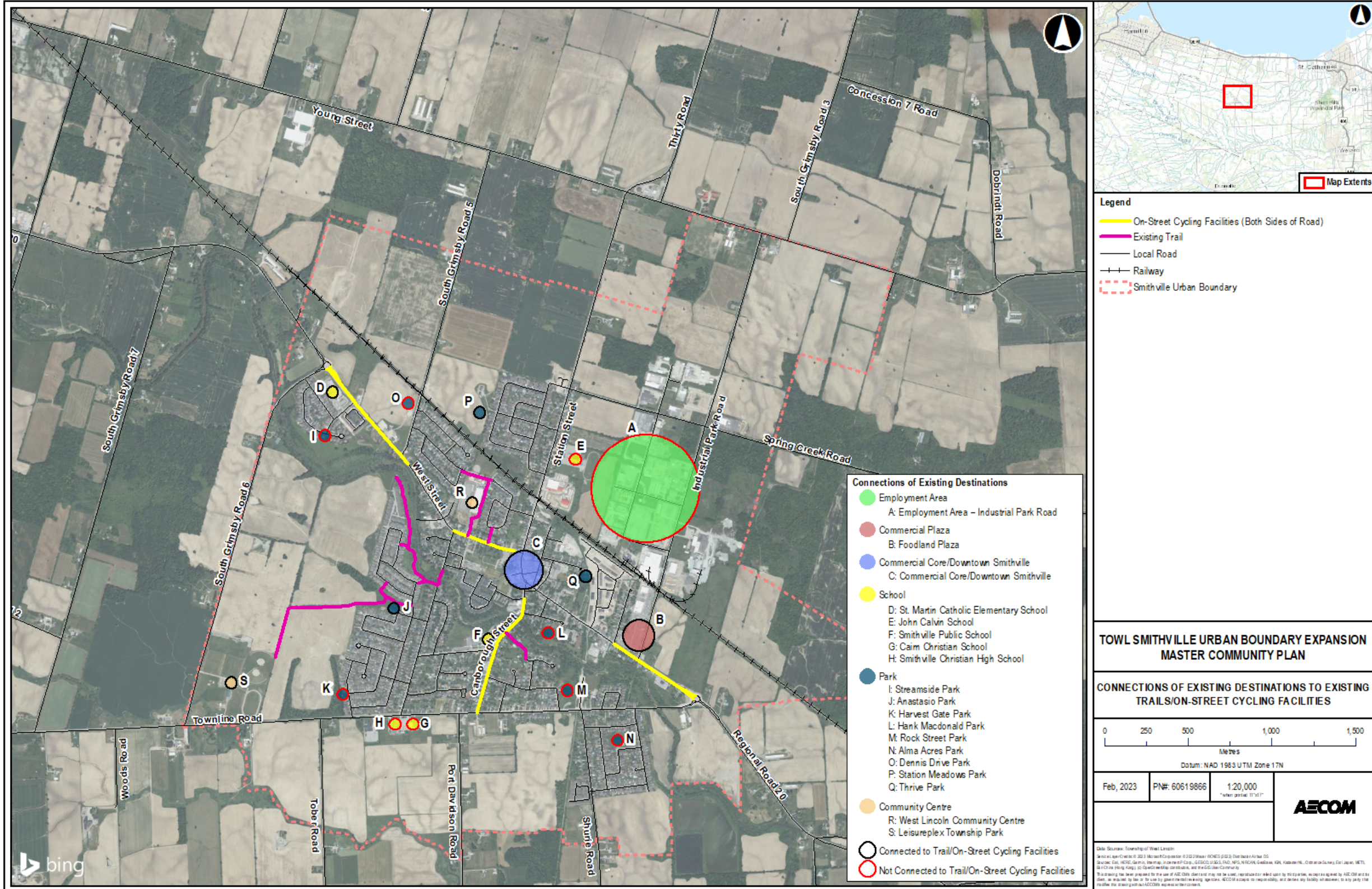
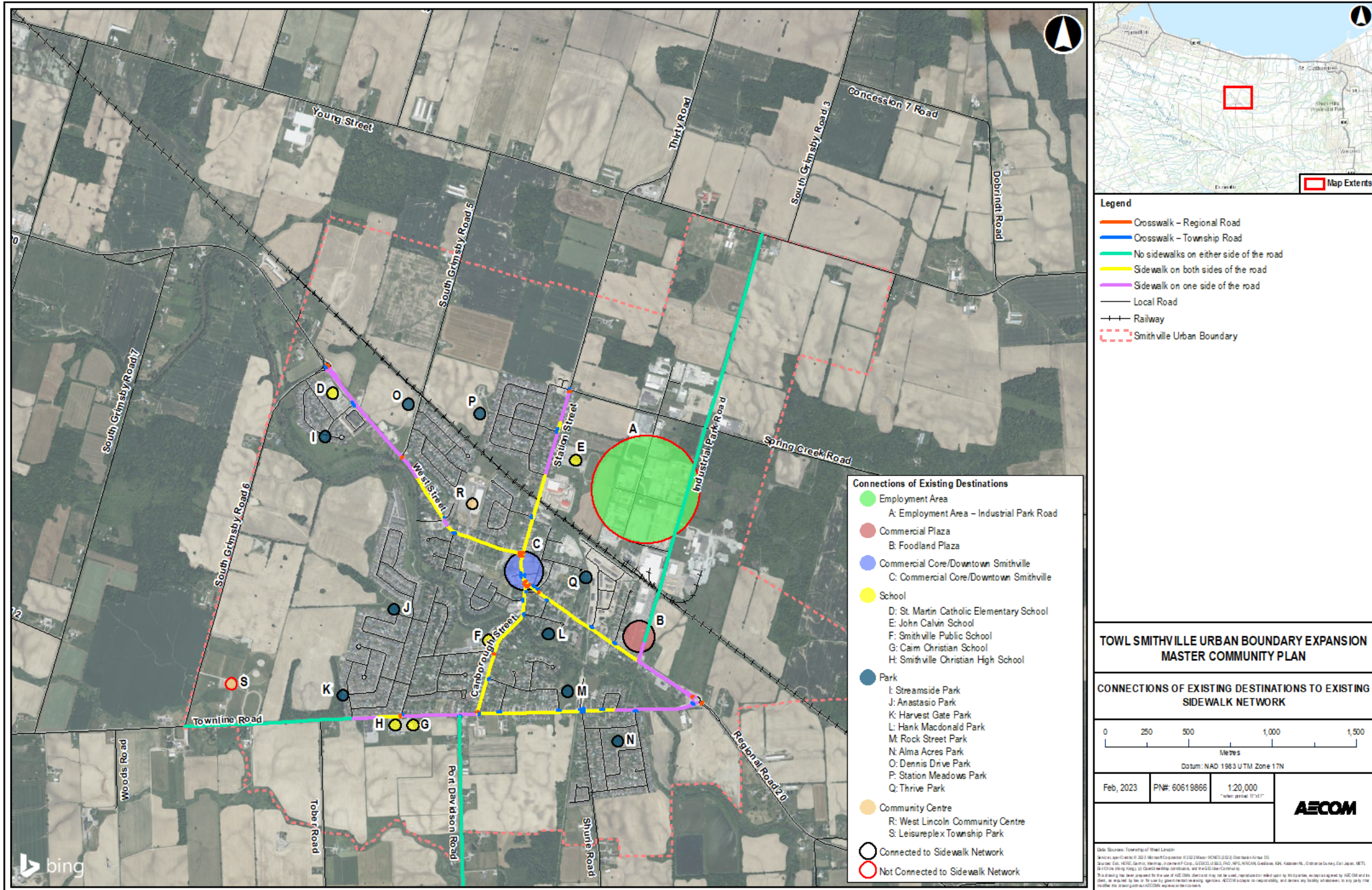


Figure 16: Connection of Destinations to Sidewalk Network



4.4 Community Engagement

As outlined in **Section 4.1**, consultation with the community and stakeholders has been undertaken to obtain input on the development of the Smithville MCP and meet the requirements of the integrated Municipal Class EA process. Community engagement is an opportunity to conduct meaningful dialogue about the growth of the Township and build awareness and excitement of the MCP. Input from the community and interested stakeholders also provides the project team with vital insight which will allow for the development of a MCP that reflects the community's needs.

Community and stakeholder engagement has included:

- Public Information Centres (PICs) (in-person/ virtual) - to provide information about the project to the community. PICs also facilitate dialogue between the Township, consultant team and members of the public. These events are important milestones to seek community feedback. There are a total of four PICs that have been held throughout the duration of this study. In advance of each PIC, notices were posted to the Township's website and in the local newspapers and other social media outlets, as well as issued to the study's contact list. Physical notices were circulated to property owners within the expansion study area and outside within a buffer of 120 metres of the expansion study area.
- Plansmithville.ca – a virtual engagement platform with project information and the opportunity to provide feedback on various aspects of the project.
- Technical Advisory Committee (TAC) workshops with stakeholders such as Niagara Region Public Works and Planning, NPCA, and landowner group representatives – held at strategic points in the project timeline to review and comment on technical work prior to supporting decisions and presentation to the public.
- Other meetings held with stakeholders, including the school boards, Municipal of Ministry Affairs and Housing and Hydro One to provide an opportunity early in the planning process to comment on how land uses are conceptually integrated into the MCP.

4.4.1 Public Information Centres

The community engagement process included a series of PICs to present project updates and receive feedback from the community and stakeholders. The overview of the PIC and transportation-related comments received at each PIC are summarized in **Table 7**, with key reoccurring themes illustrated in **Figure 17**. Feedback was collected via discussion groups, written feedback and comment forms and question and answer sessions. For the full community engagement undertaken as part of this process and the resulting feedback, refer to the Integrated EA Report.

Overall, respondents valued connectivity and safety of the transportation network, particularly in regard to active transportation, and emphasized their desire to maintain the small-town character of Smithville. Other key topics mentioned through feedback were the interest in transit, cycling lanes, providing walking paths through open spaces, and valuing a green community. The location of the Smithville Bypass within the community brought different perspectives, one of which was highlighting the influence it could have on surrounding land uses.

Figure 17: Key Themes of PIC Feedback

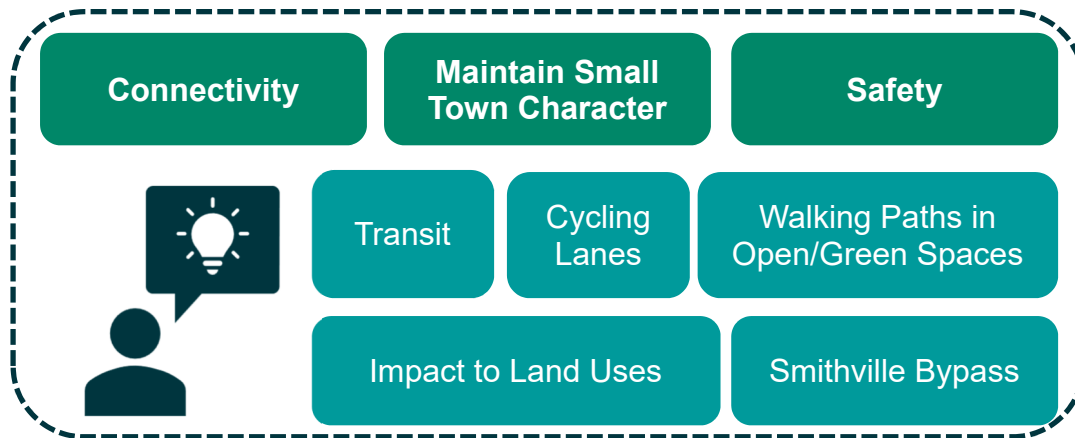


Table 7: Summary of PICs

PIC Number	Date	Purpose of the PIC	Transportation-Related Comments	Study Team Response to Comments
PIC #0 – Visioning (In Person)	January 30, 2020	<ul style="list-style-type: none"> – Introduced the Smithville MCP study – Community members participated in discussions about Smithville today and how it should grow into the future. 	<ul style="list-style-type: none"> – When asked what aspects of Smithville should be enhanced or improved, 34% of respondents identified transit service as an area of improvement. Reference was also made to provide more trail linkages for cycling tourism, improve complete streets, and suggested road improvements (such as the Young Street and Regional Road 14 intersection and traffic along Regional Road 20). – When asked what the most important issues are in the next two decades within Smithville, common responses noted roads, traffic control, pedestrian and cyclist safety, and transit (specifically noting potential connections to GO Transit). – Respondents also expressed concern over the financial investment required for transit and noted the need for the escarpment crossing and northern bypass in support the growing the industrial park. 	Recommendations provided in Section 5 capture consideration for trail linkages, transit, integration of complete streets, and the introduction of safety projects for the community.
PIC #1 (Virtual)	February 11, 2021	<ul style="list-style-type: none"> – Presented background information, which included discussion on the review of the Transportation network and infrastructure conducted to date – Introduced the preliminary concept plans – A question and answer session was held at the end of the presentation via Zoom 	<ul style="list-style-type: none"> – Respondents identified the potential need for transit in the community (including to Grimsby, Beamsville, and a potential stop at the community centre) and expressed a desire for a safe active transportation network that has walking paths in natural open spaces. In comparison, they had concerns with placing the truck bypass to the south of the community and noted the importance of keeping it away from residential areas. With placing the bypass to the north, there were concerns with the impact it could have to traffic and safety along Industrial Park Road. – Respondents provided feedback on a number of additional topics including the need to proactively implementation infrastructure prior to development, considering reclassifying Shurie Road as a Collector Road, providing safer parking lots, and supporting interregional trails. 	Recommendations provided in Section 5 and include promotion of trails in open spaces and the modelling undertaken for the TMP to assess alternative locations for the Smithville Bypass.
PIC #2 (Virtual)	October 6, 2021	<ul style="list-style-type: none"> – Summarized Community feedback to date – Provide an overview of Preliminary Preferred Concept Plan, including modifications – Presented preliminary impact assessment results, which included transportation and discussion of potential Smithville Truck Corridor/Downtown Bypass alignments – A question and answer session was held at the end of the presentation via Zoom 	<ul style="list-style-type: none"> – When asked the Preliminary Preferred Concept Plan, respondents noted the importance of cyclist and pedestrian safety, Arterials roads as complete streets with cycling lanes, and the connectivity of roads, sidewalks, trails (with Fonthill’s Steve Bauer Trail as an example), and cycling lanes within the community. – When asked about the Smithville Bypass, there was mixed feedback as to whether it should be north or south of the community. There was positive feedback that moving the bypass to the north would help reduce traffic going through the centre of the town, provide potential mountain access, and keep trucks away from residents, as well as concern that vehicles other than heavy trucks might use the bypass as well, resulting in no one travelling through the Downtown Core anymore. – Regarding ways to revitalize the Downtown Core of Smithville, respondents were very supportive of improving accessibility/safety, reducing heavy truck traffic, and making the area more pedestrian and cycling friendly. Respondents were also generally supportive of improving transit services and parking. Additional feedback was also received that cyclist should have off-road path as bike lanes are too narrow. 	Recommendations provided in Section 5 capture consideration for trail linkages, safety projects for the community, and modelling work for the alternatives of the Smithville Bypass. In support of Downtown Smithville, a new trail was proposed to link to McMurchie Lane as well as TDM measures to support the Downtown Core.
PIC #3/Public Meeting of Council (Virtual)	April 27, 2022	<ul style="list-style-type: none"> – Provided an overview of the Preferred Concept Options – Presented the impact assessment results, which included the Transportation Assessment. Summarized the key findings from the traffic analysis and forecasting exercise, and review of existing and future multi-modal needs – Presented draft Official Plan Amendment (OPA 62) for the Smithville Urban Area Expansion for Council approval 	<ul style="list-style-type: none"> – Generally, respondents had concern that the transportation component of the draft Preferred Concept Plan had an appropriate and well-connected network of infrastructure. Feedback was provided to increase walkability and trails within open spaces, improve parking lots, and consider that users typically take the most convenient path of travel (noting the roads system presented may be too out of the way). 	Recommendations provided in Section 5 included a trail network, safety programs, and a TDM parking strategy.

4.5 Opportunities and Challenges

The urban boundary expansion of Smithville presents several opportunities and challenges with regard to the transportation network. These opportunities and challenges are discussed below and illustrated in **Figure 18**.

Figure 18: Transportation Network Opportunities and Challenges for Smithville



4.5.1 Opportunities

Opportunity 1: Promote Active Transportation – Cycling Network

Currently, there are gaps in the on-street cycling facilities provided along Regional Roads 20 and 14, as indicated by the absence of the pavement markings and signage. To promote and facilitate cycling within the community, opportunities exist to develop a comprehensive cycling network through the filling of gaps and the introduction of facilities in new areas, including within the previous and expanded urban boundaries. Along with the implementation of facilities comes the opportunity to introduce programs and initiatives to encourage cycling within the community as a safe, healthy, and sustainable mode of travel. In addition, the Strategic Cycling Network identified in the Region's Official Plan and TMP supports the development of a complete network throughout the Region, promoting the implementation of facilities within Smithville and fostering a culture for cycling on a larger scale.

Opportunity 2: Promote Active Transportation – Trails

Feedback from the community indicated the desire to implement more walking paths in natural, open space settings. Opportunities exist to build upon the existing trail network within Smithville and provide linkages for recreational and destination-focused trips. Enhancing the trail network would fill a transportation need not served by the on-street cycling facilities or sidewalks as it connects locations within the community that would otherwise only be served by the road network. This provides increased choice for residents and visitors alike when they are planning their journeys, connecting them to a greater number of destinations and enabling both cyclists and pedestrians to utilize the infrastructure.

Opportunity 3: Standardized Streetscapes

With the need for new roads and road upgrades throughout the community to support the forecasted growth, there is an opportunity to develop standardized streetscapes unique to Smithville that could leverage existing Niagara Region Complete Streets Guidelines. The development of such streetscapes would outline the consistent use of landscaping elements, motorized vehicle travel and turning lanes, on-

street cycling facilities, and pedestrian facilities. The development of such streetscapes would also support the closing of active transportation gaps within the existing cycling and sidewalk network for roads set to be upgraded and proactively provide such facilities in new roads.

Opportunity 4: Revitalize Downtown Smithville

Regional Road 20, bounded by West Street and Dufferin Street, and Regional Road 14, bounded by the CPR Corridor and Colver Street, is identified as the intensification area of Smithville and includes the commercial core. Opportunities exist to revitalize this area as it intensifies through enhanced streetscapes, improved active transportation connections, provision of strategic parking initiatives, and reduced through traffic as a result of the Smithville Bypass. Providing such initiatives would support the continued development of a strong foundation at the core of the community that provides a sustainable transportation network to support land use intensification and growth.

4.5.2 Challenges

Challenge 1: Increased Interregional Demand along Regional Road 20

Regional Road 20 connects Smithville to Hamilton from the west and Pelham from the east, making it a primary east/west corridor through the area. As discussed in **Section 3.3.1.1**, Regional Road 20 passes through a mix of land uses including institutional, commercial, and residential within the Smithville existing urban boundary. According to the Smithville Safety Study of 2011, heavy trucks accounted for almost 15% of traffic at Regional Road 20 (West Street) and South Grimsby Road 6. Along with the forecasted population and employment growth set for Smithville, interregional demand is expected to increase along Regional Road 20 due to goods movement and people commuting into, out of, and within the community for employment.

As such, an opportunity exists to improve the interregional demand along Regional Road 20 through Downtown Smithville via the Smithville Bypass. The Smithville Bypass would reduce the volume of heavy vehicles on local roads through Smithville, and provide relief to both the commercial vehicles travelling between Hamilton and Niagara Falls and the increasing traffic expected due to the intensification of Downtown Smithville.

Challenge 2: Anticipated Increase in North-South Traffic

Currently, Smithville is divided by the CPR corridor. This causes a north and south separation throughout the community, leading to internal movement challenges. As traffic volumes between the north and south of Smithville are anticipated to increase due to the proposed urban boundary expansion, having at-grade and not grade-separated rail crossings may further intensify these mobility challenges. In particular, the intensification of the Northwest Quadrant will increase the use of South Grimsby Road 5 which connects to Regional Road 20. Similarly, Regional Road 14, serving as the primary north-south arterial road in the settlement area, will see increased traffic as Downtown Smithville intensifies and developments throughout Smithville occur.

Challenge 3: Dominance of Single-Occupancy Vehicle Use

Smithville is dominated by single-occupancy vehicle use as the main mode of commuting for 91% of residents based on the 2016 census. Only 3%, 3%, and 1% of residents are passengers in a vehicle, walk, and cycle, respectively, as their main method of commuting. As Smithville is an urban community situated in a municipality with a significant rural and agricultural presence, it is understandable that:

- Residents may need to utilize their private vehicles to travel outside the community for work or to access goods and services that may not be accessible within the community; and
- Visitors will utilize Smithville a hub for the municipality and will utilize their private vehicles to travel to the community for work or to access goods and services.

Thus, a challenge will exist to shift the culture of driving as the default transportation option to alternative modes for feasible trips, especially trips within the community. While driving in private vehicles will continue to meet the needs of Smithville residents, there are benefits to promoting a modal shift to alternative transportation modes. For instance, feedback from residents indicates that maintaining the small-town characteristics of the community is important as well as implementing trails in green spaces. Encouraging cycling and walking would support the development of a green community where residents

can travel to local amenities to support the small-town character. In addition, promoting a modal shift to alternative transportation modes would also support the subset of the population who may not drive for a number of reasons and enabling them with more transportation options. To support this shift, an opportunity exists to develop transportation demand management (TDM) programs and initiatives to encourage the use of modes other than single-occupancy vehicles within the community.

Challenge 4: Public Transit Options

Smithville currently does not have any conventional transit services and transportation choices by existing residents are dominated by single-occupant vehicle use. As a result, it may be difficult to encourage residents to use the existing NRT OnDemand service or any conventional transit service within the community should it be implemented. The convenience of having a private vehicle needs to be matched or improved upon if an expanded transit system were to be implemented, or fill a gap for residents who do not drive. As such, enhanced transit services should be introduced early before those who live or work in Smithville make alternative transportation choices (e.g. single-occupant vehicle use).

Tools for Implementation

Understanding the future transportation needs of Smithville, a series of recommended transportation infrastructure and programs were developed and are outlined in **Section 5**. The recommendations will be implemented through a number of standards and guidance once progressed beyond the Smithville TMP. To support the implementation of streetscapes in particular, a series of cross sections were developed for different road classifications within Smithville to support a cohesive and sustainable road network.

4.6 Standards and Guidance

The implementation of all transportation recommendations will be subject to the appropriate standards and requirements throughout the planning, design, and construction processes. Such processes can be supplemented by guidance and best practices were needed. Relevant sources include, but are not limited to:

- **Provincial**
 - Accessibility for Ontarians with Disabilities Act (AODA); and
 - OTM, such as Book 12 Traffic Signals, Book 15 Pedestrian Crossing Facilities, and Book 18 Cycling Facilities.
- **Niagara Region**
 - Standards (such as for traffic signals, roadway lighting, etc.);
 - Complete Streets Design Guidelines; and
 - Wayfinding Signage for Cyclists Guidelines.
- **Township of West Lincoln**
 - Municipal Engineering Standards; and
 - Urban Design Manual.
- **Other**
 - Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads

4.7 Complete Streets

Complete streets supports the development of cohesive transportation corridors. They envision how different modes of transportation, from driving a private vehicle to cycling and walking, interconnect and how supporting amenities such as landscaping and street furniture can support a vibrant public realm. The Region developed Complete Streets Design Guidelines as part of their TMP and the Township has policies within their Official Plan dictating the implementation of complete streets in support of healthy communities:

- Policy 3.5.2. g) “Road design and transportation planning shall be done within a complete streets design framework.”; and
- Policy 3.5.2. i) “Land use and development shall be planned using a complete streets approach considering the needs of all users – pedestrians, bicyclists, and motorists of all ages and abilities, and shall give priority to street connectivity and active transportation infrastructure”.

In recognition of the unique character and placemaking that the MCP process is supporting in Smithville, a series of Smithville specific streetscape designs have been developed. The Smithville-specific complete streets have been incorporated into the planning framework, and a series of cross sections were developed outlining four standard streetscape environments which could be implemented on Township owned roads in Smithville. Regional roads will continue to follow the guidance developed by Niagara Region, although right of ways (ROW) for the municipal streetscapes have considered the regional requirements to allow for the possibility of upload in the future. The streetscapes are summarized in **Table 8** and their implementation would be determined by the classification of road as well as other characteristics and requirements.

The streetscapes were developed with input from provincial standards and the regional framework, while also utilizing best practices in design and safety. As part of the streetscape development process a series of stakeholder workshops and reviews were conducted and feedback was incorporated into the recommended designs. In developing these designs consideration to both above and below grade requirements of the right of way were considered and accommodated within the recommended standards.

The streetscapes have been developed to reflect Smithville’s unique characteristics while also recognising operating and maintenance requirements of the municipality. The standards established provide transportation corridors with the facilities and designated space to safely support different transportation users and modes, while also providing flexibility for future upgrades or changes to road classifications and uses. Refer to **Figure 19** through **Figure 22** for the streetscape cross sections.

Table 8: Streetscape Summary

Streetscape	Total Right of Way (Metres)	Total Vehicular Travel Lanes	On-Street Parking	On-Street Cycling Facilities	Multi-Use Path	Sidewalks
Regional Road (Arterial)	30.5*	Regional Road under Regional Jurisdiction	-	-	-	-
Township Arterial (Arterial B)	25	2 travel lanes and 1 centre turning lane	-	On-street bike lanes on both sides of road	-	Sidewalks on both sides of ROW
Collector Road	22	2	-	On-street bike lanes on both sides of road	-	Sidewalks on both sides of ROW
Local Road	20	2	-	-	-	Sidewalk on one side of ROW. Addition of sidewalk on other side of ROW optional.
Rural Edge Route	24.6	2	-	-	Two-directional multi-use path on one side of ROW	-

*To be protected. Any road profile of four lanes or more would be classified as a Regional Road.

Figure 19: Township Arterial (Arterial B) Streetscape Cross Section

Township Arterial

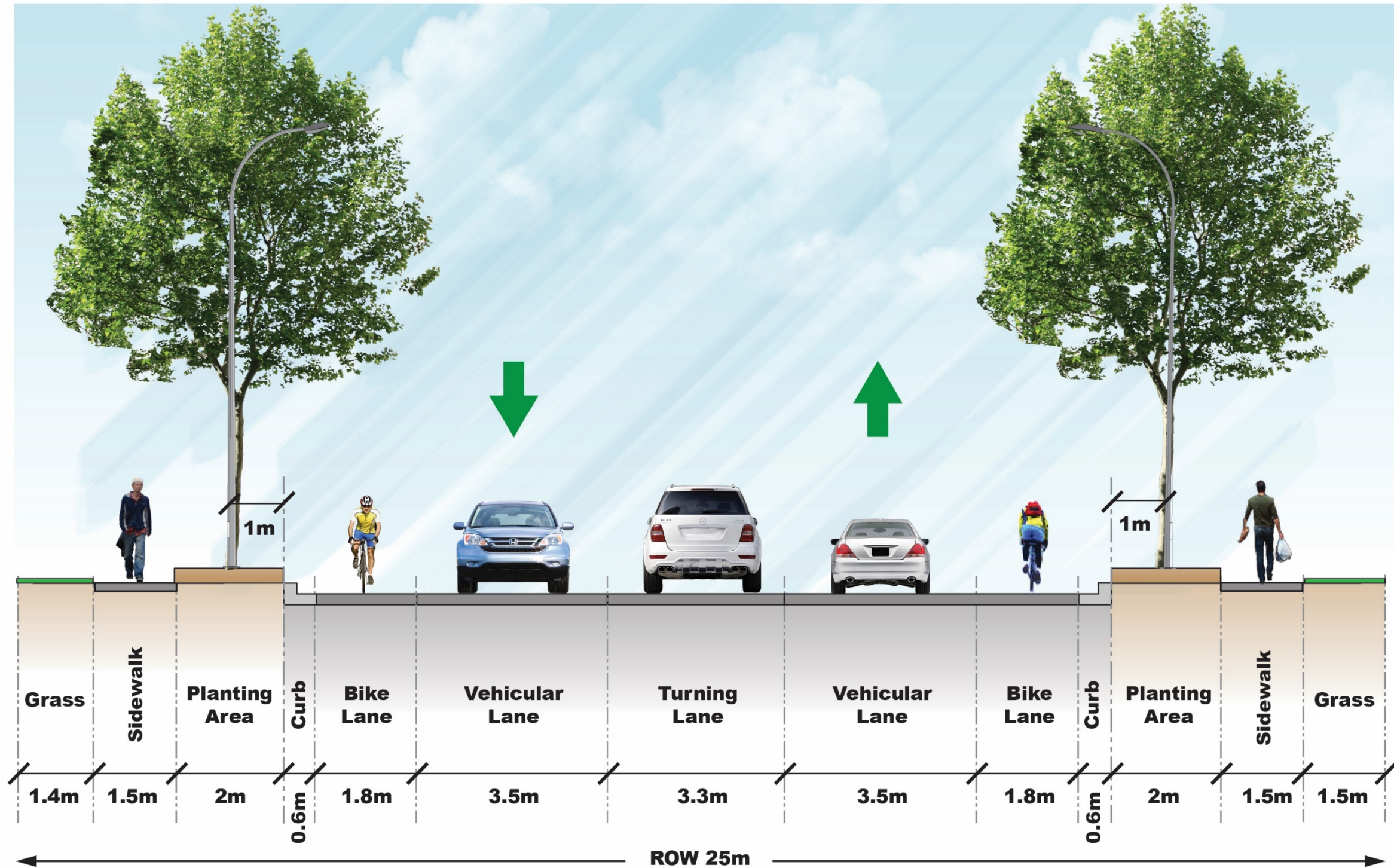


Figure 20: Collector Road Streetscape Cross Section

Collector Road

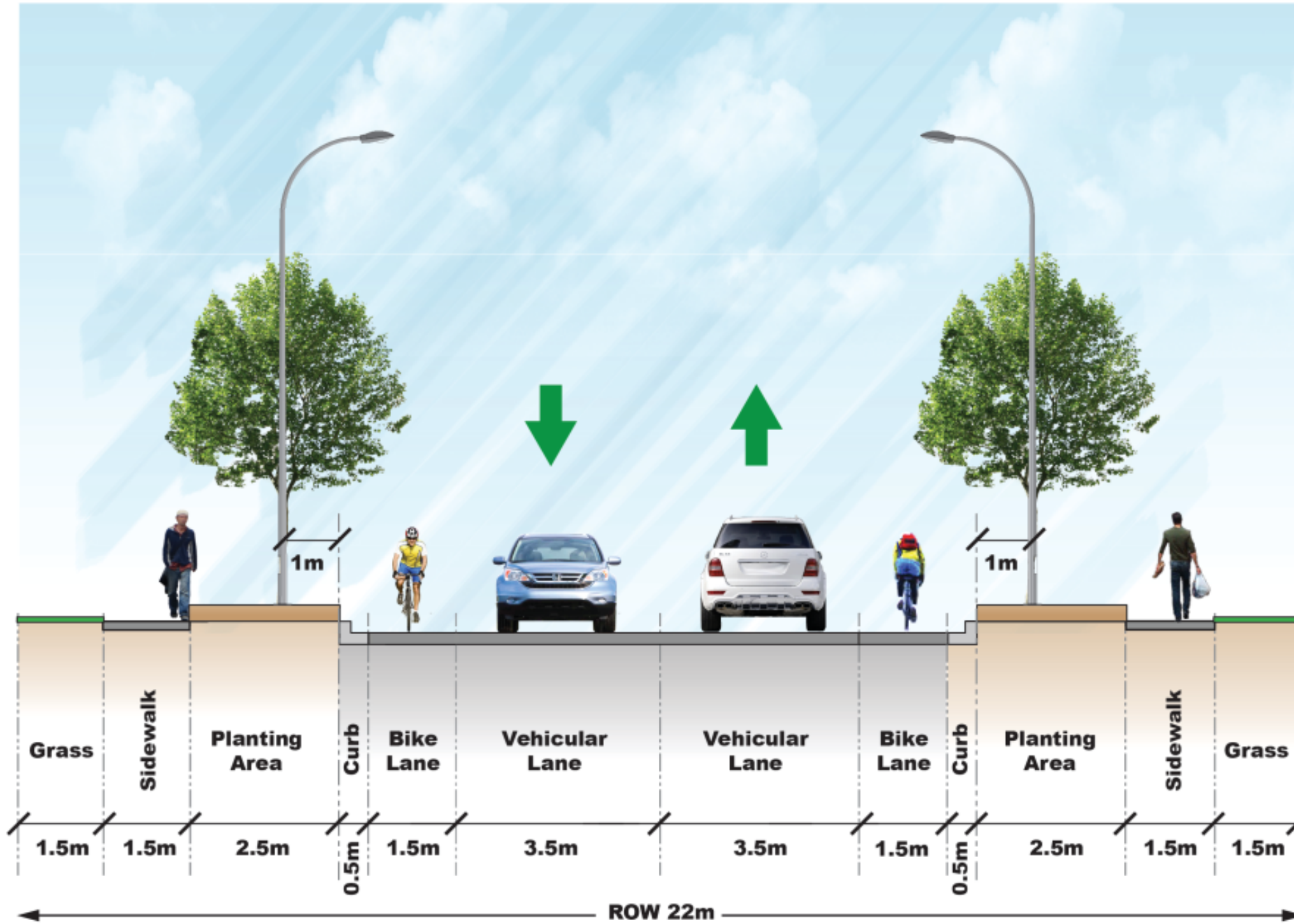


Figure 21: Local Road Streetscape Cross Section

Local Road

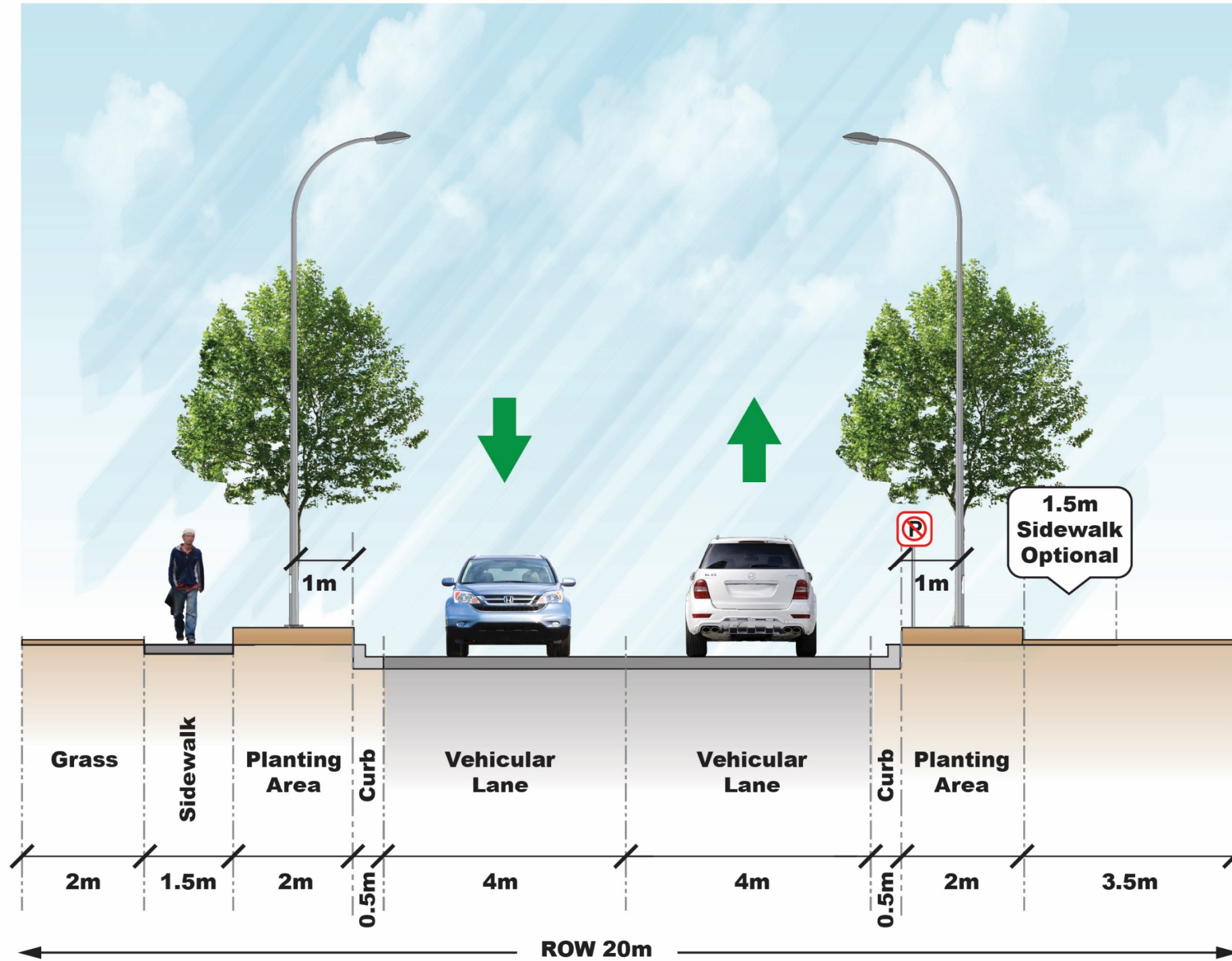
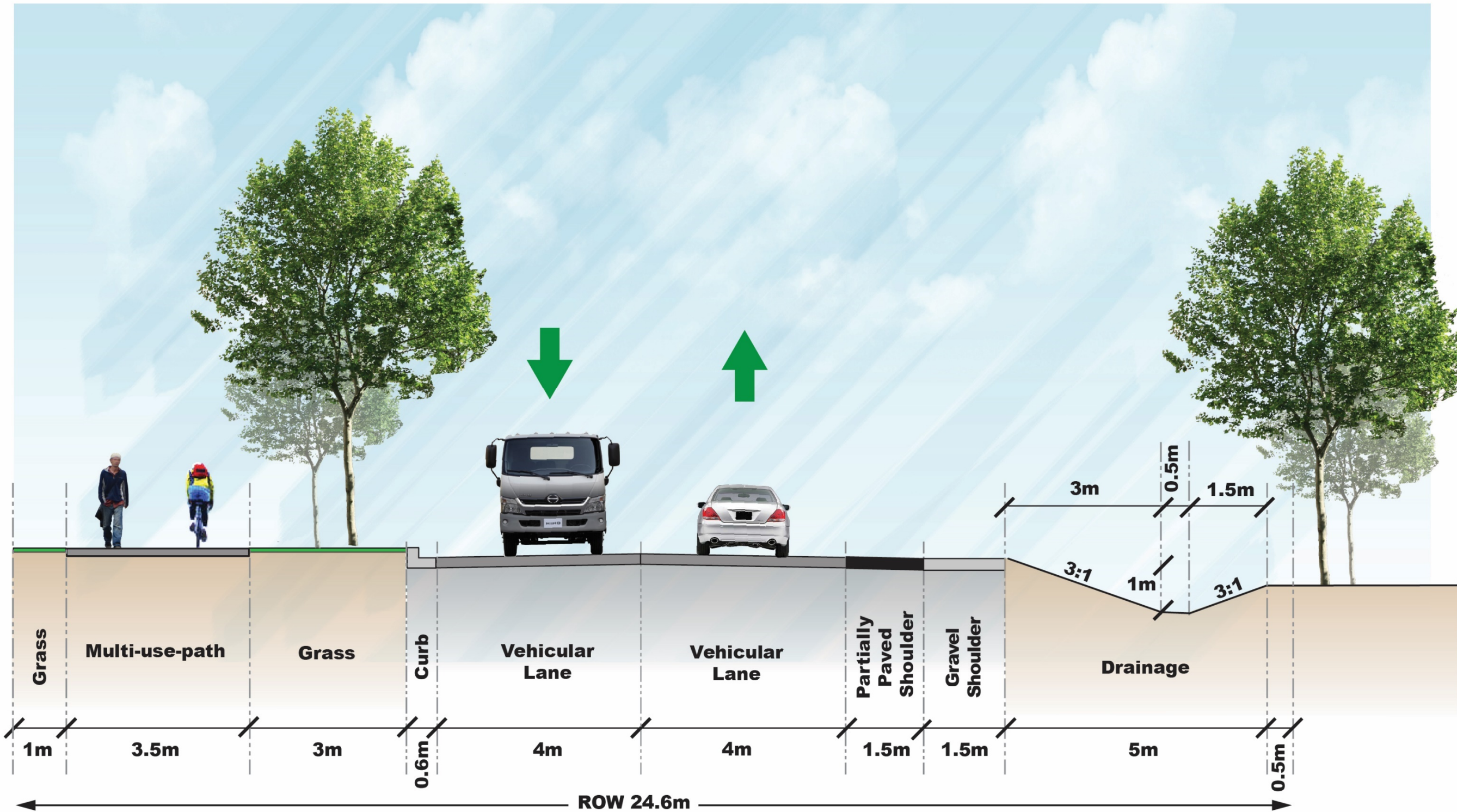


Figure 22: Rural Route Streetscape Cross Section

Rural Edge Route



5 Recommended Transportation Infrastructure and Programs

The following infrastructure and non-infrastructure measures are recommended for implementation in Smithville to support the MCP and subsequent community growth. Each measure has been assigned a project ID to assist in tracking its status through the implementation process, which can be summarized as follows through the below-noted prefixes. As the complete street cross-sections (**Section 4.7**) incorporate on-street cycling and pedestrian facilities, recommended on-street cycling facilities are captured under the respective “road” project ID.

Example Project ID: Jurisdiction-Category-Number

Jurisdiction

Niagara Region	Township	Niagara Region / Township*
RR	TWL	RR/TWL

*Has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.

Category

Roads	Active Transportation	Transit	Safety Programs	Transportation Demand Management (TDM)
Road Junction	Road Trail AT	Transit	Safety	TDM

5.1 Infrastructure Measures

The infrastructure measures were developed using three-stage processes; one for determining roads and junctions, and another for determining on-street cycling facilities.

Process 1: Roads and Junctions

(1) Modelling Assessment → 2) Block Plan Requirements → 3) Supporting Upgrades)

- 1) Modelling Assessment:** A modelling assessment was conducted using Aimsun and EMME software to assess existing and forecasted traffic conditions to 2051 within Smithville and test options to optimize the flow of vehicles. A summary of the recommendations from the assessment is provided in the below subsections and the full description of the methodology, assumptions, and results can be found in **Appendix A**.

The modelling assessment informed the infrastructure recommendations outlined below to support the urban boundary expansion, organized by Regional and Township projects. All infrastructure recommendations would need to be planned, designed, and constructed in accordance with all relevant standards and requirements.

- 2) Block Plan Requirements:** In addition to the recommendations derived from the modelling assessment, roads were identified for upgrading or retrofitting based on Block Plan requirements

outlined in OPA No. 63. The Development Staging Plan outlined in **Figure 30** can be referenced for the roads adjacent to the development block areas. It was assumed that such works would align with the corresponding streetscape cross sections in **Section 4.7**.

- **3) Supporting Upgrades:** In response to the Block Plan requirements, remaining segments of roads already identified for upgrades or retrofitting as outlined in OPA No. 63 were added to the list of recommendations. The intent of this step was to identify remaining road segments which would fill in the upgrading gaps across the road network; allowing for a consistent and seamless transition between segments.

Process 2: On-Street Cycling Facilities

(1) New Roads and Streetscape Cross Sections → 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network → 3) Supporting Links)

- **1) New Roads and Streetscape Cross Sections:** On-street cycling facilities for new roads were identified based on the streetscape cross sections identified in **Section 4.7**.
- **2) Block Plan Phasing Requirements / Regional Strategic Cycling Network:** Roads were identified for upgrading or retrofitting in response to Block Plan Phasing requirements outlined in OPA No. 63 or to support the implementation of the strategic cycling network outlined in the Region's TMP. Through such upgrades and/or retrofitting works, cycling facilities would be implemented based on the road's classification and corresponding streetscape cross sections (as outlined in **Section 4.7**):
- **3) Supporting Links:** Additional roads were identified for retrofitting to provide links for the cycling network (and to match other sections of the same roads identified for upgrades). Completing such works would address gaps in the cycling network when only considering upgrades required for Block Plan Phasing or segments of the Region's planned strategic cycling network. The intent of this step was round-out the assessment of producing a seamless cycling network across Smithville.

The infrastructure recommendations are summarized in the following tables and figures:

- **Roads, On-street Cycling Facilities, and Junctions**
 - **Table 9** (Regional) and **Table 10** (Township) summarize the recommended infrastructure projects in the form of roads (including on-street cycling facilities) and junctions. The relevant step of the three-stage processes are identified, where applicable.
 - **Figure 23**, **Figure 24**, and the **Figure 25** outlined the updated road classifications, new and upgrades roads, and junction improvements identified from this TMP. Only major roads such Regional, Arterial, and Collector road classifications that will act as key travel paths within Smithville were identified; the identification of local roads for implementation or upgrading would be subject to Block Plan development.
 - **Figure 26** provides an overview of roadways which have the potential for uploading to the Region from the Township. Discussions would need to continue to determine suitability for any jurisdictional transfers.
 - **Figure 27** outlines the recommended trails and on-street cycling facilities planned for implementation as a result of new roads being constructed and roads being upgraded or retrofitted Block Plan Phasing requirements outlined in OPA No. 63 (**Section 6.1.1.1**) or to support the implementation of the strategic cycling network outlined in the Region's TMP. Such road works are assumed to be implemented using the streetscape cross sections outlined in Section 4.7, thus incorporating on-street cycling facilities into the projects. **Figure 28** identifies roads to be retrofitted to provide links for the cycling network and to match other sections of the same roads identified for upgrades. Completing such works would address gaps in the cycling network when only considering upgrades required for Block Plan Phasing or segments of the Region's planned strategic cycling network.

- **Trails**
 - **Table 11** and **Figure 29** summarize the details and locations of each of the recommended trails, respectively. All trails are identified as Township projects.

5.1.1 Regional Projects

5.1.1.1 Smithville Bypass Connectors

The modelling assessment assessed the need for a bypass around Smithville and tested a series of conceptual alignments. Based on the data and information available at the time of the assessment, a bypass is recommended provide traffic relief as a result of development from the urban boundary expansion, mitigate the impact of having through traffic in downtown Smithville, and to provide improved connectivity to other strategic infrastructure (such as the potential Niagara Escarpment Crossing). The proposed connectors for the bypass are as follows:

- **RR-Road-04 New Eastern Link:** On the east side of Smithville, this new link would connect to Regional Road 20 (prior to the urban boundary), head north over the CPR corridor through a grade separated crossing, and travel west to connect to Industrial Park Road.
 - RR-Road-04 has the potential to be a Regional project pending the outcome of Smithville Bypass EA.
- **RR/TWL-Road-15 Industrial Park Road:** The bypass would follow along the existing Industrial Park Road from the New Eastern Link to the New Northern Connector.
 - RR/TWL-Road-15 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
- **RR/TWL-Road-02 New Northern Connector and RR-Road-03 New Western Link:** A new link that travels along the existing hydro corridor that would connect Industrial Park Road and Regional Road 20 west of the South Grimsby Road 6 roundabout, and provide a grade separated crossing on the CPR corridor. The New Western Link could connect back to Regional Road 20 at the South Grimsby Road 8 intersection.
 - RR/TWL-Road-02 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - RR-Road-03 has the potential to be a Regional project pending the outcome of Smithville Bypass EA.

All works to support the implementation of the bypass would be required to go through an EA conducted by the Region. The Township should support the Region in the completion of the EA early on within the MCP process.

5.1.1.2 All Other Roads, Junctions, and On-Street Cycling Facilities

- **Road Upgrades/Retrofitting**
 - RR-Road-11 Regional Road 14 (between Young Street and New Northern Connector)
 - RR-Road-12 Regional Road 14 (between New Northern Connector and Spring Creek Road)
 - RR-Road-13 Regional Road 14 (between Spring Creek Road and Regional Road 20)
 - RR-Road-14 Industrial Park Road (between Young Street and New Northern Connector)
 - RR-Road-17b Townline Road (between Regional Road 14 (Canborough Street) and New Western Collector 1)
 - It is proposed to widen Townline Road to three lanes (includes a centre turning lane) to support increased traffic volumes along the road as well as increased demand for turning movements across traffic lanes.
 - RR-Road-18 Townline Road (between New Western Collector 1 and South Grimsby Road 6)

- **Existing Junctions – To be Review for Improvement Opportunities**
 - RR-Junction-01 Regional Road 14 (Station Street) and Spring Creek Road
 - RR-Junction-03 Regional Road 20, South Grimsby Road 8, and New Western Link
 - This would support the efficient movement of vehicles. It is recommended that the design and geometry of this intersection be reviewed further.
 - RR-Junction-04 Regional Road 20 and South Grimsby Road 7
 - RR/TWL-Junction-09 Industrial Park Road and Spring Creek Road
 - RR/TWL-Junction-09 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - RR-Junction-10 Regional Road 20 (St. Catharines Street) and Industrial Park Road
 - RR-Junction-11 Regional Road 14 (Canborough Street)/Port Davidson Road and Townline Road
 - There may be an opportunity to realign Port Davidson Road to connect to the Townline Road/Canborough Street intersection in the future and explore resulting junction improvements (support assignment of priority traffic movements). The possibility of such works would need to be explored as development for the MCP continues.
 - RR-Junction-12 South Grimsby Road 6 and Townline Road
- **New Junctions – Review for Signalized Potential** - Recommended to be reviewed for signalized potential to support the Smithville Bypass. To be confirmed through the EA to be conducted by the Region on the Smithville Bypass.
 - RR/TWL-Junction-05 Spring Creek Road Extension and New Western Link/New Northern Connector
 - RR-TWL-Junction-05 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - RR/TWL-Junction-06 South Grimsby Road 5 and New Northern Connector
 - RR/TWL-Junction-06 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - RR-Junction-07 Regional Road 14 (Station Street) and New Northern Connector
 - RR/TWL-Junction-08 Industrial Park Road and New Northern Connector
 - RR/TWL-Junction-08 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - RR-Junction-13 New Eastern Link and Industrial Park Road
- **New Junctions – Design to be Determined**
 - RR-Junction-14 Regional Road 20 and New Eastern Link
 - RR-Junction-15 Townline Road/New Western Collector 1/Tober Road Realignment

5.1.2 Township Projects

5.1.2.1 Roads, Junctions, and On-Street Cycling Facilities

- **New Roads**
 - TWL-Road-01 Spring Creek Road Extension
 - RR/TWL-Road-02 New Northern Connector
 - RR/TWL-Road-02 has the potential to be a Regional or Township project pending outcome of Smithville Bypass EA.

- TWL-Road-05 Tober Road Realignment/New Southern Collector 2/New Southern Collector 1
 - Proposed to support efficient traffic flow in the southern and western edges of Smithville.
- TWL-Road-06 New Western Collector 1
 - Proposed to support efficient traffic flow in the southern and western edges of Smithville.
- **Road Upgrades/Retrofitting**
 - TWL-Road-07 Spring Creek Road (between Spring Creek Road Extension and Regional Road 14)
 - TWL-Road-08 South Grimsby Road 5 (between Young Street and New Northern Connector)
 - TWL-Road-09 South Grimsby Road 5 (between New Northern Connector and Spring Creek Road)
 - TWL-Road-10 South Grimsby Road 5 (between Spring Creek Road and Regional Road 20)
 - TWL-Road-14 Industrial Park Road (between Young Street and New Northern Connector)
 - RR/TWL-Road-15 Industrial Park Road (between New Northern Connector and New Eastern Link)
 - RR/TWL-Road-15 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
 - TWL-Road-16 Industrial Park Road (between New Eastern Link and Regional Road 20)
 - TWL-Road-17a Townline Road (between Regional Road 20 and Regional Road 14 (Canborough Street))
 - TWL-Road-17a is identified on **Figure 26** for potential uploading to the Region from the Township. Discussions would need to continue to determine suitability for any jurisdictional transfers.
 - It is proposed to widen Townline Road to three lanes (includes a centre turning lane) to support increased traffic volumes along the road as well as increased demand for turning movements across traffic lanes.
 - TWL-Road-19 Port Davidson Road (between Townline Road and New Southern Collector 2)
 - TWL-Road-19, and sections of Port Davidson Road beyond the urban boundary, are identified on **Figure 26** for potential uploading to the Region from the Township. Discussions would need to continue to determine suitability for any jurisdictional transfers.
 - TWL-Road-20 Shurie Road (between Townline Road and New Southern Collector 1)
 - TWL-Road-21 South Grimsby Road 6 (between New Western Collector 1 and Townline Road)
 - TWL-Road-22 South Grimsby Road 6 (between Regional Road 20 and New Western Collector 1)
 - TWL-Road-23 Young Street (between Regional Road 14 and South Grimsby Road 2)
- **Existing Junctions – To be Reviewed for Improvement Opportunities**
 - RR/TWL-Junction-09 Industrial Park Road and Spring Creek Road
 - RR/TWL-Junction-09 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
- **New Junctions – Review for Signalized Potential**
 - RR/TWL-Junction-05 Spring Creek Road Extension and New Western Link/New Northern Connector

- RR/TWL-Junction-05 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
- RR/TWL-Junction-06 South Grimsby Road 5 and New Northern Connector
 - RR/TWL-Junction-06 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
- RR/TWL-Junction-08 Industrial Park Road and New Northern Connector
 - RR/TWL-Junction-08 has the potential to be a Regional or Township project pending the outcome of Smithville Bypass EA.
- **New Junctions – Design to be Determined**
 - TWL-Junction-02 South Grimsby Road 5 and Spring Creek Road
 - TWL-Junction-16 Tober Road/New Southern Collector 2
 - TWL-Junction-17 Port Davidson Road/New Southern Collector 1/New Southern Collector 2
 - TWL-Junction-18 Shurie Road and New Southern Collector 1
 - TWL-Junction-19 South Grimsby Road 6 and New Western Collector 1

Through the implementation of new roads and upgraded roads, it is recommended to promote the integration of Smithville-specific complete streets through the standard streetscape cross sections developed for the community (**Section 4.7**) and augment with Regional design guidance for complete streets, where needed.

5.1.2.2 Trails

The following are proposed trails, which are subject to adjustments in response to the Master Trails and Corridors Plan the Township is currently undertaking. Pedestrian bridges have been identified for the applicable trails.

- **TWL-Trail-01 Hydro Corridor Trail:** from Industrial Park Road to the Spring Creek Trail extension. Subject to the Smithville Bypass alignment and road classification to be determined through the EA to be conducted by the Region, there may be opportunity to integrate this trail as a multi-path running alongside the road, should an Arterial A – Urban Edge cross section be pursued (**Section 4.7**); as well as pursue further discussions to extend the trail through the hydro corridor further west than the expanded urban boundary.
- **TWL-Trail-02 South Creek Trail Extension:** from Brookside Terrace to South Grimsby Road 6
- **TWL-Trail-03 South Grimsby Road 5 Trail:** Regional Road 20/South Grimsby Road 5 intersection to Street D/Townline Road intersection
 - TWL-Trail-03a represents the pedestrian bridge for the South Grimsby Road 5 Trail.
- **TWL-Trail-04 Enbridge Trail:** E-W trail from Tober Road Realignment to Regional Road 20
- **TWL-Trail-05 South Loop Trail:** along southern edge of expanded urban boundary between Townline Road and Shurie Road
- **TWL-Trail-06 Old Rail Trail:** N-S trail from Townline Road to southern edge of expanded urban boundary
- **TWL-Trail-07 Northwest Rail Trail – North:** Trail running along northern edge of the CPR Corridor between the western edge of the Smithville urban boundary and Hornak Road.
- **TWL-Trail-08 Industrial Park-Townline Connector Trail:** From the Regional Road 20/Industrial Park Road intersection to Townline Road.
 - TWL-Trail-08a represents the pedestrian bridge for the Industrial Park-Townline Connector Trail.
- **TWL-Trail-09 Southeast Rail Trail:** Trail running along the southern edge of the CPR Corridor between Industrial Park Road and New Eastern Link.

- **TWL-Trail-10 Margaret-McMurchie Trail:** E-W trail linking Margaret Street and McMurchie Lane
- **TWL-Trail-11 Southeast River Trail 2:** Following the watercourse between the CPR Corridor and Regional Road 20 on the east side of the East Smithville Secondary Plan area.
- **TWL-Trail-12 Southeast River Trail 1:** Following the watercourse between the CPR Corridor and Regional Road 20 on the west side of the East Smithville Secondary Plan area.
- **TWL-Trail-13 Southwest Rail Trail:** Trail running along the southern edge of the CPR Corridor between the western edge of the Smithville urban boundary and South Grimsby Road 5.
- **TWL-Trail-14 North Creek Trail:** Trail linking South Grimsby Road 6 and Streamside Park.

Table 9: Summary of Recommendations - New Roads, Road Upgrades, and Junction Improvements (Niagara Region Projects)*

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
RR/TWL-Road-02**	New Road	New Northern Connector	2.5 km	Collector at minimum - range should be for Collector – Regional Road	Multi-Use Path or Bike Lanes	Potential for Integration of Hydro Corridor Trail from Industrial Park Road to Spring Creek Road Extension into Road Right-of-Way subject to EA to be conducted by the Region. Three-stage Process: 1) Modelling Assessment; 1) New Roads and Streetscape Cross Sections
RR-Road-03***	New Road	New Western Link	2 km – 2.5 km	Collector at minimum - range should be for Collector – Regional Road	None	Three-stage Process: 1) Modelling Assessment
RR-Road-04***	New Road	New Eastern Link	2 km	Collector at minimum - range should be for Collector – Regional Road	None	Three-stage Process: 1) Modelling Assessment
RR-Road-11	Road Upgrade/Retrofit	Regional Road 14 (between Young Street and New Northern Connector)	0.5 km	Arterial B	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
RR-Road-12	Road Upgrade/Retrofit	Regional Road 14 (between New Northern Connector and Spring Creek Road)	0.5 km	Arterial B	Bike Lanes	Three-stage Process: 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
RR-Road-13	Road Upgrade/Retrofit	Regional Road 14 (between Spring Creek Road and Regional Road 20)	1 km	Arterial B	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
RR-Road-14	Road Upgrade/Retrofit	Industrial Park Road (between Young Street and New Northern Connector)	0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades
RR/TWL-Road-15**	Road Upgrade/Retrofit	Industrial Park Road (between New Northern Connector and New Eastern Link)	1 km	Collector at minimum - range should be for Collector – Regional Road	To be determined	Road to be updated to same level of cross section or higher as surrounding road classifications for Smithville Bypass Three-stage Process: 1) Modelling Assessment and 3) Supporting Upgrades; 3) Supporting Links

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
RR-Road-17b	Road Upgrade/Retrofit	Townline Road (between Regional Road 14 (Canborough Street) and New Western Collector 1)	1 km	Arterial B	Bike Lanes	Widen to three lanes. Three-stage Process: 1) Modelling Assessment and 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63.); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
RR-Road-18	Road Upgrade/Retrofit	Townline Road (between New Western Collector 1 and South Grimsby Road 6)	0.5 km	Collector	Bike Lanes	To be upgraded to a Collector cross section standard. Three-stage Process: 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
RR-Junction-01	Junction Improvement	Regional Road 14 (Station Street) and Spring Creek Road	-	-	-	Existing junction – review for improvement opportunities
RR-Junction-03	Junction Improvement	Regional Road 20, South Grimsby Road 8, and New Western Link	-	-	-	Existing junction – review for improvement opportunities Three-stage Process: 1) Modelling Assessment
RR-Junction-04	Junction Improvement	Regional Road 20 and South Grimsby Road 7	-	-	-	Existing junction – review for improvement opportunities
RR/TWL-Junction-05**	Junction Improvement	Spring Creek Road Extension and New Western Link/New Northern Connector	-	-	-	New junction – review for signaled potential Three-stage Process: 1) Modelling Assessment
RR/TWL-Junction-06**	Junction Improvement	South Grimsby Road 5 and New Northern Connector	-	-	-	New junction – review for signaled potential Three-stage Process: 1) Modelling Assessment
RR-Junction-07	Junction Improvement	Regional Road 14 (Station Street) and New Northern Connector	-	-	-	New junction – review for signaled potential Three-stage Process: 1) Modelling Assessment
RR/TWL-Junction-08**	Junction Improvement	Industrial Park Road and New Northern Connector	-	-	-	New junction – review for signaled potential

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
						Three-stage Process: 1) Modelling Assessment
RR/TWL-Junction-09**	Junction Improvement	Industrial Park Road and Spring Creek Road	-	-	-	Existing junction – review for improvement opportunities
RR-Junction-10	Junction Improvement	Regional Road 20 (St. Catharines Street) and Industrial Park Road	-	-	-	Existing junction – review for improvement opportunities
RR-Junction-11	Junction Improvement	Regional Road 14 (Canborough Street)/Port Davidson Road and Townline Road	-	-	-	Existing Junction – Review for Improvement Opportunities. Potential opportunity to realign Port Davidson Road to connect to the Townline Road/Canborough Street intersection in the future. Three-stage Process: 1) Modelling Assessment
RR-Junction-12	Junction Improvement	South Grimsby Road 6 and Townline Road	-	-	-	Existing junction – review for improvement opportunities
RR-Junction-13	Junction Improvement	New Eastern Link and Industrial Park Road	-	-	-	New junction – review for signalized potential Three-stage Process: 1) Modelling Assessment
RR-Junction-14	Junction Improvement	Regional Road 20 and New Eastern Link	-	-	-	New junction – design to be determined
RR-Junction-15	Junction Improvement	Townline Road/New Western Collector 1/Tober Road Realignment	-	-	-	New junction – design to be determined

*Proposed road implementation or upgrades, including estimated lengths and road classifications, to enable cycling facilities are subject to change. All works would be subject to EA due diligence and the appropriate planning and design.

**Regional or Township (Pending Outcome of Smithville Bypass EA)

***Regional (Pending Outcome of Smithville Bypass EA)

Table 10: Summary of Recommendations - New Roads, Road Upgrades, and Junction Improvements (Township Projects)*

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
TWL-Road-01	New Road	Spring Creek Road Extension	1 km	Collector	Bike Lanes	Three-stage Process: 1) New Roads and Streetscape Cross Sections
RR/TWL-Road-02**	New Road	New Northern Connector	2.5 km	Collector at minimum - range should be for collector - Arterial A (highest)	Multi-Use Path or Bike Lanes	Potential for Integration of Hydro Corridor Trail from Industrial Park Road to Spring Creek Road Extension into Road Right-of-Way subject to EA to be conducted by the Region.
TWL-Road-05	New Road	Tober Road Realignment/New Southern Collector 2/New Southern Collector 1	2 km – 2.5 km	Collector	Bike Lanes	Three-stage Process: 1) Modelling Assessment; 1) New Roads and Streetscape Cross Sections
TWL-Road-06	New Road	New Western Collector 1	1.5 km – 2 km	Collector	Bike Lanes	Three-stage Process: 1) Modelling Assessment; 1) New Roads and Streetscape Cross Sections
TWL-Road-07	Road Upgrade/Retrofit	Spring Creek Road (between Spring Creek Road Extension and Regional Road 14)	<0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-08	Road Upgrade/Retrofit	South Grimsby Road 5 (between Young Street and New Northern Connector)	0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-09	Road Upgrade/Retrofit	South Grimsby Road 5 (between New Northern Connector and Spring Creek Road)	0.5 km	Collector	Bike Lanes	Three-stage Process: 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63.); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
TWL-Road-10	Road Upgrade/Retrofit	South Grimsby Road 5 (between Spring Creek Road and Regional Road 20)	0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-14	Road Upgrade/Retrofit	Industrial Park Road (between Young Street and New Northern Connector)	0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
RR/TWL-Road-15**	Road Upgrade/Retrofit	Industrial Park Road (between New Northern Connector and New Eastern Link)	1 km	Collector at minimum - range should be for collector - Arterial A (highest)	To be determined	Road to be updated to same level of cross section or higher as surrounding road classifications for Smithville Bypass

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
TWL-Road-16	Road Upgrade/Retrofit	Industrial Park Road (between New Eastern Link and Regional Road 20)	1km	Arterial B	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-17a	Road Upgrade/Retrofit	Townline Road (between Regional Road 20 and Regional Road 14 (Canborough Street))	1.5 km	Arterial B	Bike Lanes	Widen to three lanes. Three-stage Process: 1) Modelling Assessment and 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63.); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
TWL-Road-19	Road Upgrade/Retrofit	Port Davidson Road (between Townline Road and New Southern Collector 2)	0.5 km	Collector	Bike Lanes	Potential opportunity to realign Port Davidson Road to connect to the Townline Road/Canborough Street intersection in the future and explore resulting junction improvements. Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-20	Road Upgrade/Retrofit	Shurie Road (between Townline Road and New Southern Collector 1)	0.5 km	Collector	Bike Lanes	Three-stage Process: 3) Supporting Upgrades; 3) Supporting Links
TWL-Road-21	Road Upgrade/Retrofit	South Grimsby Road 6 (between New Western Collector 1 and Townline Road)	1.5 km	Rural Edge Route	Multi-Use Path	Three-stage Process: 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63.); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network
TWL-Road-22	Road Upgrade/Retrofit	South Grimsby Road 6 (between Regional Road 20 and New Western Collector 1)	0.5 km – 1 km	Collector	Bike Lanes	Three-stage Process: 2) Block Plan Requirements (upgrading of road supports Block Plan development as per OPA No. 63.); 2) Block Plan Phasing Requirements / Regional Strategic Cycling Network

Project ID	Category (New Road; Road Upgrade/Retrofit; Junction Improvement)	Road Name; Boundaries	Estimated Total Length	Road Classification	On-Street Cycling Facilities	Notes
TWL-Road-23	Road Upgrade/Retrofit	Young Street (between Regional Road 14 and South Grimsby Road 2)	1.5 km	Rural Edge Route	Multi-Use Path	Upgrading of road supports Block Plan development as per OPA No. 63. Subject to EA.
TWL-Junction-02	Junction Improvement	South Grimsby Road 5 and Spring Creek Road	-	-	-	New junction – design to be determined
RR/TWL-Junction-05**	Junction Improvement	Spring Creek Road Extension and New Western Link/New Northern Connector	-	-	-	New junction – review for signalized potential
RR/TWL-Junction-06**	Junction Improvement	South Grimsby Road 5 and New Northern Connector	-	-	-	New junction – review for signalized potential
RR/TWL-Junction-08**	Junction Improvement	Industrial Park Road and New Northern Connector	-	-	-	New junction – review for signalized potential
RR/TWL-Junction-09**	Junction Improvement	Industrial Park Road and Spring Creek Road	-	-	-	Existing junction – review for improvement opportunities
TWL-Junction-16	Junction Improvement	Tober Road/New Southern Collector 2	-	-	-	New junction – design to be determined
TWL-Junction-17	Junction Improvement	Port Davidson Road/New Southern Collector 1/New Southern Collector 2	-	-	-	New junction – design to be determined
TWL-Junction-18	Junction Improvement	Shurie Road and New Southern Collector 1	-	-	-	New junction – design to be determined
TWL-Junction-19	Junction Improvement	South Grimsby Road 6 and New Western Collector 1	-	-	-	New junction – design to be determined

*Proposed road implementation or upgrades, including estimated lengths and road classifications, to enable cycling facilities are subject to change. All works would be subject to EA due diligence and the appropriate planning and design.

**Regional or Township (Pending Outcome of Smithville Bypass EA)

Figure 23: Updated Road Classifications

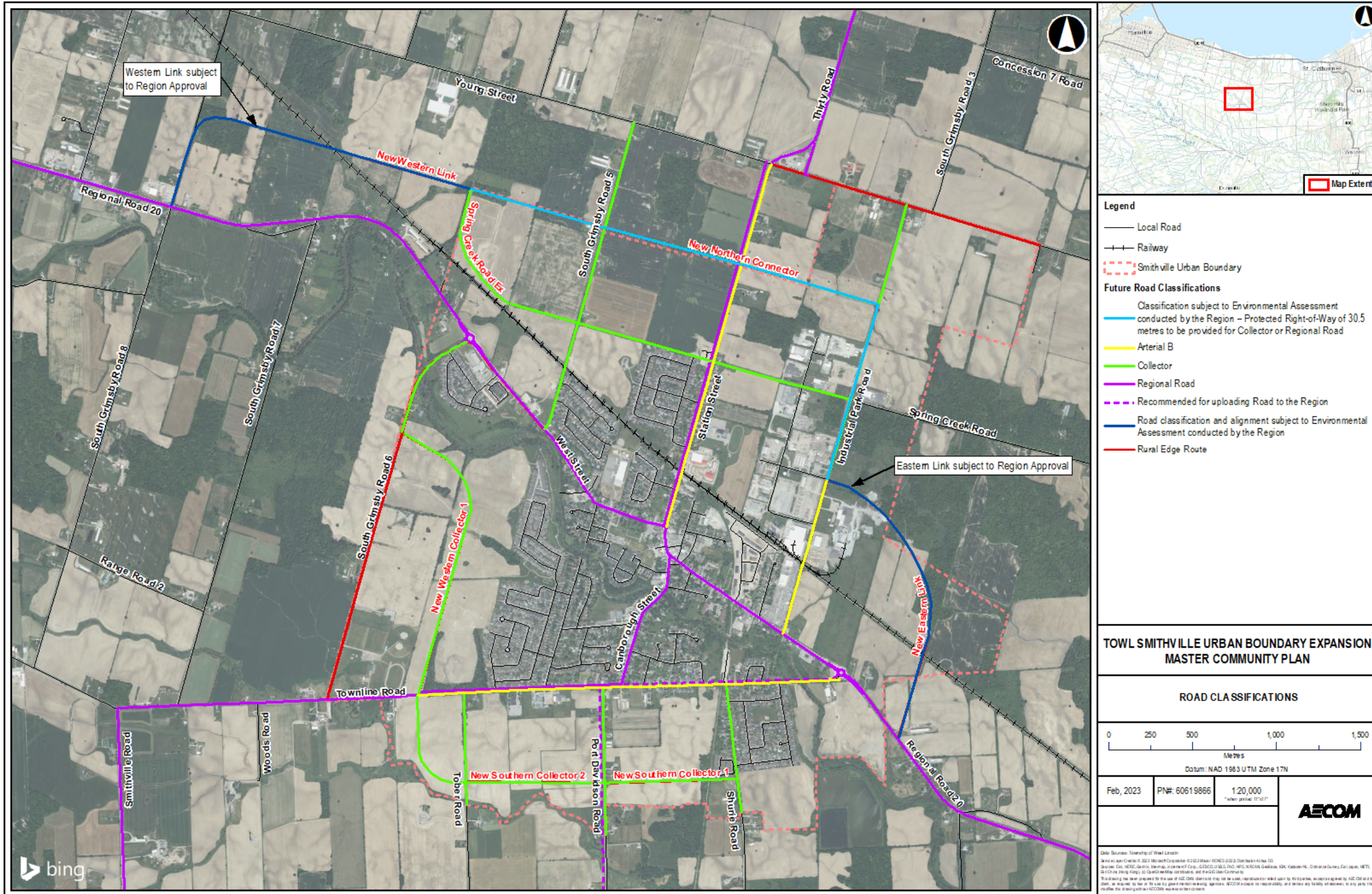


Figure 24: Proposed New Roads and Road Upgrades

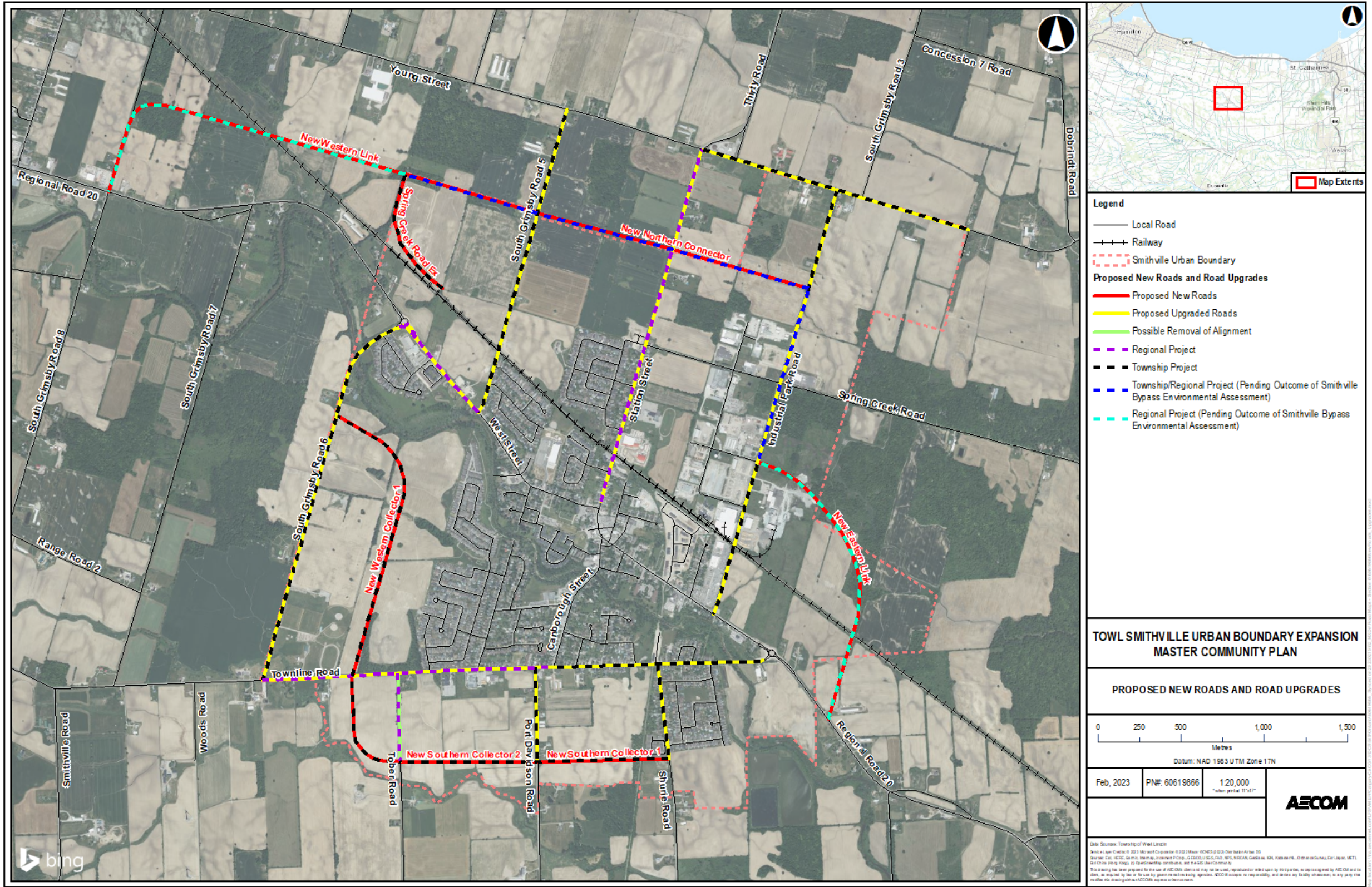


Figure 25: Planned Junction Improvements

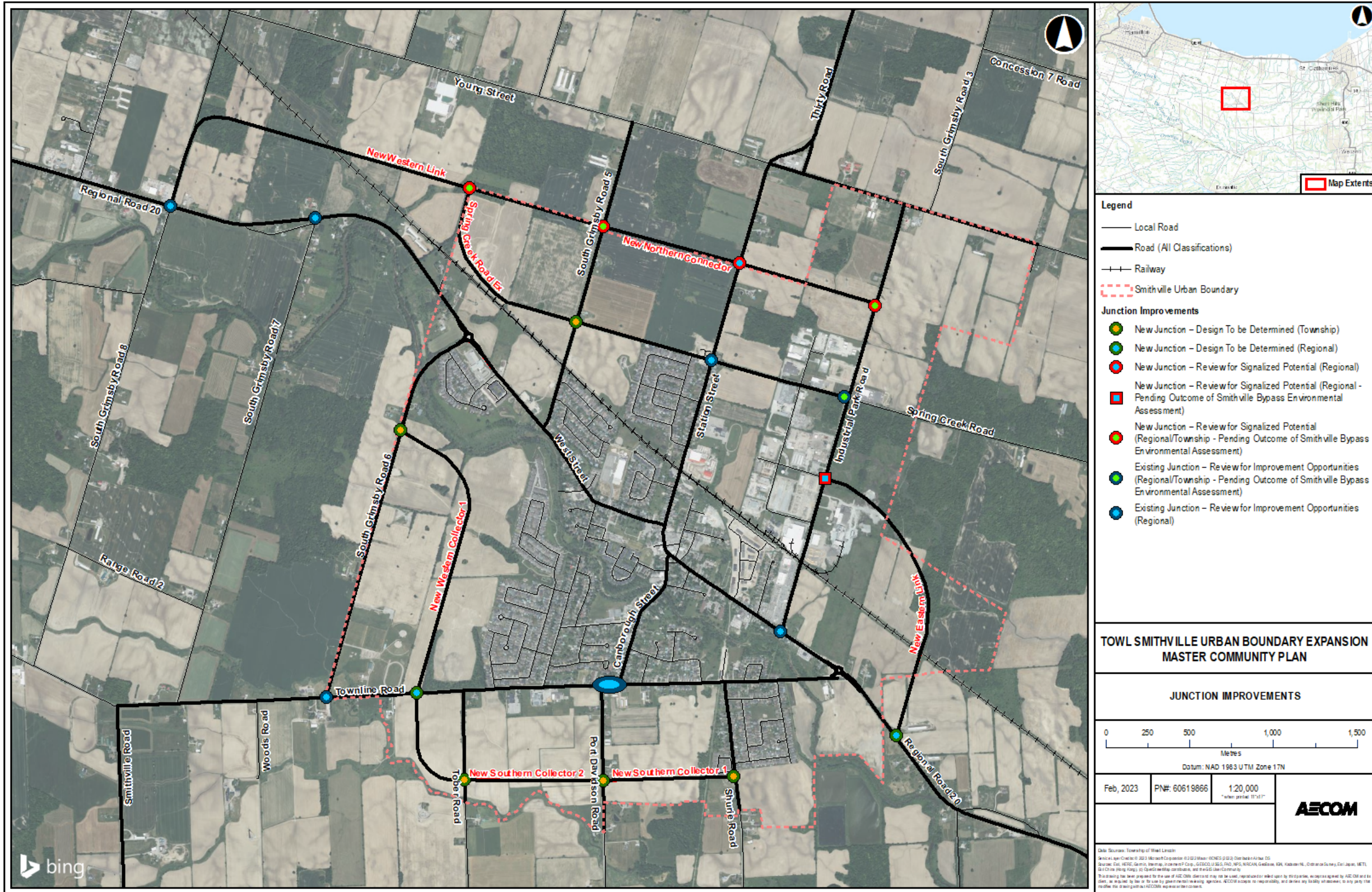


Figure 26 Potential Roads for Jurisdiction Transfer

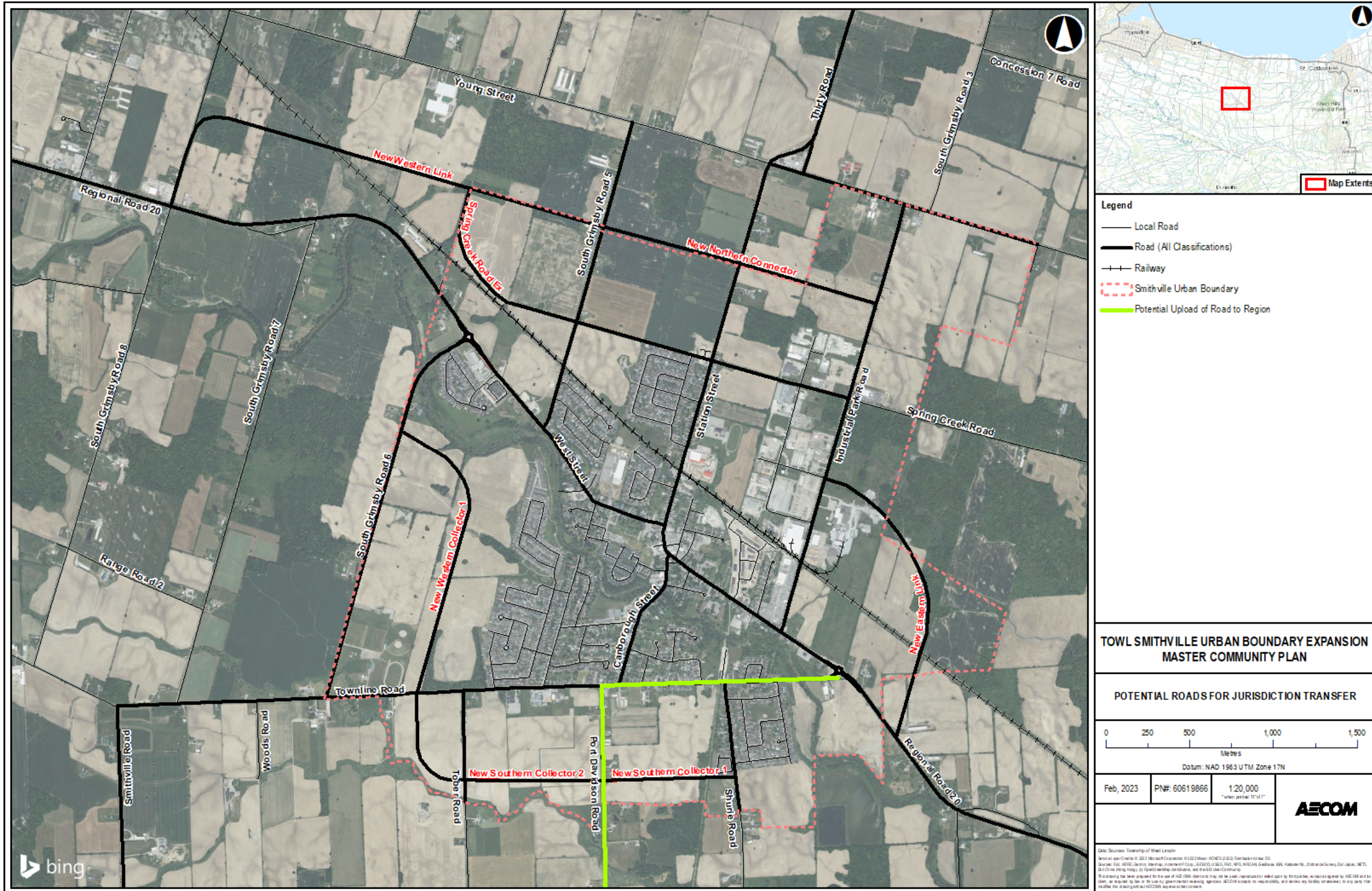


Table 11: Summary of Recommendations – Proposed Trails (Township Projects)*

Project ID	Trail Name	Estimated Total Length	Trail Boundaries	Estimated Trail Crossing Locations**	Notes
TWL-Trail-01	Hydro Corridor Trail	2.5 km	Between Spring Creek Road Extension and Industrial Park Road	Two locations (South Grimsby Road 5; Regional Road 14)	Provincial Secondary Land Use Program (PSLUP)
TWL-Trail-02	South Creek Trail Extension	1 km	Between South Creek Trail and South Grimsby Road 6	-	-
TWL-Trail-03	South Grimsby Road 5 Trail	1 km	Between South Grimsby Road 5/Regional Road 20 Intersection and Townline Road/Tober Road Realignment Intersection	Three Locations (Regional Road 20; New Western Collector 1; Townline Road)	-
TWL-Trail-03a (Pedestrian Bridge)	South Grimsby Road 5 Trail – Pedestrian Bridge	-	-	-	-
TWL-Trail-04	Enbridge Trail	2.5 km – 3 km	Between the Tober Road Realignment and Regional Road 20	Two Locations (Tober Road Realignment, Port Davidson Road, and Shurie Road)	-
TWL-Trail-05	South Loop Trail	2.5 km	Between Tober Road Realignment and Shurie Road	Two Locations (Tober Road and Port Davidson Road)	-
TWL-Trail-06	Old Rail Trail	1 km	Between Townline Road and Southern Edge of Urban Boundary	One Location (New Southern Collector 1)	Private development north of trail prevents extension to Regional Road 20. Trail identified in Regional TMP; coordinate with Region for implementation of trail and opportunities for future extensions.
TWL-Trail-07	Northwest Rail Trail – North	1.5 km - 2 km	Between western edge of Northwest Quadrant Secondary Plan boundary and Hornak Road	One Location (South Grimsby Road 5)	Trail to support Northwest Quadrant Secondary Plan.
TWL-Trail-08	Industrial Park-Townline Connector Trail	0.25 km	Between Region Road 20/Industrial Park Road Intersection and Townline Road	One Location (Regional Road 20)	-
TWL-Trail-08a (Pedestrian Bridge)	Industrial Park-Townline Connector Trail – Pedestrian Bridge	-	-	-	-
TWL-Trail-09	Southeast Rail Trail	0.5 km – 1 km	Between Industrial Park Road and New Eastern Link	-	Trail to support East Smithville Secondary Plan.
TWL-Trail-10	Margaret-McMurchie Trail	0.25 km	Between Margaret Street and McMurchie Lane	-	Trail to support 186 Margaret Street development.
TWL-Trail-11	Southeast River Trail 2	0.5 km	Between CPR Corridor and Regional Road 20	One Location (Regional Road 20)	Trail to support East Smithville Secondary Plan.

Project ID	Trail Name	Estimated Total Length	Trail Boundaries	Estimated Trail Crossing Locations**	Notes
TWL-Trail-12	Southeast River Trail 1	0.5 km	Between CPR Corridor and Regional Road 20/Industrial Park Road Intersection	One Location (Regional Road 20)	Trail to support East Smithville Secondary Plan.
TWL-Trail-13	Southwest Rail Trail	1 km	Between South Grimsby Road 5 and Western Edge of Smithville Urban Boundary	-	Trail to support Northwest Quadrant Secondary Plan.
TWL-Trail-14	North Creek Trail	0.5 km	Between South Grimsby Road 6 and Streamside Park	-	-

*Proposed trails subject to change. All trails would be subject to EA due diligence and applicable planning and design.

**Trail crossings with arterial/collector roads. Infrastructure crossings over Regional Roads would require collaboration with the Region and determination of ongoing responsibilities for road and crossing operation.

Figure 27: New Cycling and Trail Network – With Gaps

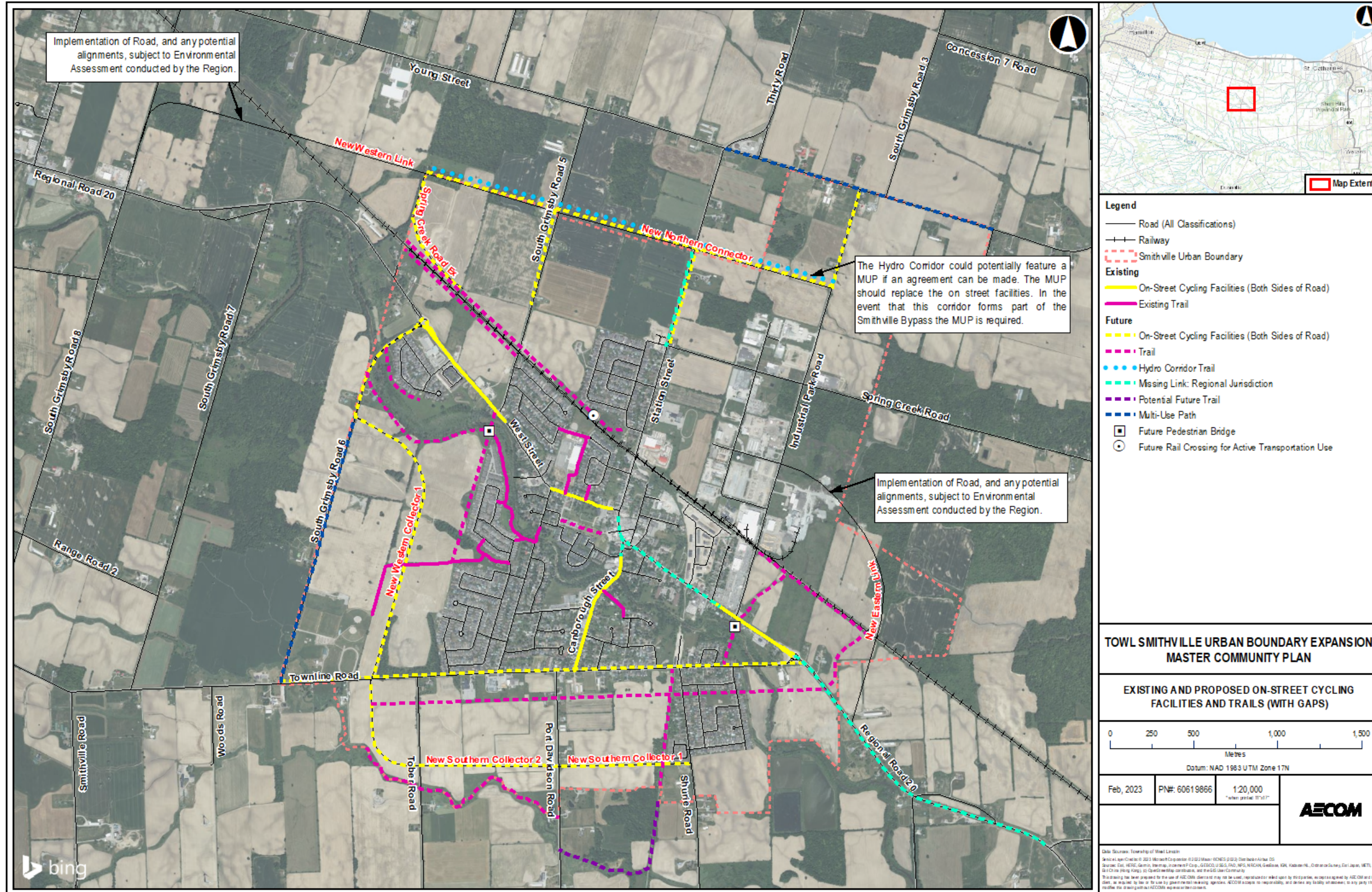


Figure 28: New Cycling and Trail Network – Without Gaps

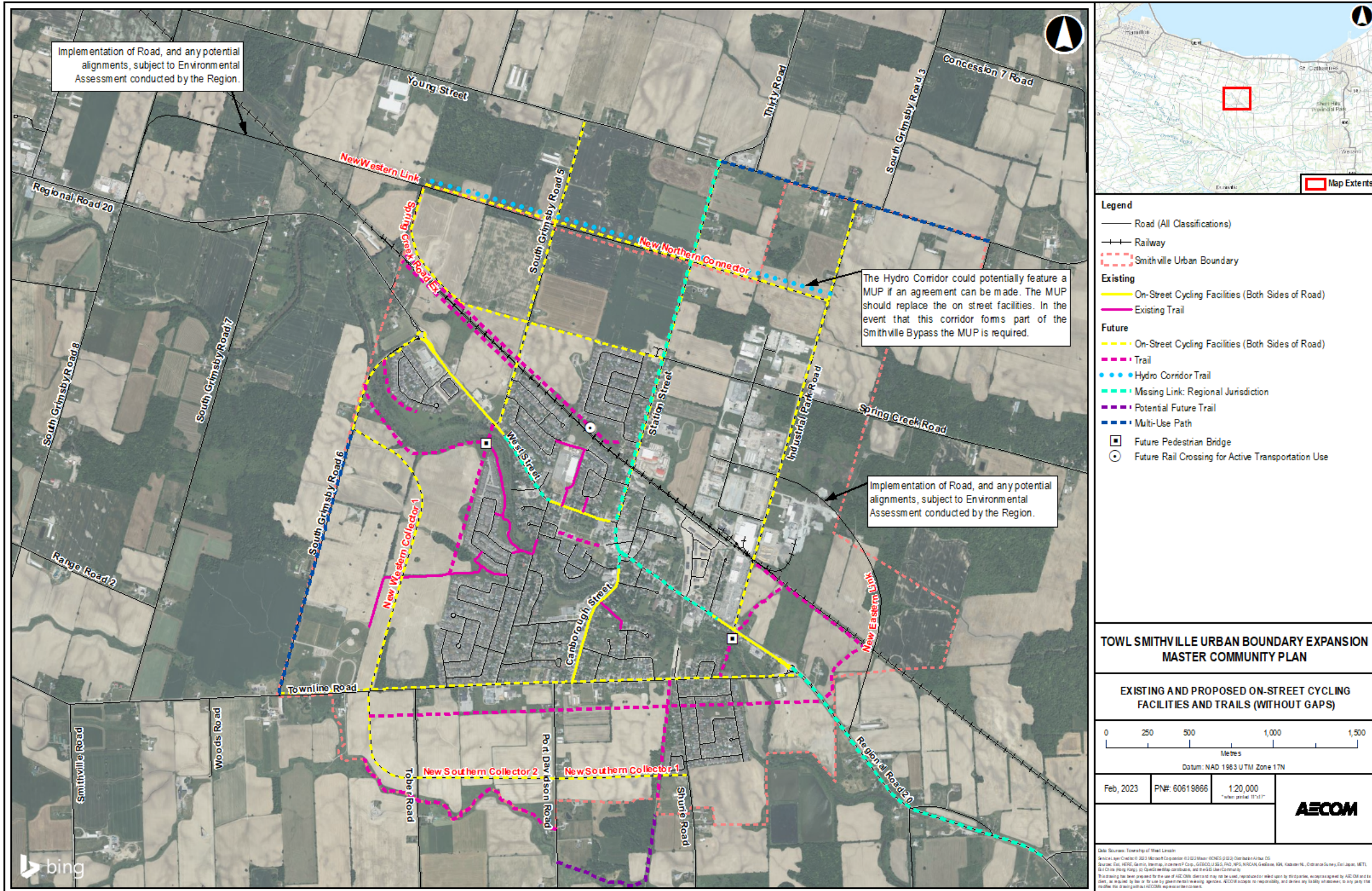
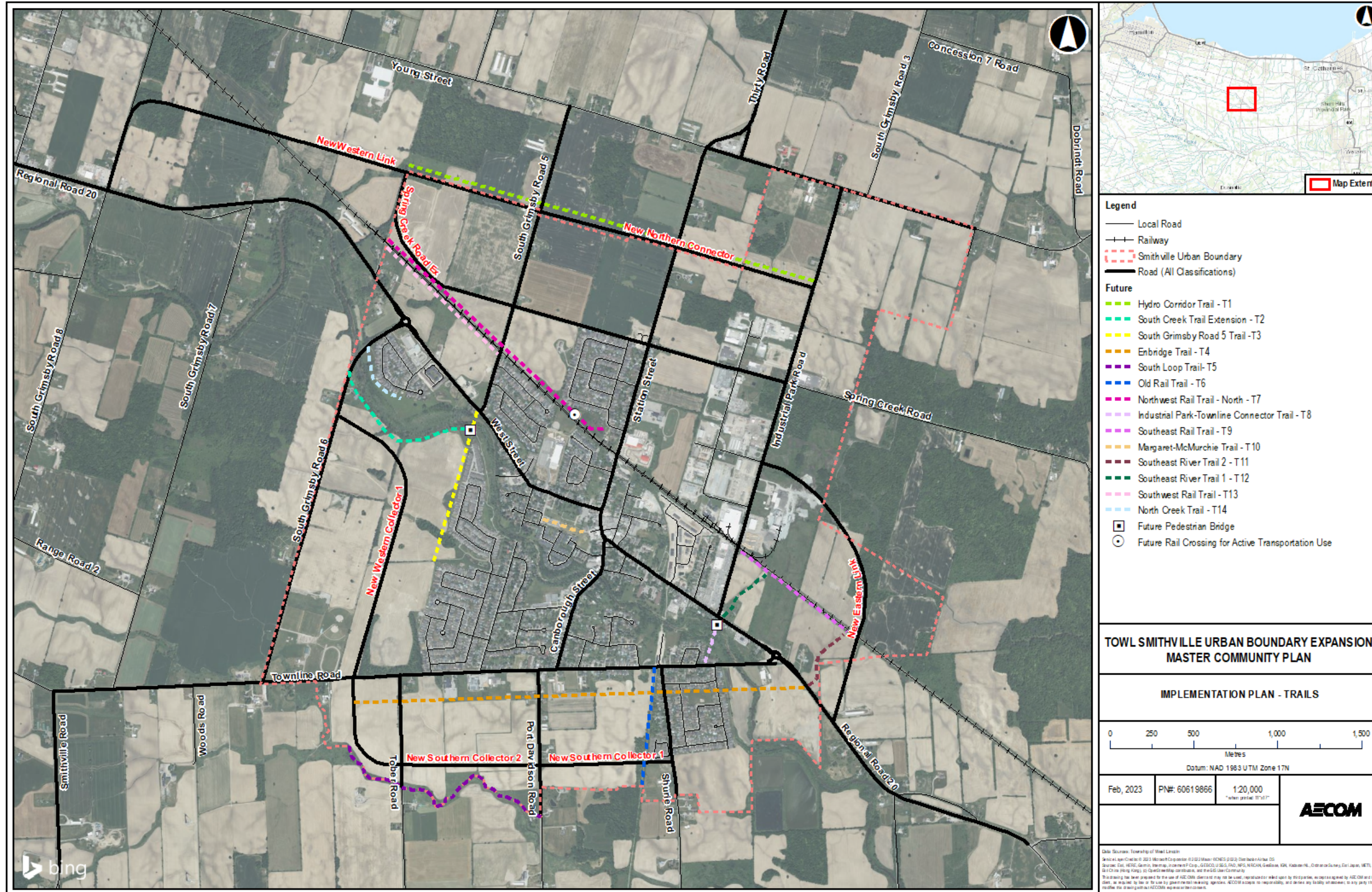


Figure 29: Implementation Plan – Trails



5.2 Non-Infrastructure Measures

In addition to infrastructure measures that would be implemented in the form of Regional and Township projects, there are also a series of non-infrastructure recommendations. The recommendations are organized in the following categories:

- **Active Transportation:** Supporting recommendations to further enhance the infrastructure-based measures. These recommendations capture all other active transportation-based initiatives such as soft measures, collaborations, and general principles.
- **Transit:** Recommendations to promote the use of transit within Smithville.
- **Safety Programs:** Feedback from PIC comments indicated the importance of safety in the transportation network to the community, especially those who utilized active transportation. Given that OTM Book 18 identifies that 51%-56% of the general population that may be interested in riding a bicycle fall under the “interested but concerned” category, it is imperative that active transportation users, in particular, feel safe and secure when travelling around Smithville. The safety program recommendations noted below consider all modes of transportation through the process. Where feasible, the implementation of proactive measures would provide additional benefit to the community over reactive measures in response to safety concerns should they arise.
- **Transportation Demand Management:** Transportation Demand Management (TDM) uses a mixture of hard (i.e. infrastructure) and soft (i.e. policies, programs, and initiatives) measures to encourage the efficient use of the transportation system. TDM measures typically focus on utilizing existing transportation infrastructure to its maximum potential and promote trips be completed by modes other than single-occupancy vehicles. While the vast majority of Smithville residents were the driver of a private vehicle as their main method of commuting, 91% as of the 2016 Census, encouraging the use of alternative modes such as walking and cycling would contribute to promoting Smithville a green community and support it’s small-town character where residents can walk to the local store or access other services without relying on a vehicle.

5.2.1 Regional Projects

5.2.1.1 Active Transportation

- **RR-AT-01:** Work with the Region to promote the implementation of the Strategic Cycling Network outlined within the Region’s TMP.
- **RR-AT-02:** Where existing cycling facilities are identified by the Region but not indicated by the appropriate pavement markings and signage, support the Region in addressing the missing linkages within their jurisdiction.

5.2.1.2 Transit

- **RR-Transit-01 Promote Existing NRT OnDemand Services:** Promote the use of the existing NRT OnDemand service to connect Smithville residents to surrounding municipalities and to conventional transit services.
- **RR-Transit-02 Partnership to Develop Transit in Smithville:** Work with NRT and the newly formed Regional transit commission to assess demand for service within Smithville and to develop fixed routes or inter-municipal transit systems.
- **RR-Safety-02 Support Niagara Region for Vision Zero:** Continue to support the Region in implementing elements of Vision Zero on Regional roads within Smithville including automated speed enforcement, red light cameras, and Community Safety Zones; as well as providing information to further support such initiatives such as traffic data and road designs when requested.
 - The Region’s Vision Zero Road Safety Programs “aims to eliminate all vehicular and pedestrian injury or death on regional roads”.

- Existing Community Safety Zones within Smithville include John Calvin School (Station Street between Spring Creek Road and West Street) and Smithville District Christian High School (Townline Road between Harvest Gate and Canborough Street).

5.2.2 Township Projects

5.2.2.1 Active Transportation

- **TWL-AT-03:** Investigate the desire to implement a program which connects Smithville residents in need with bicycles and cycling equipment, including helmets and bicycle locks, to reduce the barrier to entry due to equity considerations. Such investigation could determine potential thresholds for identifying residents including low income cut-offs (LICO) and low income measure (LIM) as well as developing potential collaborations with local organizations for the roll-out of such equipment and to determine the level of interest from residents.
- **TWL-AT-04:** All midblock trail crossings or trail crossings not at a roadway intersection are to include the appropriate crossing treatments as outlined in OTM Book 12 and in accordance with the applicable local standards. Where possible, align trail crossings at existing or planned intersections.
- **TWL-AT-05:** Trails which terminate at roadways are to provide the appropriate transition facilities to connect to on-street cycling facilities or the pedestrian sidewalk network.
- **TWL-AT-06:** Promote the implementation and retrofitting of roads to include pedestrian facilities in line with the Smithville Cross Section standards (**Section 4.7**).
- **TWL-AT-07:** All new and upgraded intersections identified within this TMP are to include complete pedestrian facilities; with the appropriate pedestrian crossing treatments as outlined in OTM Book 12 and in accordance with the applicable local standards.

5.2.2.2 Safety Programs

- **TWL-Safety-01 Collision Analysis Task:** Conduct a collision analysis to investigate the existing transportation-related safety context within the community.
 - This includes:
 - Reviewing collision data and noting trends related to the type, severity, locations, times of day, days of the week, and seasons in which collisions occur. Data related to other safety-related measures such as speeding incidents, thefts of bicycles, and disturbances on trails can also be reviewed.
 - Defining thresholds or criteria for determining collision or other safety-related hot spots and applying the methodology to the collision data reviewed. Such hot spots would be any location where incidents occur beyond an acceptable threshold by the Township, considering the costs to society.
 - Holding discussions with the Region, Niagara Regional Police, local schools, and other community organizations to understand the qualitative context for the safety of the transportation network within Smithville and discuss the collisions analysis task.
 - The results of the collision analysis task would act as a pre-screening tool to determine if further study and capital investment is required to assess the transportation safety context within the community and develop a safety program. If further assessment is deemed to be required, additional studies such as a network screening (expanded collision analysis) and in-service road safety reviews (elements not identified by collision analysis including assessment on sightlines and access management) could be conducted either community-wide or at the identified hot-spot locations to identify locations which have potential to receive the most benefits from safety improvements.
- **TWL-Safety-03 Safety Programs for Schools:** Collaborate with Niagara Regional Police to conduct safety programs with local schools to promote a positive cycling culture from a young age.

- This includes having staff visit schools to educate students on being aware of surroundings while cycling, how to securely lock a bicycle to a rack, and how to protect bicycles from theft; as well as conducting programs and trips with the Niagara Safety Village.
- **TWL-Safety-04 Traffic Calming Programs:** Develop a process to assess community requests for traffic calming measures.
 - Traffic calming measures are typically investigated on a request-basis and are implemented into right-of-ways to reduce vehicular speeds, reduce the number of vehicles that travel directly through a right-of-way, and to improve the overall streetscape². Measures may include:
 - Vertical deflections (such as raised crosswalks or speed humps or cushions);
 - Horizontal deflections (such as roundabouts, traffic circles, or realigned intersections);
 - Roadway narrowing (such as achieved through median islands or on-street parking);
 - Routing restrictions; and
 - Other tools such as education, enforcement, signs, pavements markings, textured pavement, and streetscaping.
 - As outlined within the Region’s TMP, traffic calming is considered part of the complete streets policy and is only permitted on Regional roads in the form of lane width narrowing. However, traffic calming programs exist in other lower-tier municipalities across the Region including the Town of Lincoln and the City of Niagara Falls, and present a clear process for how requests for traffic calming measures are assessed.
 - The Official Plan for the Township of West Lincoln requires that traffic calming measures be integrated into the road network. However, developing and publishing a publicly-available decision-making process for traffic calming requests would proactively prepare the Town for any requests which could come in from local residents after initial land development processes are completed, in response to changing conditions. As maintaining the small-town character of Smithville is important to local residents, implementing traffic calming measures as the community grows would help to keep its relaxed and quiet character.

5.2.2.3 Transportation Demand Management

The following are recommendations for soft measures which can be implemented to promote TDM within Smithville:

- **TWL-TDM-01 Parking Strategy:** It is recommended that a parking strategy be developed to understand the parking needs within the community as it grows and to avoid any future land use impacts. In particular, downtown Smithville is identified as an intensification area in which a greater number of visitors would be attracted as the community grows and the core is further developed. Having a parking strategy is one component of promoting a sustainable transportation network within the community and may consider both motorized vehicle and bicycle parking requirements. The parking strategy would identify the current parking opportunities and constraints within the community, project for future parking needs as the community grows, discuss safe parking lot practices. Policies developed as part of such strategy could be enforced through the Township’s parking bylaw.
- **TWL-TDM-02 Thresholds for Travel Plans:** Travel plans are a location-specific tool for controlling traffic at large sites or trip generators, detailing methods such as staggering start/end times for employees at a business or encouraging that a destination be reach by a variety of transportation options. With an additional 3,600 jobs planned to be added between 2022 and 2051, along with new employment areas north of the CPR corridor; as well as 14,500 additional residents between 2022 and 2051 across the community, it is important that the significant growth Smithville will experience does not negatively impact the efficiency of the transportation network.

² Institute of Traffic Engineers (n.d.). Traffic Calming Measures. Retrieved from <https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures/>

It is recommended that the town develop a set of thresholds which would trigger the requirement for a travel plan to be prepared by an agency, such as a destination exceeding the approved population or employment density or a business or community facility that is unable to meet the minimum parking requirements outlined in the parking bylaw. Such thresholds can also be prioritized in different locations within the community, particularly in the intensification area where space for expansion is limited. Circumstances which may require a travel plan be prepared include:

- Existing businesses with a physical location looking to hire additional employees beyond the density threshold allocated for such land uses or where they would no longer comply with the parking bylaw, with or without a building extension or property expansion.
- New businesses with a physical location looking to hire a higher number of employees beyond the density threshold allocated for such land uses or where they would be unable to comply with the parking bylaw.
- New destinations which are anticipated to attract a significant number of trips at a neighbourhood or community-scale, particularly at certain times of the day (such as AM/PM peak hours).

For non-revenue generating agencies, such as schools, community facilities, or other services, the Township could collaborate with such institutions to develop the travel plans.

- **TWL-TDM-03 School Incentive Program:** Collaborate with local schools to develop an incentive program for students to walk or cycle to school, with prizes such as coupons to bicycle shops within the Region. With the understanding that some schools may attract students from beyond the community, such incentive programs would need to be tailored to meet the needs of each individual school through discussion and collaboration.
- **TWL-TDM-04 Promoting the Economic Vitality of Downtown Core:** As indicated in the comments received from respondents at PICs, there was concern that implementing the Smithville Bypass may cause vehicles besides heavy trucks supporting goods movement to also use it, which may result in fewer and fewer vehicles travelling through the Downtown Core, reducing visibility for downtown businesses. It is recommended to promote the economic viability of Smithville's Downtown Core through transportation-related initiatives such as streetscaping and parking strategies, including publishing public parking information on the Township's website to make trip planning convenient for visitors looking to travel to the community.

5.3 TMP Goals and Objectives Alignment

Table 12 summarizes the alignment of the TMP's goals and objectives with the recommended infrastructure and non-infrastructure measures.

Table 12: Alignment of TMP Goals and Objectives with Recommendations

Project ID	Create a Complete Transportation Network			Incorporate both local and regional economic growth			Sustainably grow the community			Provide convenient mode choices		Improve the level of health and safety				Consistent implementation and monitoring		
	Key Connection Points	Movement of Residents, Visitors, and Goods	Flexibility of Transportation Network	Growth of Local Economy	Smithville as a Commercial and Industrial Centre	Benefit to Regional Economy	Appropriate Transportation Network	Balance Development of Transportation and Land Use	Small Town Character of Smithville	Balance of Mode Choice	Convenience of Active Transportation	Safety Programs	Safety of Through-Traffic	Active Transportation Opportunities	Environmentally Sustainable Transportation Network	Economically-Viable Development	Consideration for Alternatives	Maintenance of Transportation Network
Infrastructure Measures																		
TWL-Road-01	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR/TWL-Road-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-03	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	
RR-Road-04	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	
TWL-Road-05	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-06	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-07	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-08	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-09	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-10	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-14	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR/TWL-Road-15	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-16	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Project ID	Create a Complete Transportation Network			Incorporate both local and regional economic growth			Sustainably grow the community			Provide convenient mode choices		Improve the level of health and safety				Consistent implementation and monitoring		
	Key Connection Points	Movement of Residents, Visitors, and Goods	Flexibility of Transportation Network	Growth of Local Economy	Smithville as a Commercial and Industrial Centre	Benefit to Regional Economy	Appropriate Transportation Network	Balance Development of Transportation and Land Use	Small Town Character of Smithville	Balance of Mode Choice	Convenience of Active Transportation	Safety Programs	Safety of Through-Traffic	Active Transportation Opportunities	Environmentally Sustainable Transportation Network	Economically-Viable Development	Consideration for Alternatives	Maintenance of Transportation Network
TWL-Road-17a	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-17b	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Road-18	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-19	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL0Road-20	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-21	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-22	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Road-23	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Junction-02	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-03	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	
RR-Junction-04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR/TWL-Junction-05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR/TWL-Junction-06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Project ID	Create a Complete Transportation Network			Incorporate both local and regional economic growth			Sustainably grow the community			Provide convenient mode choices		Improve the level of health and safety				Consistent implementation and monitoring		
	Key Connection Points	Movement of Residents, Visitors, and Goods	Flexibility of Transportation Network	Growth of Local Economy	Smithville as a Commercial and Industrial Centre	Benefit to Regional Economy	Appropriate Transportation Network	Balance Development of Transportation and Land Use	Small Town Character of Smithville	Balance of Mode Choice	Convenience of Active Transportation	Safety Programs	Safety of Through-Traffic	Active Transportation Opportunities	Environmentally Sustainable Transportation Network	Economically-Viable Development	Consideration for Alternatives	Maintenance of Transportation Network
RR/TWL-Junction-08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR/TWL-Junction-09	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-10	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-11	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-12	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-13	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Junction-14	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	
RR-Junction-15	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Junction-16	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Junction-17	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Junction-18	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Junction-19	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-01	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-02	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-03	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-03a	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Project ID	Create a Complete Transportation Network			Incorporate both local and regional economic growth			Sustainably grow the community			Provide convenient mode choices		Improve the level of health and safety				Consistent implementation and monitoring		
	Key Connection Points	Movement of Residents, Visitors, and Goods	Flexibility of Transportation Network	Growth of Local Economy	Smithville as a Commercial and Industrial Centre	Benefit to Regional Economy	Appropriate Transportation Network	Balance Development of Transportation and Land Use	Small Town Character of Smithville	Balance of Mode Choice	Convenience of Active Transportation	Safety Programs	Safety of Through-Traffic	Active Transportation Opportunities	Environmentally Sustainable Transportation Network	Economically-Viable Development	Consideration for Alternatives	Maintenance of Transportation Network
TWL-Trail-04	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-05	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-06	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-07	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-08	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-08a	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-09	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-10	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-11	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-12	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-13	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-Trail-14	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Non-Infrastructure Measures																		
RR-AT-01	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-AT-02	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-AT-03	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-AT-04	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-AT-05	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-AT-06	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TWL-AT-07	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RR-Transit-01	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	✓	✓	-	✓	✓	-	

Project ID	Create a Complete Transportation Network			Incorporate both local and regional economic growth			Sustainably grow the community			Provide convenient mode choices		Improve the level of health and safety				Consistent implementation and monitoring		
	Key Connection Points	Movement of Residents, Visitors, and Goods	Flexibility of Transportation Network	Growth of Local Economy	Smithville as a Commercial and Industrial Centre	Benefit to Regional Economy	Appropriate Transportation Network	Balance Development of Transportation and Land Use	Small Town Character of Smithville	Balance of Mode Choice	Convenience of Active Transportation	Safety Programs	Safety of Through-Traffic	Active Transportation Opportunities	Environmentally Sustainable Transportation Network	Economically-Viable Development	Consideration for Alternatives	Maintenance of Transportation Network
RR_Transit-02	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	✓	✓	-	✓	✓	-	
TWL-Safety-01	✓	-	-	-	-	-	✓	✓	✓	-	-	✓	✓	-	✓	✓	-	
RR-Safety-02	-	-	-	-	-	-	✓	✓	✓	-	-	✓	✓	-	✓	✓	-	
TWL-Safety-03	-	-	-	-	-	-	✓	✓	✓	-	-	✓	✓	-	✓	✓	-	
TWL-Safety-04	✓	✓	-	-	-	-	✓	✓	✓	-	-	✓	✓	-	✓	✓	-	
TWL-TDM-01	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	
TWL-TDM-02	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	
TWL-TDM-03	-	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	
TWL-TDM-04	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	

6 Implementation and Monitoring

The implementation and monitoring components of realizing the recommendations outlined within the TMP are detailed in the following subsections.

6.1 Implementation

The implementation of the recommendations outlined in the TMP are detailed in the following subsections, discussing phasing and funding for the projects.

6.1.1 Phasing

The following section discusses the factors influencing the phasing of the recommended infrastructure and non-infrastructure measures as well as the timeframes proposed for implementation.

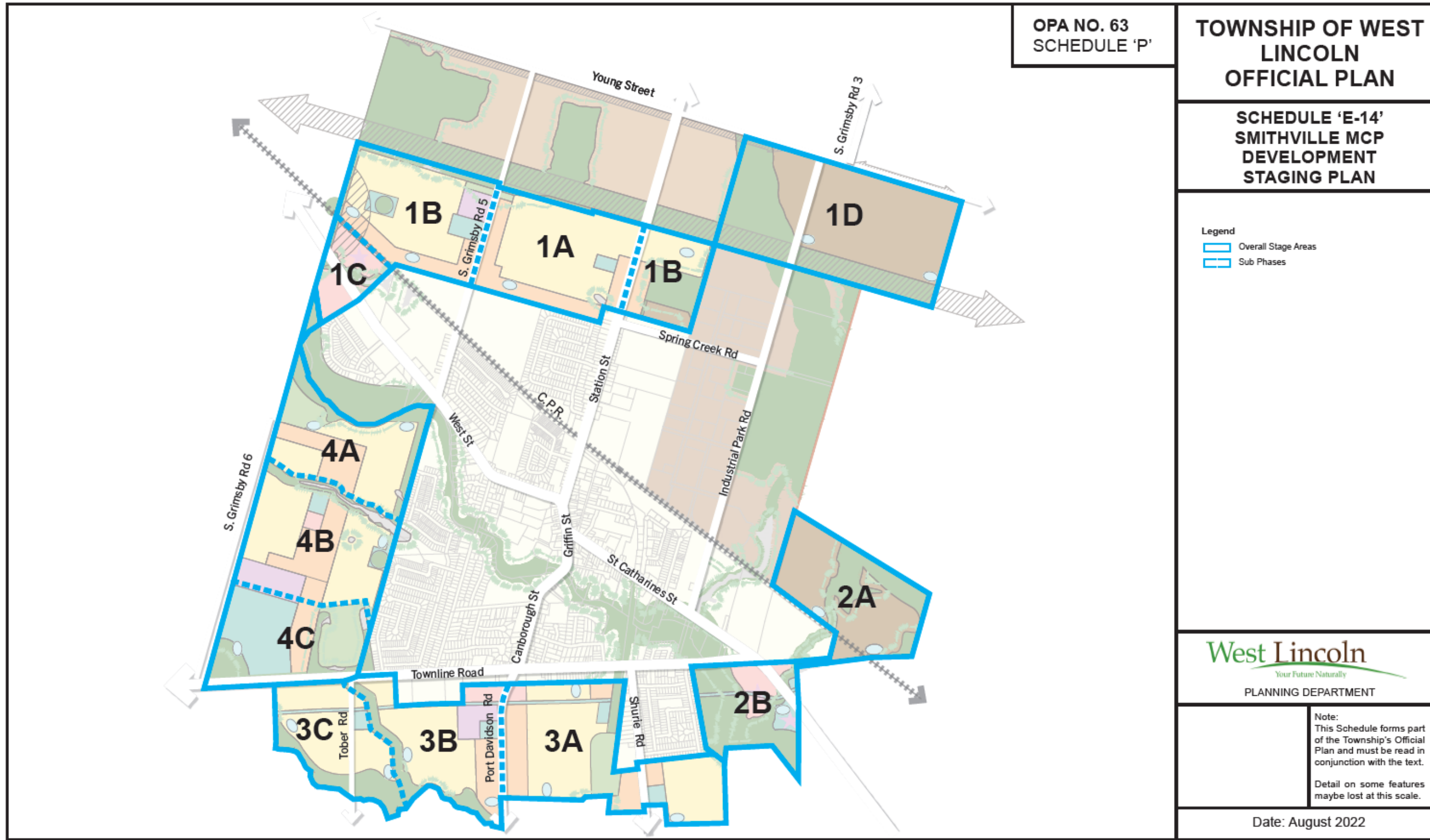
6.1.1.1 Influencing Factors

The implementation of transportation infrastructure will need to be coordinated with any works associated with servicing, the natural heritage system, or other elements which support Block Plan Development. OPA No. 63 outlines phasing requirements for transportation infrastructure, citing the importance of Block Plans in the realization and ultimate build-out of such facilities. The TMP recommendations have been phased in order to align with the planning of the Block Plan, recognizing that certain services need to be provided to support the new development. OPA No. 63 has outlined the requirements as follows:

- **6.11.7.4.5 Smithville Bypass Road Corridor:** Any Block Plan prepared within Block Plan Areas 2, 3, 4, 5, and 7 shall be required to provide and protect a sufficient corridor to accommodate a potential Arterial A Road for the conceptual alignment of Smithville Bypass Road, subject to change based on the EA to be conducted by the Region.
- **6.11.7.4.6 Road Improvements for Block Plan Areas:** No development in Block Plan Areas 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14 shall proceed until the applicable surrounding road network has been improved or upgraded to the appropriate standard. Refer to Section 6.11.7.4.6 of OPA No. 63 for the full list of applicable roads segments in relation to each Block Plan Area.
- **6.11.7.4.7 Active Transportation & Trail System:** The alignment of all trail segments will need to be refined during the Block Plan process and finalized as part of a complete development application.

The Development Staging Plan was prepared as part of OPA No. 63 and is shown in **Figure 30**.

Figure 30: Schedule E-14: Smithville MCP Development Staging Plan



6.1.1.2 Phasing Timeframes

Based on the influencing factors outlined in **Section 6.1.1.1** and the MCP approach to coordinate the activities of the various infrastructure upgrades, a series of phasing timeframes were developed. These phases apply to the implementation of the recommended infrastructure and non-infrastructure measures for the Smithville TMP and are summarized in **Table 13**. The timeframes were prepared based on the following assumptions, held constant for both Regional and Township projects:

- Work on the infrastructure and non-infrastructure related projects would begin in the year 2023, after the preparation of the Smithville TMP.
- Projects are assumed to begin, but not necessarily be completed, within the indicated timeframes. For example, a project identified within the next 10 year timeframe would be required to begin during this timeframe, but the completion date would be determined through detailed design and budget development.
- The Development Staging Plan shown in **Figure 30** was used as a basis for determining the projects to be included in each timeframe. Aside from works on the New Northern Connector, Western Link, and Townline Road, projects typically follow a clock-wise direction from north to east, south, and west around the community in line which the phase numbering (with Phase 1 staging areas assumed to be developed first and Phase 4 staging areas assumed to be developed last).

Table 13: Phasing Timeframes

Phase	Timeframe	Description
Within the next 10 years	2023-2033	Projects identified to begin in the short-term. Includes works related to the Spring Creek Road, Station Road, Industrial Park Road and the new Northern Connector.
10 – 20 years	2033-2043	Projected identified to begin in the medium-term. Includes works for Townline Road and other measures to support Phase 3.
Greater than 20 years	2043+	Projects identified in the long term to support Phase 4, including improvements to South Grimsby Road 6 and Townline Road.

The phasing timeframes for each project are summarized in **Table 16** through **Table 19**.

6.1.2 Costs

The following section discusses the capital investment for the transportation infrastructure and programs recommended as part of this TMP, including reference costs and potential sources of funding.

6.1.2.1 Reference Costs

Under the Region's 2022 Budget, Transportation Services and Transit Services requested a total funding amount of \$101,770,000, representing 40 different projects. Between 2022 and 2031, it is projected that this funding request will total \$1,206,276³. In particular, the Region's Ten Year Capital Budget Project forecasts has indicated funding in the amounts of \$500,000 in 2023 and \$9,500,000 between 2026-2031 to be put toward capacity improvements for the Smithville Bypass on Regional Road 20.

³ Niagara Region (2022). Niagara Region Budget Summary. Retrieved from <https://www.niagararegion.ca/government/budget/pdf/budget-summary-2022.pdf>

Transportation Services at the Township had an operating budget of \$3.5 million in 2022. Between 2022 and 2031, it is projected that the capital budget for Transportation Services will total \$53,995,100⁴.

6.1.2.2 Capital Investment for Transportation Recommendations and Sources of Funding

The total capital investments required to implement the recommended infrastructure and non-infrastructure measures are summarized in **Table 14** (Regional projects) and **Table 15** (Township projects), with investment requirements on a project-by-project basis outlined in **Table 16** through **Table 19**. Costs do not include improvements to rail crossings as this would require engagement with CPR.

Projects are assumed to begin, but not necessarily be completed, within the indicated phasing timeframes. The exact start year for each project would need to be determined through detailed Block Plan application and further design and budget development.

Table 14: Estimated Capital Costs for Recommendations (Niagara Region Projects)

Phasing Timeframe	Roads & On-Street Cycling Facilities	Non-Infrastructure Measures
Within the next 10 years	\$74.2M - \$87.7	\$40,000
10 – 20 years	\$14.3M	\$40,000
Greater than 20 years	\$5.4M	\$40,000
Total	\$93.9M - \$107.4M	\$120,000

⁴ Township of West Lincoln (2022). 2022 Operating and Capita Budget Final Report. Retrieved from <https://www.westlincoln.ca/en/township-office/resources/2022-Final-Operating-and-Capital-Budget-Report.pdf>

Table 15: Estimated Capital Costs for Recommendations (Township Projects)

Phasing Timeframe	Roads & On-Street Cycling Facilities	Trails	Non-Infrastructure Measures
Within the next 10 years	\$79.8M - \$105.3M	\$8.875M - \$11.175M	\$320,000 - \$465,000
10 – 20 years	\$45.5M - \$49M	\$8.775M - \$10.575M	\$245,000 - \$265,000
Greater than 20 years	\$27.2M - \$48.7M	\$4M - \$5.3M	\$245,000 - \$265,000
Total	\$152.5M - \$203M	\$21.65M - \$27.05M	\$810,000 - \$995,000

The transportation infrastructure recommendations resulting from this TMP are assumed to be funded by developers as their implementation or the upgrade of existing infrastructure would be triggered as a result of development works being undertaken. The funding arrangements for the identified measures will be discussed through development charges associated with the Block Plan process and existing bylaws.

The exception to this process is the Smithville Bypass as it would support not only the local community but also provide benefits to the inter-regional transportation system, and thus it is assumed at this stage that it would be funded through a combination of the Province, the Region, the Township, and developers. In particular, the Region and the Township typically leverage the following sources when funding capital investments:

- **The Region:** Property taxes, development charges, other governmental grants and transfers.
- **The Township:** Property taxes, development charges, government grants, and reserve funds.

6.1.3 Permitting and Approvals

It is assumed that permitting and approval requirements will be identified as part of the future Master Environmental Servicing Plan and Block Plan and, where applicable, MCEA Schedule C planning processes.

Table 16: Infrastructure Measures – Phasing and Cost Estimates – Niagara Region Projects

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
RR/TWL-Road-02	New Northern Connector	New Road - Collector at minimum - range represents Collector to Regional Road	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years (based on Regional Bypass Study)	\$17,500,000-\$25,000,000	MCEA Schedule C (MCEA Road Project #20)* *Considered as part of future Smithville Bypass EA
RR-Road-03	New Western Link	New Road - Collector at minimum - range represents Collector to Regional Road	Regional (Pending Outcome of Smithville Bypass EA)	Within the next 10 years (based on Regional Bypass Study)	<i>To be determine through additional study (assume will be over \$10 Million construction cost)</i>	MCEA Schedule C (MCEA Road Project #20)* *Considered as part of future Smithville Bypass EA
RR-Road-04	New Eastern Link	New Road - Collector at minimum - range represents Collector to Regional Road	Regional (Pending Outcome of Smithville Bypass EA)	Within the next 10 years (based on Regional Bypass Study)	<i>To be determine through additional study (assume will be over \$10 Million construction cost)</i>	MCEA Schedule C (MCEA Road Project #20)* *Considered as part of future Smithville Bypass EA
RR-Road-11	Regional Road 14 (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit- Arterial B	Regional	Within the next 10 years	\$5,000,000	MCEA Schedule C (MCEA Road Project #20)
RR-Road-12	Regional Road 14 (between New Northern Connector and Spring Creek Road)	Road Upgrade/ Retrofit - Arterial B	Regional	Within the next 10 years	\$5,000,000	MCEA Schedule C (MCEA Road Project #20)
RR-Road-13	Regional Road 14 (between Spring Creek Road and Regional Road 20)	Road Upgrade/ Retrofit- Arterial B	Regional	Within the next 10 years	\$10,000,000-\$13,000,000	MCEA Schedule C (MCEA Road Project #20)
RR/TWL-Road-15	Industrial Park Road (between New Northern Connector and New Eastern Link)	Road Upgrade/ Retrofit - Collector at minimum - range represents Collector to Regional Road	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$7,000,000-\$10,000,000	MCEA Schedule C (MCEA Road Project #20)* *Considered as part of future Smithville Bypass EA
RR-Road-17b	Townline Road (between Regional Road 14 (Canborough Street) and New Western Collector 1)	Road Upgrade/Retrofit - Arterial B	Regional	10 – 20 years	\$10,000,000	MCEA Schedule C (MCEA Road Project #20)
RR-Road-18	Townline Road (between New Western Collector 1 and South Grimsby Road 6)	Road Upgrade/ Retrofit - Collector	Regional	Greater than 20 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
RR-Junction-01	Regional Road 14 (Station Street) and Spring Creek Road	Junction Improvement	Regional	Within the next 10 years	\$2,000,000	MCEA Schedule A (MCEA Road Project #13)

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
RR-Junction-03	Regional Road 20, South Grimsby Road 8, and New Western Link	Junction Improvement	Regional	Within the next 10 years (based on Regional Bypass Study)	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR-Junction-04	Regional Road 20 and South Grimsby Road 7	Junction Improvement	Regional	10 – 20 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
RR/TWL-Junction-05	Spring Creek Road Extension and New Western Link/New Northern Collector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$700,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-06	South Grimsby Road 5 and New Northern Connector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR-Junction-07	Regional Road 14 (Station Street) and New Northern Connector	Junction Improvement	Regional	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-08	Industrial Park Road and New Northern Connector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-09	Industrial Park Road and Spring Creek Road	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR-Junction-10	Regional Road 20 (St. Catharines Street) and Industrial Park Road	Junction Improvement	Regional	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
RR-Junction-11	Regional Road 14 (Canborough Street)/Port Davidson Road and Townline Road	Junction Improvement	Regional	10 – 20 years	\$2,500,000	MCEA Schedule A (MCEA Road Project #13)
RR-Junction-12	South Grimsby Road 6 and Townline Road	Junction Improvement	Regional	Greater than 20 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
RR-Junction-13	New Eastern Link and Industrial Park Road	Junction Improvement	Regional (Pending Outcome of Smithville Bypass EA)	Within the next 10 years (based on Regional Bypass Study)	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR-Junction-14	Regional Road 20 and New Eastern Link	Junction Improvement	Regional	Within the next 10 years (based on Regional Bypass Study)	\$700,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR-Junction-15	Townline Road/New Western Collector 1/Tober Road Realignment	Junction Improvement	Regional	10 – 20 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)

Table 17: Infrastructure Measures - Phasing and Cost Estimate - Township Projects

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
TWL-Road-01	Spring Creek Road Extension	New Road - Collector	Township	Within the next 10 years	\$7,000,000	MCEA Schedule C (MCEA Road Project #20)
RR/TWL-Road-02	New Northern Connector	New Road - Collector at minimum - range represents Collector to Regional Road	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$17,500,000-\$25,000,000	MCEA Schedule C (MCEA Road Project #20)* *Considered as part of future Smithville Bypass EA
TWL-Road-05	Tober Road Realignment/New Southern Collector 2/New Southern Collector 1	New Road -Collector	Township	10 – 20 years	\$14,000,000-\$17,500,000	MCEA Schedule C (MCEA Road Project #20)
TWL-Road-06	New Western Collector 1	New Road - Collector	Township	Greater than 20 years	\$15,500,000-\$24,000,000	MCEA Schedule C (MCEA Road Project #20)
TWL-Road-07	Spring Creek Road (between Spring Creek Road Extension and Regional Road 14)	Road Upgrade/ Retrofit – Collector (addressed through ongoing planning applications)	Township	Within the next 10 years	\$9,000,000-\$13,500,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-08	South Grimsby Road 5 (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit- Collector	Township	Within the next 10 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-09	South Grimsby Road 5 (between New Northern Connector and Spring Creek Road)	Road Upgrade/ Retrofit - Collector	Township	Within the next 10 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-10	South Grimsby Road 5 (between Spring Creek Road and Regional Road 20)	Road Upgrade/ Retrofit -Collector	Township	Within the next 10 years	\$4,500,000-\$7,000,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-14	Industrial Park Road (between Young Street and New Northern Connector)	Road Upgrade/ Retrofit- Collector	Township	Within the next 10 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
RR/TWL-Road-15	Industrial Park Road (between New Northern Connector and New Eastern Link)	Road Upgrade/ Retrofit - Collector at minimum - range represents Collector to Regional Road	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$7,000,000-\$10,000,000	MCEA Schedule C (MCEA Road Project #20)

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
TWL-Road-16	Industrial Park Road (between New Eastern Link and Regional Road 20)	Road Upgrade/Retrofit – Arterial B	Township	Within the next 10 years	\$10,000,0000	MCEA Schedule C (MCEA Road Project #20)
TWL-Road-17a	Townline Road (between Regional Road 20 and Regional Road 14 (Canborough Street))	Road Upgrade/Retrofit - Arterial B	Township	10 – 20 years	\$20,000,000	MCEA Schedule C (MCEA Road Project #20)
TWL-Road-19	Port Davidson Road (between Townline Road and New Southern Collector 2)	Road Upgrade/Retrofit - Collector	Township	10 – 20 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-20	Shurie Road (between Townline Road and New Southern Collector 1)	Road Upgrade/Retrofit - Collector	Township	10 – 20 years	\$4,500,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-21	South Grimsby Road 6 (between New Western Collector 1 and Townline Road)	Road Upgrade/Retrofit – Rural Edge Route	Township	Greater than 20 years	\$7,000,000-\$15,000,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-22	South Grimsby Road 6 (between Regional Road 20 and New Western Collector 1)	Road Upgrade/Retrofit - Collector	Township	Greater than 20 years	\$4,500,000-\$9,000,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Road-23	Young Street (between Regional Road 14 and South Grimsby Road 2)	Road Upgrade/Retrofit – Rural Edge Route	Township	Within the next 10 years	\$7,000,000-\$15,000,000	MCEA Schedule A+ (MCEA Road Project #19)
TWL-Junction-02	South Grimsby Road 5 and Spring Creek Road	Junction Improvement	Township	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
RR/TWL-Junction-05	Spring Creek Road Extension and New Western Link/New Northern Collector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$700,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-06	South Grimsby Road 5 and New Northern Connector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-08	Industrial Park Road and New Northern Connector	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA
RR/TWL-Junction-09	Industrial Park Road and Spring Creek Road	Junction Improvement	Regional/Township (Pending Outcome of Smithville Bypass EA)	Within the next 10 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)* *Considered as part of future Smithville Bypass EA

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
TWL-Junction-16	Tober Road/New Southern Collector 2	Junction Improvement	Township	10 – 20 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
TWL-Junction-17	Port Davidson Road/New Southern Collector 1/New Southern Collector 2	Junction Improvement	Township	10 – 20 years	\$900,000	MCEA Schedule A (MCEA Road Project #13)
TWL-Junction-18	Shurie Road and New Southern Collector 1	Junction Improvement	Township	10 – 20 years	\$700,000	MCEA Schedule A (MCEA Road Project #13)
TWL-Junction-19	South Grimsby Road 6 and New Western Collector 1	Junction Improvement	Township	Greater than 20 years	\$700,000	MCEA Schedule A (MCEA Road Project #13)
TWL-Trail-01	Hydro Corridor Trail	New Trail*	Township	Within the next 10 years	\$3,250,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-02	South Creek Trail Extension	New Trail*	Township	Greater than 20 years	\$1,500,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-03	South Grimsby Road 5 Trail	New Trail*	Township	Greater than 20 years	\$1,500,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-03a (Pedestrian Bridge)	South Grimsby Road 5 Trail – Pedestrian Bridge	Pedestrian Bridge**	Township	Greater than 20 years	\$1,000,000 - \$2,300,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-04	Enbridge Trail	New Trail*	Township	10 – 20 years	\$3,200,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-05	South Loop Trail	New Trail*	Township	10 – 20 years	\$3,000,000-\$3,500,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-06	Old Rail Trail	New Trail*	Township	10 – 20 years	\$1,200,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-07	Northwest Rail Trail – North	New Trail*	Township	Within the next 10 years	\$1,500,000-\$2,300,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-08	Industrial Park-Townline Connector Trail	New Trail*	Township	10 – 20 years	\$375,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-08a (Pedestrian Bridge)	Industrial Park-Townline Connector Trail (Pedestrian Bridge)	Pedestrian Bridge**	Township	10 – 20 years	\$1,000,000 - \$2,300,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-09	Southeast Rail Trail	New Trail*	Township	Within the next 10 years	\$750,000-\$1,500,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-10	Margaret-McMurchie Trail	New Trail*	Township	Within the next 10 years	\$375,000	Not covered under MCEA EA – addressed through future planning approvals

TMP ID	Project Name	Project Description	Assumed Jurisdiction	Phasing Timeframe	Estimated Capital Cost (2022 CAD)	Class EA Schedule & Reference
TWL-Trail-11	Southeast River Trail 2	New Trail*	Township	Within the next 10 years	\$750,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-12	Southeast River Trail 1	New Trail*	Township	Within the next 10 years	\$750,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-13	Southwest Rail Trail	New Trail*	Township	Within the next 10 years	\$750,000-\$1,500,000	Not covered under MCEA EA – addressed through future planning approvals
TWL-Trail-14	North Creek Trail	New Trail*	Township	Within the next 10 years	\$750,000	Not covered under MCEA EA – addressed through future planning approvals

*All new trails costed as 3 m wide asphalt trails. Midblock trail crossings factored where applicable; trail crossings at intersections not included.
**Pedestrian bridge estimated cost range represents a span of between 4.5 m -100 m and a width of 3 m. To be determined as part of future study.

Table 18: Non-Infrastructure Measures – Phasing and Cost Estimate – Regional Projects

Category	Project ID	Project Name	Assumed Jurisdiction	Phasing Timeframe	Estimated Annual Cost (2022 CAD)	Estimated Total Capital Cost (2022 CAD)	Notes
Active Transportation	RR-AT-01	Support Region in Strategic Cycling Network Implementation	Regional	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.
Active Transportation	RR-AT-02	Supporting Region in Installing Pavement Markings and Signage in Missing Links	Regional	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.
Transit	RR-Transit-01	Promote Existing NRT OnDemand Services	Regional	Within the next 10 years	\$4000	\$120,000	Annual collaboration with NRT, covers 2023-2051.
Transit	RR-Transit-02	Partnership to Develop Transit in Smithville	Regional	Within the next 10 years	-	-	Ongoing collaboration with NRT, non-financial investment.
Safety Programs	RR-Safety-02	Support Niagara Region for Vision Zero	Regional	Ongoing	-	-	Ongoing collaboration with Niagara Region, non-financial investment.

Table 19: Non-Infrastructure Measures - Phasing and Cost Estimates - Township Projects

Category	Project ID	Project Name	Assumed Jurisdiction	Phasing Timeframe	Estimated Annual Cost (2022 CAD)	Estimated Total Capital Cost (2022 CAD)	Notes
Active Transportation	TWL-AT-03	Supporting Cycling Equipment	Township	Ongoing	\$2,000	\$60,000	Total capital cost covers 2023-2051.
Active Transportation	TWL-AT-04	Incorporation of Trail Crossing Standards	Township	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.

Category	Project ID	Project Name	Assumed Jurisdiction	Phasing Timeframe	Estimated Annual Cost (2022 CAD)	Estimated Total Capital Cost (2022 CAD)	Notes
Active Transportation	TWL-AT-05	Transition Facilities for Terminating Trails	Township	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
Active Transportation	TWL-AT-06	Align Pedestrian Facilities with Smithville Cross Section Standards	Township	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
Active Transportation	TWL-AT-07	Complete Pedestrian Facilities at Intersections	Township	Within the next 10 years	-	-	Capital investment incorporated into infrastructure recommendations.
Safety Programs	TWL-Safety-01	Collision Analysis Task	Township	Within the next 10 years	-	\$25,000 - \$150,000	Cost subject to safety studies undertaken.
Safety Programs	TWL-Safety-03	Safety Programs for Schools	Township	Ongoing	\$2,500 - \$4,500	\$75,000 - \$135,000	Total capital cost covers 2023-2051.
Safety Programs	TWL-Safety-04	Traffic Calming Programs	Township	Ongoing	\$20,000	\$600,000	Total capital cost covers 2023-2051.
Transportation Demand Management	TWL-TDM-01	Parking Strategy	Township	Within the next 10 years	-	\$50,000	Total capital cost represents one-time investment.
Transportation Demand Management	TWL-TDM-02	Thresholds for Travel Plans	Township	Ongoing	-	-	-
Transportation Demand Management	TWL-TDM-03	School Incentive Program	Township	Ongoing	-	-	Ongoing collaboration, non-financial investment.
Transportation Demand Management	TWL-TDM-04	Promoting Economic Vitality in Downtown Core	Township	Ongoing	-	-	Ongoing collaboration, non-financial investment.

6.2 Monitoring Program

The Municipal Class EA process states that Master Plans should be reviewed every five years to determine whether a formal review is warranted, citing significant new environmental effects or major changes to initial assumptions, components, or project timing as outlined within a Master Plan as potential reasons.

As the creation of the Smithville TMP was initiated by the MCP process being undertaken, along with resulting Official Plan Amendments No. 62 and 63 and supporting studies, the realization and performance of the recommendations outlined within the TMP are closely linked to the anticipated growth of the community and should be monitored as such. In addition to recommended five-year review cycle, the TMP should be reviewed as Block Plans become identified.

Literature suggests that monitoring programs for TMPs should be integrated into budgets and may consist of three main components⁵:

- Inputs added to enable an activity;
 - Such as the funding and investment put into projects.
- Outputs resulting from an activity; and
 - Such as traffic volumes, mode splits, etc.
- Outcomes which support identified goals.
 - Such as the goals and objectives for the Smithville TMP, as outlined in **Section 1.2**.

In their 2017 TMP, the Region expressed the intent to develop a Capital Road Project Tracking Information System to track the status of projects recommended within the TMP on an annual budget basis. For alignment with such initiative, the Town could follow the same reporting system to track all infrastructure-related recommendations outlined within the TMP and monitor results for influence on future projects:

- Project Name and ID;
- Project Jurisdiction (Regional or Local);
- Description of Project;
- Implementation Phasing/Timing and Estimated Costs;
- Status of EA study;
- Status of Detailed Design;
- Construction award – duration and estimate cost; and
- Project completion – construction, duration, final costs, and highlights.

6.2.1 Key Performance Indicators

Table 20 outlines the key performance indicators (KPI's) for use in monitoring the Smithville TMP. The KPI's capture the key recommendation categories associated with roads, active transportation transit, safety programs, and TDM; as well as the over-arching goal to build a sustainable transportation system

⁵ Hernandez-Vega, H., Milligan, C., Montufar, J., and Regehr, J.D. (2012). Performance Measurement Transportation Master Plans: Considerations for Urban Traffic Monitoring. Conference Paper. Retrieved from https://www.researchgate.net/publication/293486057_Performance_Measurement_Transportation_Master_Plans_Considerations_f_or_Urban_Traffic_Monitoring

which supports community development and growth. Accordingly, the KPI's support the achievement of the TMP's overall goals, which can be summarized as follows:

- **Create a complete transportation network; sustainably growth the community; and provide convenient mode choses**
 - Supported through KPI's which evaluate the use of transportation infrastructure and programs, such as:
 - Traffic volumes, Duration of commutes, Location of home vs work – evaluates overall capacity, efficiency, and connectivity of network
 - Percentage of regional and local infrastructure recommendations completed – evaluates progress of developing a complete transportation network for the community
- **Incorporate local and regional economic growth**
 - Supported through KPI's which evaluate the overall local and regional economic growth in relation to the implementation of infrastructure recommendations.
- **Improve the level of health and safety**
 - Supported through KPI's which evaluate shifts in mode split and collision data as a metric for tracking the safety-related transportation trends within the community.
- **Consistent implementation and monitoring**
 - Supported through KPI's which evaluate the inputs to enable the recommendations by tracking trends in funding sources and budgeted vs realized capital, operations, and maintenance costs. Analyzing such trends will enable increased accuracy with budget planning and foreseeing risks before they occur.

As the TMP is monitored, the KPI's should be updated to progress alongside future trends, data availability, and needs within the community. Key sources of data for assessing the KPI's include, but are not limited to:

- Statistics Canada (e.g. Census);
- Provincial Government (e.g. MTO);
- Regional Government;
- Local Government; and
- Transportation Tomorrow Survey (TTS).

Table 20: Key Performance Indicators

Key Performance Indicators (KPI)	Road	Active Transportation	Transit	Safety Programs	TDM	Sustainable Community Development and Growth
Inputs						
Distribution of funding for projects to track trends for future efficiencies in budget development	✓	✓	✓	✓	✓	-
Capital costs – budgeted vs realized	✓	✓	✓	✓	✓	-
Operations and maintenance costs – budgeted vs realized	✓	✓	✓	✓	✓	-
Outputs						
Traffic volumes – forecasted vs actual	✓	✓	✓	✓	-	-
Duration of commutes – measuring efficiency	-	-	-	-	-	✓
Location of home vs work – measuring connectivity	-	-	-	-	-	✓
Mode splits – overall	✓	✓	✓	-	✓	✓
Mode splits – travel to/from schools	✓	✓	✓	-	✓	✓
Mode splits – travel to/from workplaces	✓	✓	✓	-	✓	✓
Change in number of organizations with travel plans	✓	✓	✓	-	✓	✓
Change in number workplaces with travel plans	✓	✓	✓	-	✓	✓
Collision data – type, injuries, and fatalities	✓	✓	✓	✓	-	✓
Percentage of regional infrastructure recommendations completed	✓	✓	✓	-	-	-
Percentage of local infrastructure recommendations completed	✓	✓	✓	-	-	-
Percentage of road projects integrating complete street standards for Smithville	✓	✓	-	-	-	-
Goods movement – percentage of trucks using bypass	✓	-	-	-	-	✓
Gross domestic product (GDP) for the Region and the Township	-	-	-	-	-	✓
Visitor numbers	-	-	-	-	-	✓
Change in number of school cycling incentive program participants	-	✓	-	-	✓	-

Appendix A – Traffic Assessment

Introduction

As with all vibrant communities, Smithville is growing. The continued population and employment growth within the community has resulted in a need to explore an expansion to the existing urban area. The Township of West Lincoln has initiated a Master Community Plan (MCP) to help guide the future growth and development of Smithville. The MCP is a detailed land-use plan and policy document which provides a comprehensive plan for sustainable future growth and expansion in the Smithville urban settlement area. The MCP process will determine the location and amount of potentially developable land as well as the necessary infrastructure to support the new development. The study area includes the current Smithville urban settlement area and 425 gross hectares (4.25 sq. km) of potentially developable land surrounding Smithville, known as the Smithville Development Study Area (SDSA).

AECOM has been retained by the Town of West Lincoln to develop the Smithville Community Master Plan (SCMP) to guide the phased land development of the Smithville area to the 2051 planning horizon. The SCMP is progressing through an integrated Environmental Assessment process, this includes the development of a series of supporting environmental studies. One of these required studies is a Transportation Master Plan (TMP), which includes the development of a sub-regional traffic microsimulation model. This report details the process of developing the traffic model, assumptions made and reviews the outcomes and recommended mitigations.

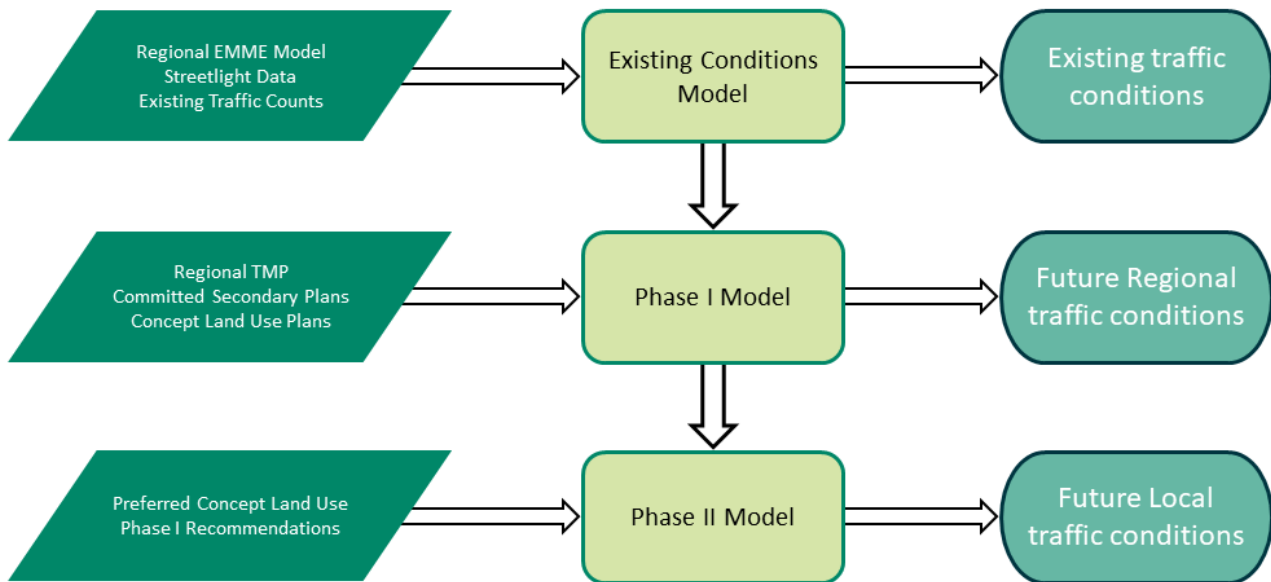
1. Model Methodology

The aim of the traffic model is to develop a simulation of the traffic in Smithville that is as close as possible to a real representation of the traffic conditions in the town. It is important to recognise that traffic patterns and movements are not uniform and that a model can not capture every detail and variation that exists in the real world. The model has been developed to reflect the major flows of vehicles, the areas where delays occur and the larger traffic patterns to the best available ability based on current traffic modelling techniques and the available data.

In developing the model it was determined that the best approach to reflecting the existing traffic conditions and network was to use a micro-simulation model. The Aimsun Next version 20 modelling software was used as it was felt that the dynamic assignment capabilities of the software would be beneficial to the modeling exercise for the Smithville. In populating the model with data it was agreed that no 2020 or 2021 data should be used to avoid the impact of the Covid Pandemic on traffic patterns and volumes. This meant that at the time of the model being developed any required traffic volume data could not be collected through traditional automated traffic counts (ATC), so a combination of previous traffic counts and Streetlight data was used to provide the necessary traffic volumes.

As the purpose of the Smithville Traffic model is to show how both strategic and local transportation mitigation could impact future traffic flow, a three stage approach has been used to assess the various impacts. The planned approach includes an initial stage where the existing conditions model is developed and validated, Phase I is then an examination of strategic and regional transportation infrastructure, with Phase II being a more detailed examination of local traffic impacts and mitigations (see **Appendix A Figure 1**). This approach allows for analysis and decisions to be made at multiple points through the modelling exercise and is supportive of the integrated Environmental Assessment process.

Appendix A Figure 31: Three Stage model process, high level inputs and outputs



This report has been structured to follow the process identified in Figure 1, with each of the three main sections of the report reflecting a stage of the model.

2. Existing Conditions Model

2.1 Model Development

The existing conditions model was developed using Aimsun Next version 20 software. The Aimsun Next software package uses a robust simulation program that integrates macroscopic, mesoscopic, and microscopic levels of analysis and supports multiple modes of transportation, driver behaviours, complex roadway geometries and advanced traffic signal controller logic.

The microsimulation model was performed using a dynamic traffic assignment strategy. For travel demand inputs, the base demand matrices were extracted originally from Niagara Region Travel Forecasting Model and have been further adjusted in Aimsun based on the received traffic data.

2.1.1 Study Area and Road Network

The study area for the traffic analysis is bounded by Young Street to the north, South Grimsby Road 6 to the west, South Grimsby Road 2 to the east and Townline Road to the south. There are currently two regional roads passing through Smithville, Regional Road 20 (St Catharines Street/West Street) and Regional Road 14 (Thirty Road/Station Street/Griffin Street/Canborough Street). There are two signalized intersections within the study area, at the intersection of St Catharines Street and Griffin Street, as well as the intersection of West Street (RR20) and Station Street. The road network was modelled based on existing configurations as observed from aerial imagery. **Appendix A Table 1** presents a list of road type definitions that were used in the model.

Appendix A Table 21: Modelled Road Types

Road Type	Maximum Speed ¹ (km/h)	Capacity per lane ² (Passenger Car Units/h)	Functional Class ³
Regional Road	50	800	2
Local Road	50	500	3
Local Road (Residential)	50	500	5

¹Based on posted speed at each road section.

²Roadway capacities per lane were referenced to Niagara Region Travel Forecasting Model.

³Defined by Aimsun. Aimsun Next will use this information to hide low functional class sections when the zoom level is high.

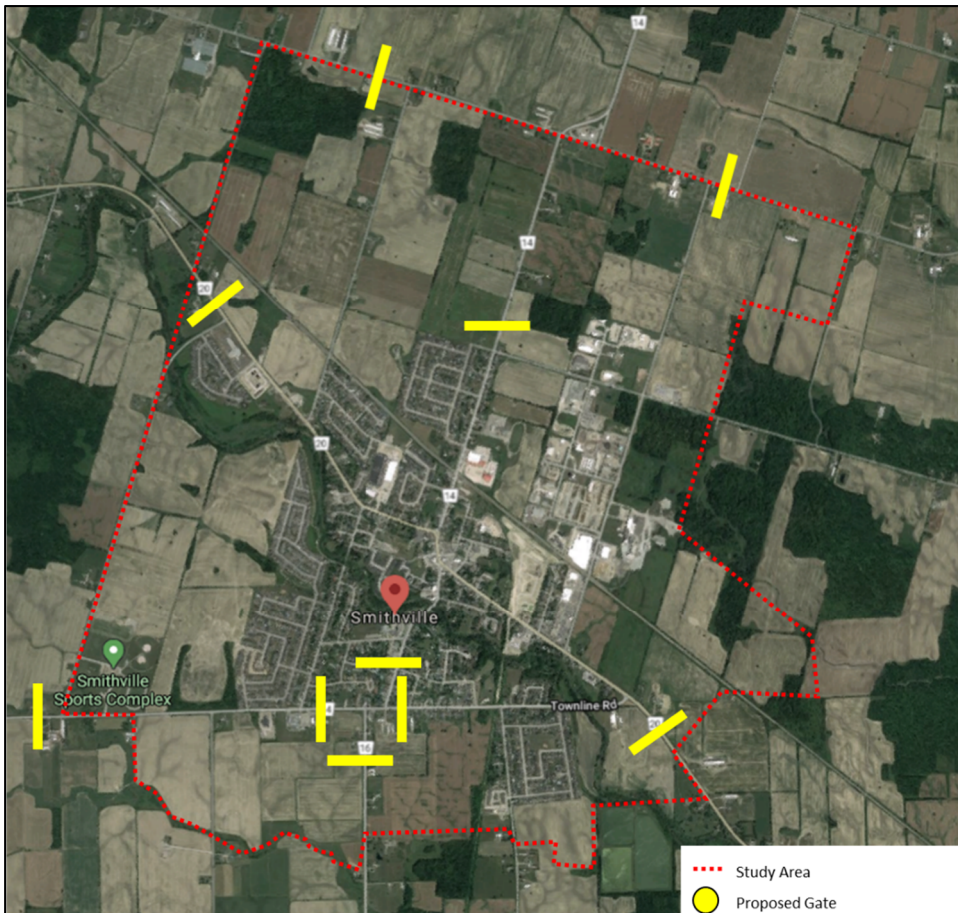
2.1.2 Analysis Period

The existing conditions model was developed for the weekday AM and PM peak hours. Given that the received data was collected over several years and in different seasons, a common base year of 2020 was selected to represent the existing conditions.

2.1.3 Observed Traffic Volumes

Due to impact of COVID-19 on travel behaviour, there was no opportunity to collect newer traffic counts through traditional on-site traffic surveys during this project. For model calibration and validation, the most recent link volumes and travel time data along the key corridors were obtained from StreetLight Data, a leading transportation data provider using big-data techniques. **Appendix A Figure 2** shows the 10 unique pre-defined gates identified where StreetLight Data was provided for traffic data in both directions of travel. The StreetLight Data output was estimated based on an average of the traffic data collected in March, April, September, and October 2019, to represent typical traffic operation conditions in one year.

Appendix A Figure 32: StreetLight Data “Gate” Locations



In this project, observed traffic volumes (i.e. TMCs, link counts and travel speed data) were directly referenced to the raw data from the Region and StreetLight Data. As the microsimulation model was developed using a dynamic route choice framework, observed traffic volumes were utilized for demand adjustment and model validation, as inputs to Real Data Sets (“RDS”) in Aimsun.

2.1.4 Traffic Intersections and Signal Timing Plans

All signalized and major unsignalized intersections were modelled in the study area. St Catharines Street and Griffin Street as well as West Street and Station Street are the only signalized intersections and were coded as per the received signal timing plans. At minor unsignalized intersections, representative accesses from local roads were modelled to allow traffic input to be reasonably assigned to/from each traffic analysis zone (“TAZ”) and represent realistic travel patterns for local users

2.1.5 Centroid Configuration

Internal traffic zones and external gates along the study area boundaries are represented with centroids and coded in the model as origin an/or destination trips in Aimsun. Centroids are connected to the road network by pairs of connectors based on the traffic zone access/egress to/from the road network. In cases where more than one pair of connectors (one as generator and one as attractor) were considered, the trips were assumed to be either equally distributed or adjusted based on observed trip purposes.

2.2 Travel Demand Estimation

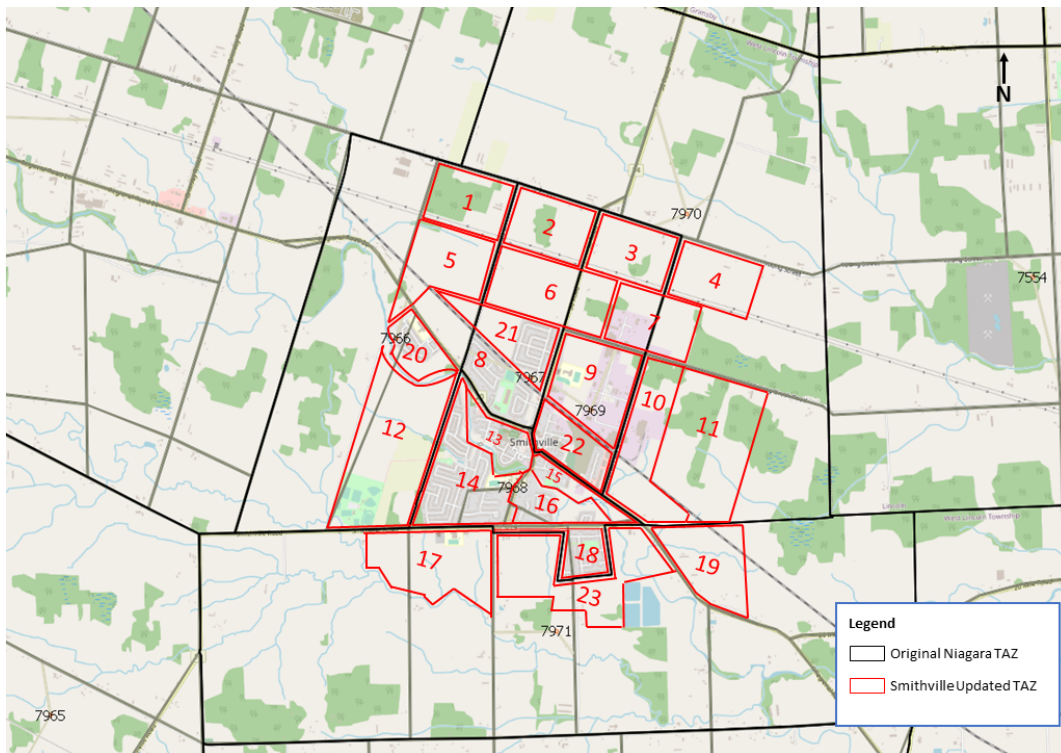
2.2.1 Base Travel Demand Estimation

The Niagara Region Travel Forecasting Model was used to develop the base demand matrices for the microsimulation model. For better representation of local land uses in the study area, a subarea model with disaggregated traffic zones was created by IBI Group for the years 2016 and 2041. The base auto demand matrices used for the existing conditions model were extracted from the 2016 Smithville subarea model.

Traffic Analysis Zones (TAZs) in the region’s EMME travel demand model were originally developed to support a high-level transportation analysis for the Niagara Region. Given that the size of the regional EMME model, TAZs for Smithville may not be appropriate to capture the levels of detail in a microsimulation model. AECOM proposed to disaggregate the Smithville study area into 23 sub-TAZs (**Appendix A Figure 3**). The proposed disaggregated zonal structure was reviewed and agreed upon with the Town, to better represent existing land uses (e.g. residential vs. industrial) and travel production/attraction within Smithville.

The TAZ disaggregation resulted in the creation of a new subarea model for the Smithville study area (“Smithville subarea model”), which was created by IBI Group from the region’s EMME travel demand model. Through the subarea model development, the auto demand matrices for the AM peak hour was reassigned to the new Smithville sub-TAZs, which was used as the base travel demands in the microsimulation model.

Appendix A Figure 33: Smithville Sub-Traffic Analysis Zones Map



2.2.2 Base Auto Demand

The AM auto travel demands extracted from the Smithville subarea model was used as the base auto demand matrices for the microsimulation model. The total auto demands for the study area was approximately 2,133 vehicles in the AM peak hour. The base auto demand matrices were further adjusted to observed traffic counts.

2.2.3 Base Truck Demand

The truck demand matrices were not included in the Smithville subarea model, so the following methodology and assumptions were used to develop the base truck demands:

- For each peak hour, average heavy vehicle percentages were calculated based on the received TMCs for the two regional roads (14 and 20) passing through the study area.
 - In the AM peak hour, the average heavy vehicle percentages for Regional Roads 14 and 20 are 11% and 12%, respectively.
- Given that both regional roads are identified as major corridors for truck transportation in the Region, the calculated heavy vehicle percentages for each regional road were applied to trips to/from the external gates on both corridors.
- It is also conservative to assume the smaller heavy vehicle percentages calculated for the regional roads (i.e. 11% in the AM peak hour) can be applied to trips to/from other external gates along the study area boundary.
- For the trips travelling between the internal TAZs, a standard heavy vehicle percentage of 3% was assumed.
- The assumed heavy vehicle percentages for each O-D pair were then applied to the base auto demand matrices, to determine the base truck demand matrices.

2.2.4 Travel Demand Adjustments

The base demand matrices were further adjusted, using the static O-D adjustment procedure in Aimsun, to observed turning movement counts. The static O-D adjustment was conducted using the Frank and Wolfe assignment. Observed turning movement counts were imported into Aimsun as a Real Data Set (RDS) file.

The base auto demand matrices extracted from the Smithville subarea model and the base truck demand matrices were used as initial demand matrices inputs for the static O-D adjustment, using the Frank and Wolfe assignment. Adjusted demand matrices were reviewed to identify O-D pairs with significant volume gaps. Missing travel demands for these O-D pairs would be manually corrected using a spreadsheet analysis, and then further adjusted to the observed turning movement counts using the same static O-D adjustment procedure.

To evaluate the accuracy of base travel demands and the impact of utilizing Aimsun's static O-D adjustment (Frank and Wolfe assignment) on traffic patterns in the study area, the following three (3) scenarios were developed and evaluated. The difference between the three scenarios is the demand matrices used in the macroscopic demand adjustment process. A brief description of each scenario used in the process is provided below:

- **Scenario 0** – In this scenario, the model demand inputs were the base demand matrices.
- **Scenario 1** – In this scenario, the base demand matrices were adjusted based on the observed turning movement counts using the Aimsun's static O-D adjustment procedure.
- **Scenario 2** – In this scenario, the adjusted demand matrices from Scenario 1 were reviewed to identify any O-D pairs with significant volume gaps as compared to the observed turning movement counts. Missing travel demands for these O-D pairs were manually corrected and further adjusted in Aimsun using the static O-D adjustment procedure. The final corrected demand matrices were used in the microsimulation DUE experiment process.

The macroscopic demand adjustment process is further detailed in the *Macroscopic Travel Demand Adjustment* section of this appendix. More details on model parameters used to setup the static O-D adjustment is presented in **Appendix A1**.

2.3 Model Calibration and Validation

2.3.1 Calibration Objectives

The objective of model calibration is to obtain a reasonable match between model performance estimates and field measurements of performance. The criteria adopted from *FHWA Traffic Analysis Toolbox* provides guidance on what constitutes as a calibrated model. The main components include:

- Turn and link volumes, model versus observed traffic volumes (from the Region and StreetLight Data)
- Auto travel time, model versus observed travel times (from StreetLight Data)
- Visual audits including individual link speeds and observed queues

Appendix A Table 2 provides a list of calibration acceptance targets commonly used when comparing modelled versus observed traffic data.

Appendix A Table 22: Calibration Acceptance Targets

Criteria #	Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed		
Individual Link Flows:		
1-1	Sum of All Link Flows	Within 5% of sum of all link counts
1-2	GEH Statistic < 5 for Individual Link Flows	> 85% of cases
1-3	GEH Statistic for Sum of All Link Flows	GEH < 4 for sum of all link counts
Travel Times / Speeds, Model Versus Observed		
Journey Times, Network:		
2	Within 15% (or 1 min, if higher)	> 85% of cases
Visual Audits		
Individual Link Speeds:		
3	Visually Acceptable Speed-Flow Relationship	To analyst's satisfaction
Bottlenecks:		
4	Visually Acceptable Queuing	To analyst's satisfaction

GEH Statistic

Traffic volumes are validated through comparison between modelled results and observed volumes. The relative difference and GEH statistics will be used as indicators for the volume comparison. The GEH statistic is used to compare sets of traffic volumes and incorporates both relative and absolute differences into a single formula. The GEH statistic is represented by the equation below:

$$GEH = \sqrt{\frac{(M - O)^2}{0.5 * (M + O)}}$$

Where:

M: simulated flows

O: observed flows

Various GEH values give an indication of a goodness of fit as outlined below:

- GEH < 5 Flows can be considered a good fit
- 5 < GEH < 10 Flows may require further investigation
- GEH > 10 Flows cannot be considered to be a good fit

Visual Audits

Visual calibration was conducted and consisted of tasks related to observing and inspecting the animated simulation model for outliers and coding issues related to vehicle, signal, and other interactive objects. All inspected objects are checked for proper representation and operation during the simulation. Some examples of the elements and checks include:

- **Vehicles:** check that vehicle inputs and decisions are being followed.
- **Signals:** check that actuated elements operate as intended.
- **Conflicts:** check that priority and conflict rules are being obeyed.
- **Actuation:** detectors should be calling or extending the appropriate signal phases; and
- **Lane restrictions:** vehicles should not deliberately violate restrictions, check that vehicles have sufficient link length for the necessary lane changes.

2.3.2 Key Model Inputs and Assumptions

Appendix A Table 3 Error! Reference source not found. summarizes the Aimsun modelling inputs used in the static O-D adjustment and microsimulation modelling. The table includes an overview of the key inputs required for the existing conditions AM peak hour model.

Appendix A Table 23: Aimsun Key Model Inputs

Input Parameter	Existing Conditions
<i>Geometry</i>	
Lane Configurations & Widths	Based on existing geometry
Turn Lanes/Storage	Left and right turn lanes per existing conditions
Sidewalks/Crosswalks	Per existing conditions.
Road Types	See Table 1
<i>Volumes & Input Data</i>	
Auto Demand Matrices	See “Base Auto Demand”
Truck Demand Matrices	See “Base Truck Demand”
Seeding Demand	100% of peak hour demand due to extended peak hour
<i>Traffic Signal Operations</i>	
Traffic Signal Timing	Per existing timing plan

Input Parameter	Existing Conditions
<i>Static OD Adjustment</i>	
Base Matrices	Developed based on the 2016 Niagara Region Travel Forecasting Model (see “ <i>Base Auto Demand</i> ”)
Real Data Set (RDS)	Developed from observed traffic counts (see “ <i>Observed Traffic Volumes</i> ”)
Simulator Parameters	See “ <i>Simulator Parameters</i> ” under “ <i>Static O-D Adjustment</i> ” in Appendix B Error! Reference source not found.
<i>Micro DUE Assignment</i>	
Driving Behaviour	See “ <i>Simulator Parameters</i> ” under “ <i>Micro DUE Assignment</i> ” in Appendix B Error! Reference source not found.
Simulator Parameters	See “ <i>Simulator Parameters</i> ” under “ <i>Micro DUE Assignment</i> ” in Appendix B Error! Reference source not found.

2.3.3

2.3.4 Macroscopic Travel Demand Adjustment

Scenario 0: Base Travel Demand

The base auto travel demands extracted from the Smithville subarea model and initial calculated truck travel demands were assigned to the model network at a macroscopic level. The results of Scenario 0 were used as a baseline to understand the impact of Aimsun’s static O-D adjustment procedure.

A summary of GEH statistics for Scenario 0 at turn level in the AM and PM peak hours is presented in **Appendix A Table 4**. In the AM peak hour, approximately 54% of turning movement volumes have an acceptable GEH statistic less than 5, and 33% are between 5 and 10. Low percentages of the acceptable GEH statistics for Scenario 0 indicate a need for appropriate O-D adjustment.

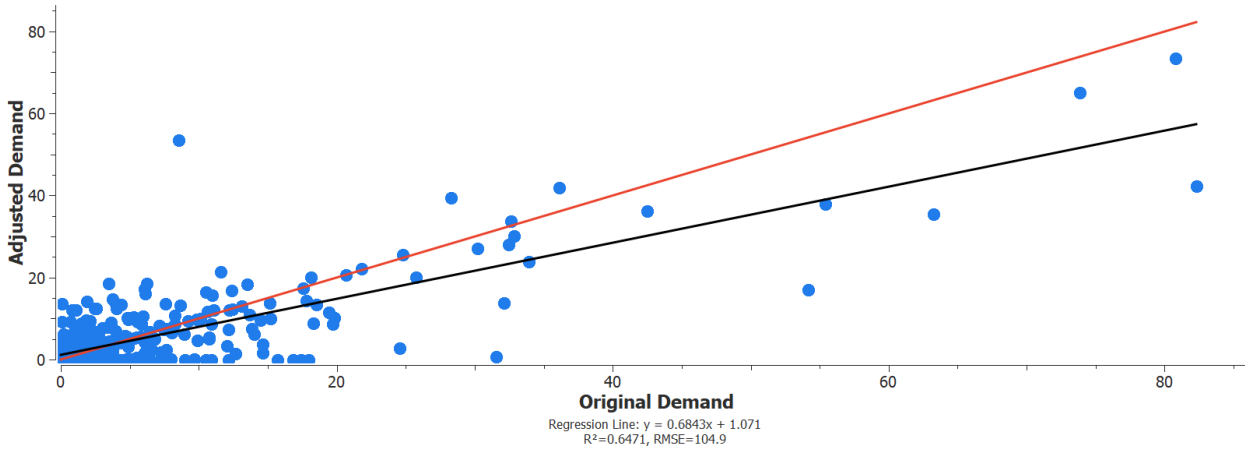
Scenario 1: Macroscopic Demand Adjustment

The criteria used to evaluate the changes made by the static O-D adjustment in Aimsun are presented below:

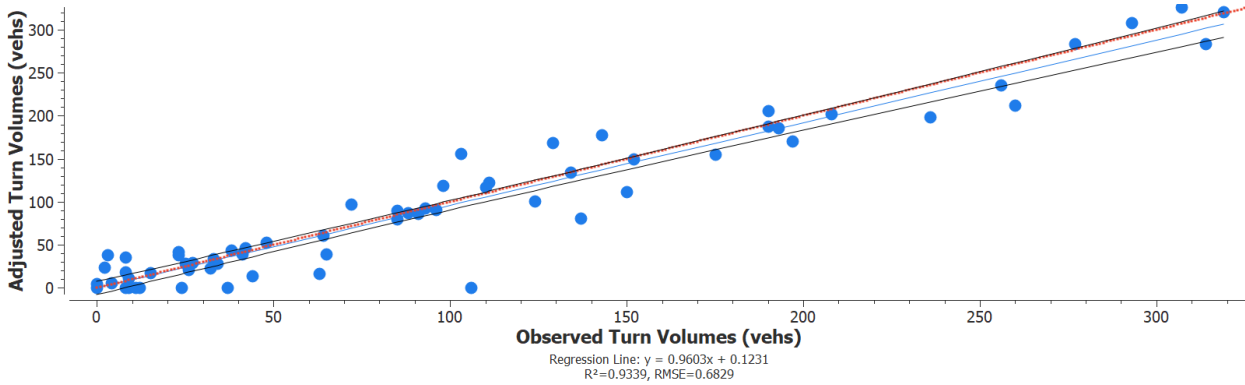
- Adjusted demand versus original vehicle demand
- Modelled turn volumes versus observed turning movement volumes
- Trip length distribution before and after adjustment
- GEH statistics results compared to the results of Scenario 0

Total vehicle trips in the AM peak hour were changed from 2,278 to 2,322 because of travel demand adjustment. A summary of changes in the demand matrix and validation results for the AM peak hour are presented in **Appendix A Figure 4** to **Appendix A Figure 6**.

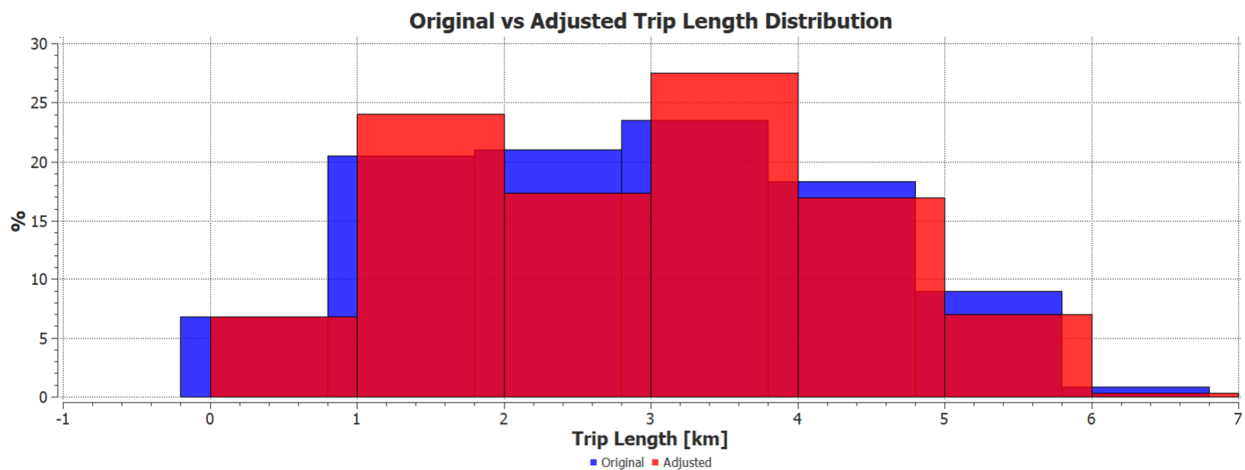
Appendix A Figure 34: Static O-D Adjusted AM Peak Hour Original Demand



Appendix A Figure 35: Static O-D Adjustment vs. AM Peak Hour Observed Turn Volumes



Appendix A Figure 36: Static O-D Adjustment vs. AM Peak Hour Original Trip Length Distribution



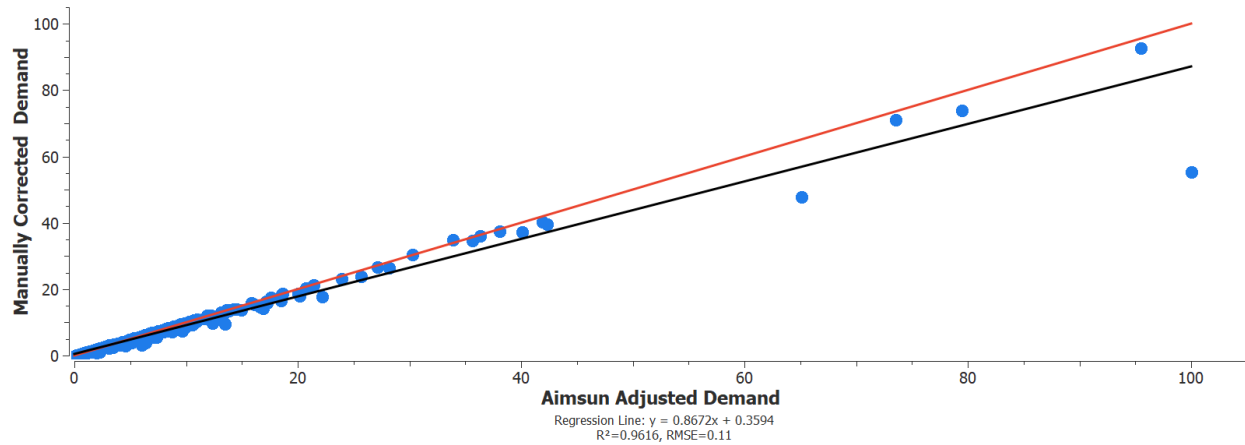
Scenario 2: Demand Manual Adjustment

After reviewing the simulation results of Scenario 1, there are a number of O-D pairs with significant volume gaps identified in the adjusted travel demands. To better match the existing travel patterns, missing travel demands for these O-D pairs were manually added to the adjusted demand matrices resulting from Scenario 1. The manually adjusted travel demands were then calibrated to the observed turning movement counts, using the same O-D static assignment procedure. The final corrected travel demands were utilized for microsimulation runs in

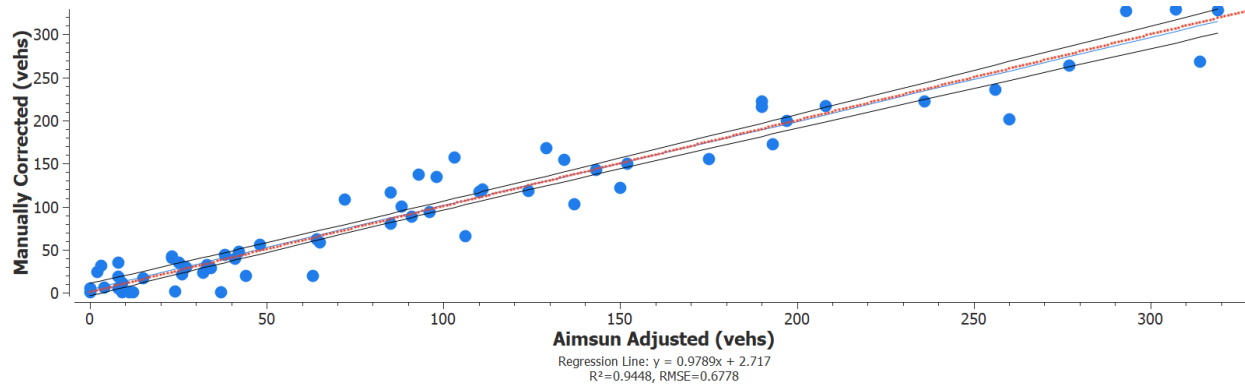
The criteria used to evaluate the changes made by manual adjustment are the same as those described in Scenario 1, which includes comparisons of travel demands, turn volumes, trip length distribution, and the GEH statistics. In this scenario, the demand adjustment results were compared between the adjusted travel demands from Scenario 1 and the final corrected travel demands from Scenario 2.

Total vehicle trips in the AM peak hour were changed from 2,322 to 2,414, which results in an approximately 6% increase from base travel demands. A summary of changes in the demand matrix and validation results for the AM peak hour are presented in **Appendix A Figure 7** to **Appendix A Figure 9**.

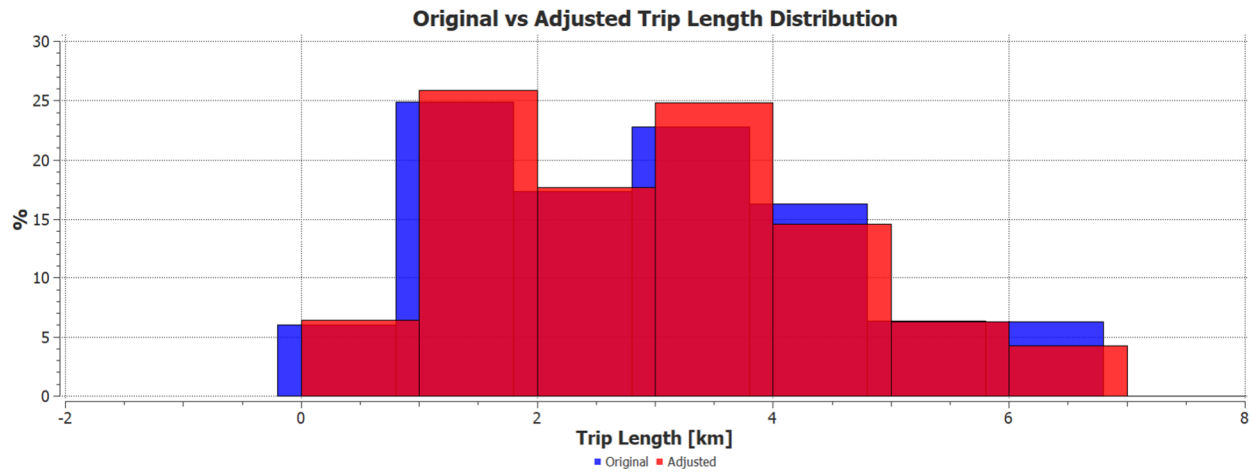
Appendix A Figure 37: Manually Corrected vs. Aimsun Adjusted AM Peak Hour Demands



Appendix A Figure 38: Manually Corrected vs. AM Peak Observed Turn Volumes



Appendix A Figure 39: Manually Corrected vs. Aimsun Adjusted AM Peak Hour Trip Length Distribution



¹Original (Blue) – Aimsun Adjusted; Adjusted (Red) – Manually Corrected

Summary of GEH Statistics Results

A comparison of GEH results among Scenarios 0, 1, and 2 is summarized in **Appendix A Table 4** for the AM and PM peak hours.

From Scenario 0 to Scenario 1, the results show significant improvement in GEH calibration, after applying the static O-D adjustment at a macroscopic level in Aimsun. In the AM peak hour, turning movement volumes with acceptable GEH statistics less than 5 increased by approximately 34%, and less than 10 increased by approximately 12%.

From Scenario 1 to Scenario 2, the GEH statistics results also indicate promising improvement, especially by eliminating all turning movement volumes with GEH statistics greater than 10 in the AM peak hour.

Therefore, the GEH statistics results clearly show the improvements achieved by applying a static O-D demand adjustment process and through manual corrections made to missing travel demands.

Appendix A Table 24: Original and Static OD Adjusted GEH Statistics Summary

	Scenario 0	Scenario 1	Scenario 2
Total Traffic volumes with GEH < 5	39 (54%)	63 (88%)	66 (92%)
Total traffic volumes with 5 < GEH < 10	24 (33%)	8 (11%)	6 (8%)
Total number of turning movements	72	72	72

2.3.5 Microscopic Dynamic Traffic Assignment

The model was simulated in Aimsun using a microsimulation Dynamic User Equilibrium (DUE) experiment under adjusted travel demands. DUE is an iterative traffic assignment that distributes vehicles such that travel times on competing paths are equal. In a DUE experiment, vehicle route choices are determined based on the experienced travel time from previous iterations.

Initial iterations of the DUE experiment run partial traffic demands starting at 50% for the first 10 iterations and then 70% for the next set of iterations until 100% traffic demand is reached. These iterations are set up as outer iterations that are executed at the start of the model run and do not contribute to the final model results.

The purpose of using incremental iterations with partial demand in the beginning of the model run is to allow modelled vehicles to explore alternative path choices, while minimizing the number of bottlenecked areas that are created because of poor path selection. Detailed parameters used in the microsimulation DUE experiment are presented in **Appendix A2**.

For model calibration and validation, the following two model outputs were evaluated to understand the accuracy of the microsimulation model developed for the Smithville study area:

- Traffic Volumes Comparison, including turn volumes and link volumes
- Vehicle Travel Times on Regional Roads (14 and 20)

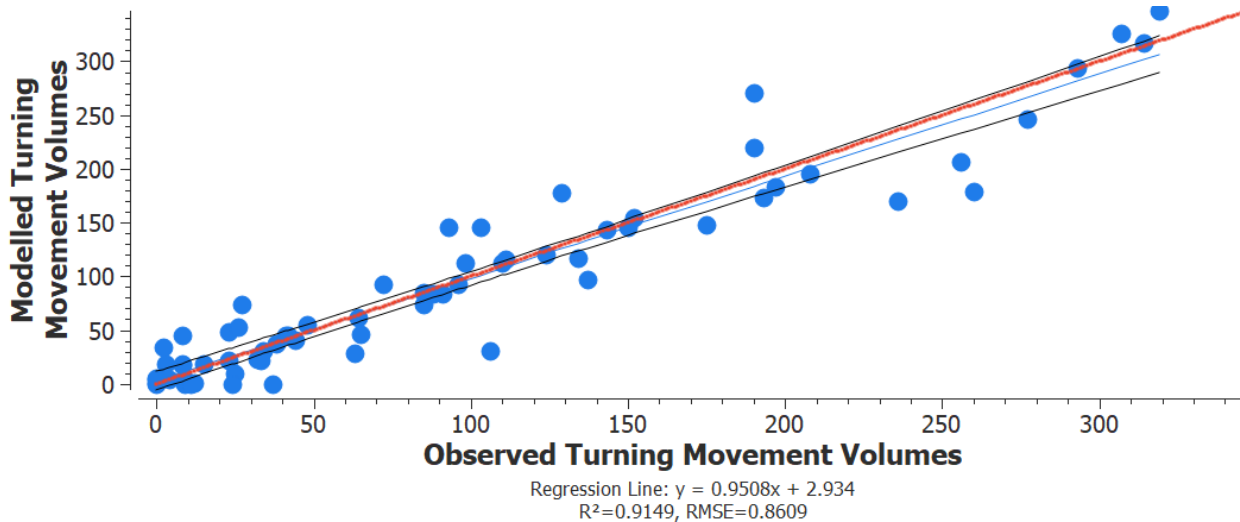
Traffic Volumes Comparison

The modelled traffic volumes were compared to the observed volumes, including turning movement volumes from the received TMCs and link volumes extracted from StreetLight Data. The microsimulation DUE experiment was executed for every 10 iterations each for 3 outer incremental iterations (with travel demand loads of 50%, 70% and 100%). The modelled results were obtained based on the last 10 iterations of the DUE model run with 100% travel demand.

Turn Volumes

Appendix A Figure 10 shows the comparison results of modelled and observed turning movement volumes for the AM peak hours.

Appendix A Figure 40: Observed vs. Modelled AM Peak Hour Turning Movement Volumes



Appendix A Table 5 Error! Reference source not found. contains the comparison results of modelled and observed turning volumes, based on the calibration acceptance criteria 1-2 and 1-3 (see **Appendix A Table 2**).

Appendix A Table 25: Turn Volumes Comparison Results

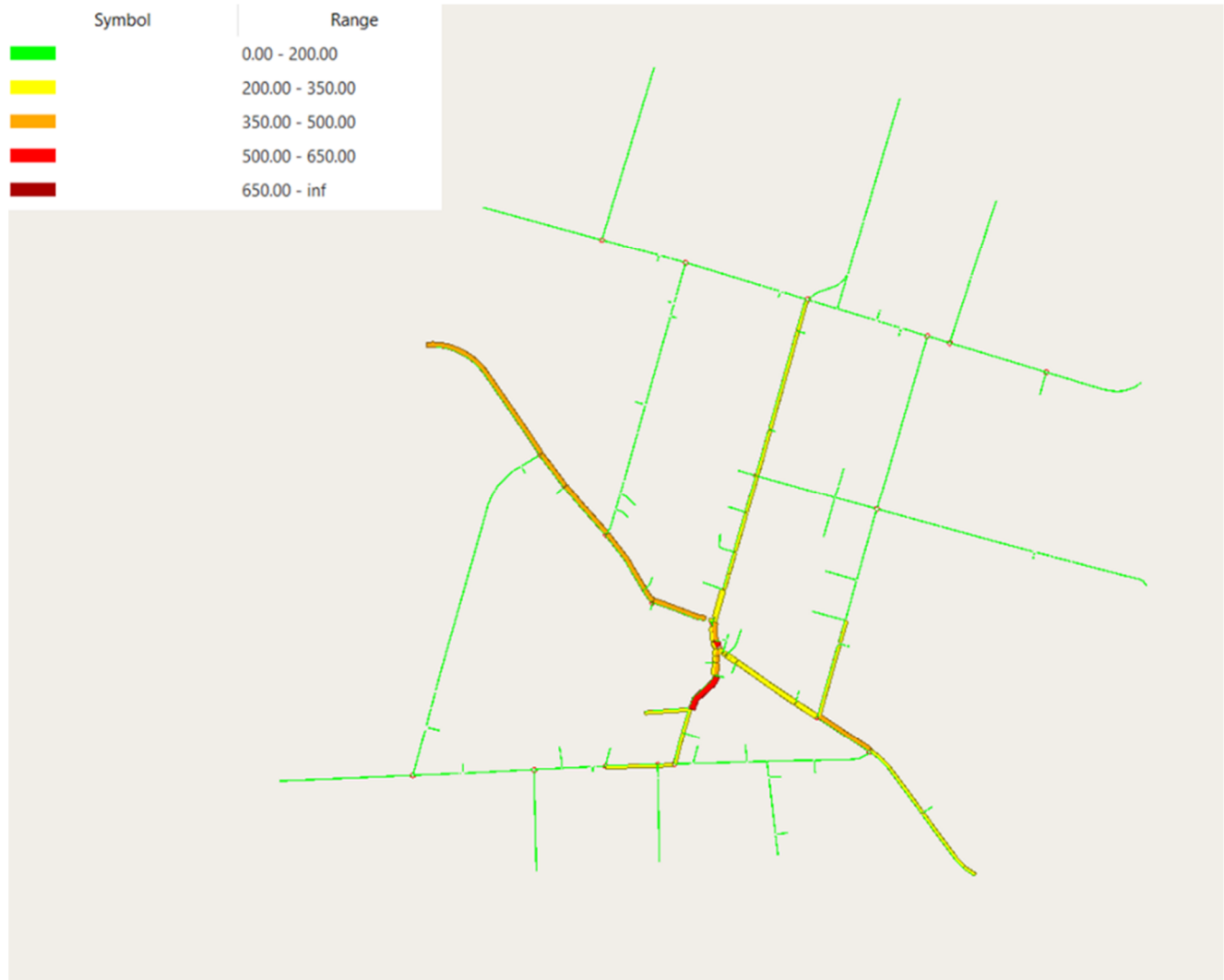
Descriptions	Total Turn Volumes Weekday AM Peak Hour
Sum of All Turn Volumes	
Observed turn volumes	6,321
Modelled turn volumes	6,221 (~98%)
GEH	1.2
Individual Turn Volumes	
Turn volume with GEH statistic < 5	63
Turn volume with 5 < GEH statistic < 10	9
Turn volume with GEH statistic > 10	0
Total turn volumes	72
% GEH < 5	87.5%
% 5 < GEH < 10	100%

Link Volumes

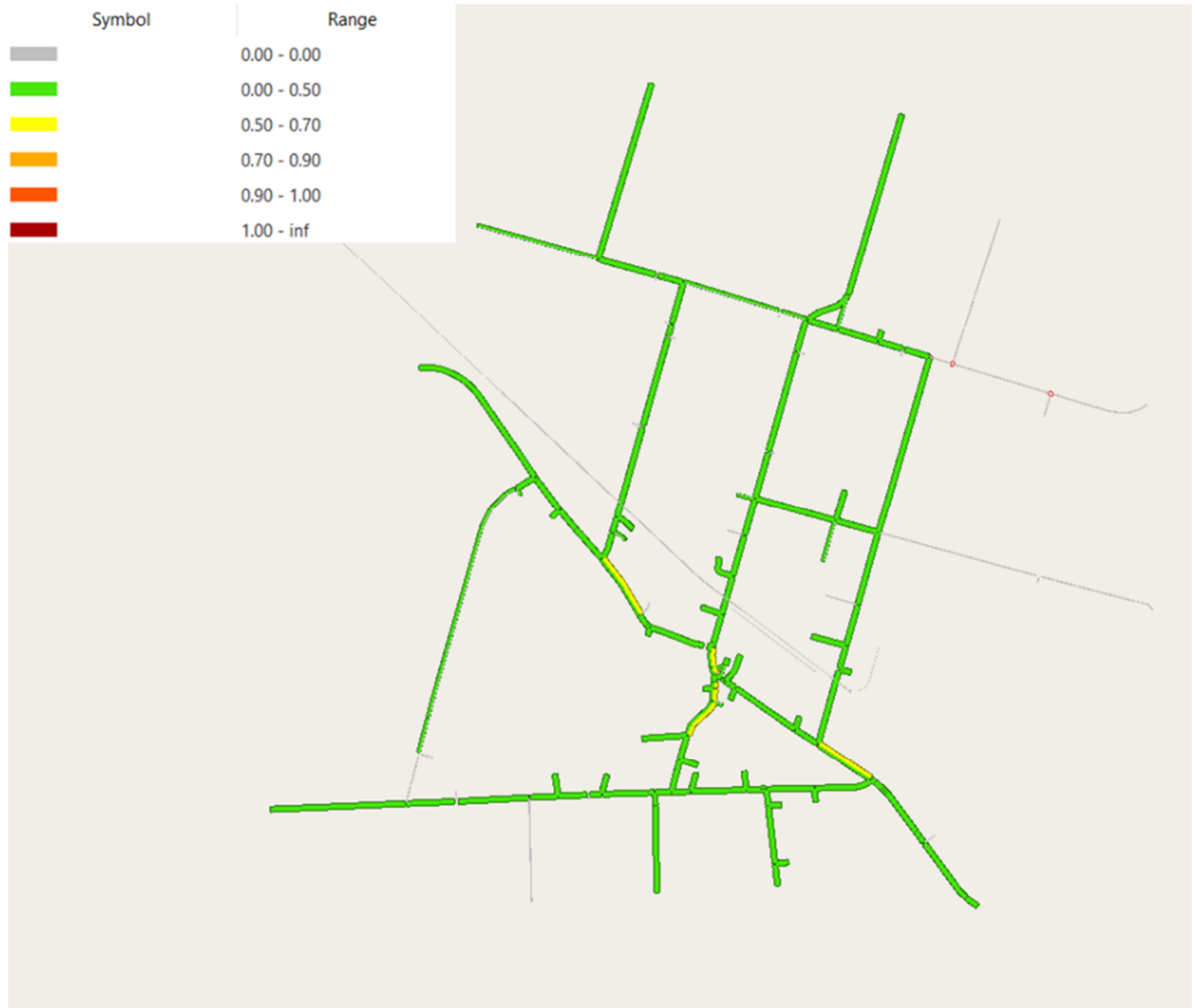
For model calibration, it is also important to evaluate link volumes along the study area boundaries, to check the total traffic volumes to/from the study area. Link volumes at each of major corridors within the study (i.e. Regional Road 14, Regional Road 20, Townline Road and Young Street) were compared between the modelled and observed volumes.

Appendix A Figure 11 and **Appendix A Figure 12** show the simulated flow and link V/C results for the AM peak hour, respectively.

Appendix A Figure 41: Existing Conditions - Simulated Flow



Appendix A Figure 42: Existing Conditions - Simulated Link V/C



Appendix A Table 6 contains the comparison results of modelled and observed link volumes at the corridor limits.

Appendix A Table 26: Link flows comparison results

Corridor	Link Location ¹	Link Flows		GEH
		Observed	Modelled	
Regional Rd 14 / Canborough Street	North Gate	260	272	0.7
	South Gate	432	390	2.1
Smithville Rd / Townline Rd	East Gate, at RR14 ²	387	303	4.5
	West Gate	215	194	1.5
Regional Rd 20	East Gate	517	517	0
	West Gate	458	481	1.1
Young St	East Gate	109	85	2.4
	West Gate	164	145	1.5
Total		2,542	2,387 (~94%)	3.1

¹Refer to "gate" locations used in StreetLight Data (see Error! Reference source not found.).

²Observed link volumes at the east limit of Townline Road (approximately west of RR 20 and Townline Rd) are not available. When extracting StreetLight Data, the "gate" for the east limit of Townline Road was selected at east of Regional Road 14 on for model calibration.

Calibration Acceptance for Traffic Volumes

The criteria adopted from the *FHWA Traffic Analysis Toolbox* provides guidance on the effectiveness of a calibrated model. A review of calibration acceptance for traffic volumes is concluded in **Appendix A Table 7** Error! Reference source not found..

The results show that based on the criteria for traffic volumes, the calibrated existing AM model achieved all targets, except for sum of modelled link volumes within 5% of the observed counts. However, the total modelled link volumes are reported to be approximately 94% of the observed counts, which is only slightly over the acceptance level of 5%. Overall, the calibrated existing AM model is acceptable to use for future scenario modelling.

Appendix A Table 27: Summary of Calibration Acceptance for Traffic Volumes

Criteria #	Criteria and Measures	Calibration Acceptance Targets	Turn Volumes	Link Volumes
<i>Hourly Flows, Model Versus Observed</i>				
1-1	Sum of All Link Flows	Within 5% of sum of all link counts	Yes	No, ~6%
1-2	GEH Statistic < 5 for Individual Link Flows	> 85% of cases	Yes	Yes
1-3	GEH Statistic for Sum of All Link Flows	GEH < 4 for sum of all link counts	Yes	Yes

Vehicle Travel Times on Regional Roads

Observed vehicle travel time data on Regional Roads 14 and 20 within the study area was extracted from StreetLight Data based on the proposed "gates" set on each corridor (see **Appendix A Figure 2**). In Aimsun, a "subpath" can be created to replicate the same travel route where observed travel time data is available. In this case, two "subpaths" were modelled in Aimsun to represent the same routes on both regional roads. The modelled travel time data was extracted for the "subpaths", to be compared with the observed data from StreetLight Data.

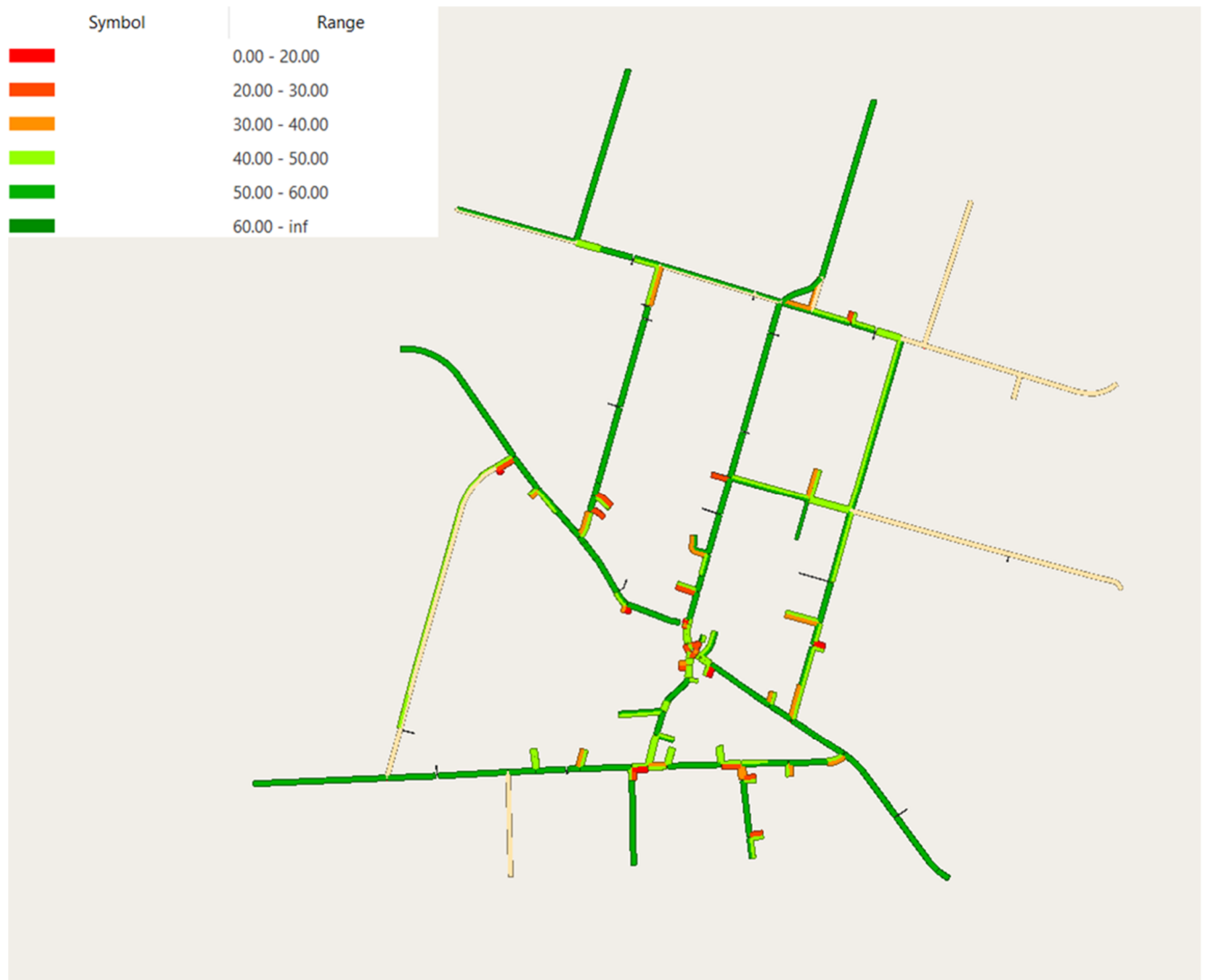
The results of the travel time comparison on Regional Roads 14 and 20 are summarized in **Appendix A Table 8**.

Appendix A Table 28: Auto Travel Times on Regional Road 14 and 20

Corridor	Segment	Direction	Travel Time (min)		Difference		Check (Less Than 15% or 60s)
			Observed	Modelled	Abs.	%	
Regional Rd 14 / Canborough Street	Young St to Townline Road	NB	4.1	3.1	0.97	24%	Yes
		SB	4.8	3.3	1.55	32%	No
Regional Rd 20	South Grimsby Rd 6 to Townline Rd	EB	4.7	3.9	0.77	16%	Yes
		WB	4.2	4.1	0.12	3%	Yes

In the AM peak hour, the modelled travel times along both corridors are acceptable compared to observed travel times in the AM peak hour, except the southbound direction on Regional Road 14 with approximately 33s over the acceptance target of 60s. In addition, a graphic summary of the simulated speed for the AM peak hour is presented in **Appendix A Figure 13** Error! Reference source not found..

Appendix A Figure 43: Existing Conditions - Simulated Speed



2.4 Summary

A 2020 Smithville Existing Conditions traffic microsimulation model was developed for the AM peak hour in Aimsun Next version 20 software, which has been calibrated and validated following the *FHWA Traffic Analysis Toolbox* guidelines. Base travel demands extracted from the Niagara Region Subarea model were adjusted to align with observed traffic volumes using Aimsun’s Static O-D Adjustment Procedure. The adjusted demands were then used as demand inputs for the Aimsun’s DUE microsimulation assignment. The results from the DUE were visually audited and compared against observed traffic counts and sectional travel times. In conclusion, the Aimsun model is acceptable as a base model for future scenario modelling.

A summary of the modelling criteria and performance are provided in **Appendix A Table 9**.

Appendix A Table 29: Summary of Calibration Modelling Results

Criteria	Measures	Calibration Acceptance Targets	Comments	Reference
Hourly Flows, Model Versus Observed	Individual Link Flows and Turn Volumes	Sum of All Link Flows within 5% of sum of all link counts.	Acceptable; modelled link volumes are slightly over the 5% acceptance (within 6%) level. - Model link flows are ~94% - Model turn volumes are ~98%	See Table 6 and Table 7
		GEH Statistic less than 5 for Individual Link Flows observed for more than 85% of cases.	Pass - Model turn volumes 87.5% with GEH<5	
		GEH Statistic for Sum of All Link Flows less than 4 for sum of all link counts.	Pass - Model link flows GEH of 3.1 - Model turn volumes GEH of 1.2	
Travel Times / Speeds, Model Versus Observed	Network Journey Times: Auto Travel Times on Regional Roads 14 and 20	Within 15% (or 1 min, if higher) for more than 85% of cases.	Acceptable; only Regional Road 14 southbound does not meet the target, exceeding it by approximately 33s	Error! Reference source not found.
Visual Audits	Individual Link Speeds:	Visually Acceptable Speed-Flow Relationship	Pass	See Figures 11, 12 and 13
	Bottlenecks:	Visually Acceptable Queuing	Pass	As observed in the Simulation Animation

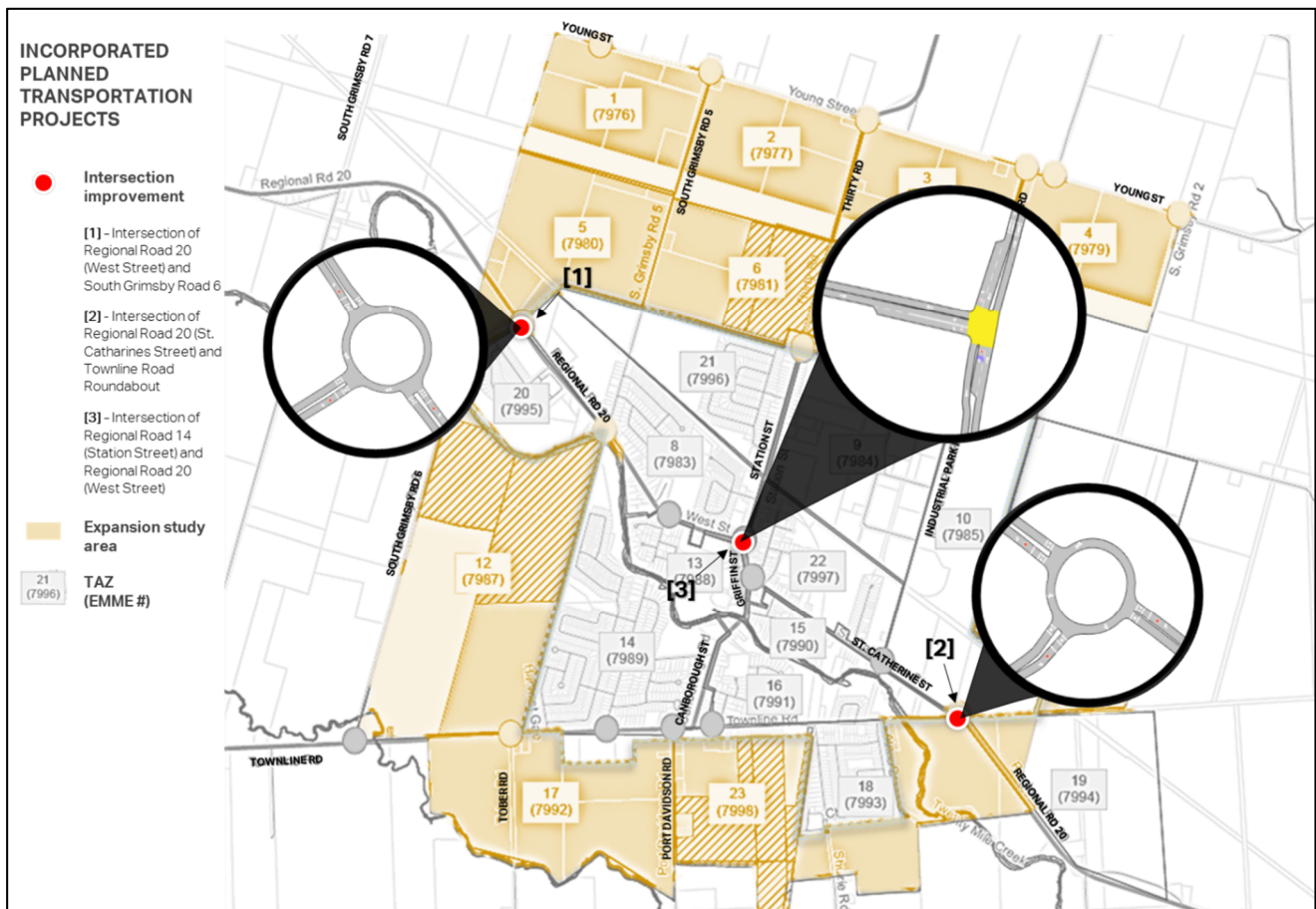
3.Phase I Model

3.1 Model Assumptions

3.1.1 Future Road Network

The modelled 2051 road network is based on the developed Existing Conditions model (“base model”). Modifications to the Existing Conditions network include the planned transportation projects that could be represented within Aimsun and would have impacts on the overall network performance. Due to lack of details and information regarding other planned road improvements at this time, only the roundabouts from the Regional Road 20 Reconstruction project and the signalised intersections of St Catharines Street & Griffin Street and West Street & Station Street have been included in the future Aimsun network as committed infrastructure improvements. Summarized in **Appendix A Figure 14** are the planned/implemented since the base analysis, transportation projects that have been incorporated into the model along with the assumed configurations that are represented within the model. In addition to the intersection improvements, Spring Creek Road has also been extended to the west towards the existing CP Railway tracks as this has been agreed through the Northwest Secondary plan approvals. Additional centroid connectors, representing zonal access/egress, have also been included in the model to increase the connections between the future development zones and the road network.

Appendix A Figure 44: Planned transportation projects modelled in Aimsun



3.1.2 Centroid Configuration

Vehicles enter and exit the network from gates (external zones) and zones via pairs of connectors (generators and attractors) which represent access/egress points. In the case where there are multiple access/egress options for the zone/gate, the “Best Entrance” option was selected, which sets the route choice algorithm within Aimsun to consider only the shortest path from the entrance with the lowest cost. This assumption is based on the level of known detail regarding development plans and can be updated as planning applications are provided to the Township of West Lincoln.

3.1.3 Signal Controls

Traffic Intersections

The signal timing plan at the intersection of St Catharines Street & Griffin Street was coded according to the received signal timing plan. Signal timing plans were not provided for the intersection of West Street (Regional Road 20) & Station Street. Considering the simulation turning movement volume outputs and the proximity of the intersections at West Street (Regional Road 20) & Station Street and St Catharines Street & Griffin Street, the signalized intersection of West Street (Regional Road 20) & Station Street was coded using the same signal timing plan as St Catharines Street & Griffin Street.

Grade Crossings

The traffic impact of trains along the existing CP Rail line is represented in the model as an event that occurs once within the AM Peak hour. The event is assumed to have a duration of approximately 7.6 minutes; this is the time estimated for a 2 km train travelling at approximately 35 km/hr to clear all three grade crossings with additional time buffers, or for two shorter trains potentially traveling in opposite directions. This assumption has been made due to the uncertain usage patterns of the CP line and acknowledging the guidance and discussions with CP Rail that indicate that the line is one they plan to consider for additional use in the future.

Three existing grade crossings were modelled, located at South Grimsby Road 5 north of Regional Road 20, Station Street north of West Street, and Industrial Park Road north of St Catharines Street (Regional Road 20). It is important to note that any additional rail corridor crossings will need to be grade separate, as directed by CP Rail and in accordance with Transport Canada guidance.

3.1.4 Bypass Options

A high-level plan of the bypass alignments, developed in collaboration with the project team, Township, and Region, was used as a reference for the future options model network (See **Appendix A1**). Details such as connectivity to the existing road network were assumed, such as the intersection at Townline Road and Option C bypass connecting Townline Road to South Grimsby Road 7. All bypass alignments are represented in the model with a two-lane cross section (with the exception of Option A between South Grimsby Road 5 and Townline Road) and are grade separated, with no traffic conflict occurring with the existing CP Rail line.

Because the analysis is performed at a high-level, none of the intersections along the bypass alignments were modelled as signalized in Phase I.

3.2 Forecasted Traffic Demand

Traffic volumes were projected over a 30-year-horizon with full build out by the year 2051. AECOM was provided with the Emme Subarea models of the Niagara Regional Model for auto vehicles in the AM Peak hour in the years 2016 and 2041. Two land use scenarios were determined for the 2051 horizon year using the results extracted from the Subarea models: 1) background traffic; and 2) the boundary expansion concept. Truck demand was also projected to the 2051 horizon year from the base truck OD adjusted matrix. Truck percentage assumptions for the base truck demand estimation from the calibrated Existing Conditions were carried over to the 2051 truck demand estimation.

3.2.1 Projected Background Traffic

The 2051 background traffic demand was developed by combining the regional travel demand model with a determined average annual growth rate to estimate the future auto demand. Separate average annual traffic growth rates were determined and applied to internal trips within the study area and all other trips (which included trips between the study area and external regions, as well as pass-through trips). These average annual growth rates were observed from the 2016 and 2041 subarea model OD matrices. The growth between the years 2016 and 2041 was assumed to follow a linear trend. Based on the determined averages, an annual growth rate of 2.5% was assigned to internal-to-internal trips while an annual linear growth rate of 2% was assigned to internal-to-external, external-to-internal, and external-to-external trips. The growth rates were applied to the 2041 OD demand matrix and linearly extrapolated to the target year of 2051.

3.2.2 Estimated Boundary Expansion Concept Traffic Growth

The 2041 subarea model received was used to determine the anticipated traffic demand with development in the boundary expansion zones. Traffic demand associated with the expansion area was estimated by taking the difference between the 2041 UBE and no-UBE subarea models (developed in July 2020) and adding it to the 2051 projected background traffic. Significant reductions in trips, particularly in external-to-external trips, were observed between the two 2041 subarea models. For conservativeness, modification factors of 1.1 and 2.1 were applied to external-to-internal and external-to-external trips, respectively to counter data inconsistencies. It is also assumed that 5% of trips entering the network along Regional Road 20 on the west side of the model will be routed to the Young Street gate. This adjustment was made in the model through the centroid connectors input in Aimsun.

The 2051 estimated number of trips within the study area are summarized in **Appendix A Table 10** below. The tabulated values include both auto and truck demand.

Appendix A Table 30: Future estimated number of trips in 2051

Demand	Internal to Internal	Internal to External	External to Internal	External to External	Total
Projected Background Traffic	880	1995	1340	1578	5793
Boundary Expansion Concept	1546	2533	1585	1143	6807

3.3 Future Scenarios Overview

In Phase I the primary objective of the modeling exercise is to examine the impact of and need for, strategic transportation infrastructure. There is no existing Township of West Lincoln or Smithville Transportation Master Plans, so any guidance on new transportation infrastructure comes from the Niagara Region Transportation Master Plan (TMP). The Regions TMP identifies a single piece of transportation infrastructure in the Smithville area, which is the need for a new connection around Smithville that avoid travel through the middle of the town. This new infrastructure has been collectively referred to as the Smithville Bypass.

The Smithville Bypass has been a proposed infrastructure item that has been under consideration since before the province downloaded Regional Road 20 to the Niagara Region. When first conceived the proposed alignment of the bypass would be south of the existing town centre, as the town has grown over time however, the alignment has switched and been shown going north of Smithville.

The model work being conducted in Phase I is the first time the Smithville bypass concept has been examined at anything more than a policy level. Given that there is no existing quantitative analysis on the bypass and given that there are several alignments that have been previously identified, it was determined that more than one option for a bypass alignment needed to be explored in the Phase I model work.

In developing the bypass scenarios to test in the Phase I model work, it is also necessary to include a Do-Nothing scenario that is used as a benchmark for comparison of the networks performance.

3.3.1 2051 Future Do-Nothing

The Future Do-Nothing scenario incorporates planned road improvements within the 30-year horizon as identified in **Appendix A Figure 14**. To compare against the alternative bypass options scenarios, this scenario roadway network was run under both the projected background traffic and boundary expansion demands.

3.3.2 Alternative Bypass Options

The bypass options were all built upon the future Do-Nothing scenario with planned road improvements incorporated. All bypass options were assessed under the boundary expansion concept demand with a fully extended South Grimsby Road 7 connecting Townline Road to the south and Young Street to the north. A brief description of the characteristics of each bypass can be found in **Appendix A Table 11**.

In developing each of the three alignments for the purpose of testing their impact on traffic conditions in the future 2051 horizon year, a number of considerations and factors are noted:

- It was determined that despite the 2051 Future Do-Nothing scenario showing that there were significant areas of delay and volume in parts of Smithville, a number of the existing roads still had significant available capacity. Given this it was considered that where possible existing infrastructure should be used to form the bypass routes.
- The development of the three options has been done to demonstrate broader approaches to the future alignment of a bypass and not necessarily to show the exact alignment. At this early stage any alignment is only being tested for the impact it has on network operation and any new or expanded road sections would still be subject to appropriate environmental assessments and further design.

The three options developed use a combination of new road links and existing roads, and are described:

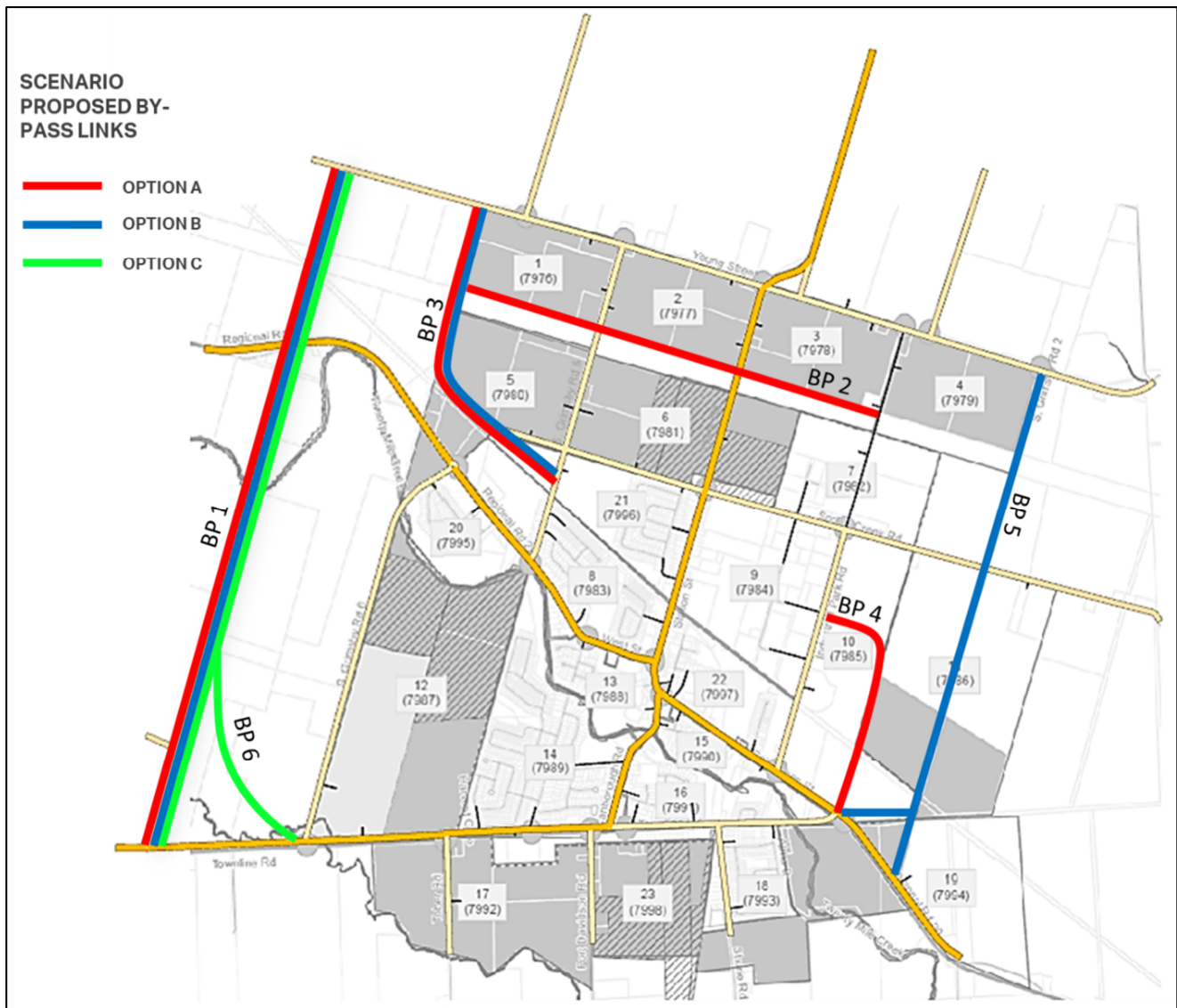
Option A: In this scenario there are four new road links added to the existing network (approximately 9.60-km of new road added). This is the only option with a new section of road running in an east-west direction, which is located north of Regional Road 20 in parallel and in between Young Street and the Spring Creek Road. East of the study area, a new section of road is proposed to bypass congestion at the southern end of industrial park road and connects Industrial Park Road north of the CP line and Regional Road 20.

Option B: In this scenario there are three new road links in the north-south direction on the east and west side of the study area. This is approximately an additional 9.25-km of road added to the network. To the east of the study area, South Grimsby Road 2 is extended from Young Street and connecting to Regional Road 20, with the aim of providing relief to Industrial Park Road and reducing the number of intersections that through traffic would encounter. The option includes sensitivity testing regarding whether the new leg should join the existing roundabout at Townline Road and Regional Road 20, or should connect to Regional Road 20 further to the Southwest.

Option C: In this scenario there are two new road links provided on the west side of the study area, approximately 5.25-km of road added to the network. These links consist of an extension to South Grimsby Road 7 (common to all the options), as well as a dedicated curvature of Townline Road to connect to South Grimsby Road 7 which provides priority for this movement and avoids the need for additional or enlarged intersections.

The bypass links are grade separated from the CP Rail line, therefore traffic routed along the bypass routes should not experience traffic impact from trains crossing through Smithville. **Appendix A Figure 15** presents all options overlayed on the existing road network, to demonstrate where the new links are used.

Appendix A Figure 45: Proposed new links for each bypass option



Appendix A Table 31: Bypass descriptions

Bypass	Description	Length (km)	Maximum Speed (km/h)	Capacity per lane (Passenger Car Units/h)	Option(s)
BP1	South Grimsby Rd 7, a north and south link connecting Regional Rd 20 to Townline Road and Young Street.	4.03	50	1000	All
BP2	Road in the east and west direction between Spring Creek Rd and Young St	2.42	50	700	A
BP3	North and south link connecting South Grimsby Rd 5 and Young St	1.75	50	700	A and B

Bypass	Description	Length (km)	Maximum Speed (km/h)	Capacity per lane (Passenger Car Units/h)	Option(s)
BP4	North and south between St. Catharines St Roundabout and Industrial Park Rd	1.38	50	700	A
BP5	South Grimsby Rd 2 connecting to St. Catharines/Regional Road 20 and Townline Rd Roundabout	3.00	50	700	B
BP6	Link connecting to South Grimsby Rd 8 and Townline Rd	1.23	50	700	C

3.4 Results

All future alternative scenarios were evaluated using a Dynamic User Equilibrium (DUE) experiment setup. Network geometric variations and projected increases in vehicle demand are expected to influence subarea road users to seek out alternative routes or develop new habitual routes as a means of reaching their destinations. As such, routes generated from the base model were not used in this evaluation. The model was set to run under AM Peak hour conditions with a 1-hour start-up period.

To provide an overview of route patterns, road utilization, and intersection performance, the subarea road network performance was assessed for the following simulation evaluation measures listed below:

- Simulated Flow
- Simulated Volume-to-Capacity (V/C)
- Simulated Density
- Simulated Delay Time

Results retrieved were aggregated over the 1-hour peak period for each evaluation measure. The evaluations are presented graphically as heat maps showing the distribution of each evaluation measure across the study area road network.

3.4.1 2051 Future Do-Nothing

Results from the background traffic growth and boundary expansion growth are compared in this section. At a high-level, an overall increase in trips (due to the boundary expansion) results in an amplification of vehicle flow, although overall vehicle flow patterns are relatively consistent with the existing network as shown in **Appendix A Figure 16**. Note that pass-through trips are expected to decrease in response to the expected increase in local traffic within Smithville in the boundary expansion growth scenario.

Deficiencies in the road network are observed to generally be at the same locations in both scenarios and have either been amplified or propagated further along adjacent links. These deficiencies are noted below:

- Both roundabouts along Regional Road 20 at South Grimsby Road 6 and Townline Road are generally expected to exceed capacity through at least one leg. With the future boundary expansion growth, volumes on sections near the western limit of Regional Road 20 are approaching or exceeding the road capacity as seen in **Appendix A Figure 16**.
- Railway crossing delays have significant impacts on the travel time along Station Street, Industrial Road, and South Grimsby Road 5 corridors. This result is similar in both scenarios as seen in **Appendix A Figure 19**. It should be noted that in the event a train crosses the town, a physical barrier is created which separates the northern and southern parts of the town.

- In general, delays are quite similar in both scenarios. However, there are two noteworthy locations:
 - Delays appear to be amplified in the Boundary Expansion Growth scenario near the intersection of Townline Road and Canborough Street with significant increase in traffic density on the east approach of the intersection as seen in **Appendix A Figure 18**. This is most likely attributable to the intersection all-way stop control being unable to process the increased traffic demand at the approach, as observed in the simulation.
 - An observed decrease in delay on South Grimsby Road 6 approaching the roundabout can be attributed to the fact that there is a reduction in trips in and out of Regional Road 20 on the west leg (mostly a reduction in pass-through trips). Therefore, more vehicles are able to be processed at the south leg of the roundabout.

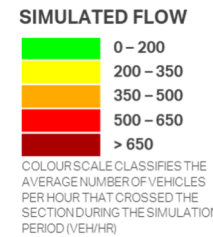
A comparison of the model results for both scenarios, background traffic demand versus boundary expansion demand, is presented in **Appendix A Figure 16** to **Appendix A Figure 19**.

Appendix A Figure 46: 2051 Future Do-Nothing - Simulated Flow

BACKGROUND TRAFFIC GROWTH



BOUNDARY EXPANSION GROWTH

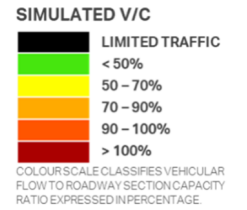


Appendix A Figure 47: 2051 Future Do-Nothing - Simulated V/C

BACKGROUND TRAFFIC GROWTH



BOUNDARY EXPANSION GROWTH

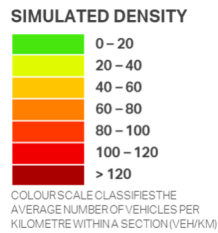


Appendix A Figure 48: 2051 Future Do-Nothing - Simulated Density

BACKGROUND TRAFFIC GROWTH



BOUNDARY EXPANSION GROWTH

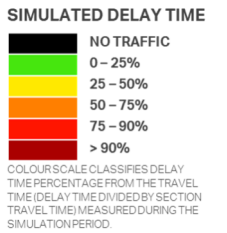


Appendix A Figure 49: 2051 Future Do-Nothing - Simulated Delay Time

BACKGROUND TRAFFIC GROWTH



BOUNDARY EXPANSION GROWTH



3.4.2 Future Options

The evaluation output for each optional road network assessed under 2051 future conditions are presented in this section. Because Phase I is a high-level analysis of the bypass links, modelling interventions for performance improvements, such as introducing new traffic signal controls at inefficient intersections, were not included in the analysis (This will be done once a preferred concept and bypass option are selected in Phase II). These set of outputs are presented in **Appendix A Figure 21** to **Appendix A Figure 24**. In addition some sensitivity testing was performed for Option C to further investigate the potential connection and rearrangement of directional priorities for the proposed bypasses.

In addition to the graphical outputs, screenline counts were sampled at key locations to provide insight on the effectiveness of the bypass links by determining the proportion of vehicular volume the bypass carries compared to the existing alternatives. The results can be found in **Appendix A Table 12**. The screenlines are defined below and are depicted in **Appendix A Figure 21** under their respective options:

The screenlines were set to assess the bypass's contribution to the network, these were compared against links that would have been used on alternative routes. For example, vehicles travelling southbound to Townline Road from Regional Road 20 have the option of using link BP1, South Grimsby Road 6, Canborough Street, or continuing along Regional Road 20 to Townline Road via the roundabout. The screenline would be defined to cross all four roads and the volumes sampled at the screenline for each road would be compared to determine the attractiveness of the road in routing vehicles towards Townline Road. Screenlines listed below are grouped based on direction of travel in the network.

➤ *North-South Volumes:*

- **Screenline #1** is located south of Regional Road 20 near Townline Road crossing BP1, BP6, South Grimsby Road 6, Canborough Street, and Townline Road (west approach of the roundabout).
- **Screenline #2** is located slightly north of Regional Road 20 crossing BP1, BP4, BP5, South Grimsby Road 5, Station Street, and Industrial Park Road.
- **Screenline #3** is located north of Regional Road 20 near Young Street crossing BP1, BP3, BP5, South Grimsby Road 5, 30 Road, and Industrial Park Road.

➤ *East-West Volumes:*

- **Screenline #4** is located slightly west of South Grimsby Road 6 crossing BP6, Young Street, Townline Road, and Regional Road 20.
- **Screenline #5** is located between South Grimsby Road 5 and Industrial Road, crossing BP2, Spring Creek Road, Young Street, Townline Road, and Regional Road 20.

A general overview of the bypass utilization is obtainable from both the simulated flow distribution in **Appendix A Figure 21** and section volume-to-capacity in **Appendix A Figure 22**. BP1 (South Grimsby Road 7) appears to have the greatest utilization out of all the new links. In all options, BP1 (South Grimsby Road 7) has a significant impact on the network, processing vehicles at volumes within the ranges of key corridors such as Station Street. Option C essentially demonstrates the isolated impact BP1 would have on the existing network, with a noticeable reduction in average delay time that can be seen in **Appendix A Figure 24**. All other proposed links have a lesser impact on the performance of the network as they do not attract vehicles at volumes in the magnitude of BP1. The utilization of the proposed new links compared to the existing links in all options is summarized in **Appendix A Table 12**, where subtle variations in link volume are observed along the screenlines and vehicle volumes processed along the links are generally much lower than those on existing links with the exception of BP1. Although the distribution of average delays times, in **Appendix A Figure 24**, are not too different across the options, there are noticeable reductions in delay compared to the Future Do-Nothing with Boundary Expansion Growth scenario.

3.4.3 Option A

The road configuration of Option A introduces four new links (BP1, BP2, BP3, and BP4) which provide relief to the congested areas along St Catharines Street (Regional Road 20) corridor and the impacts of the delay at the railway crossings, while also providing connectivity to the expansion areas north of the existing urban boundary.

In terms of vehicular flow, BP2, BP3, and BP5 do not seem to attract as many vehicles compared to other roads in the network which can be seen in **Appendix A Figure 21**, **Appendix A Figure 22**, and **Appendix A Table 12**. The bypass links in this configuration do not resolve the capacity issues experienced along Regional Road 20 at the western end of town by the South Grimsby Road 6 roundabout. Traffic flow along Spring Creek Road is quite low in the Do-Nothing scenario with Boundary Expansion Growth and is again observed to be low in the future options. Low volumes are also observed on BP2. The addition of BP4 does result in a reduction in flow along Industrial Road compared to the other options. Option A exhibits the most reduction in density on Industrial Road approaching the railway crossing which is possibly due to BP4 being utilized by vehicles to bypass the railway crossing in the event of a train passing through the township.

3.4.4 Option B

The road network configuration of Option B has several similarities to Option A, with new links BP1 and BP3 still present in the network. However, BP2 has been removed and the short link on the east side (BP4 in Option A) has been replaced with a longer road connecting the most southern and northern parts of the town (BP5), which provides a direct connection between St. Catharines Street (Regional Road 20) and Townline Road to Young Street.

As BP5 is adjacent and runs parallel to Industrial Road, vehicular volume is observed to be reduced along Industrial road compared to Option A. However, the traffic relief provided by BP5 on Industrial Park Road is not uniform with many of the sections of Industrial Park Road north of the railway crossing, not experiencing significant volume in the Do-Nothing scenario with Boundary Expansion Growth. Queues generated on Industrial Road in the northbound approach towards the railway crossing are almost twice as long in Option B than Option A. By this observation, BP5 is not highly utilized to bypass the railway crossing, and the new link does not serve to provide a preferable alternative for many users.

3.4.5 Option C

Option C proposes the introduction of fewer new links than both Option A and B, while also focusing on infrastructure in the southwest area of Smithville. The option involves the introduction of two new links (BP1 and BP6).

BP6 connecting Townline Road to South Grimsby Road 7, via a new preferred link. This new link has been proposed to support the movement of trips from the Townline Road area that are attempting to access the west side of Smithville and reach Regional Road 20. The initial model simulations of this new preferred link did not result in any significant improvement to flow and delays in the southwest, a sensitivity analysis was conducted on this link and is discussed further.

Similar to the previous options, the new road links in this configuration do not resolve the capacity issues near Regional Road 20 west gate and the roundabout. Queue formations observed in the model approaching the railway crossings are not too different from the Do-Nothing scenario with Boundary Expansion Growth. Traffic density for these areas are within ranges between those observed in the Do-Nothing and Option B.

After the initial model simulations it was determined that a few sensitivity tests should be tried to increase the attractiveness of the link BP6. The first test was to allocate more vehicles entering the model from Zone 7987 on the access point connecting to Townline Road instead of South Grimsby Road 6. Initially, the model was set to choose the "Best Entrance" out of the two access points. This resulted in a reduction of trips along South Grimsby Road 6 of approximately 100 less vehicles processed, while the number of vehicles using link BP1 has increased by approximately the same proportion to which South Grimsby Road 6 has reduced. However, the total number of vehicles observed to select South Grimsby Road 6 to travel northbound towards Regional Road

20 is still greater than the new link in this scenario (**Appendix A Figure 20** left image). To try and improve the number of vehicles utilising link BP6, a signalized control plan was added to the intersection of Regional Road 20 & South Grimsby Road 7 (BP1). This mitigation measure has a much greater impact on the attractiveness of BP6, resulting in traffic flow increases in both directions along BP6 and significant reductions in vehicles processed on South Grimsby Road 6 as seen in the right image in **Appendix A** Error! Reference source not found.. Both the left and middle images in **Appendix A Figure 20** show the impact of the isolated changes (i.e., impact of adding only a controlled signalized intersection), the combined effect can be seen in the right image. Although there is an observed decrease in flow along South Grimsby Road 6, the roundabout at the intersection of South Grimsby Road 6 and Regional Road 20 is still operating over capacity.

Appendix A Figure 50: Zone 7989 access on Townline Road (far-left), added signalized control plan at Regional Road 20 & South Grimsby Road 7/BP1 (middle), and combined intervention (far-right)



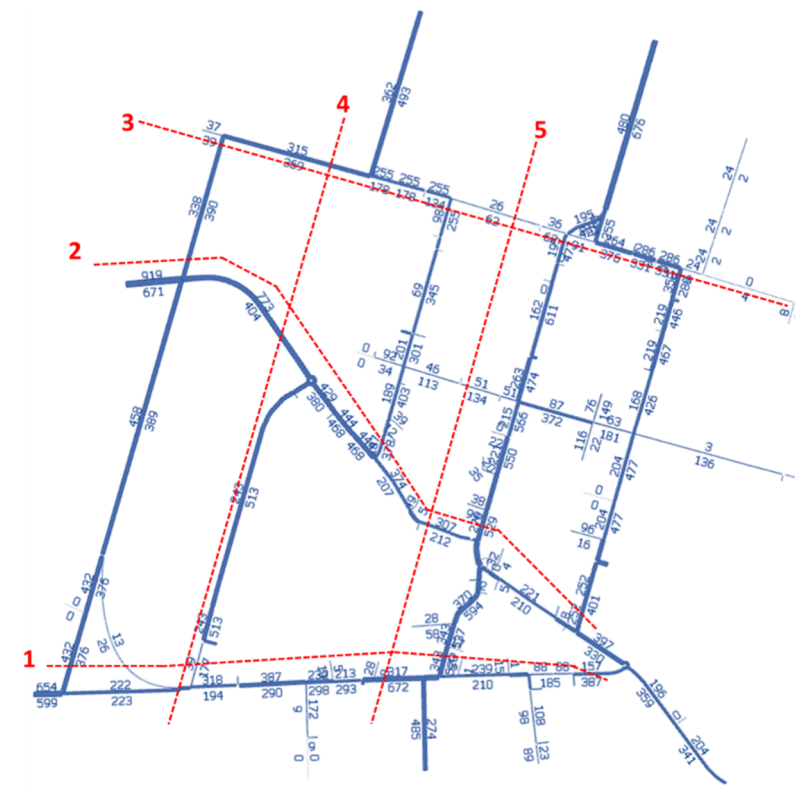
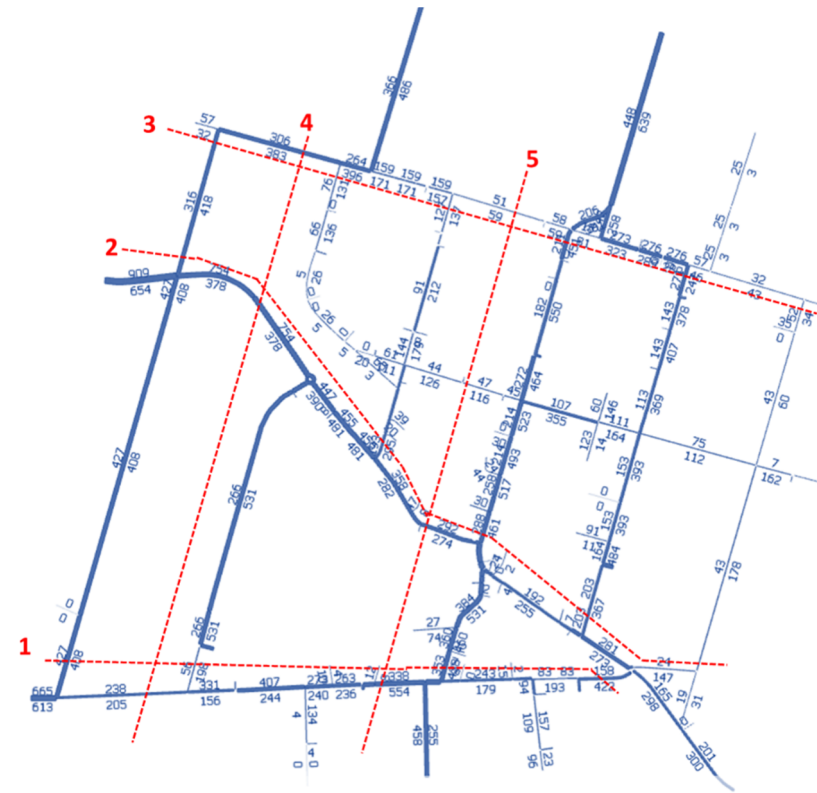
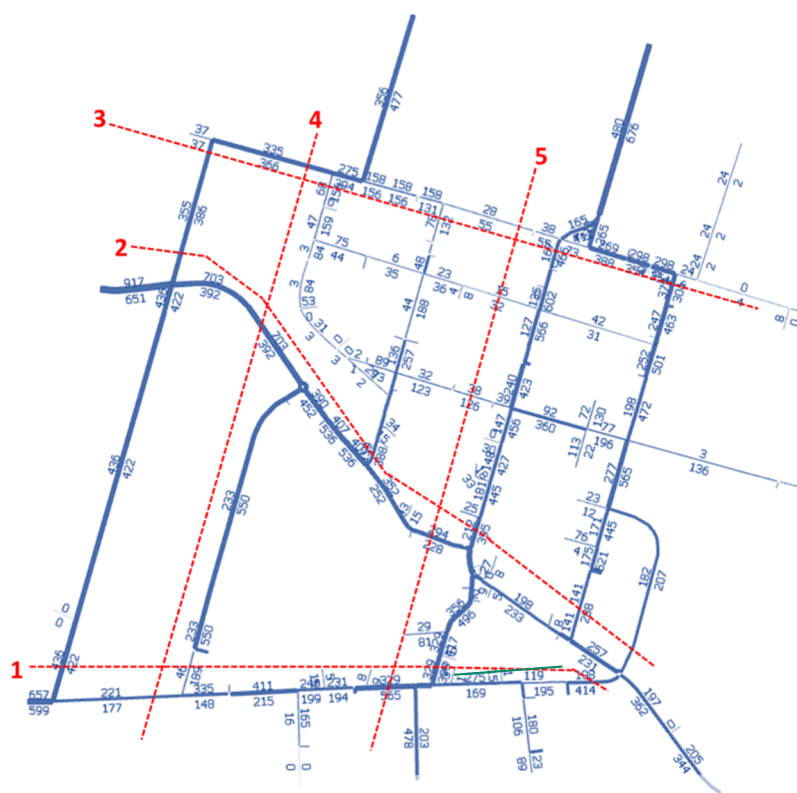
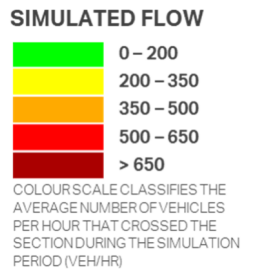
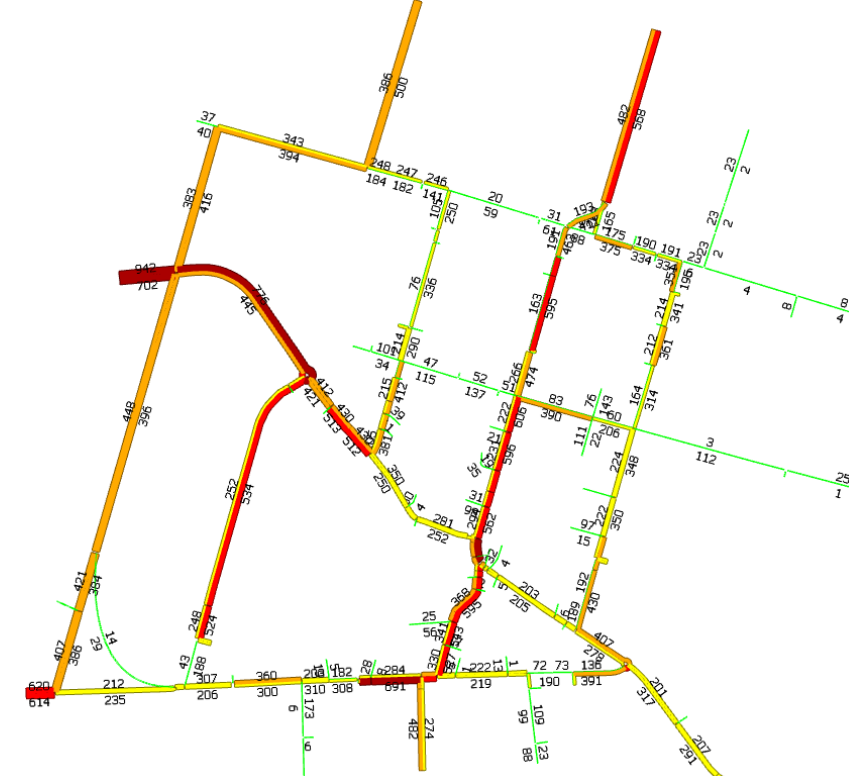
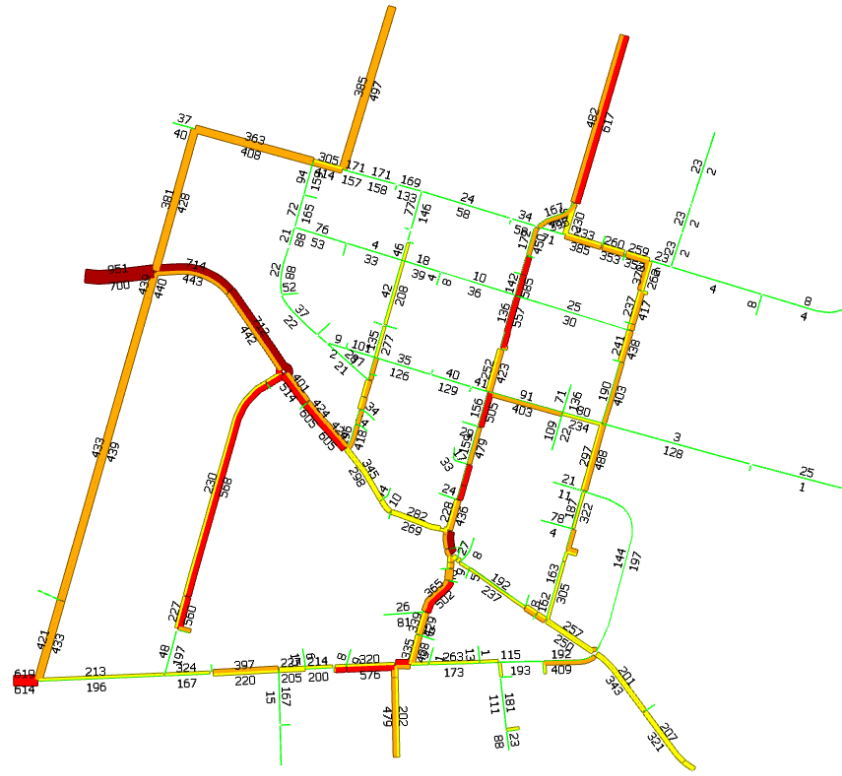
The sensitivity tests discussed above have not been applied in **Appendix A Figure 21** to **Appendix A Figure 24**, and would be applied in Phase II instead. **Appendix A Figure 21** to **Appendix A Figure 24** assume the best entrance will be used with no additional traffic interventions incorporated into the model to impact user decision making.

Appendix A Figure 51: Bypass options - Simulated Flow and Screenlines

OPTION A

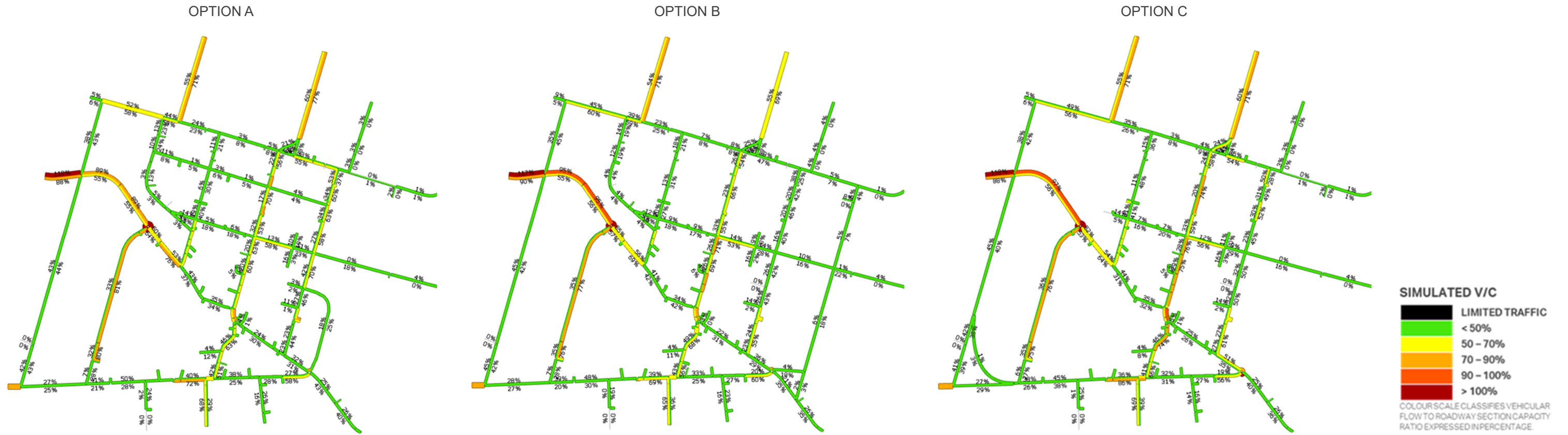
OPTION B

OPTION C

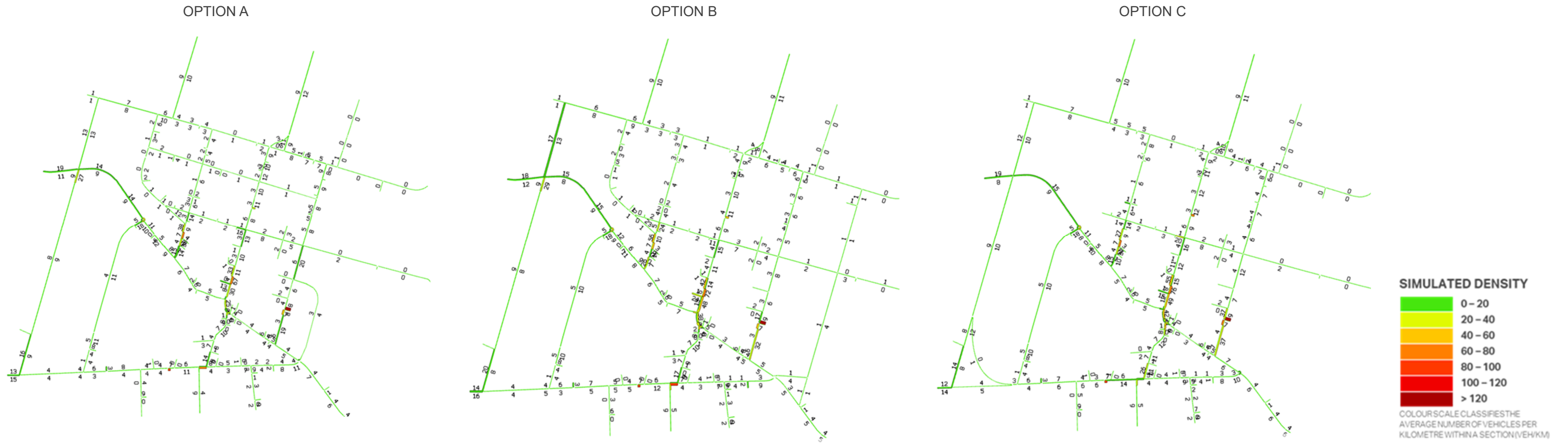


*Screenlines in red

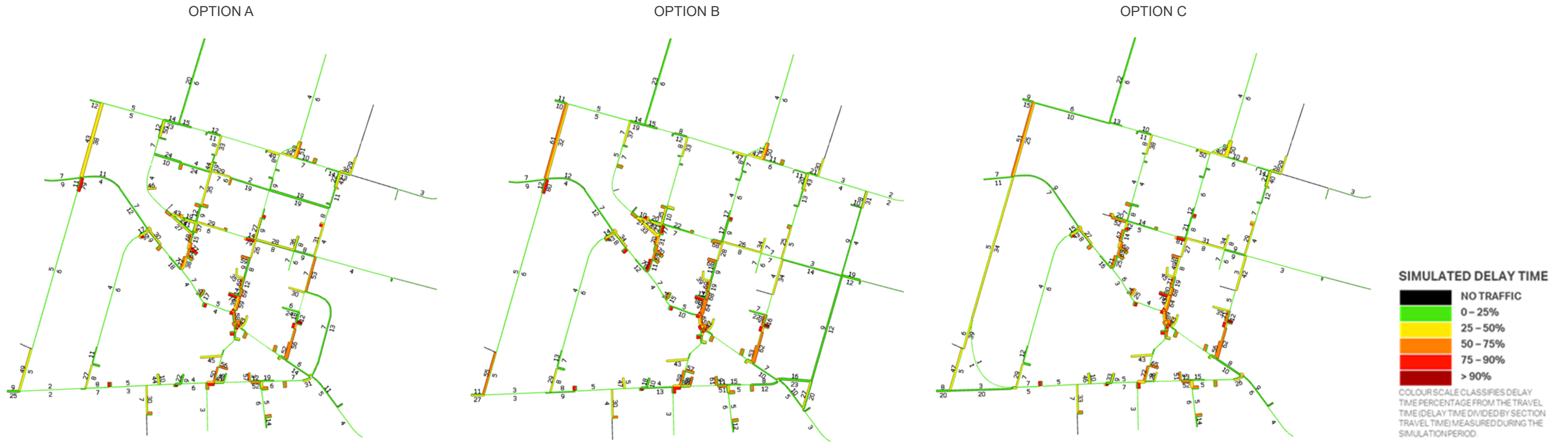
Appendix A Figure 52: Bypass options - Simulated Volume-to-Capacity Ratio



Appendix A Figure 53: Bypass options - Simulated Density



Appendix A Figure 54: Bypass options - Simulated Delay Time



Appendix A Table 32: Bypass options - link volume comparison

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
1	BP1	South Grimsby Road 7 NB/SB connection	4.03	NB	422	29.7%	1423	408	27.8%	1466	376	25.5%	1473
				SB	436	43.2%	1009	427	43.0%	994	432	43.3%	997
	BP6	Link connecting to South Grimsby Road 7 and Townline Road	1.23	NB/WB	-	-	-	-	-	-	13	0.9%	1473
				SB/EB	-	-	-	-	-	-	26	2.6%	997
		South Grimsby Road 6	-	NB	189	13.3%	1423	198	13.5%	1466	177	12.0%	1473
				SB	46	4.6%	1009	56	5.6%	994	39	3.9%	997
		Canborough Road	-	NB	398	28.0%	1423	438	29.9%	1466	520	35.3%	1473
				SB	329	32.6%	1009	353	35.5%	994	343	34.4%	997
		Townline Road	-	EB	414	29.1%	1423	422	28.8%	1466	387	26.3%	1473

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
				WB	198	19.6%	1009	158	15.9%	994	157	15.7%	997
2	BP1	South Grimsby Road 7 NB/SB connection	4.03	NB	386	23.2%	1664	418	24.3%	1719	390	23.0%	1698
				SB	355	33.8%	1049	316	30.3%	1043	338	32.1%	1053
	BP4	North and South between St Catherines Street Roundabout and Industrial Park Road	1.39	NB	207	12.4%	1664	-	-	-	-	-	-
				SB	182	17.3%	1049	-	-	-	-	-	-
	BP5	South Grimsby Road 2 connecting to St Catherines Street /Regional Road 20	3.01	NB	-	-	-	178	10.4%	1719	-	-	-
				SB	-	-	-	43	4.1%	1043	-	-	-
	-	South Grimsby Road 5	-	NB	388	23.3%	1664	295	17.2%	1719	378	22.3%	1698
				SB	159	15.2%	1049	193	18.5%	1043	187	17.8%	1053

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
		Station Street	-	NB	395	23.7%	1664	461	26.8%	1719	529	31.2%	1698
				SB	212	20.2%	1049	288	27.6%	1043	276	26.2%	1053
		Industrial Park Road	-	NB	288	17.3%	1664	367	21.3%	1719	401	23.6%	1698
				SB	141	13.4%	1049	203	19.5%	1043	252	23.9%	1053
3	BP1	South Grimsby Road 7 NB/SB connection	4.03	NB	386	26.8%	1440	418	29.5%	1418	390	27.6%	1411
				SB	355	34.0%	1043	316	30.0%	1053	338	34.4%	983
	BP3	North and south connection to South Grimsby Road 5 and Young Street	1.75	NB/WB	156	10.8%	1440	131	9.2%	1418	-	-	-
				SB/EB	68	6.5%	1043	76	7.2%	1053	-	-	-
	BP5	South Grimsby Rd 2 connecting to St Catherines and Townline Road Roundabout	3.01	NB	-	-	-	34	2.4%	1418	-	-	-

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
				SB	-	-	-	52	4.9%	1053	-	-	-
		South Grimsby Road 5	-	NB	132	9.2%	1440	137	9.7%	1418	255	18.1%	1411
				SB	78	7.5%	1043	127	12.1%	1053	98	10.0%	983
		Thirty Road	-	NB	465	32.3%	1440	451	31.8%	1418	477	33.8%	1411
				SB	167	16.0%	1043	211	20.0%	1053	195	19.8%	983
		Industrial Park Road	-	NB	301	20.9%	1440	247	17.4%	1418	289	20.5%	1411
				SB	375	36.0%	1043	271	25.7%	1053	352	35.8%	983
4	BP6	Link connecting to South Grimsby Road 7 and Townline Road	1.23	NB/WB	-	-	-	-	-	-	32	2.4%	1355
				SB/EB	-	-	-	-	-	-	15	1.5%	1037

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
		Young Street	-	EB	366	39.1%	935	383	39.6%	966	223	22.1%	1037
				WB	335	26.6%	1259	306	23.6%	1298	222	16.5%	1355
		Regional Road 20	-	EB	392	41.9%	935	378	39.1%	966	404	40.0%	1037
				WB	703	55.8%	1259	754	58.1%	1298	773	57.6%	1355
		Townline Road	-	EB	177	18.9%	935	205	21.2%	966	369	36.5%	1037
				WB	221	17.6%	1259	238	18.3%	1298	315	23.5%	1355
5	BP2	East and West between Spring Creek Road and Young Street	2.43	EB	32	3.2%	1006	-	-	-	-	-	-
				WB	15	2.1%	704	-	-	-	-	-	-
	-	Young Street	-	EB	55	5.5%	1006	59	5.9%	1003	62	5.7%	1080

Screenline	Bypass	Description	Bypass Length in km	Direction	OPTION A			OPTION B			OPTION C		
					Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)	Bypass Link Volume (veh/hr)	Bypass Volume to Screenline Volume (%)	Total Screenline Directional Volume (veh/hr)
		Spring Creek Road	-	WB	28	4.0%	704	51	7.0%	728	26	3.7%	701
				EB	126	12.5%	1006	116	11.6%	1003	134	12.4%	1080
				WB	38	5.4%	704	47	6.5%	728	51	7.3%	701
		Regional Road 20	-	EB	228	22.7%	1006	274	27.3%	1003	212	19.6%	1080
				WB	294	41.8%	704	292	40.1%	728	307	43.8%	701
		Townline Road	-	EB	565	56.2%	1006	554	55.2%	1003	672	62.2%	1080
				WB	329	46.7%	704	338	46.4%	728	317	45.2%	701

3.5 Conclusion

The model outputs in the Future Do-Nothing with Boundary Expansion Growth scenario identified the impact the boundary expansion growth would have on the existing network in the 2051 horizon year. With the increased number of trips, traffic would need to be redistributed to relieve existing roads that are expected to exceed their capacity by 2051. This can be achieved through a combination of new links that relieve capacity constraints, and provide new connections to existing under utilized road segments.

The evaluation of three different bypass options has demonstrated that there is a need to provide a bypass of Smithville to alleviate volume and delay impacts on the existing network that future growth will generate. The model outputs in all scenarios (Options A, B, and C), indicate that link BP1 can provide the most significant impact in alleviating traffic volumes and delays along corridors operating above desired capacity.

As noted through the Phase I analysis a new BP1 link alone is not enough to address all the deficiencies across the traffic network noted in the Future Do-Nothing scenario. Options A and B both provide some relief to the deficiencies related to the railway crossing delays, through the creation of a grade separated rail crossing at either end of town. Although both links BP4 and BP5 provide this mitigation, while also alleviating impacts at the intersections of Regional Road 20/Industrial Park Road and Regional Road 20/Townline Road, BP4 achieves this with a significantly lower amount of new road and is therefore preferred.

The Future Do-Nothing with Boundary Expansion Growth scenario also indicates that the demand for east/west travel will increase and that this will result in increased volumes and delays along Regional Road 20. This creates the need for new east/west corridors to be created, which was proposed in Option A and the results show a decrease in the volumes and delays seen on Regional Road 20. As this new east/west corridor can support the mitigation of traffic from development impacts in the northern part of Smithville and also allows for the development of a Smithville bypass, the creation of this new link is recommended.

As indicated in this report the modeling exercise is proposed as a two phase process, with Phase II providing further testing and refinement of the preferred concept to optimize possible transportation mitigation infrastructure. As the model exercise moves into Phase II the following considerations are noted:

- The testing of a western aligned BP1 new link has proceeded with South Grimsby Road 7 considered as the corridor for this link. After discussion with the Township of West Lincoln Public Works and upon inspection and cost considerations, it is recommended that South Grimsby Road 8 would be a better corridor to promote as this new link. It is not considered materially impactful to the model results, and it may actually provide a benefit to Regional Road 20 as the intersection of the new BP1 link and the existing South Grimsby Road 6 roundabout would be spaced further apart reducing the impact of one on another. For modeling purposes in Phase II the South Grimsby Road 7 alignment will continue to be used.

4. Phase II Model

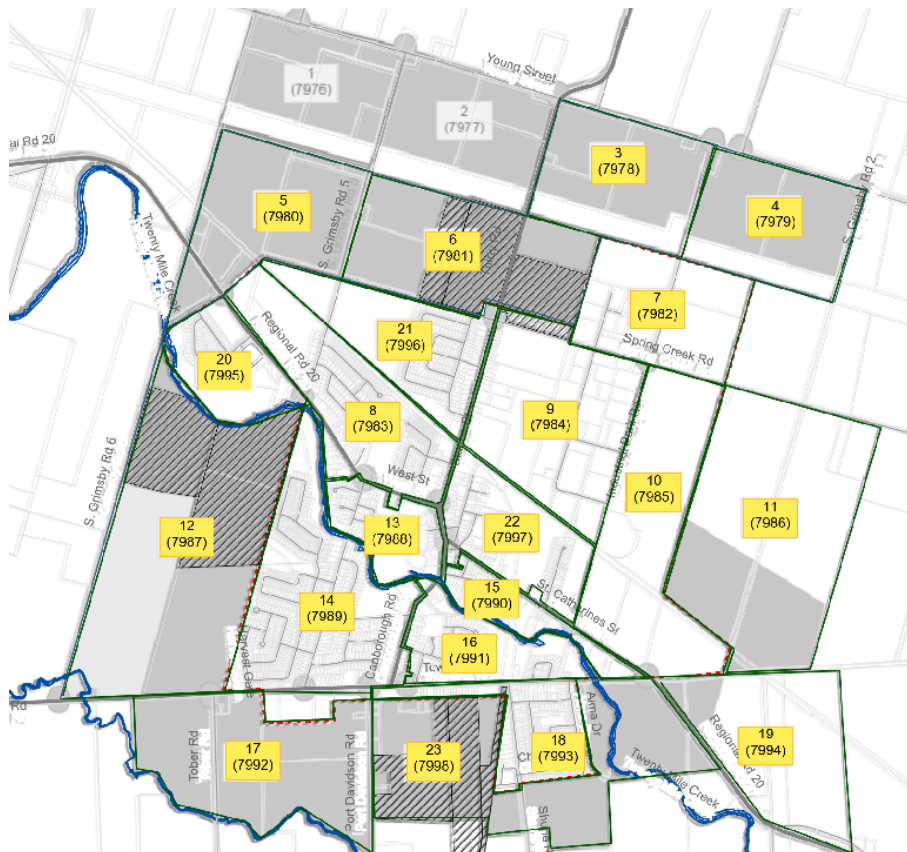
The findings and recommendations from the Phase I model work indicated that the introduction of a bypass around Smithville is warranted and that this can be created through a series of new links and existing segments of road. As noted in **Section 3** new road links are proposed to be added to the network and are indicated in **Appendix A Figure 26**. The Phase II model work will consider these new links along with the existing road network and look at opportunities to further improve the traffic flow and delays through refine of the network.

4.1.1 Centroid Configuration

The Phase I model used the originally conceived land use concept designs when developing trip demand, origins, and destinations. In Phase II the refined land use concept design has been reviewed and any changes incorporated into the traffic model. As noted in the revised land use concept an area in the north of the study area has been proposed to be removed from the proposed urban boundary. This has meant Zones 1(7976) and 2(7977) from the previous phase models were removed as can be seen in **Appendix A Figure 25**. In the previous model runs these two zones were identified as light industrial and minimal trip generation was assigned, it is therefore considered that the removal of these zones will have minimal impacts on the previous results.

The model approach continues to use a node approach to the zones with a series of gates defined for vehicles to enter and exit the network (external zones) and pairs of connectors (generators and attractors) which represent access/egress points. In the case where there are multiple access/egress options for the zone/gate, Aimsun’s “Best Entrance” setting was selected, as was also applied in Phase I.

Appendix A Figure 55: Updated zones



4.1.2 Signal Controls

Traffic Intersections

The signal timing plan at the intersection of St Catharines Street & Griffin Street was coded according to the received signal timing plan. Existing and planned signalized traffic intersections where no signal timing plans are provided are modelled as actuated controlled intersections adjusted to reasonably accommodate future traffic conditions. Note that signal timing plans were developed at a high-level and optimization for specific conditions is still recommended for future studies.

New unsignalized intersections are modelled to give priority to the dominant traffic direction (i.e., direction attracting greater volume of traffic). In the case where both roads are equally used based on modelled flows, an all-way stop control is implemented.

Grade Crossings

The traffic impact of trains along the existing CP Rail line is represented in the model as an event that occurs once within the AM Peak hour. The event is assumed to have a duration of approximately 7.6 minutes; this is the time estimated for a 2 km train travelling at approximately 35 km/hr to clear all three grade crossings with additional time buffers (this is also similar to two 1 km trains traveling at similar speeds in opposite directions within the hour to pass through). This assumption has been made due to the uncertain usage patterns of the CP line and acknowledging the guidance and discussions with CP Rail that indicate that the line is one they plan to consider for additional use in the future.

Three existing grade crossings were modelled, located at South Grimsby Road 5 north of Regional Road 20, Station Street north of West Street, and Industrial Park Road north of St Catharines Street (Regional Road 20).

It is important to note that any additional rail corridor crossings will need to be grade separate, as directed by CP Rail and in accordance with Transport Canada guidance.

Bypass and Internal Roads

The 2051 baseline model includes new road links (including the formation of the preferred bypass) and a number of internal roads. The bypass is grade separated from the CP Rail line and has two segments: an east-west segment located between Young Street and Spring Creek, and a north-south segment joining Regional Road 20 and Industrial Road referred as the *North Bypass* and *East Bypass* respectively.

The North Bypass is a two-lane per direction alignment that spans in the east-west direction, joining South Grimsby Road 7 at Regional Road 20 on the west and terminates at Industrial Park Road to the east. The East Bypass is a single lane per direction alignment that spans in the north-south direction connecting Regional Road 20 at a new intersection and Industrial Park Road.

Internal roads are single lane per direction, provided south of Regional Road 20 joining on Tober Road, terminating at South Grimsby Road 6 on the west and Shuri Road in the east.

The new baseline road network is depicted in **Appendix A Figure 26**. It should be noted that Spring Creek Road is extended in the west to connect to the North Bypass. Intersections 1,2,3,4,5, and 6 are new signalized intersections introduced into the road network. Intersection 7 would be a change in the road geometry to prioritise movements that use the East Bypass link.

Appendix Figure 56: 2051 Baseline road network



4.2 Results

All future alternative scenarios were evaluated using a Dynamic User Equilibrium (DUE) experiment setup. Network geometric variations and projected increases in vehicle demand are expected to influence subarea road users to seek out alternative routes or develop new habitual routes as a means of reaching their destinations. As such, routes generated from the base model were not used in this evaluation. The model was set to run under AM Peak hour conditions with a 1-hour start-up period.

To provide an overview of route patterns, road utilization, and intersection performance, the subarea road network performance was assessed for the following simulation evaluation measures listed below:

- Simulated Flow
- Simulated Delay Time

Results retrieved were aggregated over the 1-hour peak period for each evaluation measure. The evaluations are presented graphically as heat maps showing the distribution of each evaluation measure across the study area road network.

4.2.1 2051 Baseline

The network performance was assessed using the average simulated flow, density, and delay time results to identify localized operational deficiencies. The evaluation outputs at a network level are presented in **Appendix A Figure 27** and **Appendix A Figure 28**.

Vehicular flows are highest along Regional Road 20, Station Street, Industrial Road, and South Grimsby Road 7. The North Bypass from Regional Road 20 to South Grimsby Road 5 is highly utilized based on the vehicular flow output, whereas the East Bypass doesn't get the same level of utilization. Delay times are observed to be significant on Townline Road between Port Davidson Road and Canborough Street and the downtown corridor between St. Catharines Street & Griffin Street and the railway crossing north of Station Street & West Street.

Appendix A Figure 57: 2051 Base scenario simulated flow



Appendix A Figure 58: Base scenario simulated delay time



4.2.2 Mitigation Measures

Given the results of the baseline model runs three locations have been identified that could benefit from improvements, these are summarized in **Appendix A Figure 29**.

Location 1 is the intersection of Regional Road 20 and South Grimsby Road 7. The baseline model indicates that there are significant volume flows and delays at this intersection as a result of the competing movements of vehicles using the North Bypass, Regional Road 20 and South Grimsby Road 7. The introduction of a signalized intersection and new lane configuration at this location would improve the flow of competing movements in the area.

Location 2 is the segment along Townline Road between Port Davidson Road and Canborough Street. Adding an eastbound left-turn storage lane at the intersection of Townline Road & Canborough Street would separate the eastbound higher volume left-turning to prevent the eastbound through traffic from being blocked. Signalizing Townline Road & Canborough Street could potentially improve operations at the intersection by processing more left-turning vehicles onto Canborough Street and prevent spill backs from queues.

Location 3 is the corridor between St. Catharines Street & Griffin Street and the railway crossing north of Station Street & West Street. Coordination between the two intersections could improve the processing of traffic headed in the northbound direction to Station Street. However, vehicles will have to consider bypassing this section in the event of a passing train, which is noted to cause a knock on effect to congestion in the area when closed. It is recommended that continued monitoring of traffic signal performance at these two intersections is conducted and that an increase in the usage of the CP rail corridor would likely require a change to signal timings to avoid knock on effects.

Appendix A Figure 59: Identified road network improvement locations



4.3 Sensitivity Testing

The review of the baseline models and consideration of desired network operations resulted in the identification of five sensitivity tests to perform. These were performed to assess the impact of isolated changes in the network such as road/lane configurations and traffic control operations. The sensitivity tests considered are listed below and the locations on the network are shown in **Appendix A Figure 30**.

- Sensitivity Test #1 – Internal Road 2 Extension
- Sensitivity Test #2 – Townline Road Widening
- Sensitivity Test #3 – Signalized Intersection at Townline Road & Canborough Road
- Sensitivity Test #4 – Signalized Intersection at Regional Road 20 & South Grimsby Road 7
- Sensitivity Test #5 – Grade Separation at Station Street Railway Crossing

Appendix A Figure 60: Sensitivity testing locations



The sensitivity testing model evaluation outputs at a network level are presented in **Appendix A3**. Discussed below are notable localized impacts observed from the simulation outputs compared to the base scenario.

Sensitivity Test #1 - Internal Road 2 Extension

The alignment of Internal Road 2 is extended to the east, joining the East Bypass and Regional Road 20/St. Catharines Street at a new roundabout. Internal Road 2 provides alternative routing to bypass sections of Townline Road where queues and delays are generated because of turning vehicles blocking the thru traffic or vehicle processing at traffic intersections.

By extending Internal Road 2 no significant reduction in delay time and density was observed, particularly along Townline Road.

Sensitivity Test #2 - Townline Road Widening

Townline Road is a single lane road, to prevent turning vehicles from blocking the thru traffic stream, intersection storage lanes are provided along the Townline Road corridor from South Grimsby Road 6 to the Regional Road 20 roundabout.

Introducing storage lanes along Townline Road resulted in reduced delay time and density in the eastbound traffic at Townline Road & Canborough Road. A slight increase in vehicular flow along segments of Townline Road as delays were reduced for through traffic, and decreased vehicular flow along South Grimsby Road 6 was observed.

Sensitivity Test #3 - Signalized Intersection at Townline Road & Canborough Road

The Townline Road and Canborough Road intersection was identified as a potential location to implement road improvements. High level recommendations mentioned were the addition of eastbound left-turn storage lane and increase the processing of the left-turning vehicles by upgrading the intersection to a signalized controlled intersection to prevent spill backs from queues.

With the addition of the left-turn storage lane and intersection signalized, reduction in vehicular flow along South Grimsby Road 6 and delay time and density in the eastbound direction of Townline Road were observed.

Sensitivity Test #4 - Signalized Intersection at Regional Road 20 & South Grimsby Road 7

The Regional Road 20 and South Grimsby Road 7 intersection is a point of direct access from Regional Road 20 to the North Bypass, a two-lane roadway. This location was identified as a potential location to implement road improvements (Location 1, **Appendix A Figure 29**). Additional storage lanes have been introduced to the intersection to accommodate left-turning vehicle on Regional Road 20 and prevent them from blocking thru traffic. Considering potentially the size of the intersection, movements will require traffic signal controls to safely facilitate northbound and southbound traffic to traverse the intersection and process north-south traffic, while also maintaining the flow of the higher volume traffic along Regional Road 20.

With the intersection operating under signalized control, there were no noticeable improvements in terms of density and delay time in the northbound-southbound direction. Green time allocation may require a delicate balance in the opposing directions without overly compromising the flow of traffic in the east-west direction. Reduced vehicular flow were observed along South Grimsby Road 6 and in the westbound direction of Regional Road 20. The detailed evaluation of this intersection is beyond the scope of the current work, however, it is recommended that both the geometry and signal arrangement/phasing at this intersection are further explored in future studies.

Sensitivity Test #5 - Grade Separation at Station Street Railway Crossing

Station Street is identified as one of the key conveyors of northbound traffic and is a regional road. This location was identified as a potential location to implement road improvements. The CP Rail line crosses Station Street north of the West Street and Griffin Street intersection. In the event of a passing train, northbound and southbound vehicles are halted at the rail crossing until the train has passed a safety clearance point. The duration of the event can vary depending on the train operations and characteristics.

To maintain the flow of traffic along Station Street, grade separation between the road traffic and rail vehicles was tested.

With the grade separation implemented at the Station Street Railway Crossing, vehicular flow along South Grimsby Road 6 and Internal Road 1 were reduced. Significant decrease in delay time and traffic density in the northbound direction, north of West Street & Griffin Street was observed.

5. Recommendations

The Phase I model work has established two 2051 horizon scenarios (with and without the urban boundary expansion and associated development). This exercises has highlighted that there are a number of impacts to the existing traffic network as a result of the proposed development that will impact performance by increasing volumes, delays, and capacities. The recommendation from this stage are that a series of mitigation measures are required to minimize the impact on the existing traffic network of the new development.

At the time of this study the only proposed piece of traffic infrastructure identified that has not yet been implemented is a Smithville bypass, identified in the Niagara Region Transportation Master Plan. The Phase I model work has explored three different possible options for the alignment of a Smithville bypass and tested their impact on future traffic patterns. The results of this analysis have indicated:

- To meet the future needs of the Smithville urban area a bypass with a northern alignment is required. This bypass is required to reduce the impact of through traffic on the existing Smithville downtown area. Although alignments were tested in this model exercise, further work on other impacts of the bypass are required through an Environmental Assessment process to be conducted by Niagara Region.
- Based on the data and information available at the time of this study a bypass is recommended to provide relief to traffic in Smithville as a result of the urban boundary expansion development; mitigate the impact of through traffic including trucks on the Smithville downtown area; and, to provide improved connectivity to other strategic infrastructure such as a new escarpment crossing connection. The links proposed are as follows:
 - A new link on the east side of Smithville that connects Regional Road 20 prior to the urban boundary and then follows a northern direction over the CP Rail line (grade separated crossing), before heading west and reconnecting with Industrial Park Road.
 - The use of Industrial Park Road from the new East Bypass link to a new northern connector link to be created in the area around the hydro corridor.
 - A new link that travels along the existing hydro corridor that would connect Industrial Park road and Regional Road 20 west of the South Grimsby Road 6 roundabout, and provide a grade separated crossing on the CP Rail line.

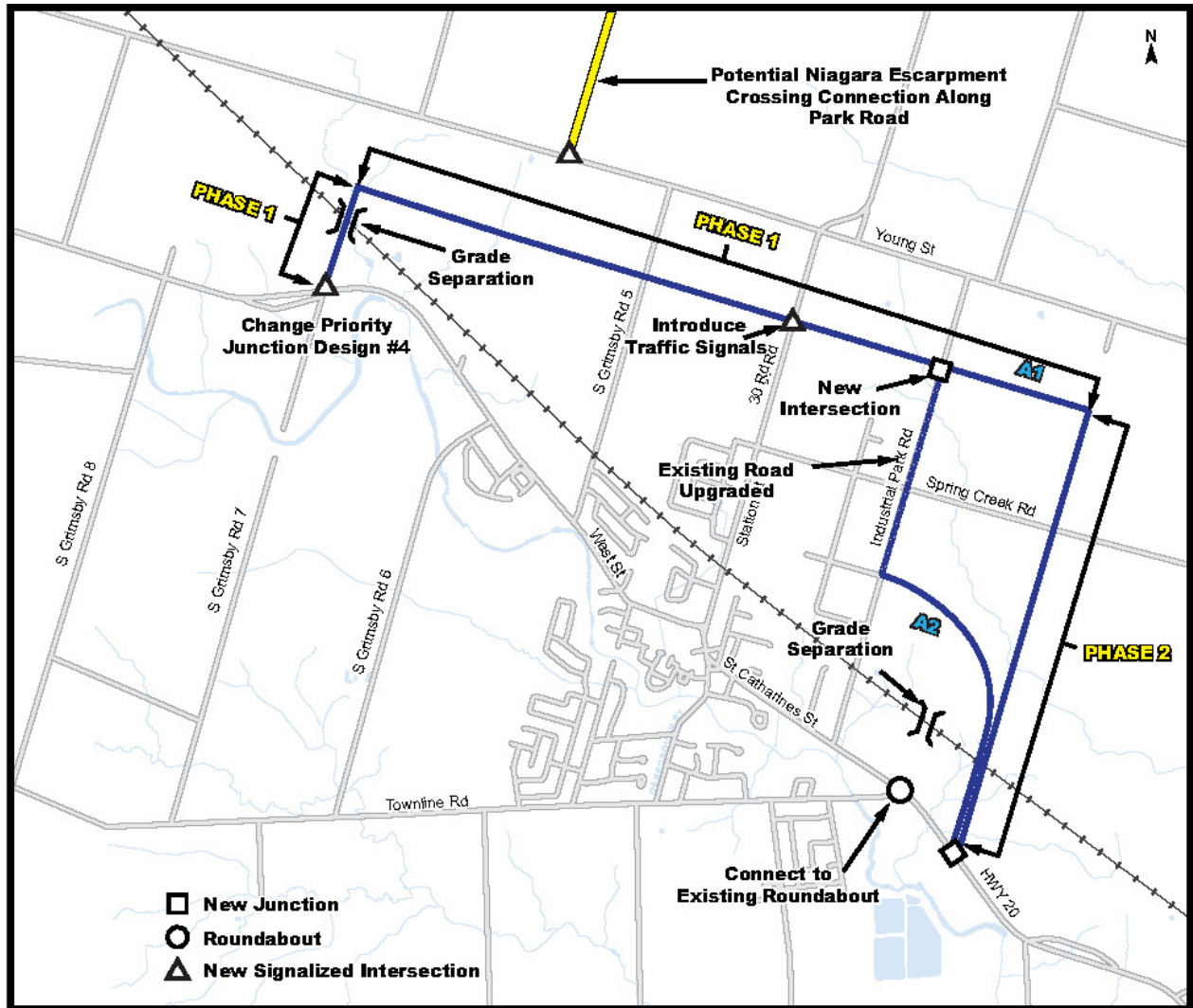
The work conducted during Phase II has explored how the refined urban boundary expansion land use design concept in combination with the regionally strategic transportation infrastructure has impacted the 2051 horizon year. The results of this analysis has shown that while many parts of the traffic network are still expected to perform within acceptable ranges, there are several areas where further mitigation is required. Based on the Phase II results the following measures are recommended:

- The increase in volume along Townline Road combined with the increased requirements for vehicle to turn across active traffic lanes means that Townline Road should be widened to three lanes. The addition of a turning lane for vehicles making left turns across live traffic will reduce delays caused at intersections to through traffic.
- To further address specific issues at Townline Road and Canborough Street intersection, signalization of this intersection is required to allow for greater control over the assignment of priority movements.
- The intersection of Regional Road 20, the north bypass and South Grimsby Road 8 will experience significant delays if it is not signalized due to competing interests amongst users. It is also recommended that further examination of the design and geometry of this intersection is conducted in order to optimize the flow.
- The proposed use of Industrial Park Road as part of the new bypass alignment, in combination with an increase in service and industry activities along this corridor will require sections of Industrial Park Road to include turning lanes. Subject to the results of the Regional bypass study Industrial Park Road should be widened to a three lane profile from Regional Road 20 to the area around the hydro corridor where the new east/west link intersects.
- There are also a number of intersections indicated in **Appendix A Figure 26** where signalization could improve priority for particular movements. In order to prioritize the bypass route the noted intersections are recommended to be signalized, however, this should be confirmed through the Niagara Region Environmental Assessment for the bypass.
 - East Bypass and Industrial Park Road
 - Industrial Park Road and North Bypass
 - Station Street and North Bypass
 - South Grimsby Road 5 and North Bypass
 - Spring Creek Road and North Bypass

Appendix A1- Bypass Options

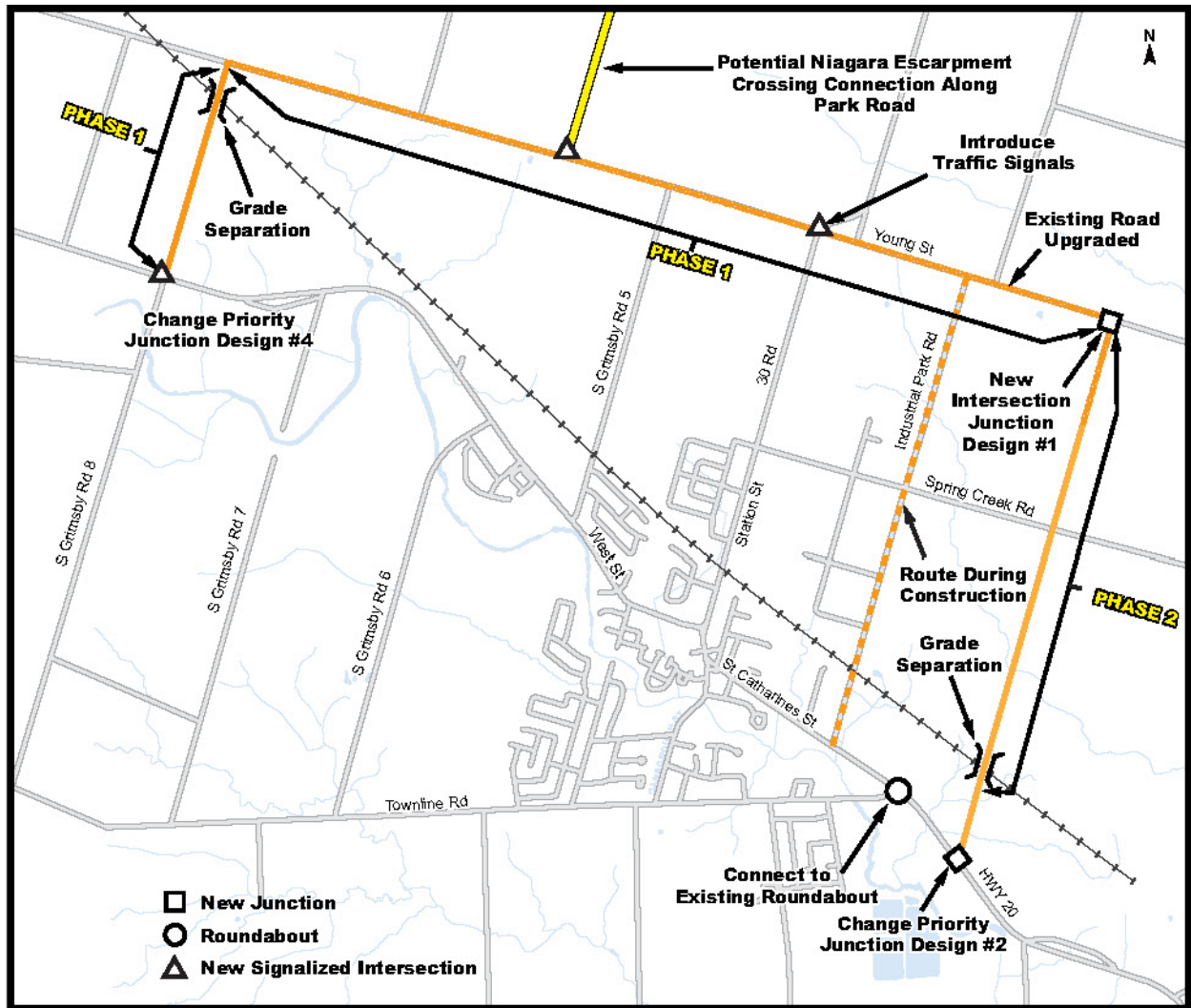
Option A

Appendix A1 Figure 1: Option A bypass links and road improvement plan



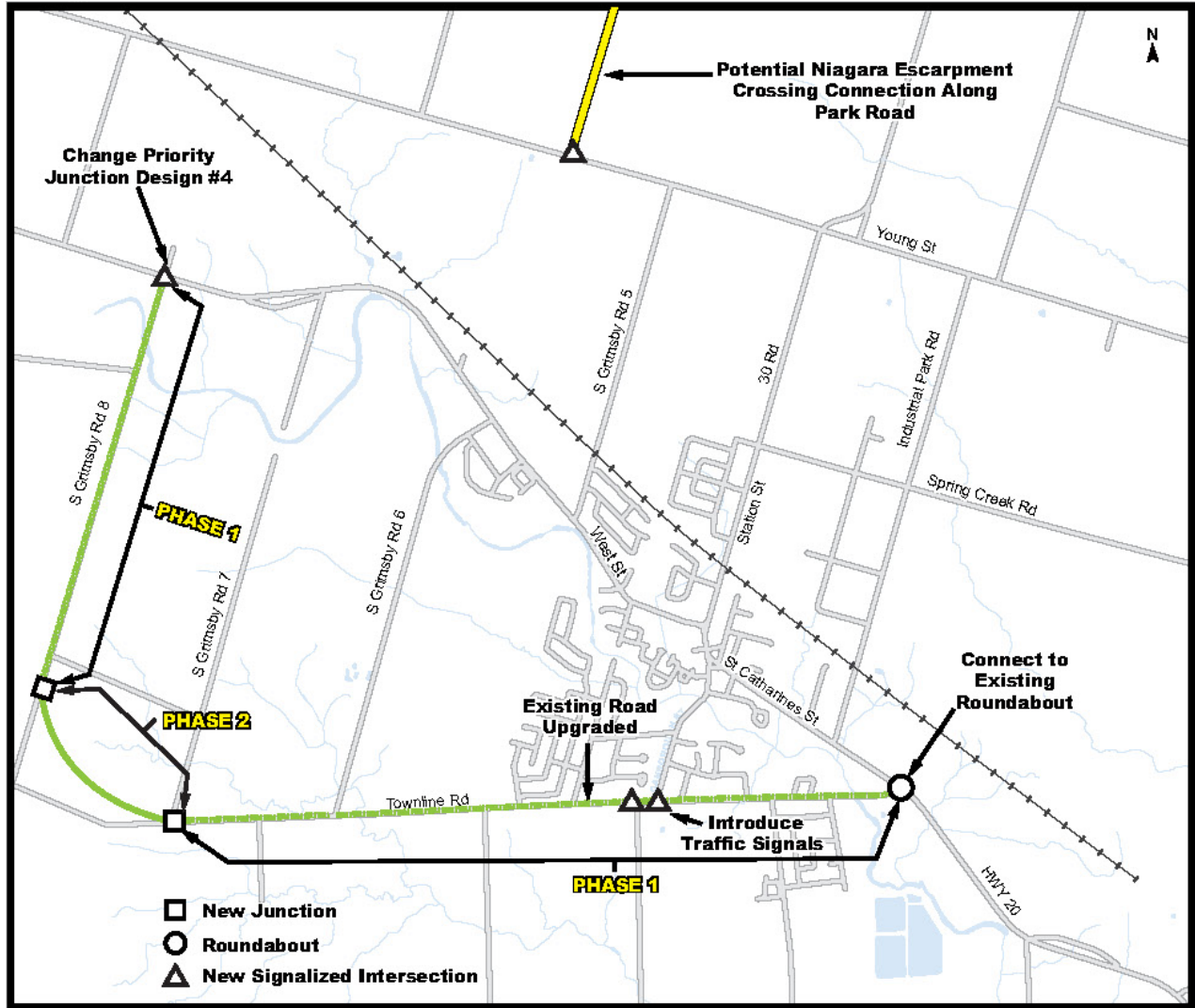
Option B

Appendix A1 Figure 2: Option B bypass links and road improvement plan

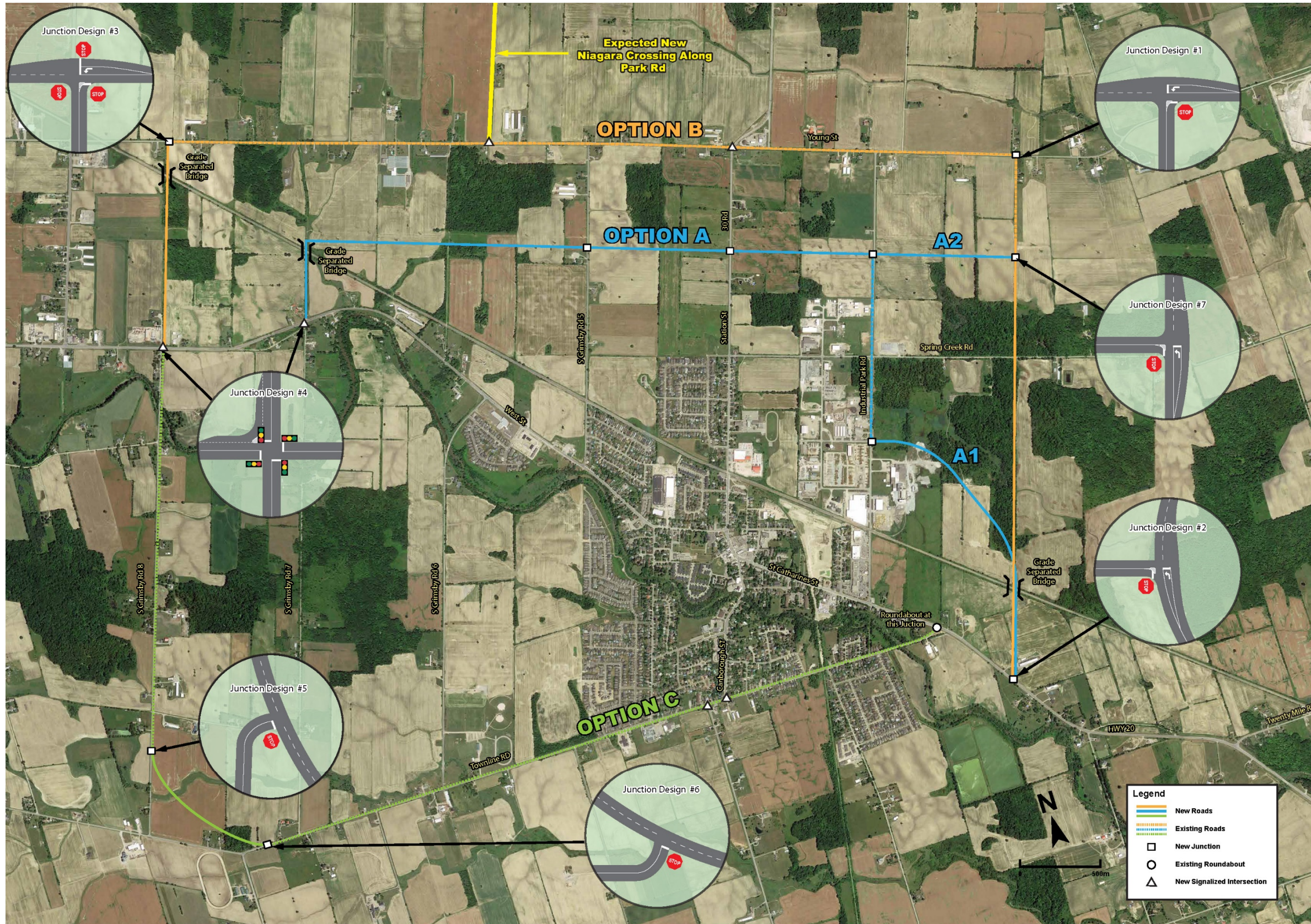


Option C

Appendix A1 Figure 3: Option C bypass links and road improvement plan



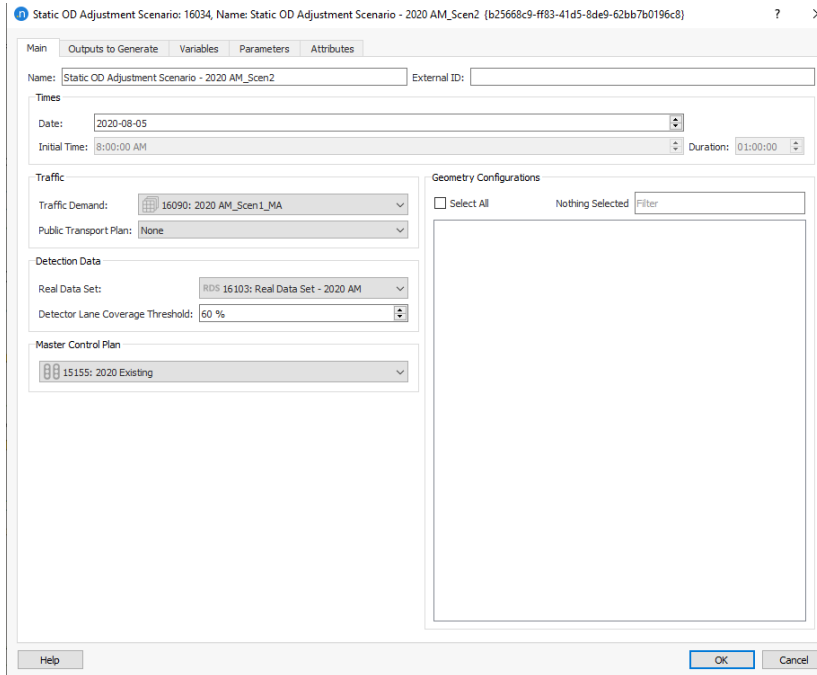
Appendix A1 Figure 4: Bypass alignments options with aerial overlay for Traffic model testing



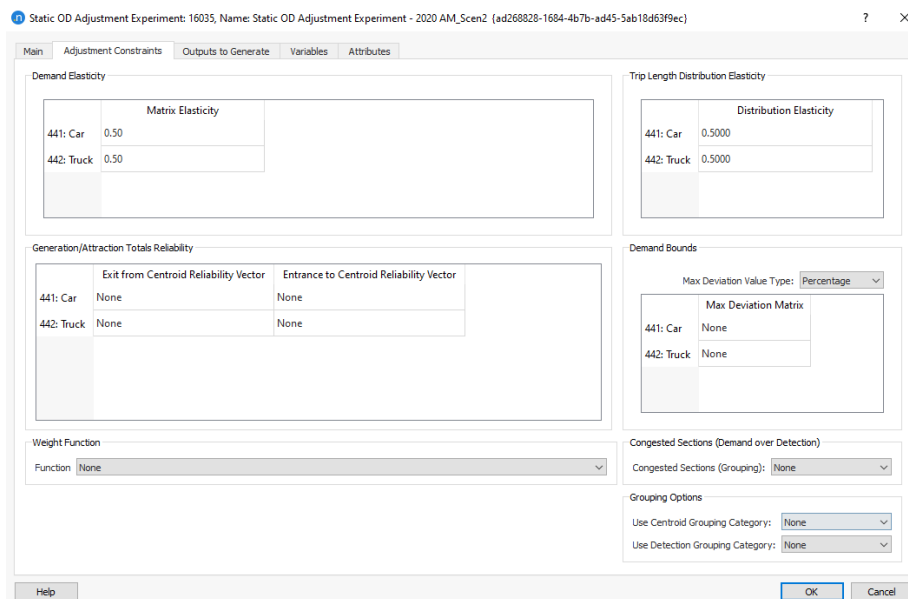
Appendix A2 - Aimsun Simulation Parameters

Static O-D Adjustment

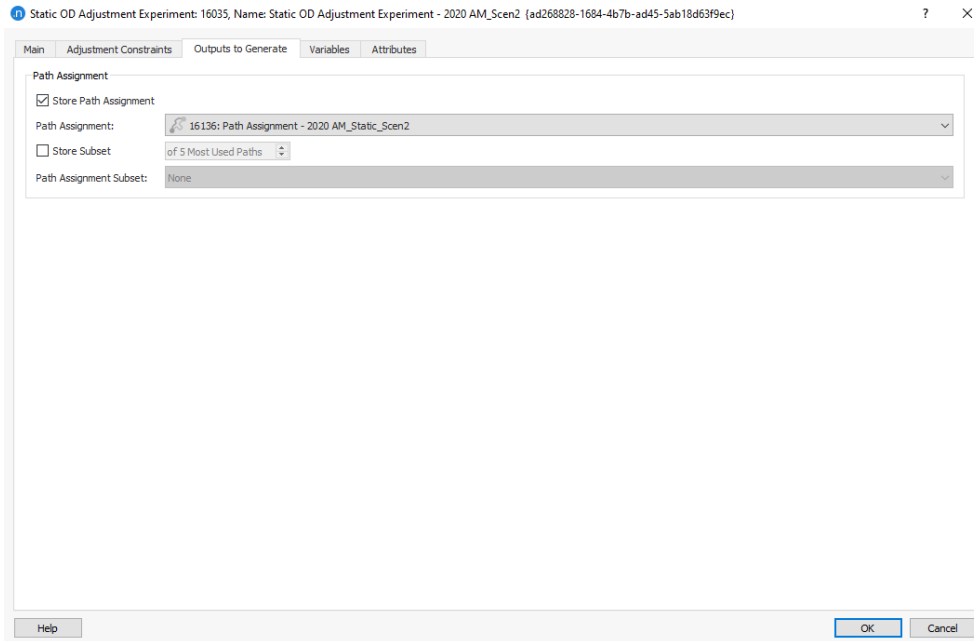
Appendix A2 Figure 1: Static O-D Adjustment - Main Tab



Appendix A2 Figure 2: Adjustment Constraints

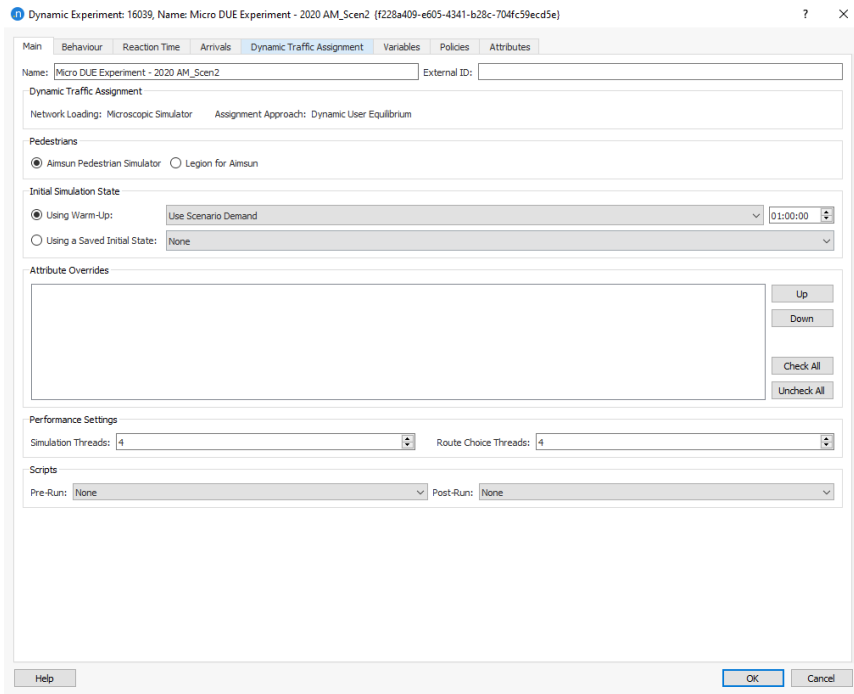


Appendix A2 Figure 3: Outputs to Generate

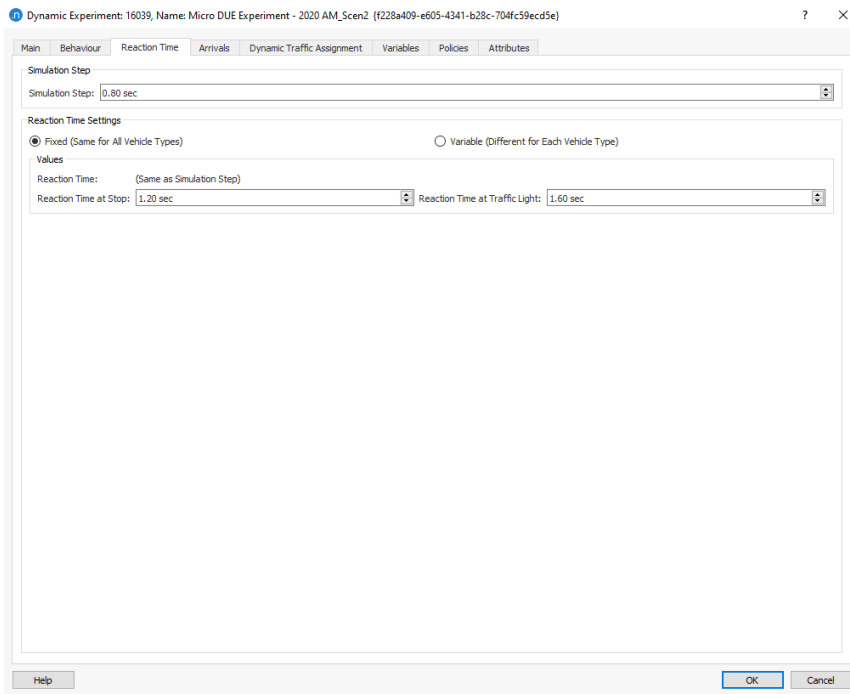


Micro DUE Assignment

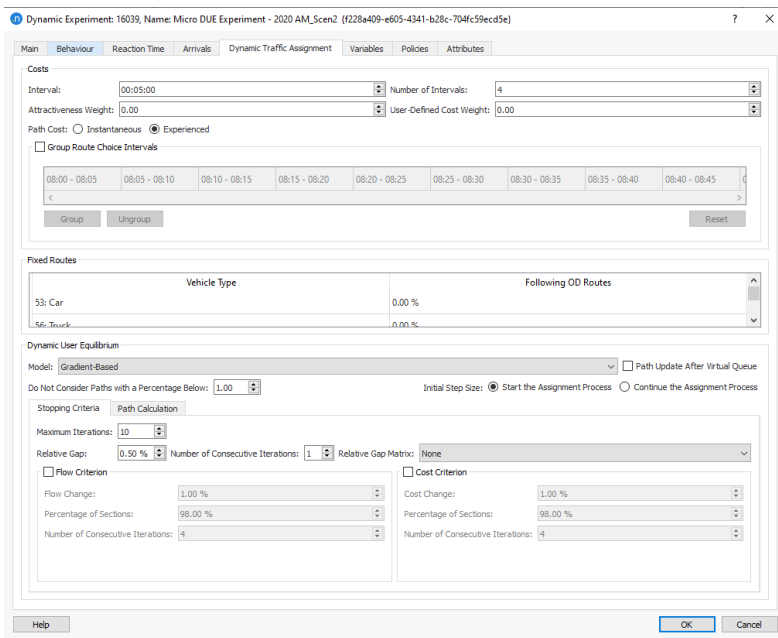
Appendix A2 Figure 4: Micro DUE Assignment - Main Tab



Appendix A2 Figure 5: Micro DUE Assignment – Reaction Time Tab



Appendix A2 Figure 6: Micro DUE Assignment - Dynamic Traffic Assignment Tab



Appendix A2 Figure 7: Micro DUE Assignment - Driving Behaviour

Dynamic Experiment: 16039, Name: Micro DUE Experiment - 2020 AM_Scen2 (f228a409-e605-4341-b28c-704fc59ecd5e)

Main Behaviour Reaction Time Arrivals Dynamic Traffic Assignment Variables Policies Attributes

Car Following

Two-Lane Car-Following Model

Number of Vehicles: 4 Maximum Speed Difference: 50.00 km/h
Maximum Distance: 100.00 m Maximum Speed Difference On-Ramp: 70.00 km/h
Speed Difference Settings: Relative

Apply TWOPAS Slope Model

Lane Changing

Allow Vehicles Non-Lane Based Behaviour

Two-Way Two-Lane Overtaking Model

Delay Time Threshold: 60.00 sec Number of Simultaneous Overtakings Allowed: 1
Minimum Speed Difference Threshold: 10.00 km/h Delay Between Simultaneous Overtakings: 10.00 sec
Maximum Speed Difference Threshold: 35.00 km/h Sensitivity Factor for Reduced Car Following: 0.65
Maximum Rank: 2 Overtaking Speed Enhancement Factor: 1.10
Remaining Travel Time Threshold: 0.00 sec Speed Difference Threshold for Enhanced Overtaking Speed: 15.00 km/h

Queue Speeds

Queue Entry Speed: 1.00 m/s Queue Exit Speed: 4.00 m/s

Behavioural Models

Activate External Behavioural Model

Help OK Cancel

Appendix A3 - Phase II Model Outputs

Presented in this appendix are the average outputs extracted from the Aimsun Next simulation model scenarios for the sensitivity testing.

Scenario Comparisons

The scenarios are quantitatively compared by the average northbound and southbound flow across two screenlines set up just before Young Street in the north and just before Townline Road in the south.

Screenline #1 is located slightly north of Townline Road, it cuts across South Grimsby Road 7, South Grimsby Road 6, Internal Road 1, Canborough Road, and Regional Road 20/ St. Catharines Street.

Screenline #2 is located slightly south of Young Street, it cuts across South Grimsby Road 5, Station Street, and Industrial Park Road.

Average vehicular flow over the 1-hour analysis period across the screenlines are tabulated in **Appendix A3 Table 1** for comparison purposes across each scenario to provide an understanding of vehicle processing within the network as a result of implementing network changes.

Appendix A3 Table 1: Average vehicular flow (veh/hr)

Scenario	Screenline #	Average Northbound Flow Per Hour	Average Southbound Flow Per Hour
Baseline	1	1350	1077
	2	1463	743
Internal Road 2 Extension	1	1267	1072
	2	1465	746
Townline Road Widening	1	1398	1075
	2	1436	746
Signalized Intersection at Townline Road & Canborough Road	1	1360	1091
	2	1455	746
Signalized Intersection at Regional Road 20 & South Grimsby Road 7	1	1308	1075
	2	1459	746
Grade Separation at Station Street Railway Crossing	1	1454	1153
	2	1324	746

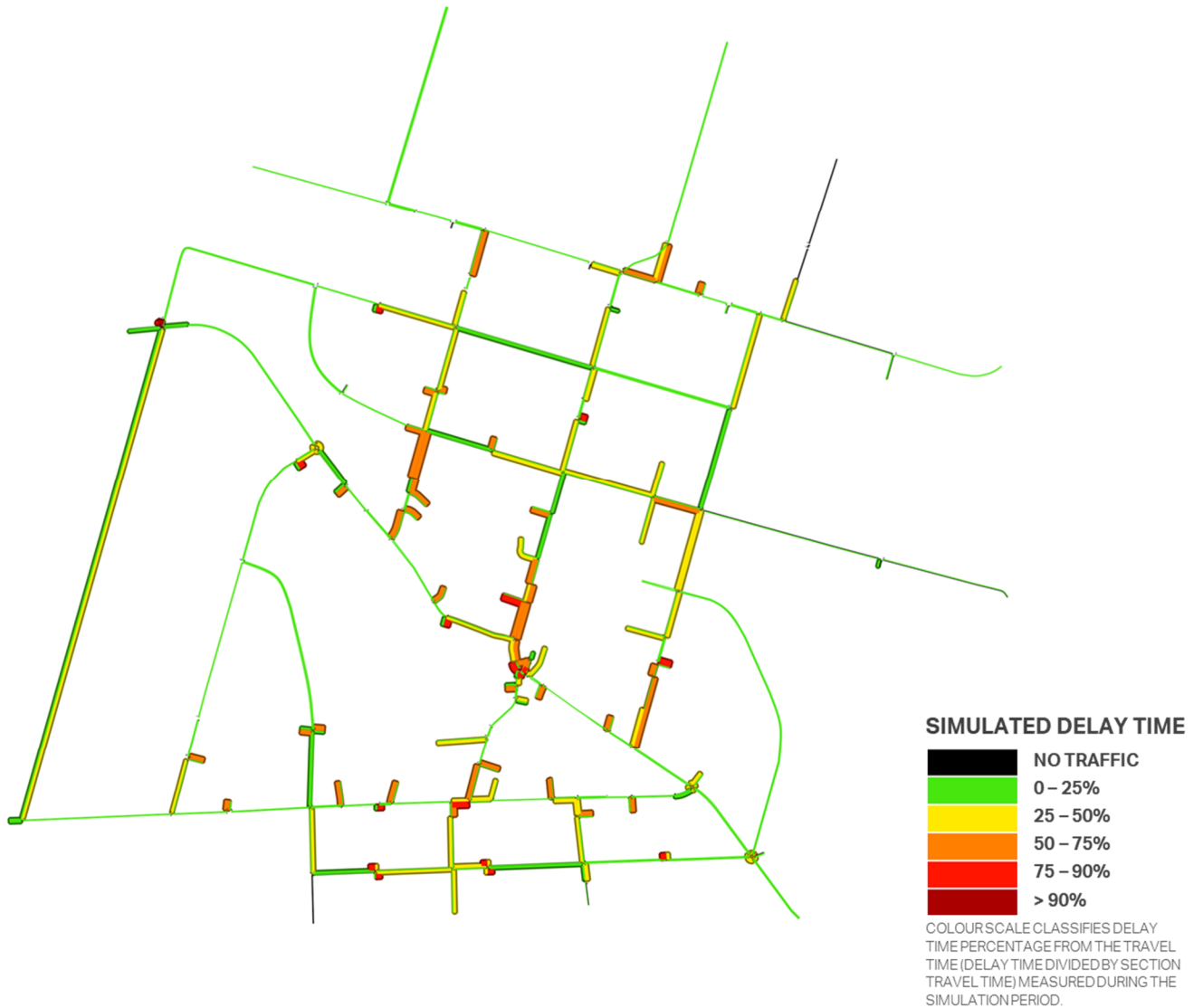
Sensitivity Testing

Internal Road 2 Extension

Appendix A3 Figure 1: Sensitivity test #1 - simulated flow



Appendix A3 Figure 2: Sensitivity test #1 - simulated delay time

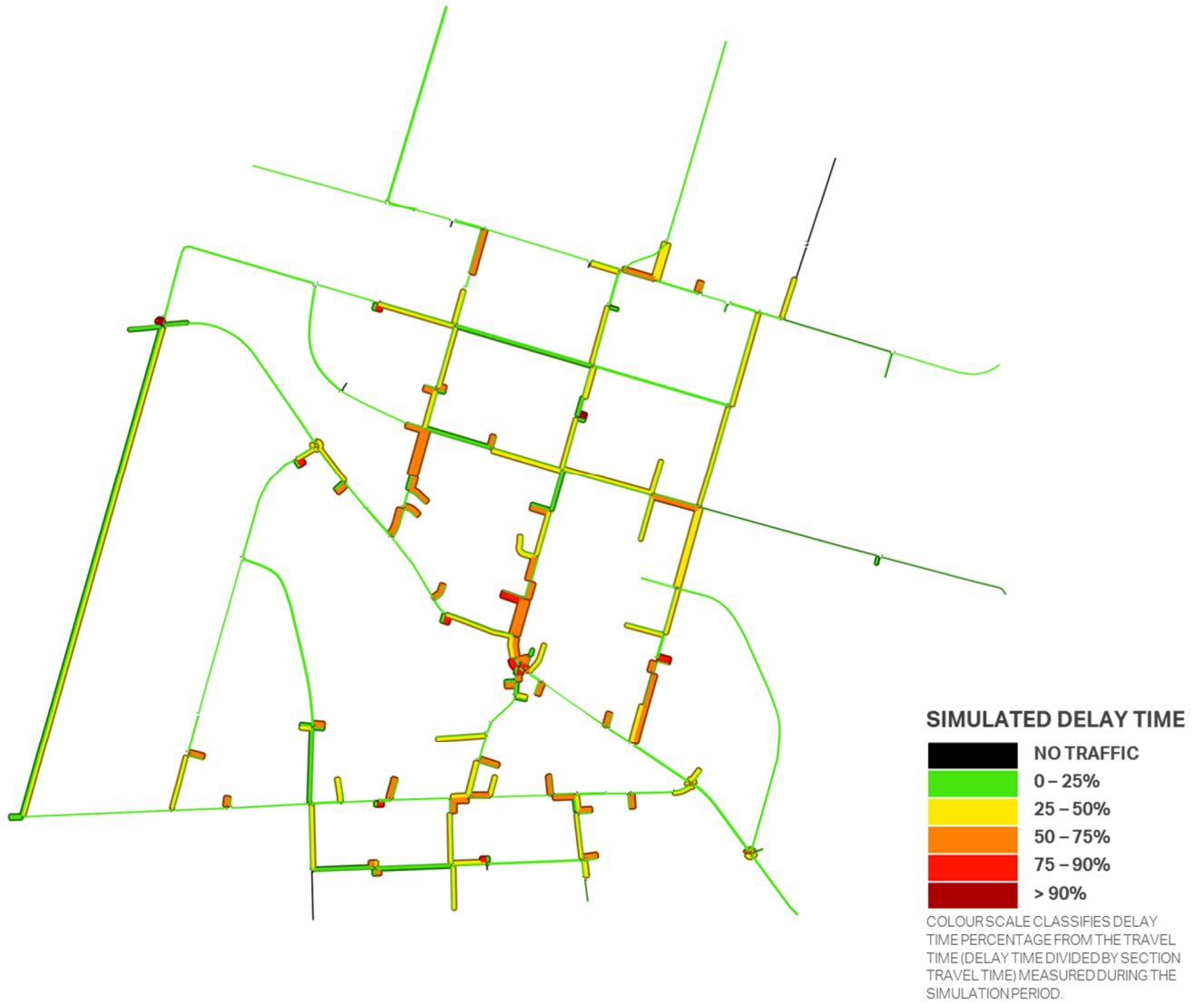


Townline Road Widening

Appendix A3 Figure 3: Sensitivity test #2 - simulated flow



Appendix A3 Figure 4: Sensitivity test #2 - simulated delay time

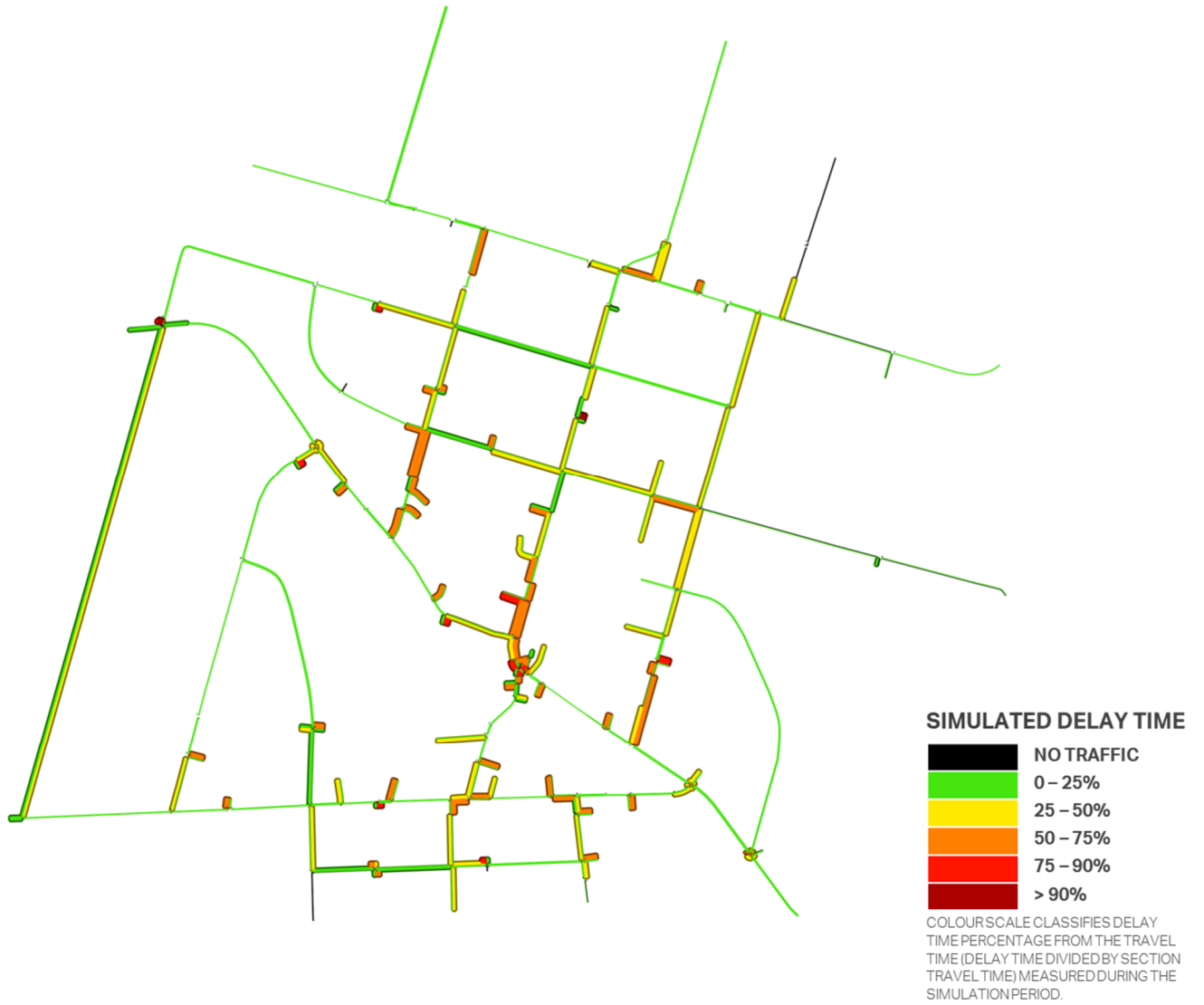


Signalized Intersection at Townline Road & Canborough Road

Appendix A3 Figure 5: Sensitivity test #3 - simulated flow



Appendix A3 Figure 6: Sensitivity test #3 - simulated delay time

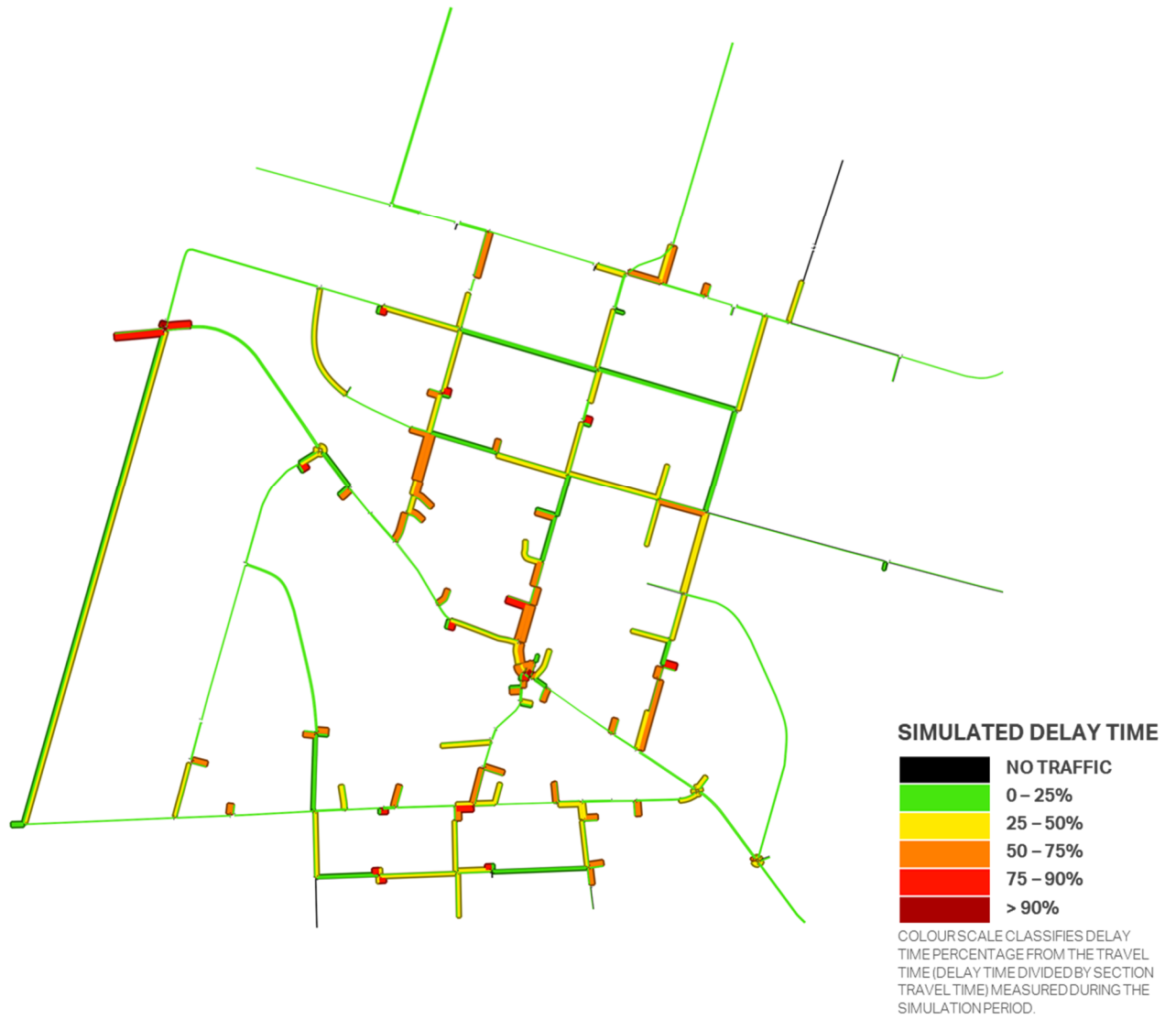


Signalized Intersection at Regional Road 20 & South Grimsby Road 7

Appendix A3 Figure 7: Sensitivity test #4 - simulated flow



Appendix A3 Figure 8: Sensitivity test #4 - simulated delay time

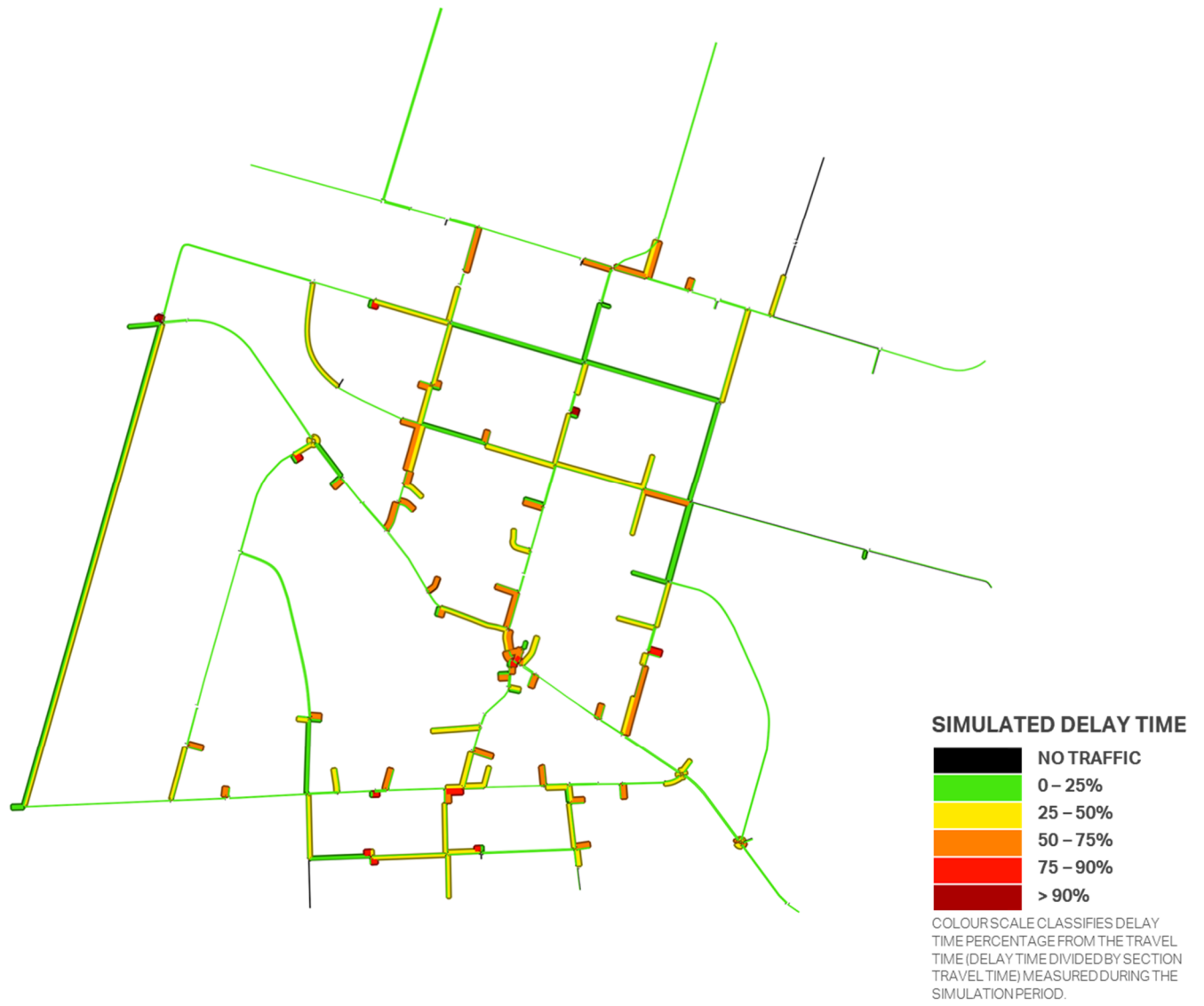


Grade Separation at Station Street Railway Crossing

Appendix A3 Figure 9: Sensitivity test #5 - simulated flow



Appendix A3 Figure 10: Sensitivity test #5 - simulated delay time



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