



HOW WE GO

Niagara Region Transportation Master Plan Road Network Strategy Technical Paper



IBI Group in association with
Parsons and Brook McIlroy

NIAGARA
2041

Fostering an environment for Economic Prosperity



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1 Purpose

This technical paper provides background information and context for the recommended road strategy for the Niagara Region Transportation Master Plan.

Niagara Region's transportation system must become more responsive as travel demands become more complex, and as the connections between Niagara Region's municipalities grow stronger.

The Region has the opportunity to focus transportation investments to create a more multi-modal system that offers improved choice, reduces effort, maximizes connectivity, and makes Niagara more attractive to investors and residents. The TMP considers expansions to road network capacity in strategic areas in tandem with strategies and initiatives for public transit, active transportation, transportation demand management and transportation system management.

2 Background

Between 2011 and 2041, travel by motorized vehicles is expected to grow by 55%, reaching more than 10 million vehicle-km daily. Future growth and increasing demands to move people and goods within and through the Region will intensify the need for a safe, connected and sustainable road network. Strategies and initiatives to influence how, how much, when, where, and why people travel and technologies to maximize the capacity of the road network will work hand-in-hand with the proposed capacity improvements.

For much of Niagara Region, the network of provincial, regional and local roads provides sufficient capacity to accommodate existing and anticipated travel demands. In some areas, there is an opportunity to optimize use of regional rights-of-way to better accommodate walking and cycling. However, a number of constraints exist along key corridors, such as the major provincial and regional corridors that traverse Niagara Region, and at key locations, such as the crossings of the Niagara Escarpment and Welland Canal. A program of strategic network capacity improvements, beyond what the Region has already planned, is needed to meet the needs of residents and businesses.

The areas that are expected to be congested in 2041 generally experience congestion already. These are:

- *Queen Elizabeth Way (QEW)* – the QEW is the only 400-series highway connecting Niagara Region to the Greater Toronto and Hamilton Area (GTHA), and is also the main route between Southern Ontario and the United States. It attracts high volumes of commercial and passenger vehicles, and will continue to be congested in both peak periods. Congestion on the QEW will need to be addressed by the Ministry of Transportation (MTO), and solutions could include a potential Niagara-Hamilton Trade Corridor.
- *Niagara Escarpment Crossing* – there are limited routes between the top and bottom of the escarpment. Existing crossings are constrained by operational issues due to the steep inclines and truck movements.

- *Welland Canal crossings* – opportunities to cross the canal by road are limited. Many crossings experience some congestion, especially in St. Catharines and across the Lundy’s Lane bridge. Port Colborne crossings are not as congested, although the Clarence Street bridge may experience long wait times when the lift bridge is in use.
- *Seasonal congestion* – tourist travel peaks on weekends and in summer, and includes visitors from the GTHA, the rest of Canada, and the US. Transportation demand management and system management strategies can help address seasonal congestion. Cross-border congestion could be relieved through customs improvements or more NEXUS lanes. Improved transit connections with the GTHA could reduce the demand for car travel.

Additionally, five sub-areas were identified by Niagara Region for more detailed analysis. These subareas were identified based on their current and anticipated future traffic demands and history of traffic operations or safety concerns:

- Subarea 1: QEW-Glendale-Highway 405.
- Subarea 2: West St. Catharines
- Subarea 3: Port Robinson
- Subarea 4: Welland East Main Street and Division Street One-Way Couplet
- Subarea 5: Highway 20 Smithville bypass

These subareas, and the recommended network improvements in each, are discussed in further detail in the Subarea Analysis Technical Paper.

3 Network Assessment Approach

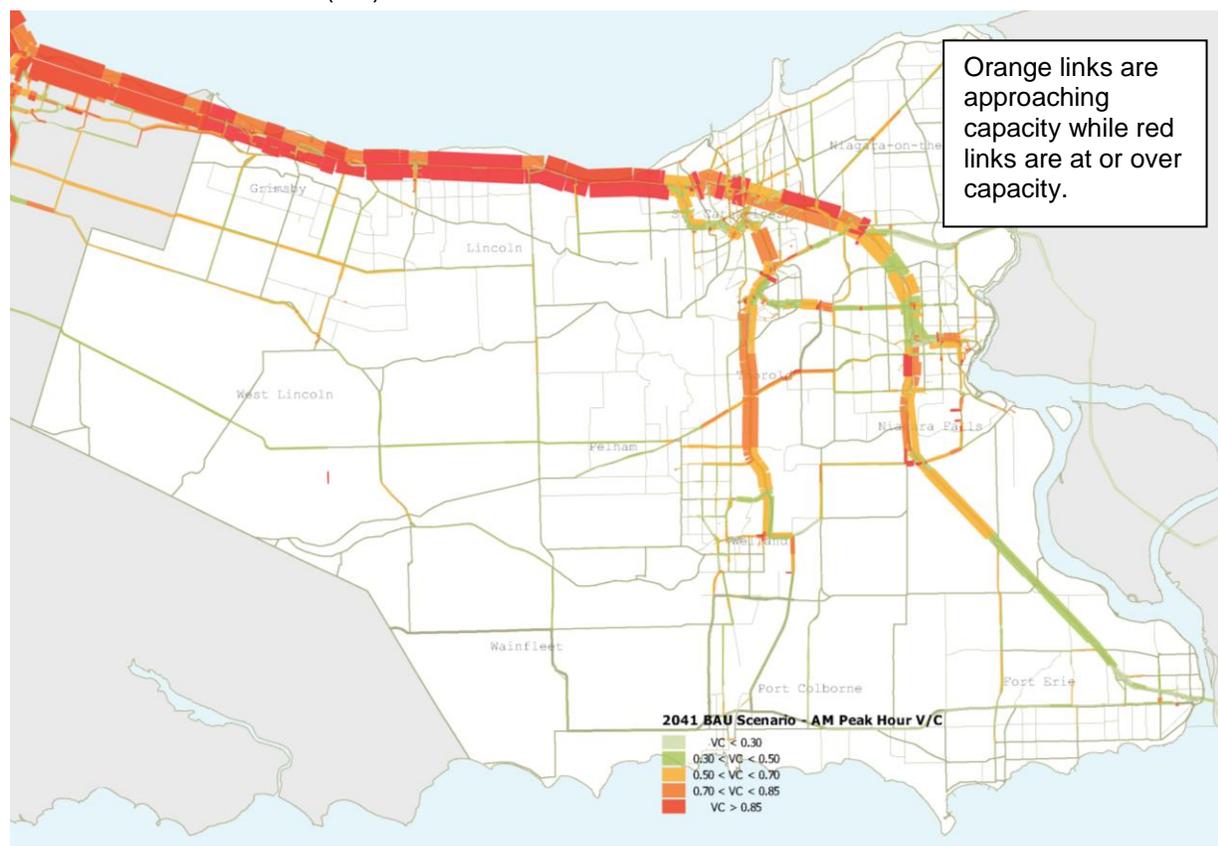
A long list of potential road network capacity improvements were identified through a combination of travel demand forecast modelling, review of previous/on-going studies, detailed subarea analysis, input from regional and municipal staff, and input from stakeholders and the public. The recommended improvements are intended to provide a connected road network that accommodates the travel demands of Niagara residents, supports economic development, and supports tourism and international travel.

An updated travel demand model was developed to provide a technical base upon which to assess the transportation system in Niagara Region. The model forecasts indicated that few regional roads in Niagara Region would exceed capacity in 2041 as shown in Exhibit 1. However, it is noted that the model shows travel demand that gravitates towards a few main corridors – most notably the QEW, which experiences significant congestion. It is also noted that a regional macroscopic model does not capture operational deficiencies at intersections and interchanges, nor operational implications due to steep grades at the crossings of the Niagara Escarpment. For the subareas, where appropriate, microscopic modelling was conducted to analyze operational deficiencies and those findings have been incorporated in the overall network assessment.

Other background studies were also used to inform the plan including the *Niagara Escarpment Crossing Master Plan*, the *Niagara to GTA Transportation Corridor Planning Study*, and previously identified road projects in the Region's 10-year road capital improvement program.

The assessment of the road network also considered planned growth areas, including the designated Urban Growth Centre (downtown St. Catharines); Niagara Economic Gateway centres, zones, and employment lands; and planned growth throughout Niagara Region as per the Municipal Comprehensive Review undertaken in parallel to the Transportation Master Plan.

Exhibit 1: 2041 Base Case (PM) Network Performance



4 Road Network

4.1 Queen Elizabeth Way

The Queen Elizabeth Way (QEW) is the only major provincial highway that traverses Niagara Region and connects the GTHA to the international border in South Niagara. Highway 405 and Highway 420 branch from the QEW to the Queenston-Lewiston Bridge and to the Rainbow Bridge, respectively.

The QEW is the main link from Niagara Region to the GTHA, and is a significant constraint on tourist and trucking activities in Niagara. The vast majority of Niagara's truck traffic travels to or from the GTHA on the QEW. Trucks represent about 15% of weekday traffic volumes on the QEW, which is congested during weekday peak periods and off-peak tourist times. Increasing demands on the QEW will lead many truck drivers to look for alternatives. Cross-border traveller volumes peak during the summer months, and for the last 15 years they have fluctuated with the strength of the Canadian dollar.

MTO has completed a recent study for the Niagara to GTA Corridor (*Planning and Environmental Assessment Study Phase 1*, 2013) which recommended widening of the QEW to 8 lanes (addition of 2 HOV lanes) from the Freeman Interchange in Burlington to Highway 406 in St. Catharines and widening QEW to 6 lanes (additional 2 general purpose lanes) from approximately Highway 405 to Highway 420.

The Ministry of Transportation's Southern Highway Program 2016-2020 indicates the above QEW widening projects under "Planning for the Future" indicating that the project timings is beyond 2020. Additionally, the Garden City Skyway bridge replacement is also included under "Planning for the Future".

The widening of the QEW, as previously identified, is needed to accommodate existing and projected travel demands. The QEW is a major trade, tourism and commuter corridor and improving traffic flow will improve mobility for goods and people within Niagara and between Niagara and the Greater Toronto and Hamilton Area and the US.

While Niagara Region cannot determine the future of these plans, it must continue to support and advocate for delivery of the MTO program.

4.2 NGTA Corridor and Niagara-Hamilton Trade Corridor

In the report to Regional Council on the Regional Council Strategic Priorities – Implementation Plan, pursuing a Provincial commitment to the Niagara to GTA (NGTA) Corridor was identified as one of the key components of the Region's strategic priority to move people and goods. The Region is actively working with the City of Hamilton and the Regions of Halton, Peel, and Waterloo, through an agreement with these municipalities, to advocate for the NGTA Corridor as a key trade corridor and an alternate route to the QEW (Council Report, CAO 2-2015, January 30, 2015).

The *Niagara-Hamilton Trade Corridor Technical Paper* provides a detailed summary of the planning history for the NGTA Corridor and its evolution to the **Niagara-Hamilton Trade Corridor** and should be reviewed in tandem with this document for a better understanding of the trade corridor's significance to the highway network and goods movement. In summary, the background report confirms the need for the Province to provide an alternate provincial facility that connects Niagara Region to the Greater Toronto and Hamilton Area as well as to the international border. This facility would support international trade and tourism by improving access to the international border crossings and to other transportation facilities in Niagara Region. The existing freeway infrastructure, specifically the QEW, currently experiences heavy congestion and does not have available capacity to accommodate the projected growth. A new Niagara-Hamilton Trade Corridor is recommended.

4.3 Niagara Escarpment Crossing

The Region completed the Niagara Escarpment Crossing (NEC) Transportation Study in 2016. This study identified the need to improve road crossings of the Escarpment to allow for the safe and efficient movement of heavy trucks across the Niagara Escarpment. Existing crossings have steep grades, ranging from 10% to 16%, which significantly impact safety and operations, i.e. slow climbing speed of heavy commercial vehicles, sight lines, etc.

The study recommended several short and long term projects to meet the needs of traffic demands and the efficient movement of goods. Recommendations included a new Escarpment crossing and improving the operations of existing crossings.

The study concluded with two primary recommendations:

1. Download Mountain Road (Grimsby) and Mountain Street (Lincoln) from regional to municipal jurisdiction so that provisions can be made to reduce truck traffic in the built up areas along these roadways.
2. Extend Bartlett Avenue (Grimsby) from Main Street East to Mud Street East. The extension alignment could include significant improvements to the Park Road corridor.

Niagara Region staff recommended that the Bartlett extension project proceed to Phases 3 and 4 of the Municipal Class EA process (Schedule C).

Analysis completed for the TMP confirmed the need for an improved crossing of the Niagara Escarpment to accommodate the movement of people and goods, and supports the proposal to proceed with the EA for the Bartlett Avenue extension and Escarpment crossing.

A second, higher-order (i.e. highway) escarpment crossing, located between Beamsville and Vineland, was noted in the NEC Transportation Study as a potential future project. The TMP analysis of the 2041 horizon did not indicate a need for a second additional escarpment crossing and is not recommended for the 2041 network.

4.4 Interchange Improvements

Although not part of the TMP, the Region and MTO are addressing improvements to the interchange at Casablanca Boulevard and Victoria Avenue.

Highway 406 Interchange at Third Avenue Louth

In 2013, Niagara Region completed an Environmental Assessment (EA) Study for a new interchange on Highway 406 at Third Avenue Louth to address existing traffic congestion on Fourth Avenue and at the adjacent interchange at Fourth Avenue. The EA study identified a preferred option that included a new service road to improve access to the Niagara Health System Hospital. This interchange was also assessed as part of the West St. Catharines subarea analysis.

A new Highway 406 Interchange at Third Avenue Louth would provide improved access to/from the new Niagara Health System St. Catharines site, and relieve traffic demands

along Fourth Avenue and at the Fourth Avenue interchange. A new interchange is recommended.

Highway 405 Interchange at Concession 6 Road

Through the analysis of the QEW-Glendale-Highway 405 subarea and through consultation with the local area municipalities and the public, a potential new interchange on Highway 405 at Concession 6 Road was identified. The QEW interchange at Glendale Avenue is becoming constrained with the traffic demands of the large retail mall and adjacent development growth. An alternate freeway interchange to accommodate the anticipated growth in the south part of Niagara-on-the-Lake and in the employment lands along York Road was assessed.

The current configuration of the freeway-to-freeway interchange at QEW and Highway 405 is such that Highway 405 is not accessible from the south and Niagara-bound QEW is not accessible from Highway 405. As a result, truck traffic to/from the employment lands in northeast Niagara Falls (along Stanley Road) and to/from the Queenston-Lewiston international bridge crossing rely on Mountain Road (Regional Road 101) to access QEW to/from the south. While Mountain Road is a regional road, it also has considerable residential lots fronting on to it. Improving access to Highway 405 would divert heavy commercial vehicles to the freeway reducing truck volumes on Mountain Road.

Concession 6 Road already crosses over Highway 405. To the south, Concession 6 Road becomes Mewburn Road in Niagara Falls. Since 2009 the Mewburn Road bridge over the CN Railway has been closed to vehicular traffic due to safety concerns with the bridge structure. The Region's Capital Forecast includes a contribution to the rehabilitation of the Mewburn bridge to be undertaken by the City of Niagara Falls.

A new interchange at Concession 6 Road would serve as an alternative access to QEW and Highway 405 and improve mobility and truck access to the QEW / Glendale area and the Highway 405 / Stanley Road area. A new interchange is recommended.

QEW / Glendale Interchange Improvements

Based on the anticipated increase in traffic to/from Toronto attracted by the developments in the area (i.e. Outlet Collection at Niagara, Niagara College), MTO is currently considering potential improvements to the QEW/Glendale Avenue interchange. The current configuration of the interchange may not be sufficient to support the additional traffic on existing ramps (i.e. northbound traffic queuing to make a left turn onto the existing Toronto-bound on-ramp) A new Toronto-bound loop on-ramp could alleviate traffic operations across the interchange and along Glendale Avenue.

The recommendations from the subarea analysis include a reconfiguration of the Glendale Avenue interchange to include a new Toronto-bound loop on-ramp, including the realignment of the existing on-ramp. The new ramp relieves the high left-turn demands at the existing ramp intersection improving traffic operations from Level of Service (LOS) E to LOS B.

4.5 Regional Road Improvements

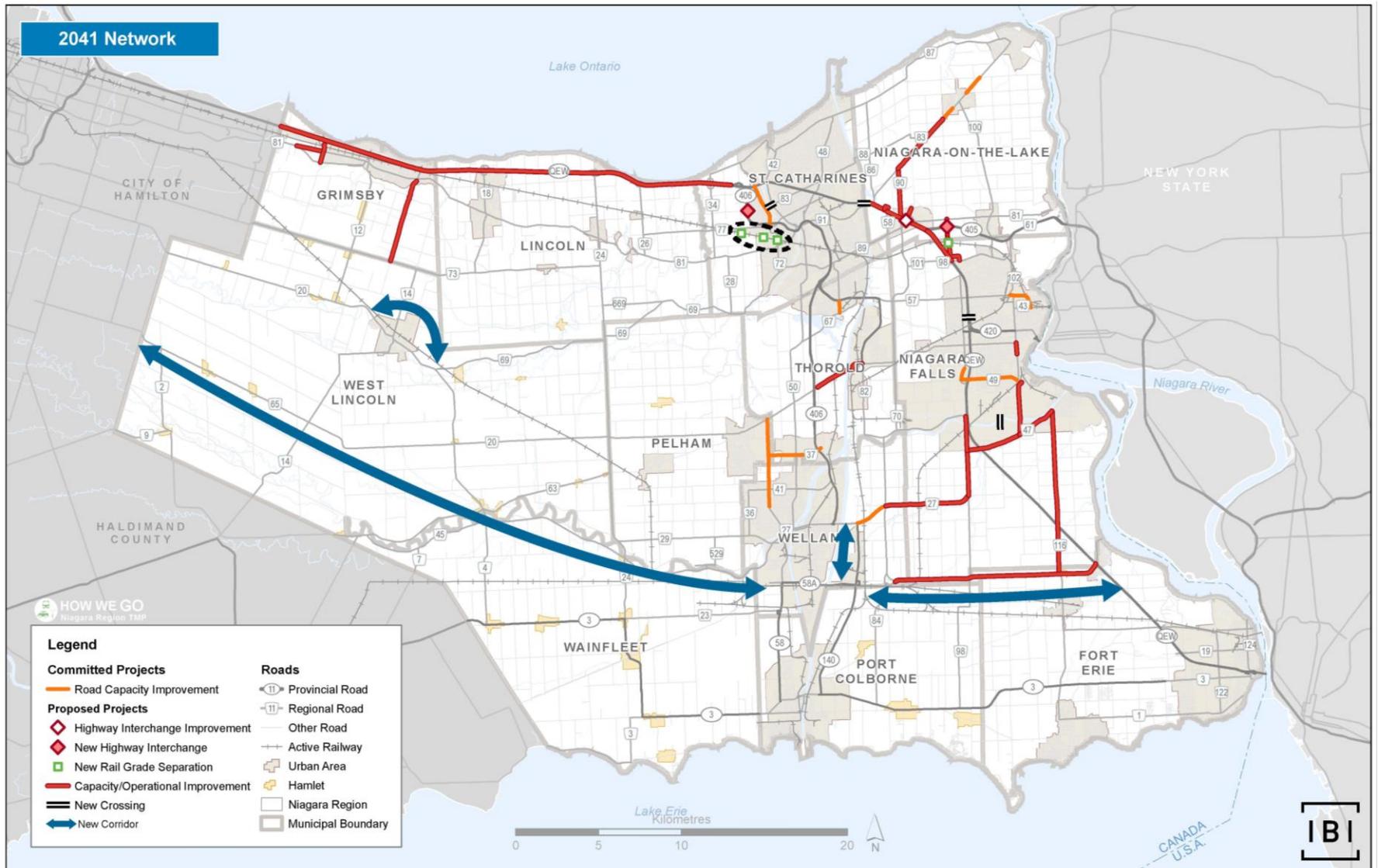
The recommended major road network expansion projects include:

- Projects already in Niagara Region’s 10-year Capital Program (Planning and Construction)
 - Casablanca Blvd (RR 10), QEW to Livingston Avenue
 - East Main Street (RR 27), Highway 140 to Moyer Road
 - Merritt Road (RR 37), Rice Road to Highway 406
 - Martindale Road (RR 38), QEW to Fourth Avenue, including bridge over Highway 406
 - McLeod Road (RR 49), Pin Oak Drive to Stanley Avenue
 - Rice Road (RR 54), Old Highway 20 to Thorold Road
 - Niagara Stone Road (RR 55), Concession 6 Road to Line 2 Road
 - Niagara Stone Road (RR 55), Penner St (Line 1 Road) to East and West Line
 - Collier Road (RR 56), Highway 58 to Beaverdams Road
 - Thorold Stone Road (RR 57), Extension east of Stanley Avenue to Victoria Avenue
 - Montrose Road (RR 98), Charnwood Avenue to McLeod Road
 - Livingston Avenue (RR 512), Main Street to Casablanca Boulevard
 - South Niagara East-West Arterial, Highway 406 extension to QEW
 - Canadian Motor Speedway infrastructure improvements
- Additional Capacity Expansion Projects
 - Bartlett Avenue (RR 14) extension (Niagara Escarpment Crossing), Muscat Drive to Mud Street
 - Highway 20 (RR 20) Smithville Bypass
 - Highway 20 (RR 20), Kottmeier Road to Davis Road/Allanport Road
 - Schisler Road (RR 27), Moyer Road to Montrose Road
 - Lyons Creek Road (RR 47), Montrose Road to Sodom Road
 - Niagara Stone Road (RR 55), Airport Road to Concession 6
 - Glendale Avenue (RR 89), York Road to Queenston Road
 - Airport Road (RR 90), Niagara Stone Road to York Road
 - Montrose Road (RR 98), Chippawa Creek Road to Schisler Road
 - Stanley Avenue (RR 102), Ferry Street to Murray Street
 - Stanley Ave (RR 102), Marineland Parkway to Lyons Creek Road
 - Sodom Road (RR116), Lyons Creek Road to Netherby Road
 - Concession 6 Road-Mewburn Road, York Road to Mountain Road, including bridge over CN Rail

- Queenston Road realignment to accommodate Garden City Skyway project
- New road/rail grade separation in West St. Catharines at one of Louth Street, Vansickle Road or First Street Louth
- Corridor Protection for future roads that are regionally-significant, provide local benefits and connectivity
 - Carlton Street (RR 83), protect for new crossing of Twelve Mile Creek between Martindale Road to Ontario Street
 - Morrison Street, protect for new crossing of the QEW between Kent Avenue and Victor Drive
 - Future Road (west of Stanley Avenue), protect for new crossing of Welland River

The Regional 10-year road capital improvement program includes intersection improvements, road rehabilitation improvements, and other improvements for the maintenance and operation of the road network to accommodate existing transportation needs as well as future growth. These improvements are outside of the scope of the TMP which focuses on network capacity expansion and connectivity.

Exhibit 2: 2041 Road Network



5 Phasing

All road capital infrastructure are prioritized on an on-going basis through Niagara Region's Capital Budget and 10-year forecasting process. This process, conducted annually by Region staff, accounts for existing and projected transportation needs, development-driven needs, on-going asset management, and financial envelopes. Looking beyond the current Capital Budget, this TMP provides a longer-term outlook of the road capital program, planning to the 2041 horizon. A prioritization process to balance the needs of travel demand, providing access to new development lands and supporting areas of employment growth was undertaken. Consideration for timing on adjacent or upstream corridors and the status of projects in the environmental assessment process were also factors in the project phasing.

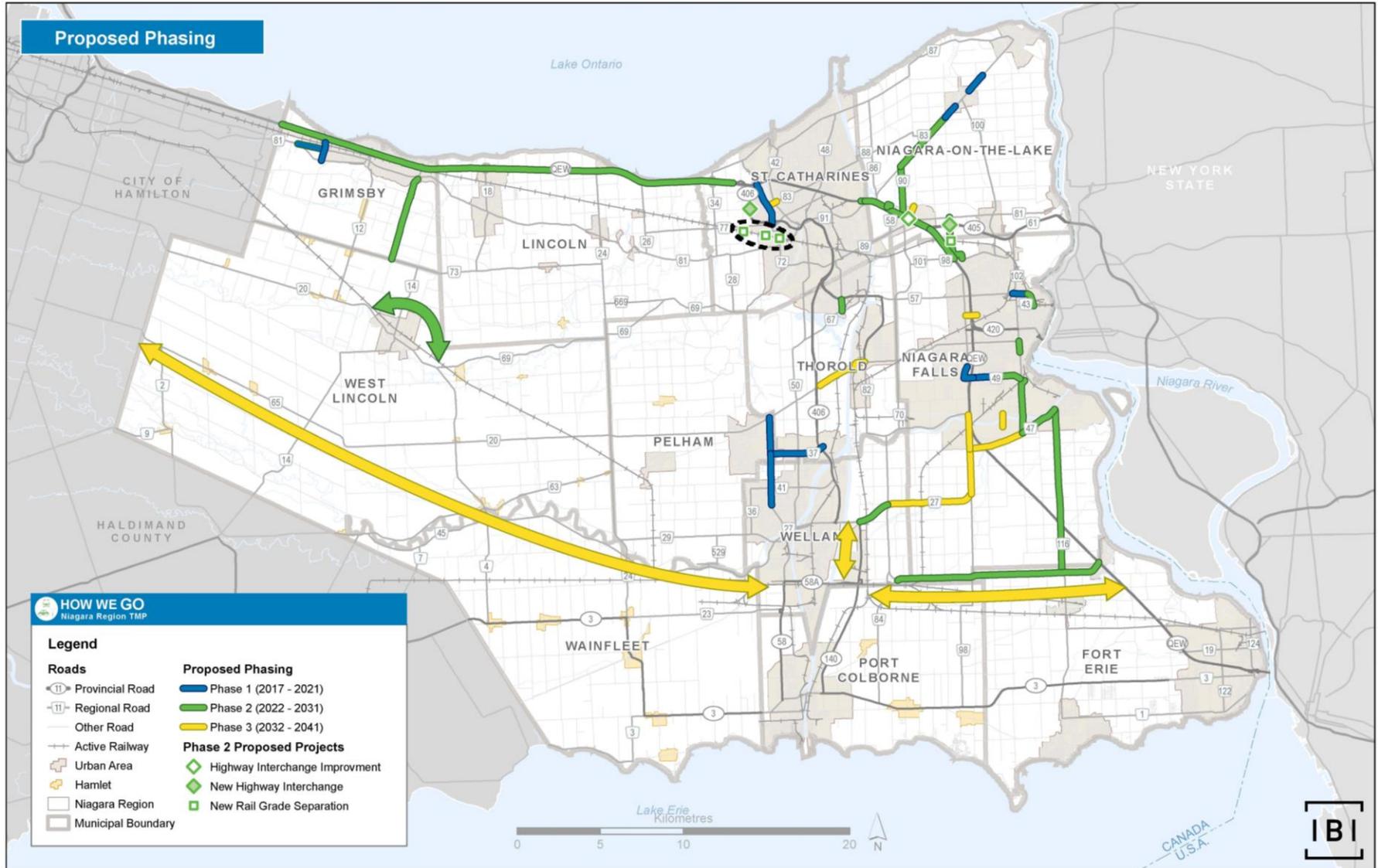
In the short term, by 2021, the Region will focus on implementing policies that will transform the Region's approach to transportation, address existing constraints in the road system by implementing a number of projects already in the Capital Program, adopt TDM and TSM measures to support the road network, fill in gaps in the cycling network, and take the next steps to plan for the major network needs of the future.

In the medium term, by 2031, Niagara Region will begin to implement major regional road projects and improve connections to the freeway network, both of which will support goods movement in Niagara Region. The Strategic Cycling Network will be completed and incremental improvements to the cycling network will continue through the roads capital program. Transit service will continue to expand and inter-municipal service will connect all the local municipalities.

In the long term, by 2041, the Niagara-Hamilton Trade Corridor will support economic growth in Niagara Region and provide a significant benefit to the movement of goods in and through Niagara. Inter-municipal connections by road and transit, and crossings of major barriers, will continue to be implemented.

The recommended projects by phase are shown in Exhibit 3. The timing for these investments will be refined through on-going monitoring of transportation system performance, land development and the annual capital budget process.

Exhibit 3: Proposed Road Network Phasing



6 Recommended Strategy and Actions

It is recommended that the Region accommodate future growth in travel through strategic network capacity increases and address operational improvements at key constraints as described in Section 4.

Highway capacity improvements are also critical to the efficient operations of the regional road network. It is recommended that the Region continue to advocate for highway capacity improvements to address inter-regional and international trade and tourism-related demands, including a new trade corridor connecting Niagara to Hamilton and the international border.

Recommended actions for Niagara Region include the following:

- Advocate and work with MTO for capacity improvements to accommodate inter-regional and international travel demand for people and goods, including:
 - Widening of the QEW and introduction of managed lanes – such as high-occupancy vehicle lanes – from Hamilton to Highway 406;
 - Widening and rehabilitation of QEW from McLeod Road to Mountain Road;
 - Implementing the NGTA East corridor and extension of Highway 406; and
 - Building a new Niagara-Hamilton Trade Corridor.
- Actively work with MTO to identify a short-term solution to provide network redundancy through an alternate provincial route parallel to the QEW that can accommodate longer-distance, inter-regional travel and goods movement, including a Role and Function study of Regional Road 20 and a study to address the Smithville Bypass.
- Undertake or complete Environmental Assessment studies for:
 - Niagara Escarpment Crossing (Bartlett Avenue extension) extending to Mud Street, and beyond to Regional Road 20; and
 - South Niagara East-West Arterial Road.
- Work with MTO to undertake Environmental Assessments / Detailed Design for interchange improvements including:
 - QEW / Glendale Avenue Interchange;
 - Highway 405 interchange / Concession 6 / Mewburn Road interchange; and
 - Highway 406 / Third Avenue Louth interchange.
- Work with City of St. Catharines, Metrolinx and CN Rail to undertake Environmental Assessment for the rail grade separation in West St. Catharines.

- Protect non-regional transportation corridors that provide local benefits and network connectivity including:
 - Crossing of QEW – Morrison Street in Niagara Falls;
 - Crossing of Twelve Mile Creek – Carlton Street in St. Catharines; and
 - Crossing of Welland River – future road in Niagara Falls.
- Complete implementation of the 2041 Road Network as shown in Exhibit 2.