CITY OF BRANTFORD

2020 BRANTFORD TRANSPORTATION MASTER PLAN UPDATE

November 2020

FINAL

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Background

As part of the 2017 budget process, Brantford City Council approved the review of the 2014 update to the 2007 Transportation Master Plan (TMP). This update occurred at the same time as the review of the City of Brantford's Master Servicing Plan (MSP) and Official Plan (OP). The 2020 Transportation Master Plan (TMP) update includes the Boundary Expansion Lands (approximately 460 ha in the North and Tutela Heights Expansion Areas) that were transferred from Brant County to the City on January 1, 2017. Recommendations from the TMP will be considered for inclusion in the 10-year capital forecast and future Development Charges studies, and the strategic objectives have been incorporated into the OP.

Updating the 2014 TMP has provided an opportunity to review, reconfirm, or change the City's main transportation infrastructure and service plans. The update has also addressed newer issues involving changing economic and associated growth conditions, changes in the regional transportation context around Brantford (i.e., Highway 24, Highway 403, provision of GO Transit service), changing travel patterns, and evolving public priorities for the transportation system, for example dealing with the new Complete Streets philosophy, expanding the emphasis on Active Transportation, and new traffic management and calming measures (i.e. potential for roundabouts).

Study Objectives

The following study objectives were set by the City for this TMP Update:

1. Plan to accommodate city growth to 2041, including the urban boundary expansion of the City of Brantford, the intensification target for development within the Built-Up Area, and density targets within the Designated Greenfield Area as set out in the new Official Plan;
2. Provide transportation infrastructure project and cost input into the Development Charges update;
3. Follow the Master Planning process and key principles of the Municipal Class EA to satisfy EA requirements for Schedule 'B' undertakings, and Phase 1 and 2 for Schedule 'C' projects; and
4. Consult with First Nations, agencies, stakeholders and the public early and continuously throughout the Master Planning process, using various techniques and materials.

Study Approach

The approach used in this TMP Update was organized into five (5) distinct project phases:

- Phase 1: Develop a Study Foundation – Set the stage and boundaries for the City of Brantford's transportation system.
- Phase 2: Integrated Transportation Strategy – Determine integrated strategies for developing networks, programs, and policies for all travel modes in a manner that supports community building objectives.

- Phase 3: Street Network Capacity Needs – Define problems and opportunities for the transportation system.
- Phase 4: Review of Key Transportation Issues – Review and assess the relationship between regional and local needs of the transportation network and identify a plan and role for the local system.
- Phase 5: Implementation Plan – Bring the elements of the TMP together and develop a practical approach to implement and monitor the TMP transportation network and guide the City forward to the 2041 horizon year.

The approach and methodology are designed to satisfy Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process and follow a Master Planning Process Approach. The integration of technical and consultation activities is a core element of the process.

Foundations

Public Consultation

The City recognizes that the choices the community makes today with respect to growth and development and long-term needs for transportation infrastructure will shape the community for years to come. Therefore, a key factor influencing the development of the TMP Update, as well as the associated Master Servicing Plan (MSP) and Official Plan Review (OPR), has been the input received from the various stakeholders and the general public on the future of transportation service in the City to address demands by 2041.

The formal public consultation program for the three projects was integrated due to the parallel nature of the three studies. The specific stakeholder and public consultation sessions that were conducted as part of the TMP are as follows:

- External Agency Notification: October 2017;
- Notice of Study Commencement: October 19 and 26, 2017;
- Public Meeting #1: Envisioning Our City: 2041 – November 16, 2017;
- Active Transportation Workshop - April 5, 2018;
- Public Meeting #2: Foundations and Strategies - May 17, 2018;
- Public Meeting #3: Constraints and Opportunities - February 10, 2020; and
- Virtual Public Open House – Meeting #4: Preferred Future Network and Service Recommendations – June 9 to June 23, 2020.

In addition to the stakeholder and public consultation sessions, The City of Brantford's Council was kept informed of the study progress and findings through formal reports. These contact points include the following:

- TMP Project Update, May 2020 prior to Public Information Centre #4 (Briefing Note PWIR2020-006 May 4, 2020: Water, Wastewater and Stormwater Master Servicing Plan (MSP) and Transportation Master Plan (TMP) – Project Update); and

- TMP Update presentation of recommended plan, October, 2020; prior to the Public Review Period (Council report October 2020: Transportation Master Plan (TMP) update 2020-427).

Existing Conditions

The following is a summary of observations pertaining to Brantford's existing arterial/collector road network performance during typical weekday, peak hour conditions:

- The PM peak hour vehicle demands are higher than the AM peak hour;
- Highway 403 interchanges with King George Road and Wayne Gretzky Parkway experience approaching capacity conditions during the PM peak hour due to high demands accessing/returning to the city;
- Highway 403 access to/from the downtown core are experiencing mild congestion during the PM peak hour:
    - King George Road Interchange via King George Road and Brant Avenue; and
    - Wayne Gretzky Parkway Interchange via the Parkway and Colborne Street / Dalhousie Street one-way couplet;
- North of Highway 403, King George Road and Wayne Gretzky Parkway serve as the primary north-south corridors accessing east-west facilities, such as Fairview Drive, Powerline Road, and Dunsdon Street. They are experiencing mild congestion and/or approaching capacity during the PM peak hour;
- The West Street corridor has high north-south vehicle demands and traverses Highway 403 (without access to Highway 403);
- The two bridge crossings of the Grand River, Colborne Street (4 lanes) and Veterans Memorial Parkway (2 lanes) provide the primary connections between the downtown core and southwest Brantford. They are experiencing mild congestion and/or approaching capacity in both peak hours;
- Blackburn Drive in the vicinity of Veterans Memorial Parkway is approaching capacity in both peak hours; and
- Erie Avenue is approaching capacity in both peak hours in the vicinity of Veterans Memorial Parkway.

The daily travel mode share in Brantford has remained relatively static over the past decade (2006 - 2016), as displayed in ***Table ES-1*** and ***Table ES-2***. There has been modest growth (as a proportion of travel) in the use of active modes (cycle/walk) and transit but the largest growth has been to auto driver. The only mode that decreased its mode share was auto passenger. It is worth noting that the combined auto passenger and auto driver share has decreased slightly, with a swing towards active modes. Overall, these trends are not surprising given Brantford's characteristics (location, size, geography, etc.) and investment in active modes of transportation and transit.

Table ES-1: Brantford Travel Mode Share: Internal Trips (Brantford to Brantford)

Mode \ Year	2006	2011	2016
Auto Driver	69.5%	68.8%	70.8%
Auto Passenger	18.3%	18.7%	14.6%
Transit	2.3%	2.6%	2.8%
Cycle/walk	6.6%	6.9%	7.8%
Other	3.3%	3.0%	4.0%
	100.0%	100.0%	100.0%

Source: Transportation Tomorrow Survey (TTS)

Table ES-2: Brantford Travel Mode Share: Trips Originating in Brantford (Brantford to All)

Mode \ Year	2006	2011	2016
Auto Driver	71.7%	71.4%	74.2%
Auto Passenger	17.9%	18.1%	14.2%
Transit	2.0%	2.3%	2.3%
Cycle/walk	5.3%	5.4%	5.8%
Other	3.2%	2.9%	3.4%
	100.0%	100.0%	100.0%

Source: Transportation Tomorrow Survey (TTS)

Impacts of Growth

The Growth Plan for the Greater Golden Horseshoe identifies the growth directions for population and employment growth within the City.

Ultimately the City's population is expected to grow from 101,700 people in 2016 to 163,000 people by 2041. Employment is expected to grow from 44,890 in 2016 to 79,000 people by 2041, as shown in ***Table ES-3***.

Table ES-3: Population and Employment Growth - Brant and Brantford

Demographic Area	2016	2041	Growth
Population			
County of Brant	36,700	57,000	55%
City of Brantford	101,700	163,000	60%
Total	**138,400**	**220,000**	**59%**
Employment			
County of Brant	22,100	26,000	18%
City of Brantford	44,900	79,000	76%
Total	**66,990**	**104,000**	**55%**

Source: A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2019

The new growth of 61,300 people and 34,110 jobs is anticipated to be distributed throughout the City, in a combination of intensification within the Built-up Area and growth in the City's new and existing Designated Greenfield and Employment Areas.

A growth to 2041 was assessed for a 'Do Minimal' network scenario (reflecting no changes to mode shares or roadway network capacity with the exception of the proposed arterial/collector road network for the expansion lands in Tutela Heights and North Brantford to facilitate access to future lands).

The following 2041 capacity issues are consistent with 2014 TMP model findings for the 2031 horizon:

- Wayne Gretzky Parkway between Henry Street and Highway 403;
- King George Road crossing Highway 403;
- Veterans Memorial Parkway between Mt. Pleasant Street and Market Street South;
- Colborne Street crossing the Grand River;
- Paris Road between Highway 403 and Powerline Road;
- Brant Avenue between St Paul Avenue and Colborne Street; and
- West Street between Charing Cross Street and Henry Street.

However, there are a few notable capacity issues that have emerged in 2041, most notably as a result of the settlement boundary expansion, that were not present in the 2014 TMP findings for the 2031 horizon:

- Powerline Road between Paris Road and Wayne Gretzky Parkway;
- Wayne Gretzky Parkway north of Highway 403;
- Hardy Road between Ferrero Boulevard and Paris Road;
- Paris Road south of Highway 403; and
- Erie Avenue between Veterans Memorial Parkway and Birkett Lane.

Integrated Transportation Strategy

Complete Streets Framework

Complete Streets are streets that are designed to be safe for everyone: people who walk, bicycle, take transit, or drive, and people of all ages and abilities. A Complete Streets policy ensures that transportation planners and engineers consistently design and operate the entire street network for all road users, not only motorists. Complete Streets offer wide ranging benefits; they are cost effective, sustainable, safe, and encourage the continuation of the shift from auto to non-auto based travel.

The purpose of the City-Wide Complete Streets Planning Principles and Design Guidelines is to provide planning and design directions for the network in the City of Brantford. These principles and guidelines provide direction for new development, public realm investments and future planning studies along the City's major and minor road network.

These principles and guidelines should be used:

- In the evaluation of any Planning Act applications for development;
- In the preparation of secondary plans, strategies or initiatives that relate to an urban transportation corridor;
- In the preparation of any implementation tools, including Zoning By-laws, infrastructure projects, master plans, design standards, or other City projects or initiatives that impact the transportation network; and
- To communicate the important elements of transportation planning and infrastructure design to citizens and the development community.

Existing Policies and Plans

Land use and transportation infrastructure and service are mutually dependent. Policies help to shape the way that the transportation networks can support the principles of good land use planning. Therefore, a review was undertaken of the current transportation infrastructure planning and design policies for context.

Draft Official Plan (2020)

The Official Plan is a comprehensive framework of goals and objectives statements, land use designations and policies which will guide the future development of the City of Brantford. This planning framework will also assist Council, staff, and other public agencies in their consideration of public and private development proposals.

Chapter 7 in the Draft Official Plan includes policies for an integrated transportation system to complement the TMP and related direction on active transportation, public transit, parking, transportation demand management, goods movement and the road network.

Transportation Master Plan (2014)

In 2014, an update to the 2007 Transportation Master Plan provided an opportunity to review and reconfirm the City's main transportation infrastructure and service plans. The update also addressed emerging issues involving changing economic and associated growth conditions, changes in the regional transportation context around Brantford (i.e., Highway 24, Highway 403, and GO Transit service), travel behaviour, and evolving public priorities for the transportation system, for example dealing with the new Complete Streets philosophy, expanding the emphasis on Active Transportation and new traffic management and calming measures (i.e., roundabouts).

Specific objectives and considerations carried forward from the 2014 TMP include:

- Make this a "made for Brantford" master plan reflecting the unique characteristics of Brantford and its context while still learning from successes in other similar-sized cities;
- Show the impacts of not making system improvements in terms of deficiencies, level-of-service and ability to meet planning targets;

- Coordinate TMP preparation with the City's concurrent Master Servicing Plan study in terms of growth forecasting, consultation activities and planning of cost efficiencies in the development of new transportation, sewer and water infrastructure;
- Integrate transportation and land use planning. Transportation and land use planning has been coordinated to identify bold transportation strategies that will be required to support an overall sustainability plan for transportation to 2031, and translate these strategies into Official Plan policy;
- Define the future role of public transit. Reduce the City's environmental footprint by increasing transit use through improved service levels, by effectively serving newly developing areas, meeting the accessibility needs of residents, and by considering inter-municipal and inter-regional links. Incremental fixes have become increasingly limited in meeting Brantford's future transit needs; and
- The Complete Streets philosophy has been applied to this TMP Update so that streets are planned, built and maintained for all users.

This document is being prepared to support the update of the 2014 TMP. The 2020 TMP will address the updated land use forecasts to 2041 resulting from the new Official Plan land use allocations, including expansion.

Linear Municipal Infrastructure Standards

With regard to Design, the Linear Municipal Infrastructure Standards outline the minimum Right of Way requirements in achieving the City's policies regarding Complete Streets and Healthy communities, as set out by its latest Transportation Master Plan Update. The purpose of the policies is to focus on designing, maintaining and operating public streets in a manner that promotes active transportation.

The document further identifies cross-section, geometric, and traffic control requirements on above and below grade infrastructure for local, minor collector, major collector, minor arterial, and major arterial roads.

Network Design Elements

A complete transportation network for Brantford will include many complete streets, but those streets will not be uniform in design. Street design should change according to the transportation context (where the street is located in the transportation network for each mode of travel) and the land use context (what the lands along the street are used for).

A complete transportation network for Brantford will also make use of off-street paths and trails to provide connections and close gaps in the walking and cycling networks. Paths and trails can also allow the walking and cycling networks to serve recreational trips, in addition to utilitarian (for example, commuter) trips.

Goals and objectives were established for each mode of travel, based on a technical review and based on input from stakeholders and the public:

- Walking
  - GOAL: Be a complete, pedestrian-friendly community with networks that integrate with transit, paths and trails, neighbourhood amenities, parks, open space, and schools.
  - OBJECTIVES:
    - Facilities provide a high level of pedestrian connectivity;
    - Walking environment is safe for users; and
    - Pedestrian accessibility, comfort, and mobility levels support walking as a preferred mode.
- Cycling
  - GOAL: Provide safe and convenient bicycle routes suitable for all user types: utilitarian (commuting), recreational (personal or family discretionary), and sport (advanced, high level recreational).
  - OBJECTIVES:
    - There is a continuous network of safe and direct bicycle routes;
    - There is an ability to navigate the bicycle network with ease;
    - End-of-trip facilities support cycling as a preferred mode of transportation;
    - The bicycling environment is safe; and
    - Provide unique and specific design environments appropriate for the different types of users.
- Public Transit
  - GOAL: Foster an efficient, affordable, safe, and accessible transit system that is an attractive alternative to the private vehicle and integrates with all other elements of the transportation system.
  - OBJECTIVES:
    - Transit contributes to a more environmentally sustainable community;
    - Transit is well integrated with all other transportation modes;
    - A robust frequent transit network serves the community;
    - There are high levels of bus stop accessibility and safety;
    - There is public awareness that transit is an attractive alternative to the private vehicle; and
    - Design of the system must not neglect the design of the vehicle and the design of facilities, remembering that transit needs to provide the rider with a great experience to develop and maintain strong ridership levels.
- Goods Movement
  - GOAL: Maintain and enhance the efficient movement of goods and service (including emergency and municipal services).
  - OBJECTIVES:
    - Truck traffic (excepting delivery service) avoids areas designated for high-density residential, mixed use, and pedestrian- and transit-oriented development;
    - There is a high level of goods and emergency services mobility on major regional routes;
    - Goods and municipal and emergency services are being delivered at a local level;
    - High level of accessibility and mobility for emergency services; and

    - While there is a focus on street design for placemaking, must continue to accommodate appropriate design vehicles, including local deliveries and long-distance freight trips.
- Automobile
  - GOAL: Provide for responsible planning and development of roads, and transportation connections to facilitate the efficient movement of people. Ensure that traffic control is considered that places emphasis on safe, efficient, and sustainable for all modes.
  - OBJECTIVES:
    - Provide a road network connectivity that supports local and regional mobility;
    - There is a balance between traffic congestion and mobility performance;
    - All systems integrate and work together to move people, goods, and services; and
    - Roads adapt to accommodate the future, including appropriate traffic controls.

Transportation System Review

Approach

The performance of the transportation system was assessed using the city's strategic travel demand forecasting model. This model accounts for land-use (at a traffic zone level of detail, as provided by the Municipal Comprehensive review process) trip generation, trip distribution, and mode split in assigning travel demands to the transportation network. The assigned vehicle volumes are then compared to the capacity of the infrastructure at a corridor and roadway link level (i.e. volume to capacity assessment). This analysis tool also allows for the detailed evaluation of the origins and destinations for trips using specific infrastructure.

Travel demands were then used to identify the impacts of the alternative strategies on the corridor performance and assist in the identification of the impact of alternatives considered to address the identified roadway constraint.

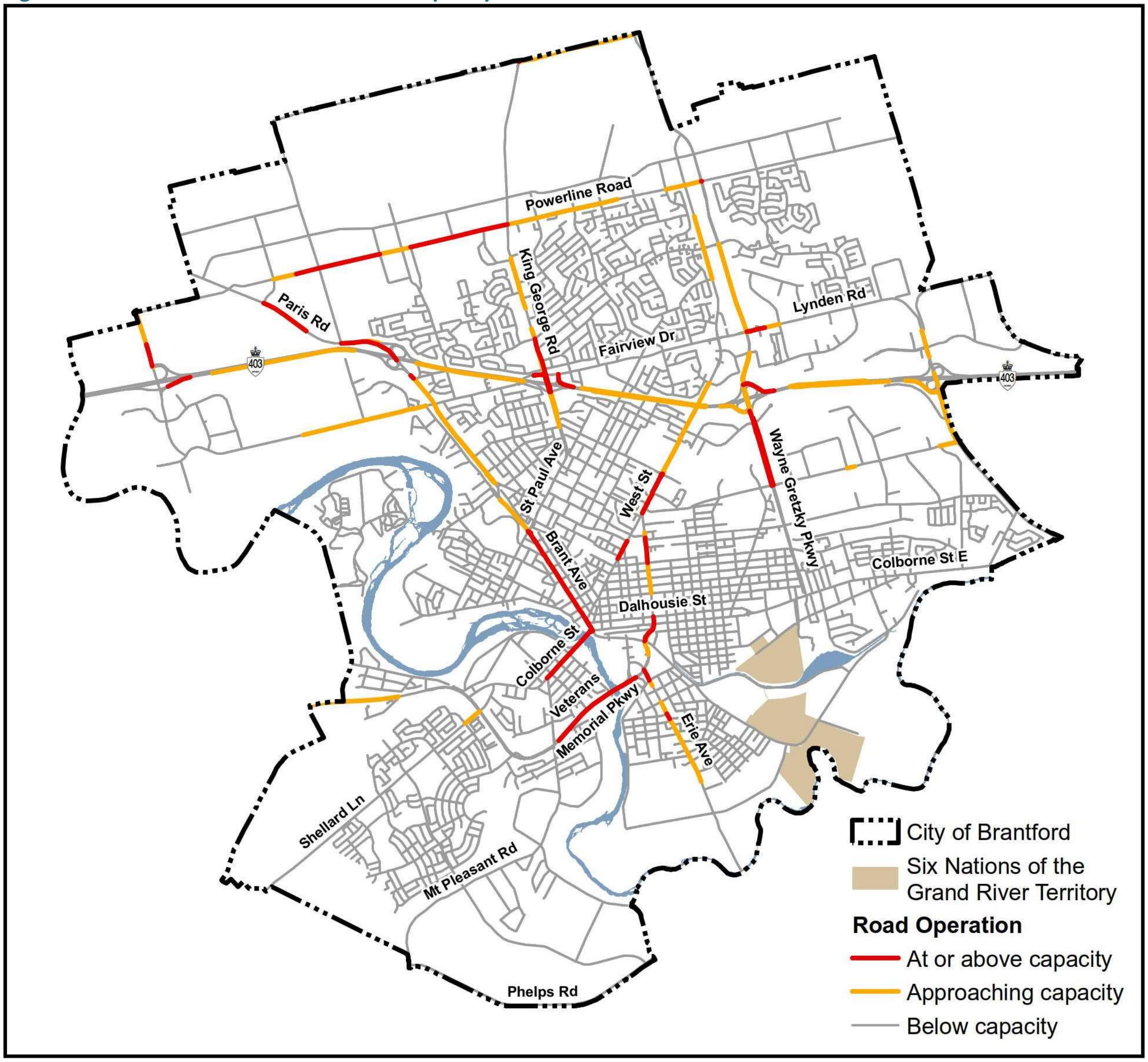
It is important to understand that that infrastructure and service provisions in one corridor can have impacts, positive and negative, in other corridors. Problems identified and solutions assessed during the transportation analysis are mindful of this interdependency between corridors.

Do Minimal

The capacity constraints by 2041, accounting for proposed growth under a transportation network scenario with minimal improvements over today's condition, were identified. The changes to the road network include only short term committed projects (e.g. The Oak Park Road/Highway 403 interchange upgrade) and collector roads required to support the expansion growth areas (required to provide access to future development)

By 2041, the do-minimal network assessment shows that many of the arterial roads will be operating at or above capacity in the afternoon peak hour. Existing issues crossing Highway 403 and the Grand River are exacerbated by growth, and new issues have emerged (as a result of boundary expansion) along the north-south roadways connecting the downtown area to Highway 403. ***Figure ES-1*** provides a summary of the Do Minimal capacity constraints.

Figure ES-1: 2041 Do Minimal Network: Capacity Constraints



The following critical deficiencies were identified in the road network:

- Inter-regional (significant number of trips in the corridor are to/from areas outside of Brantford):
  - Brant Avenue - St Paul Avenue to Colborne Street;
  - Wayne Gretzky Parkway - Henry Street to Highway 403;
  - Wayne Gretzky Parkway - North of Highway 403;
  - King George Road - Crossing Highway 403; and
  - Paris Road - Highway 403 to Powerline Road.

- Intra-regional (significant number of trips in the corridor are to/from areas within Brantford):
  - Lorne Bridge - Grand River Crossing;
  - West Street - Charing Cross Street to Henry Street;
  - Veterans Memorial Parkway - Mt. Pleasant Street to Market Street;
  - Paris Road - South of Highway 403;
  - Powerline Road - Paris Road to Wayne Gretzky Parkway;
  - Hardy Road - Ferrero Boulevard to Paris Road; and
  - Erie Avenue - Veterans Memorial Parkway to Birkett Lane.
- Local System (trips primarily local in nature):
  - Clarence Street/Clarence Street South – Dalhousie Street to Icomm Drive; and
  - Colborne Street West – County Road 7 (Pleasant Ridge Road) to D'Aubigny Road.

Alternative Strategies

The 2020 TMP's strategic transportation direction follows the previous 2007 and 2014 TMP's closely. The 2007 and 2014 strategies were built on two principle themes:

- Increase the supply of transportation infrastructure (optimize, expand and new facilities); and
- Manage travel demand (cost, behaviour, land use).

The 2020 TMP update refines these themes as follows:

- **Travel Demand Management (TDM)** - Manage travel demand (cost, travel behaviour [including mode choice], land use);
- **Transportation System Management (TSM)** - Manage the transportation infrastructure to optimize efficiency and safety for all modes (provide space and operating environment for all modes); and
- **Infrastructure Enhancements** - Increase the supply of transportation infrastructure (expand existing and add new facilities).

The impacts of these strategies have been updated to reflect the new growth forecasts and network capacity improvements to the 2041 horizon year. Ultimately when implementing these strategies, minimizing impacts to properties is a significant consideration.

TDM Max Assessment

Travel Demand Management (TDM) relies heavily on the use of transit. While the use of transit is growing, today approximately 3% of weekday peak hour trips are made by transit. The success of transit depends on the availability of service and the proximity of that service to people and jobs. The more people that have good access to transit, the higher the potential for transit ridership.

Achieving these increases requires significant expansion of existing service (new routes) and service frequency (more buses, shorter headways between buses).

A review of existing mode splits was undertaken to establish the penetration of the transit market. Population and employment densities in the 2041 condition were reviewed to identify areas where transit service would have the most impact. New mode share targets were identified and applied to future trip generation to establish new transit ridership levels and make corresponding adjustments to the auto trip making.

The effect of the target of 5.9% transit mode share (more than double the current 2.8% transit mode share), in combination with a 10% mode share (almost 30% increase from existing 7.8 % share) to Active Modes (walking and cycling) will significantly reduce the 2041 vehicle demand on the network from the current 85.4% modal share to 79.5% for drivers and passengers. This TDM scenario, as assigned to the Do Minimal network, results in a noticeable improvement in network operations across the city compared with the 2041 Do Minimal forecasts. ***Figure ES-2*** illustrates an overview of the link capacity constraints in the 2041 TDM network.

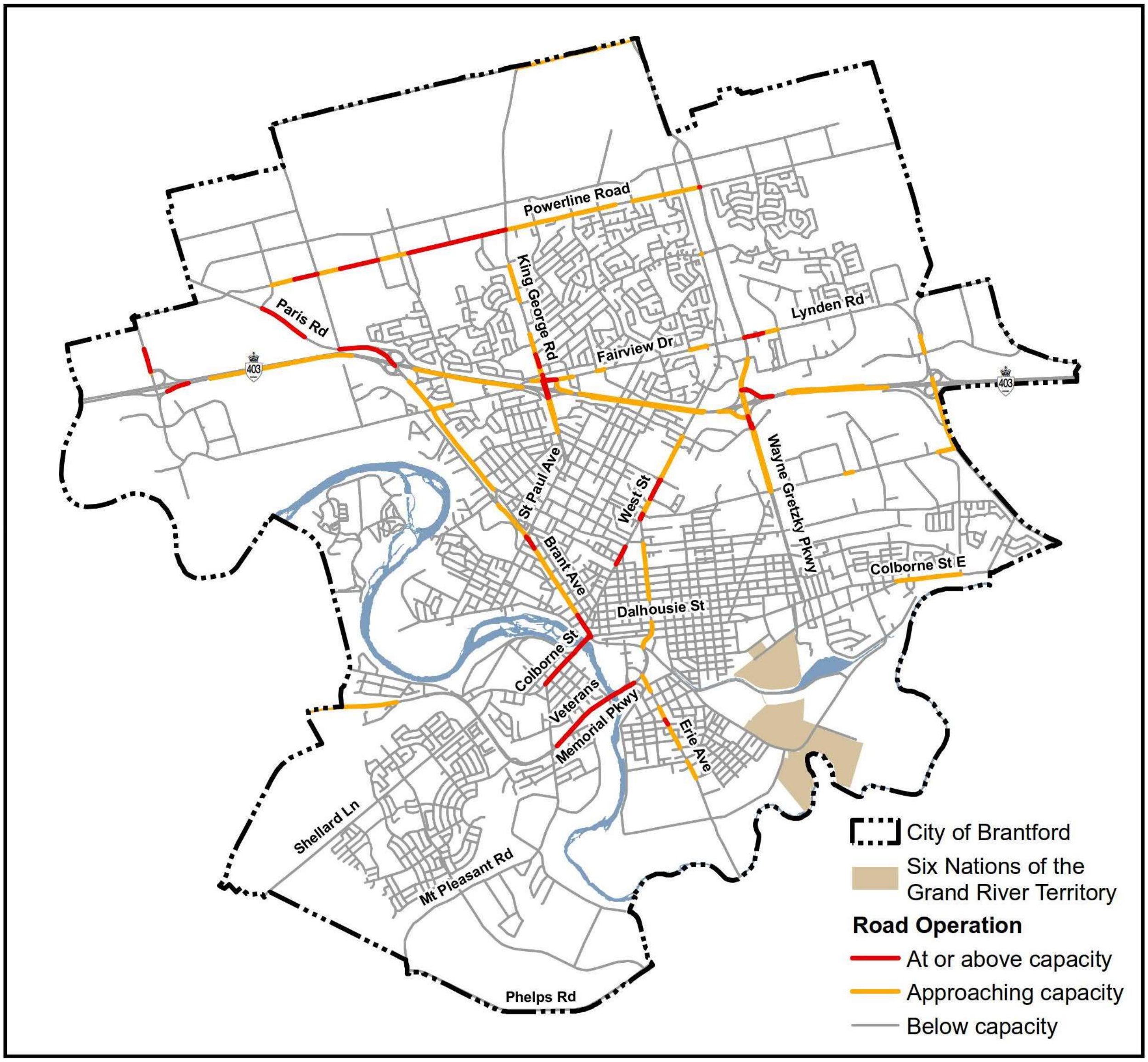
The TDM network is forecast to work much more reliably in the downtown area and crossing Highway 403. However, specific problem areas still remain: Paris Road between Highway 403 and Golf Road, King George Road crossing Highway 403, and the Colborne Street and Veterans Memorial Parkway crossings of the Grand River.

In addition to the Brantford-to-Brantford transit service, there are opportunities to partner with other agencies to connect communities outside the City limits by public transit. Providing transit connectivity will result in benefits to the City's road system performance. Travel markets to/from the County, the Greater Toronto Area (GTA), and the Cambridge/Kitchener/Waterloo area are significant. Not all of these trips are divertible to transit but even achieving 2%-5% market penetration could result in significant auto trip reduction on critical roadways.

The development of such service has the potential to reduce auto volumes on the critical north-south arterials in the City but will require inter-agency collaboration to implement (e.g. planning and funding).

A TDM strategy alone does not address all of the transportation network system constraints. Transportation issues remain in the north along Powerline Road and on two of the bridge crossings of the Grand River (Lorne Bridge on Colborne Street and Veterans Memorial Parkway).

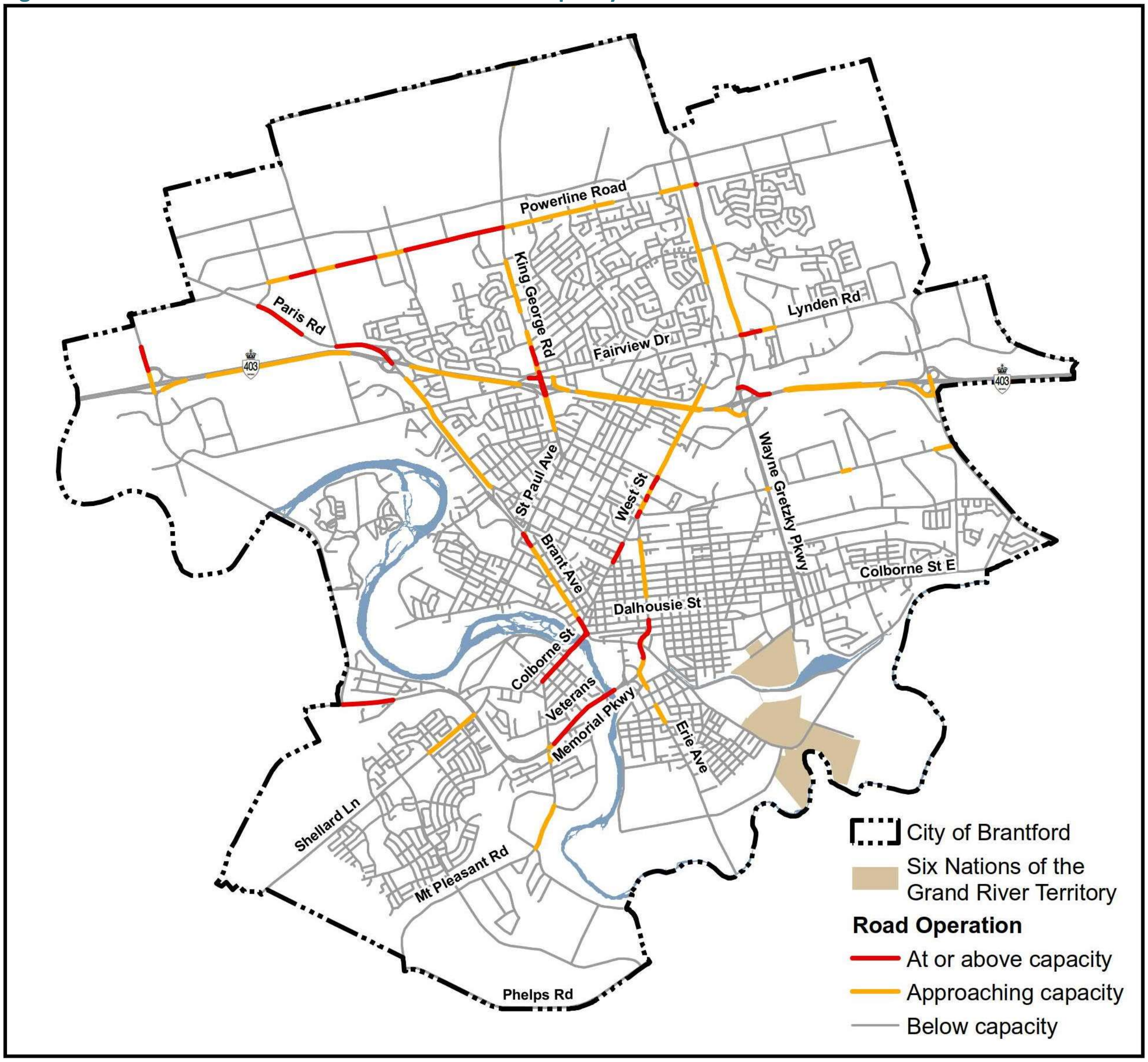
Figure ES-2: 2041 Manage Travel Demand Network: Capacity Constraints



Infrastructure Max Assessment

The Increase Infrastructure strategy addresses travel demands on the City's road network by enhancing the carrying capacity of the network through strategic road widenings and extensions. The main impact of this strategy is the ability to maintain an acceptable and efficient Level-of-Service on Brantford roads over the next 20 years. ***Figure ES-3*** illustrates an overview of the link capacity constraints in the 2041 Increased Infrastructure network. The Increase Infrastructure strategy includes short-term committed improvements, as well as a full program of infrastructure projects as was identified in the 2014 Transportation Master Plan (excluding the Veteran's Memorial Parkway extension, due to the August 2019 Council resolution restricting use of the Six Nations of the Grand River lands (Report 2019-453), known as Glebe Farm Lands as a transportation corridor).

Figure ES-3: 2041 Increased Infrastructure Network: Capacity Constraints



The increased infrastructure network will operate significantly better than the 2041 Do Minimal network in the following areas:

- Reducing congestion along Hardy Road and Brant Avenue as a result of the Oak Park Road extension; and
- Eliminating congestion on Wayne Gretzky Parkway, a result of a widening to six lanes.

However, the two main crossings of the Grand River are still anticipated to be significantly over capacity even with the addition of the Oak Park Road Grand River crossing (4 lanes) and a widening of the Veteran's Memorial Parkway Grand River crossing (from 2 to 4 lanes).

In short, the network will still experience some residual capacity issues under the new 2041 growth scenario even with significant investment in infrastructure improvements (as recommended in the 2014 TMP).

Network Constraints and Solutions

While the TDM and Increased Network Infrastructure scenarios show significant potential to reduce congestion and delay in the network, neither strategy completely addresses the needs of the 2041 condition in isolation.

The next step in the transportation analysis was to assess the need for improvements in each of the constrained corridors, and consider the impact of each strategy (TDM, TSM, Increased Supply) on the constraint. This was done by assessing the 2041 Do Minimal scenario network performance to determine the magnitude performance issue (volume to capacity) and the travel characteristics of the demand in the corridor (origin and destination markets for future users).

Based on the critical deficiencies in the 2041 Do Minimal network alternative, an assessment of the impact of each strategy on each deficiency was undertaken.

Brant Avenue - St Paul Avenue to Colborne Street

Brant Avenue between St Paul Avenue and Colborne Street has significant auto demand in both directions, however southbound is the critical direction during the PM peak hour. Overall, the volumes forecast do not significantly exceed capacity, as much of the over flow demand for the corridor uses the adjacent and parallel one-way pair of William Street and Albion Street.

The capacity issue on Brant Avenue is strategic in nature. The lack of a direct connection between Northwest Brantford (commercial/industrial use) and Southwest Brantford (residential use) appears to be one of the main issues. A considerable amount of traffic traveling between these two areas is forced to travel east towards downtown in order to cross the Grand River to travel back to the west to reach their destination. The City recently implemented more stringent parking restrictions on Brant Avenue, and other traffic signal system measures to improve its operation.

Brant Avenue between St. Paul Avenue and the Lorne Bridge is part of the Brant Avenue Heritage Conservation District. A widening of the road to provide 6 lanes (three in each direction) or to provide 5-lanes (the addition of a center left turn lane) would have a significant property impact, thereby contradicting the Heritage Conservation District designation.

The potential Oak Park Road extension over the Grand River has potential to divert 300-500 peak hour vehicles in the peak direction from Brant Ave. This facility is currently the subject of a Municipal Class EA study.

Wayne Gretzky Parkway - Henry Street to Highway 403

Wayne Gretzky Parkway between Henry Street and Highway 403 is forecast to have significant auto demand in both directions, reaching highs of 2,000 to 2,200 vehicle trips. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour. Overall, Wayne Gretzky Parkway is expected to operate just over capacity throughout this area, with the exception of the short section between Morton Avenue/Holiday Drive and Highway 403 where the volume exceeds its capacity by 10%.

The capacity issues on Wayne Gretzky Parkway between Henry Street and Highway 403 are strategic in nature, focusing on the immediate corridor, i.e. the demand south of Highway 403 originates or is destined to areas within the corridor and not related to pass through traffic.

Widening Wayne Gretzky Parkway from 4 lanes to 6 lanes between Henry Street and Highway 403 would provide the additional capacity required to meet 2041 demands.

As a majority of the demands on Wayne Gretzky Parkway are focused on accessing land use in the corridor primarily to/from Highway 403, improving a parallel roadway like Garden Avenue would have little impact on the future volume demand on Wayne Gretzky Parkway.

Wayne Gretzky Parkway - North of Highway 403

Volumes on Wayne Gretzky Parkway north of Highway 403 are forecast to reach highs of 1,800 to 1,900 vehicle trips in the PM peak hour, which reflects full capacity conditions. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour.

Wayne Gretzky Parkway serves as a major north-south connection for development in the north expansion areas.

A road widening across the Highway 403 Bridge and north of Lynden Road is not considered a necessity to accommodate adequate levels of service in 2041. However, protection for future widening and interchange (ramp) improvements is advisable depending on the future potential/opportunity for a provincial corridor (Highway 24).

As a majority of the demands on Wayne Gretzky Parkway are focused on accessing land use in the corridor primarily to/from Highway 403, improving a parallel roadway like Garden Avenue would have little impact on the future volume demand on Wayne Gretzky Parkway.

King George Road - Crossing Highway 403

The King George Road crossing Highway 403 is forecast to have significant auto demand in both directions, reaching highs of roughly 1,700 to 1,800 vehicle trips in the PM peak hour. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour.

More than 60% of the traffic using King George Road to cross Highway 403 does so as a result of regional travel on Highway 403 or Highway 24.

Providing an additional lane in each direction on King George Road would have significant property impacts. The preferred solution would be to divert long distance trips from King George Road to a parallel route. This would provide relief to the forecast capacity issue in the area of Highway 403. The Wayne Gretzky Parkway extension north of Powerline Road has the potential to provide this alternative capacity.

Paris Road - Highway 403 to Powerline Road

The capacity issues on Paris Road between Highway 403 and Powerline Road are strategic in nature. The 2-lane, from 500 m north of Golf Road to beyond Powerline Road, will be insufficient to accommodate the demand in 2041.

The PM peak hour, peak direction demands on this section of Paris Road can be broken down as follows: 25% of vehicles are destined to south of the Grand River via Lorne Bridge; 50% of vehicles are destined to Highway 403 eastbound, and 25% of the vehicles are destined for downtown/central.

A widened Paris Road, from 500m north of Golf Road to Oak Park Road, would provide capacity to alleviate a portion of the capacity constraint.

Approximately 350 vehicles in the PM peak hour use Paris Road for north-south travel to connect across the river into Southwest Brantford. The extension of Oak Park Road (currently in EA stage) to Colborne Street West would provide a north-south connection in west Brantford and an additional crossing of the Grand River. This would alleviate the remaining capacity constraint on Paris Road.

Lorne Bridge - Grand River Crossing

Lorne Bridge has significant auto demand in both directions, however, during the PM peak hour, westbound is the critical direction. The volume in the westbound direction is forecast to reach almost 2,700 vehicle trips in the PM peak hour, which will exceed capacity by 68%.

The distribution of trips shows that a significant amount of traffic originating in/destined the southwest area of Brantford is destined to/originating in areas north of Highway 403 in the west and central areas.

A widening of the bridge to 6-lanes would address the issue but operational constraints on either side of the bridge would limit the effectiveness of the widening. It is noted that there are seasonal load restrictions on the bridge and that there is an ongoing EA for the three bridges (including the two pedestrian bridge crossings in close proximity) to evaluate options for rehabilitation (including the feasibility of removing load restrictions) and to provide sustainable modes of travel over the Grand River.

A widening of the Veterans Memorial Parkway, while it provides some river crossing capacity relief, does not address the primary origin-destination pattern for Lorne Bridge users (i.e. to the northwest and north central areas of Brantford).

An Oak Park Road extension has the potential to divert some 300 to 500 trips in the PM peak hour from Lorne Bridge, relieving a significant part of the capacity constraint on the bridge.

West Street - Charing Cross Street to Henry Street

West Street between Charing Cross Street and Henry Street has significant auto demand in both directions, however the critical direction during the PM peak hour is northbound. The West Street capacity issue is confined to the short 500m section between Charing Cross Street and Harris Street.

There are approximately 130 southbound vehicle trips and 150 northbound vehicle trips in the PM peak hour that could be diverted from West Street between Charing Cross Street and Henry Street with the provision of a continuous east-west connection in the vicinity. It is noted that there is an EA for the intersection improvement at the intersection of Charing Cross and West Street that would add additional northbound left turn lanes.

A widening of West Street would address the capacity shortfall between Charing Cross Street and Henry Street, but there would be significant property impacts on West Street, as well as property and secondary infrastructure impacts on Henry Street and Harris Street that would also require mitigation.

There are approximately 200-300 peak hour trips in the peak direction (150 trips from Harris Street alone) that are using West Street to facilitate a broader east-west trip. The extension of Charing Cross Street from West Street to Henry Street (approximately 850m; with a crossing of CN rail main line) would provide that continuous east-west connection and would also provide additional capacity across the rail corridor for all modes. The diversion of 200-300 trips in the peak direction would reduce the volume to capacity on West Street to less than 1.00.

Veterans Memorial Parkway - Mt. Pleasant Street to Market Street

The Veterans Memorial Parkway crossing of the Grand River has significant auto demand in both directions, however during the PM peak hour, westbound is the critical direction. The volume in the westbound direction is forecast to surpass 1,350 vehicle trips in the PM peak hour which will exceed capacity by over 35%.

The distribution of PM peak hour trips on the bridge reveals the following: 15% of trips originate from the east (Hamilton/GTA) via Highway 403; 20% of trips originate from north of Highway 403; and 65% originate from Central / Downtown Brantford. Travel markets to the northwest Brantford and Paris and west (Woodstock-London) markets are not served by this crossing.

Providing additional width on the bridge to accommodate an additional lane (such that both directions have 2 vehicle lanes) while providing adequate design space for the shoulder and any future active mode considerations would require either an extension or replacement of the bridge deck.

Alternative crossings of the Grand River that would serve the origin-destination patterns observed for the Veterans Memorial Parkway are limited.

Paris Road - South of Highway 403 to Hardy Road

Paris Road south of Highway 403 has significant auto demand in both directions, however southbound is the critical direction during the PM peak hour. While the forecast volume does not exceed capacity, they are approaching capacity.

The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) results in a significant number of vehicles traveling between these two areas using Paris Road towards downtown in order to cross the Grand River. Hardy Road is also an alternative but is constrained by its Right of Way and the at grade rail crossing west of Paris Road.

The roadway is only just approaching capacity in 2041, therefore there is not a compelling reason to add an additional lane of capacity in each direction. Such a widening would have significant impacts on utilities (i.e. relocation).

As an alternative, the potential Oak Park Road extension has the potential to divert some 300 to 500 trips from the Paris Road corridor.

Powerline Road - Paris Road to Wayne Gretzky Parkway

Powerline Road between Paris Road and Wayne Gretzky Parkway is forecast to experience significant growth in traffic as a result of the urban expansion to the north. Powerline Road has considerable auto demand in both directions, however the critical direction during the PM peak hour is eastbound.

The trip distribution patterns demonstrate the corridor specific nature of the demand issues on Powerline Road.

Widening Powerline Road from 2 lanes to 4 lanes between Paris Road and Wayne Gretzky Parkway would provide the additional capacity that is required to meet the remaining 2041 demands. Given the classification of the roadway (major arterial), the growth in residential and commercial/industrial development, and the anticipated truck traffic associated with commercial/industrial development, the widening of Powerline Road is critical.

As the growth in auto trips (volume) on Powerline Road is directly related to the adjacent future development, alternative corridors would not address the basic transportation need fulfilled by Powerline Road.

Hardy Road - Ferrero Boulevard to Paris Road

Hardy Road between Ferrero Boulevard to Paris Road is forecast to experience significant growth in traffic by 2041. The increases in traffic volumes are a result of the planned development within the Oak Park Road corridor and Northwest Business Park.

The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) is the main reason for growth in traffic as it provides a connection to Paris Road.

A widening of Hardy Road to 2-lanes in each direction would address the emerging long-term capacity issue. However, this widening would have significant impacts on property, utilities (i.e. relocation), and the adjacent natural heritage system. As well, the CN rail crossing is a potential constraint.

As an alternative, the potential Oak Park Road extension has the potential to divert some 300 to 500 trips from Hardy Road, and would avoid the need to the widen Hardy Road

Erie Avenue - Veterans Memorial Parkway to Birkett Lane

Erie Avenue between Veterans Memorial Parkway and Birkett Lane is forecast to have modest auto demand in both directions, reaching highs of roughly 600 to 800 vehicle trips in the PM peak hour. However, the critical direction during the PM peak hour is southbound. Overall, the capacity constraints forecast for Erie Avenue are only indicative of an emerging (potential) issue, as 2041 PM peak hour volume does not generally exceed capacity, and tend to decrease to the south towards Brant County.

Erie Avenue provides both a local and regional function. Locally, Erie Avenue is the main north-south corridor in south Brantford, providing a connection between Eagle Place and the rest of Brantford, while regionally it provides a connection to/from Brant County as one of only three roadways that cross the Grand River.

Providing an additional lane in each direction would address the emerging capacity issue. However, this widening would have significant impacts on property and utilities (i.e. relocation). As the roadway is only just approaching capacity by 2041, it is considered a marginal issue. As such, there is not a compelling reason to add a lane of capacity in each direction.

The Veterans Memorial Parkway widening and partial extension (to Murray Street) would provide additional river crossing capacity and alternative east-west connectivity to Murray Street and Wayne Gretzky Parkway. From a review of the volume market (auto trips) for Erie Avenue it was identified that there are relatively few trips that would divert to this facility (approximately 50-100 vehicles, to/from the southwest). Trips destined for central Brantford could easily divert from Erie Avenue to Murray Street or Wayne Gretzky Parkway today by using Mohawk Street. The analysis of long-term volume forecasts suggests that the Veterans Memorial Parkway widening and extension has limited potential to reduce volumes on Erie Avenue.

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Clarence Street/Clarence Street South – Dalhousie Street to Icomm Drive

Clarence Street/Clarence Street South is forecast to be operating at approximately 5-10% over capacity by 2041. The critical direction in the PM peak hour is southbound.

A majority of trips on Clarence Street/Clarence Street South are travelling from north-central Brantford (i.e. north of Highway 403) to the south side of the river via West Street.

A widening of Clarence Street/Clarence Street South would result in significant property impacts, and would be constrained by the railway spur line on the east side (limiting widening options to the west side).

The Veterans Memorial Parkway partial extension (to Murray Street) provides an opportunity for an alternative route out of downtown via Murray Street. The TDM and TSM initiatives are expected to resolve the prevailing future capacity concern. However, this situation should be monitored. A partial extension of the Veterans Memorial Parkway could be considered beyond 2041 to address potential long-term issues and should be protected for as an alternative to Clarence Street/Clarence Street South.

Colborne Street West – County Road 7 to D'Aubigny Road

Colborne Street West between County Road 7 and the existing 4-lane section is forecast to be an emerging issue in 2041. The nature of this section's 2 lanes westbound and 1 lane eastbound results in poorer operating conditions in the morning peak hour than the evening peak hour.

Colborne Street West plays a significant role in moving trips from the west into Brantford downtown. As Colborne Street connects to the Lorne Bridge, effective opportunities to provide parallel capacity are limited. A majority of trips using Colborne Street are to/from the west via Rest Acres Road (in the County of Brant) to access the downtown.

With growth, capacity issues are forecast for Rest Acres Road and Colborne Street accessing the City, requiring the widening of Colborne Street West. With the potential for an Oak Park Road Extension connection and an additional influx of approximately 300-500 peak hour peak direction volumes, the widening of Colborne Street would accommodate the forecast volumes.

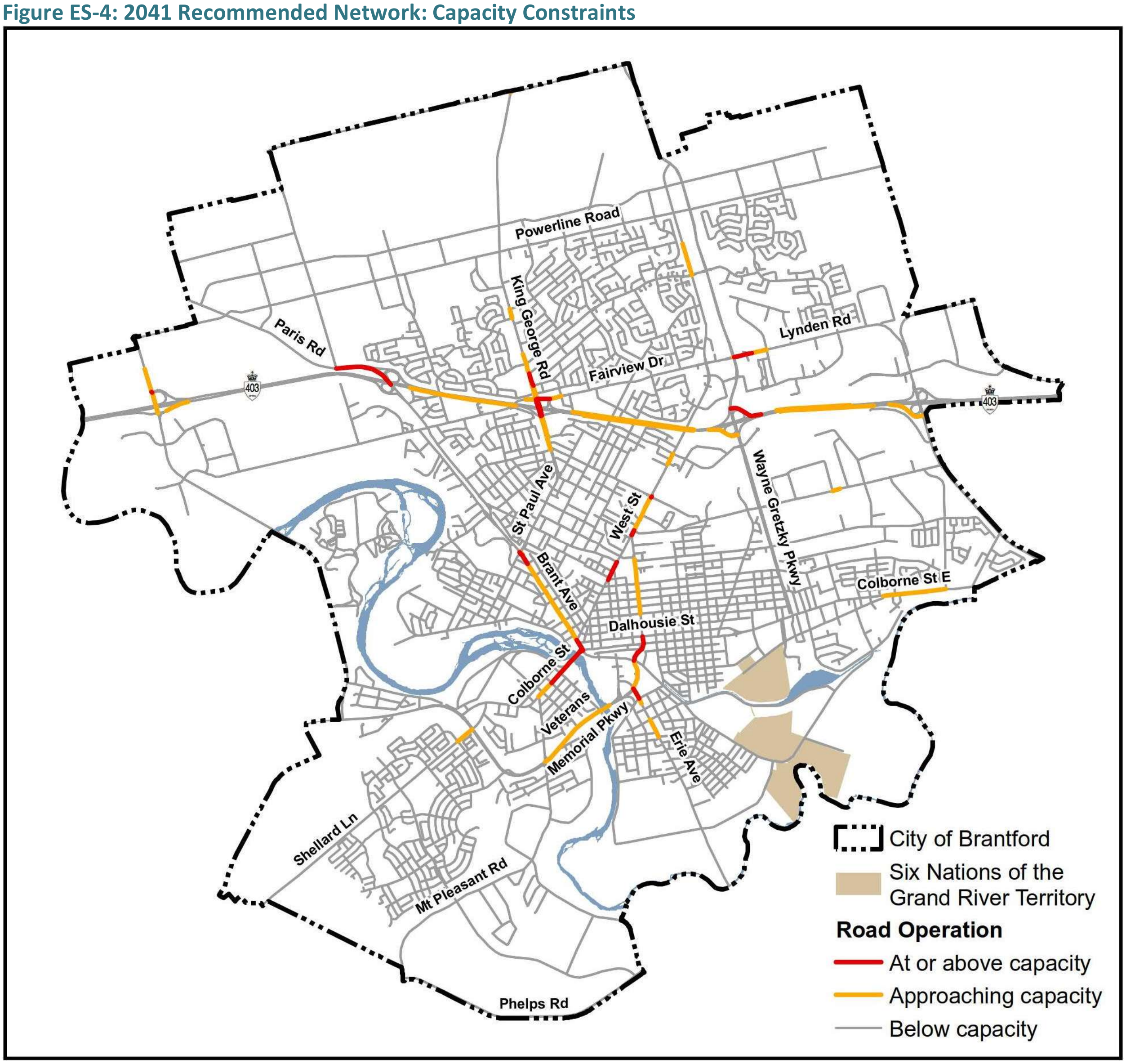
Recommended Network

The preferred solution to address the forecast growth of the City to 2041 is a combined scenario that includes the following elements: transit service improvement/enhancements to promote increased transit use; the provision of active mode infrastructure to promote increased cycling and walking; and network infrastructure improvements to address the capacity constraints in the network. This solution results in a network and demand solution that addresses the identified long-term network deficiencies.

The performance of this combined scenario 2041 Recommended Plan shows that almost all of the anticipated roadway capacity issues identified for 2041 Do-Minimal condition (where no long-term investment was made in transit service, active transportation, or infrastructure) are resolved.

Figure ES-4 identifies the few remaining capacity/operational issues in the 2041 Recommended Network. The remaining capacity/operational issues include the Lorne Bridge, Clarence Street/Clarence Street South between Icomm Drive and Colborne Street East, and Paris Road. The transportation assessment suggests that while these are identified as capacity constraints in the long term, the magnitude of the issue has been significantly reduced. These issues are now forecast to be marginal and can be successfully managed in the near- and mid-term. These locations should continue to be monitored to identify the significance of any emerging issue.

Figure ES-4: 2041 Recommended Network: Capacity Constraints



Recommended Plan

Active Transportation

A key objective of the TMP is to work towards becoming a Bicycle Friendly Community by providing a clear, concise roadmap towards a more bicycle friendly future. Achieving this goal is dependent on providing full connectivity and the right environment to promote use and foster confidence in the system. This means addressing the needs of both recreational and utilitarian users. Full connectivity makes active transportation a feasible choice for any trip in the City. Providing the right space allows users of all skill levels to feel comfortable and choose routes that satisfy their safety and efficiency concerns by removing barriers to use.

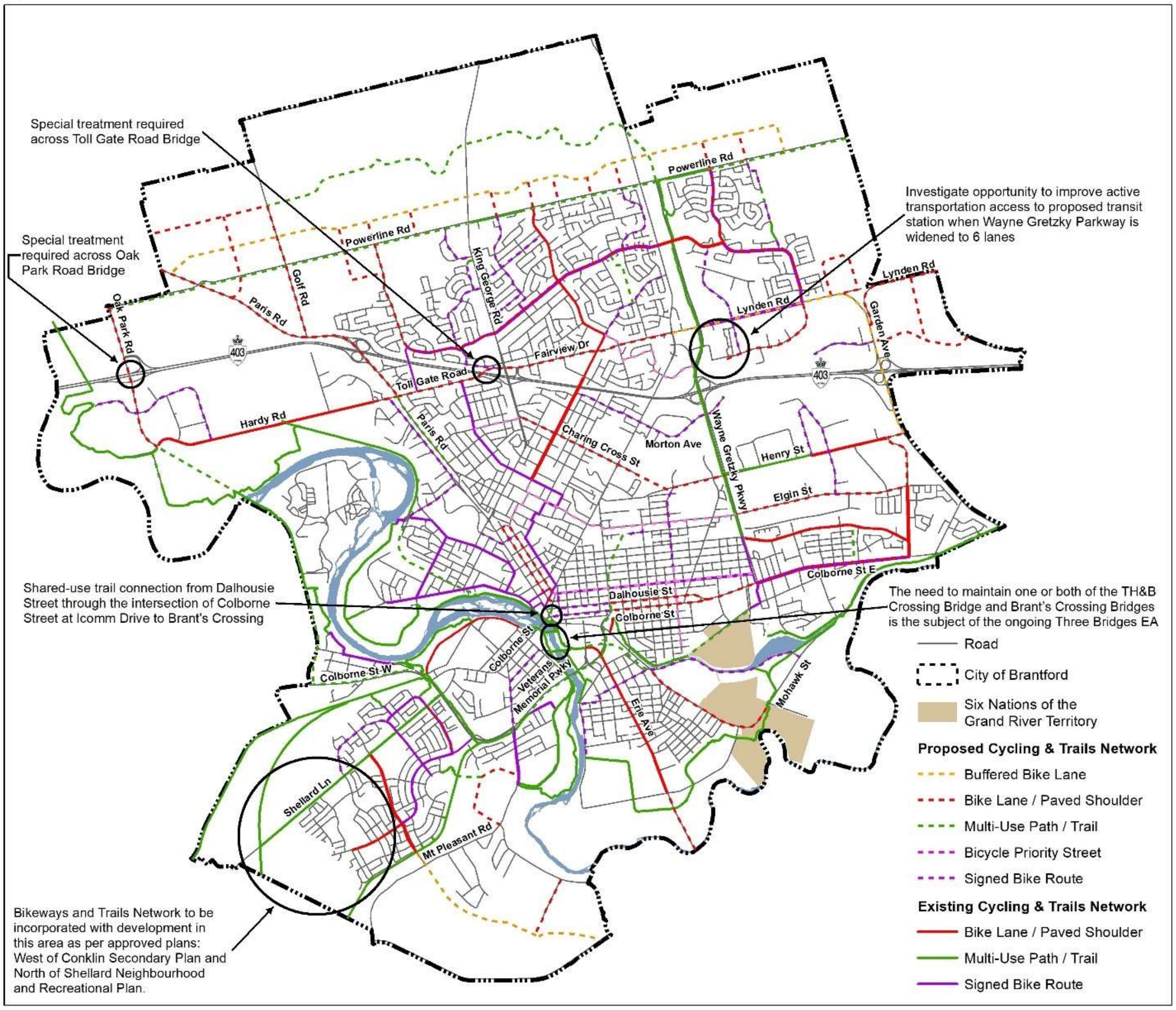
Barriers to active transportation modes include highway crossings, traversing large urban intersections, travelling in close proximity to high volumes of fast-moving vehicles, and the lack of user amenities (bike racks, lockers, shower facilities, rest areas).

The active transportation network identified (reflecting approximately 145 km of additional improvements over today's condition) provides a mix of on-road (cycle track, bike lanes and shared facilities) and off- road (multi-use paths and trails) that provide full connectivity for a full range of origins and destinations, and full range of user types/skills.

Sidewalks and multi-use paths are incorporated into specific road design, where the cross- section elements have been defined for each roadway functional class to address the needs of all users. These design elements are part of the City's Linear Infrastructure Design Guidelines and have been updated to reflect the enhanced focus on active transportation.

The proposed cycling infrastructure is shown in ***Figure ES-5***. The implementation of this plan will increase the current 67.4 km of on road cycling to 141 km by adding 74 center-line kilometres of bike lanes; 30 km of multi-use paths and trails and a program for encouraging more AT as the city expands.

Figure ES-5: Proposed 2041 Active Mode Network

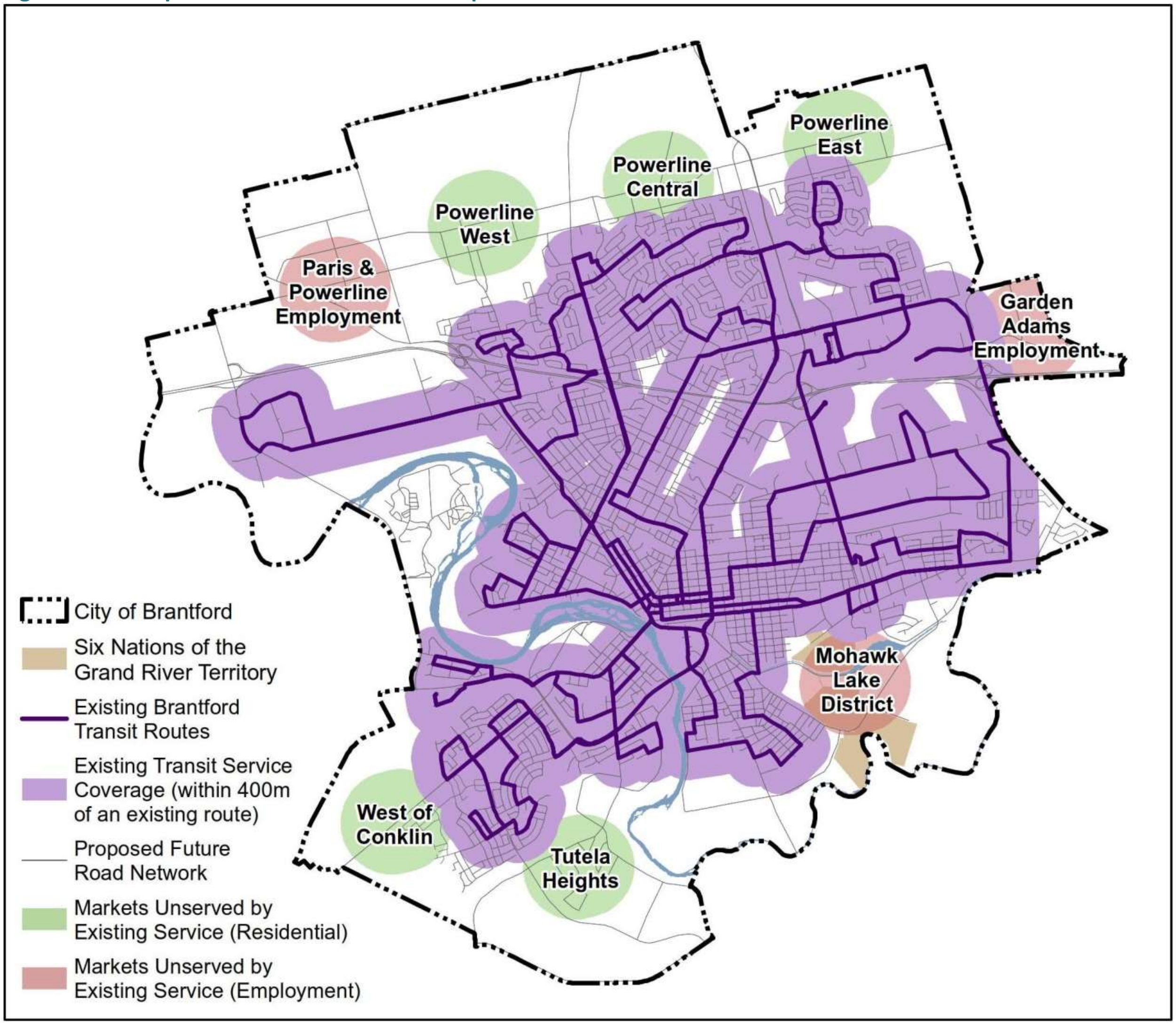


Transit

The scope of the Transportation Master Plan is to identify the role, need, and potential impact of the transit system in accommodating growth and moving people. The assessment has quantified the potential for ridership at the City wide and corridor levels.

The objectives with respect to the system coverage and expansion requirements for transit system are identified in ***Figure ES-6***.

Figure ES-6: Proposed 2041 Transit Service Expansion and Enhancement



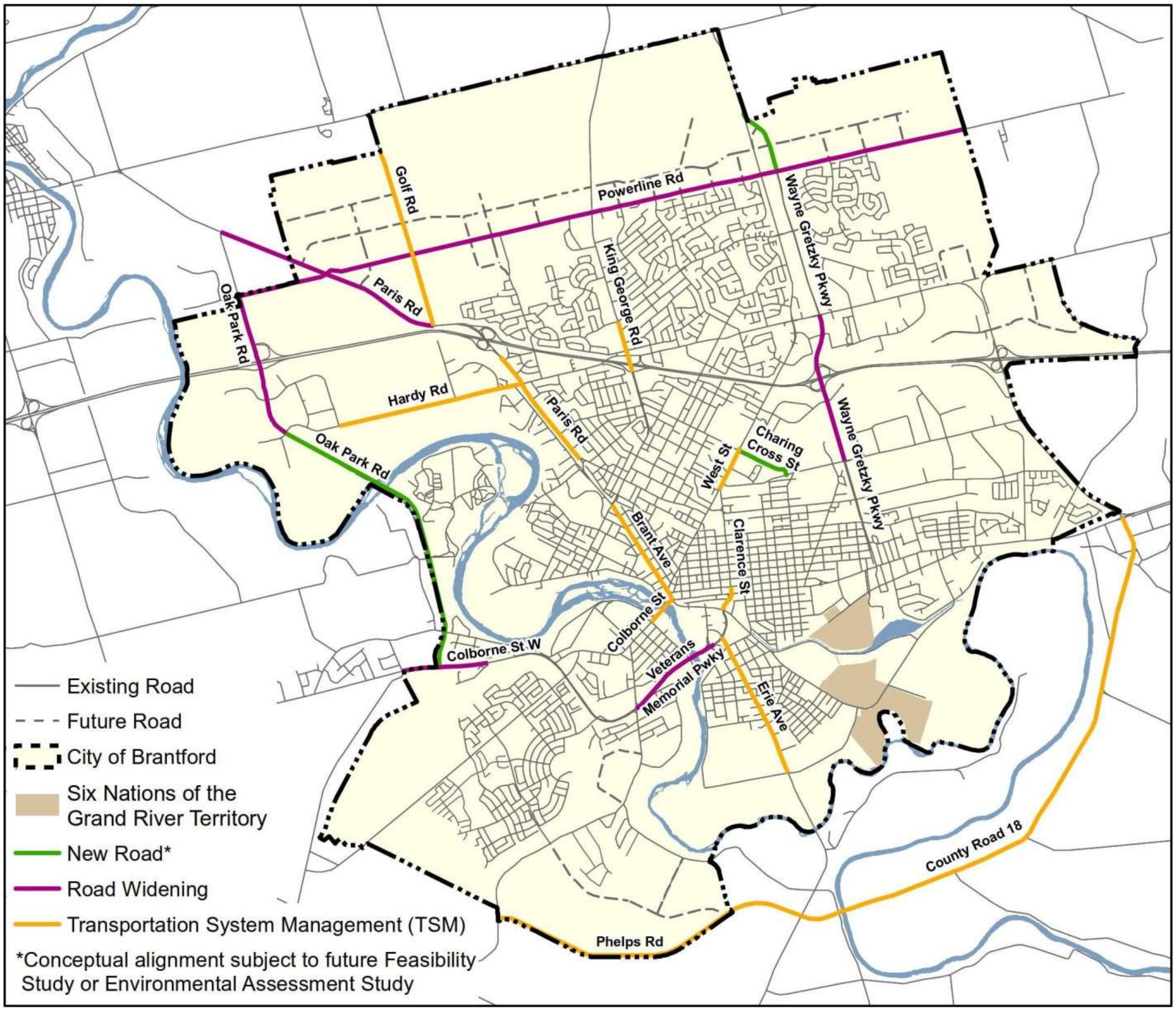
The specific implementation plan for transit is provided in the next phase of the TMP (Implementation Plan). The implementation plan will identify the high-level service expansion and strategic service needs. However, with the expansion of transit service it is anticipated that the city fleet will be expanded to approximately 57 vehicles (40 conventional and 17 specialized), representing an increase of 25% in equipment alone.

The future transit service, routes and operational characteristics will be identified by future studies, i.e. a Transit Master Plan or Transit Operational Study.

Road Infrastructure

From the transportation assessment, the road infrastructure improvements for the 2041 horizon year have been identified as shown on ***Figure ES-7***.

Figure ES-7: Proposed 2041 Road Network



The enhancements include infrastructure widening on:

- Wayne Gretzky Parkway between Henry Street and Lynden Road;
- Veterans Memorial Parkway between Mount Pleasant and Market Street South;
- Colborne Street West from County Road 7 to the existing 4-lane section;
- Paris Road from Golf Road to Oak Park Road;
- Oak Park Road from Hardy Road to Powerline Road; and
- Powerline Road from Oak Park Road to the City east limits.

New road additions include:

- Oak Park Road extension to Colborne Street West;
- Wayne Gretzky Parkway extension to connect with Park Road; and
- Charing Cross Street extension to Henry Street.

TSM improvements to enhance the existing capacity (through urbanization, parking restrictions, and operational improvements) are proposed for several corridors including:

- Golf Road;
- Paris Road;
- Brant Ave;
- Hardy Road;
- West Street;
- King George Road;
- Erie Avenue;
- Clarence Street; and
- County Road 18 (note that this is a County Road. The City will work with the County to determine potential for improvements to the corridor).

All of the projects identified will require a Schedule B or C MCEA to be completed, which would include significant public/stakeholder consultation, before they can be implemented.

Implementation Plan

Active Transportation Plan

The 2020 TMP Update includes an expansion of the City Cycling and Trails Network, building on the 2014 TMP plan, to include the extension of multi-use paths and trails into the Tutela Heights and North Expansion lands. In addition, enhancements have been made to conform to new provincial guidance now in place (OTM Book 18 – Cycling Facilities – 2020).

The capital cost to provide these facilities is estimated at $31.7 Million to year 2041. ***Table ES-4*** summarizes the recommendations for the short, medium and long term to 2041.

Table ES-4: Active Transportation Network Recommendations

Facility Type	Length (centre line km)	Cost ($000)*
Short Term [2021 – 2025]		
Signed Bike Route	7.6	$10
Bike Priority Street	3.0	$380
Bike Lanes / Paved Shoulders	16.6	$1,640
Multi-Use Paths	4.7	$529
Programs (Studies, Initiatives, Events)	-	$820
Sub Total	**31.9**	**$3,379**

Table ES-4: Active Transportation Network Recommendations, Continued

Facility Type	Length (centre line km)	Cost ($000)*
Mid Term [2026 – 2031]		
Signed Bike Route	7.6	$10
Bike Priority Street	3.1	$392
Bike Lanes / Paved Shoulders	22.4	$7,146
Multi-Use Paths	10.1	$845
Programs (Studies, Initiatives, Events)	-	$690
Sub Total	**43.2**	**$9,084**
Long Term [2032 – 2041]		
Signed Bike Route	15.2	$21
Bike Priority Street	3.9	$493
Bike Lanes / Paved Shoulders	35.4	$12,891
Multi-Use Paths	15.4	$4,476
Programs (Studies, Initiatives, Events)	-	$1,375
Sub Total	**69.9**	**$19,257**
TOTAL	**145.0**	**$31,720**

* All costs stated in 2020 dollars & Contingency of 30% for Engineering assumed (excludes Programs).

Transit Service Plan

The Short and Mid-Term transit improvements for the transit system build on the 2016 Transit Service Review, specifically Report 2, *TRANSformation2021, Brantford Transit and Brantford Lift*. Further expansion and improvement of the service is required to support future expansion areas to 2041.

The capital cost to provide this system is estimated at $32.3 Million to year 2041. ***Table ES-5*** summarizes the recommendations for the short, medium and long term to 2041.

Table ES-5: Transit Service Recommendations

Capital Item	Description	Cost ($000)*
Short Term [2021 – 2025]		
Fleet	1 new vehicle, 13 replacement vehicles	$15,400
Building	-	$ -
Transfer Points	Lynden Mall, Brantford Commons - Upgrades	$500
Route Infrastructure	Signage and Shelters Upgrade, ITS	$561
Studies	Transit TMP, Fleet Electrification Feasibility	$375
Specialized	Vehicle Replacement, Telecom Software	$1,570
	Sub Total	**$18,406**

Table ES-5: Transit Service Recommendations, Continued

Capital Item	Description	Cost ($000)*
Mid Term [2026 – 2031]		
Fleet	2 new vehicles, 10 replacement vehicles	$13,200
Building	Transit Center	$1,100
Transfer Points	-	$ -
Route Infrastructure	New Stops/ Shelters Expansion Routes/ITS	$651
Studies	Transit Master Plan Update	$100
Specialized	Vehicle Replacement	$3,750
	Sub Total	**$18,801**
Long Term [2032 – 2041]		
Fleet	5 new vehicles, 12 replacement vehicles	$18,700
Building	New/Upgrade Transit Terminal	$7,500
Transfer Points	-	$ -
Route Infrastructure	New Stops/ Shelters Expansion Routes/ITS	$1,620
Studies	-	$ -
Specialized	Vehicle Replacement, Software Upgrade	$5,800
	Sub Total	**$33,620**
	TOTAL	**$70,827**

* All costs stated in 2020 dollars

Road Infrastructure Plan

For Road Infrastructure, estimates of interim year population and employment, 2026 and 2031, and the 2041 network performance assessment were used to generate a timeline for emerging constraints. The performance constraints were compared with the 2041 network recommendations to determine the likely need for infrastructure improvement for the interim years.

The capital cost to provide this infrastructure (some 80 lane kilometres of network) is estimated at $293 Million to the year 2041. ***Table ES-6*** summarizes the recommendations for the short, medium and long term to 2041.

Table ES-6: Road Infrastructure Recommendations

Project	Description	Cost ($000)***
Short Term [2021 – 2025]		
Veterans Memorial Parkway Widening	4 lanes – Mount Pleasant Street to Erie Avenue*	$40,500
Oak Park Road Widening	4 lanes – Powerline Road to Hwy 403 & Fen Ridge Court/Savannah Oaks Drive to Hardy Road	$6,400
Colborne Street West Widening	4 lanes – CR7 to D'Aubigny Road	$3,500
Wayne Gretzky Parkway Extension	4 lanes - Powerline Road to Park Road North	$4,100
	Sub-Total	**$54,500**

Table ES-6: Road Infrastructure Recommendations, Continued

Project	Description	Cost ($000)***
Mid Term [2026 – 2031]		
Oak Park Road Extension	4 Lanes – Hardy Road to Colborne Street **	$98,900
Paris Road Widening	4 lanes – Oak Park Road to Golf Road	$10,800
Powerline Road Widening	4 lanes – Oak Park Road to King George Road	$19,900
Charing Cross Extension	4 Lanes – West Street to Henry Street	$19,000
Golf Road TSM	Paris Road to Proposed Development Limit	$4,100
	Sub-Total	**$152,700**
Long Term [2032 – 2041]		
Wayne Gretzky Parkway Widening	6 Lane – Lynden Road to Henry Street	$29,100
Powerline Road Widening	4 lanes – King George Road to East City Boundary	$21,000
Conklin Road Extension	2 lanes - Mt. Pleasant Road to Phelps Road	$10,200
New East/West Road	2 lanes – Oak Park Road to King George Road	$15,300
New East/West Road	2 lanes – King George Road to East City Boundary	$16,400
	Sub-Total	**$92,000**
	TOTAL	**$299,200**

* Reference Costs Source: Veterans Memorial Parkway Widening and Extension, CIMA+, October 2018 - [Assume: Mt Pleasant to Bridge = 950 m (from feasibility study) and Bridge to existing 4-lane cross section west of Erie = 240 m]

** Reference Costs Source: Oak Park Road Extension Feasibility Study, Parsons, July 2019

*** *All costs stated in 2020 dollars* & Contingency of 20% for Construction and 30% for Engineering assumed unless stated specifically in reference reports (i.e. feasibility reports).

Monitoring

The TMP is intended to be reviewed every five years and updated if necessary. It also addresses only the Phase 1 and 2 requirements of the Municipal Class EA planning process for specific road extension, widening and intersection improvements, providing an assessment of the problem or opportunity and assessment of alternative planning solutions. It is not intended to address planning and design details that will be further addressed in Phases 3 and 4 of the complete process.

Many of the TMP policy recommendations are being incorporated into the new Official Plan (e.g. requirements for expansion, functional classification, design elements for category and functionality of road), and will be implemented through processing of land use applications under the Planning Act. The City may also choose to implement the recommended projects in a different order or phasing that has been suggested in the TMP Update to accommodate Council priorities, the need to coordinate with other infrastructure works (i.e. sewer work), planned developments in the area, or other considerations beyond the scope of this project to consider.

The TMP should also be monitored by maintaining the traffic demand forecasting model, including continued participation in the Transportation Tomorrow Survey. TMP monitoring may contain recommendations on updated traffic calming, parking management and truck route management. It is recommended that the TMP be monitored on an annual basis, taking into consideration new traffic counts, trends, private sector initiatives, performance targets, provincial initiatives and city growth.

1.0 Study Foundation

1.1 Background

As part of the 2017 budget process, Brantford City Council approved the review of the 2014 update to the 2007 Transportation Master Plan. This update occurred at the same time as the review of the City of Brantford's Master Servicing Plan (MSP) and Official Plan (OP). The 2020 Transportation Master Plan (TMP) update includes the Boundary Expansion Lands (approximately 460 ha in the North and Tutela Heights Expansion Areas) that were transferred from Brant County to the City on January 1, 2017. Recommendations from the TMP will be considered for inclusion in the 10-year capital forecast and future Development Charges studies, and the strategic objectives will be incorporated into the OP. The TMP was undertaken using Approach 1 of the Master Planning Process, where the Master Plan document is prepared at the conclusion of Phases 1 and 2 of the Municipal Class EA process. The Master Plan would therefore become the basis for, and be used in support of, future investigations for the specific Schedule B and C projects identified within it. Schedule B projects would require the filing of the Project file for public review while Schedule C projects would have to fulfill Phases 3 and 4 prior to filing an Environmental Study Report (ESR) for public review.

The previous TMP Update for the City of Brantford was adopted in August 2014. Since then, a few changes in the transportation infrastructure have taken place in and around the community which were recommended in the 2014 TMP Update to be implemented in the period 2014 to 2019. These include:

- Widen Shellard Lane with in boulevard multi-use path and intersection improvements from Veterans Memorial Parkway to the vicinity of the T. H. & B. Rail Trail; and
- Widen Oak Park Road overpass (over Highway 403) to accommodate left turn lanes and paved shoulder / bike lanes.

According to Brantford's Municipal Comprehensive Review (MCR), the City's population was 93,650 in 2011 and 101,700 in 2016, representing an 8.6% change over the 5-year period. The City's new population and employment forecasts now reflect the planning horizon of 2041, consistent with the Province's *Places to Grow* policies as amended in May 2019. The population growth currently forecast for the 2041 horizon year is 163,000, representing a 60% increase over the 2016 MCR population figure.

Furthermore, a number of transportation infrastructure projects recommended in the 2014 to 2019 period have not been implemented, nor have Environmental Assessment studies been undertaken due to funding constraints and/or reduced transportation demand. These projects include:

2014-2019 Recommended Projects Not Implemented

- Widen Clarence Street to include two-way left turn lane and signals from Colborne Street to West Street. Potential trail may be added if the abandoned privately owned rail line is available;

- Conversion of Colborne/Dalhousie Streets to two-way operation from Brant Avenue to the intersection of Colborne Street and Dalhousie Street (EA approved but expired);
- Widen Oak Park Road from Highway 403 to Hardy Road (Partially completed as only widened from westbound on/off ramp to Fen Ridge/Savannah Oaks);
- Widen Veterans Memorial Parkway to four lanes from Mount Pleasant Street to Erie Street including widening the Grand River crossing; and
- Downtown Intersection Improvements at the intersections of Colborne Street & Icomm Drive and Dalhousie Street & Brant Avenue.

Updating the 2014 TMP has provided an opportunity to review, reconfirm, or change the City's main transportation infrastructure and service plans. The update has also addressed newer issues involving changing economic and associated growth conditions, changes in the regional transportation context around Brantford (i.e., Highway 24, Highway 403, provision of GO Transit service), changing travel patterns, and evolving public priorities for the transportation system, for example dealing with the new Complete Streets philosophy, expanding the emphasis on Active Transportation and new traffic management and calming measures (i.e. potential for roundabouts).

The basic transportation issues and needs facing Brantford to 2041 are similar to those in other smaller Canadian cities. They include responding to growth, funding constraints, auto-dominated travel, core area revitalization, cost-effective transit operation, and maximizing the capacity of the existing road network. In the context of south-central Ontario, Brantford has growth potential that requires plans that will effectively serve growing transportation demands.

1.2 Study Objectives

The following study objectives were set by the City for this TMP Update:

1. Plan to accommodate city growth to 2041, including the urban boundary expansion of the City of Brantford, the intensification target for development within the Built-Up Area, and density targets within the Designated Greenfield Area as set out in the new Official Plan;
2. Provide transportation infrastructure project and cost input into the Development Charges update;
3. Follow the Master Planning process and key principles of the Municipal Class EA to satisfy EA requirements for Schedule 'B' undertakings, and Phase 1 and 2 for Schedule 'C' projects; and
4. Consult with First Nations, agencies, stakeholders and the public early and continuously throughout the Master Planning process, using various techniques and materials.

Other objectives, constraints and limitations that influenced the development of this TMP Update include:

- **Continue to strive for a "made for Brantford" Master Plan** reflecting the unique characteristics of Brantford and its context while still learning from successes in other similar-sized cities.
- **Show the impacts of "Status Quo" approach to system management,** in terms of addressing deficiencies, level-of-service, and ability to meet planning targets.

- **Coordinate TMP preparation with the City's concurrent Municipal Comprehensive Review (OP) and the Master Servicing Plan (MSP) study** in terms of growth forecasting, consultation activities, and planning of cost efficiencies in the development of new transportation, sewer and water infrastructure.
- **Integrate transportation and land use planning.** Transportation and land use planning has been coordinated to identify bold transportation strategies that will be required to support an overall sustainability plan for transportation up to 2041, and translate these strategies into Official Plan policy.
- **Work towards becoming a Bicycle Friendly Community** and receiving a designation by Share the Road Cycling Coalition by providing a clear, concise pathway towards a more bicycle friendly future.
- **Define the future role of public transit.** Reduce the City's environmental footprint by increasing transit use through improved service levels, by effectively serving newly developing areas, meeting the accessibility needs of residents, by considering inter-municipal and inter-regional links, and by considering new micro-transit technologies in support of first/last mile solutions.
- **A Complete Streets philosophy** has been applied to this TMP Update so that streets are planned, built, and maintained for all users.
- **Preparation for Connected and Autonomous Vehicles (CAVs).** Consider how the emergence of CAVs will impact small-sized cities, such as Brantford, and how to strategically prepare for them.

1.3 Study Approach

The approach used in this TMP Update was organized into five (5) distinct project phases:

- **Phase 1: Develop a Study Foundation** – Set the stage and boundaries for the City of Brantford's transportation system.
- **Phase 2: Integrated Transportation Strategy** – Determine integrated strategies for developing networks, programs, and policies for all travel modes in a manner that supports community-building objectives.
- **Phase 3: Street Network Capacity Needs** – Define problems and opportunities for the transportation system.
- **Phase 4: Review of Key Transportation Issues** – Review and assess the relationship between regional and local needs of the transportation network and identify a plan and role for the local system.
- **Phase 5: Implementation Plan** – Bring the elements of the TMP together and develop a practical approach to implement and monitor the TMP transportation network and guide the City forward to the 2041 horizon year.

Our approach and methodology is designed to satisfy Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process and follows Master Planning Process Approach #1. The integration of technical and consultation activities is a core element of the process.

1.4 Stakeholder Agency Consultation

Several stakeholders were consulted with over the duration of the TMP. Their input informed the direction and recommendations in the study.

In accordance with the Ontario government's process for Indigenous and First Nations consultation, communities were contacted at multiple points throughout the study process. Specifically, the study team contacted the Indigenous and First Nations communities at the point of the Notice of Commencement, the in-person and virtual Public Information Centers, and Notice of Study Completion for the TMP. The communities contacted are listed below:

- Mississaugas of the New Credit First Nation;
- Six Nations of the Grand River; and
- Métis Nation of Ontario.

Agencies who have jurisdiction in the area of the study and whose feedback is vital in guiding the study's direction were consulted through correspondence and face-to-face/virtual meetings throughout the TMP. These agencies included:

- The County of Brant; and
- The Ministry of Transportation

The following external agencies were provided notification of the project start and public information centers, and provided opportunities to provide comment on the project:

- Active Grand;
- Bell Homestead;
- Boys & Girls Club of Brantford;
- Brant County Health Unit;
- Brant Food Coalition;
- Brant Haldimand Norfolk Catholic;
- District School Board;
- Brant Museum & Archives;
- Brantford YMCA-YWCA;
- Brantford/Brant Chamber of Commerce;
- Brantford-Brant Roundtable on Poverty;
- Canadian Hearing Society;
- Canadian Mental Health Association-Brant;
- Canadian Military Heritage Museum;
- Community Living Brant;
- Conestoga College;
- Contact Brant;
- Family Counselling Centre of Brant;
- Grand Erie District School Board;
- Grand River Community Health Care;
- Grand River Conservation Authority;
- Grand Valley Trails Association;
- St. Leonard's Community Services;
- Wilfrid Laurier University;
- YMCA Employment, Training and Settlement Services; and
- Brantford Town Crier.

1.5 Public Consultation

The City recognizes that the choices the community makes today with respect to growth and development and long-term needs for transportation infrastructure will shape the community for years to come. Therefore, a key factor influencing the development of the TMP Update, as well as the associated Master Servicing Plan (MSP) and Official Plan Review (OPR), has been, and will be, the input received from the various stakeholders and the general public on the future of transportation service in the City to address demands by 2041.

The formal public consultation program for the three projects was, and will be, integrated due to the parallel nature of the three studies. The specific stakeholder and public consultation sessions that were conducted as part of the TMP are as follows:

- External Agency Notification: October, 2017;
- Notice of Study Commencement: October 19 and 26, 2017;
- Public Meeting #1: Envisioning Our City: 2041 – November 16, 2017;
- Active Transportation Workshop - April 5, 2018;
- Public Meeting #2: Foundations and Strategies - May 17, 2018;
- Public Meeting #3: Constraints and Opportunities - February 10, 2020; and
- Virtual Public Open House – Meeting #4: Preferred Future Network and Service Recommendations – June 9 to June 23, 2020.

The notices, presentation material, and public comments for the aforementioned consultation events are included in ***Appendix A***.

In addition to the stakeholder and public consultation sessions, The City of Brantford's Council was, and will be, kept informed of the study progress and findings through formal reports and findings. These contact points included/will include the following:

- TMP Project Update, May 2020 prior to Public Information Centre #4 (Briefing Note PWIR2020-006 May 4, 2020: Water, Wastewater and Stormwater Master Servicing Plan (MSP) and Transportation Master Plan (TMP) – Project Update); and
- TMP Update presentation of recommended plan, October, 2020; prior to the 30-day Public Review (Council report October 2020: Transportation Master Plan (TMP) update 2020-427).

1.5.1 Public Information Center – Meeting #1: Envisioning Our City: 2041

The Public Information Center took place on Thursday, November 16, 2017 from 6:00-8:30 PM at the North Park Collegiate & Vocational School. Approximately 80 people attended.

The purpose of the Public Information Center was to provide information about the Official Plan Review, Master Servicing Plan, and Transportation Master Plan. Input and feedback was received from the public on the growth options under consideration through the Municipal Comprehensive Review, and issues and ideas relating to the City's servicing and transportation systems.

After providing an introduction to each of the studies, participants were invited to join one of five Discussion Groups: Official Plan; Housing, Intensification and Growth Options; Employment; Transportation Master Plan update; and Master Servicing Plan update.

A summary of the TMP Update discussion is as follows:

- Used to have public transit, but don't have it now. It is needed and wanted;
- Need the transportation system solutions to be cognizant of Regional needs, particularly for rural area access to transit into the urban/downtown area;
- Brantford Southern Access Road - 25 year plan;
- There is poor network performance now. Consider how to address future issues. The Plan needs to be implementable;
- Traffic on West Brant Avenue and Colborne Street. Consider access to hospital;
- Nobody is using the bike routes;
- Have Grand River crossing at Oak Street and St. Paul Avenue;
- Show the Brantford Southern Access Road extending east to the Glebe Lands, into the southern terminus of Wayne Gretzky Parkway;
- Extend Conklin Road to County Road 18;
- Consider the form of development, role and function of the street and ability to achieve intensification;
- Does walking and cycling fit with the idea of the 'suburban dream'? The sub-urban dream is why people moved to Brantford;
- City structure is not conducive to street oriented development;
- Some benefit to the bulk of the growth occurring to the north;
- People drive because they commute to work in Toronto, Hamilton and Cambridge; and
- Transportation Master Plan must look at trends and future impacts of distribution.

1.5.2 Active Transportation Workshop

The Share the Road Cycling Coalition facilitated a Bicycle Friendly Communities Workshop (from 9:00 AM – 3:00 PM) and a Community-based World Café (from 6:00-8:00 PM) on Thursday, April 5, 2018 at the Brantford & District Civic Centre. The purpose of this Workshop was to help identify a path forward for the City to become more bicycle friendly through the development of new programs, projects and partnerships to make cycling more comfortable and accessible to all residents and visitors to the area. More than 70 community members, key stakeholders, Municipal staff, and City Councillors heard new ideas and contributed their local expertise about how Brantford can become a better place for cycling.

The Bicycle Friendly Communities Workshop focused the efforts of attendees on developing strategies to advance new programs to support cycling in addition to creating innovative strategies for creating a stronger network of cycling infrastructure throughout the City and surrounding region.

During the workshop, participants helped to:

- Identify the existing cycling assets and some of the challenges faced within their community;
- Discuss opportunities for developing new programs, projects and partnerships to foster a stronger culture of cycling in Brantford;
- Articulate a five-year vision for cycling in Brantford; and
- Develop a two-year work plan for making progress toward that vision.

We are confident that Brantford can achieve meaningful progress towards these goals, especially if undertaken in tandem with infrastructure improvement. The essential programmatic elements of a more Bicycle Friendly Brantford by 2023 are:

- **Education** – A more coordinated effort will be made by the various agencies and stakeholders working on cycling to ensure that education about cycling – both teaching people how to ride bikes safely and teaching people how to share the road with cyclists when driving, is made more available to the community. Brantford will have several trained cycling instructors, and will offer courses to new and experienced riders to help encourage safe, legal cycling practices. All schools in Brantford will have access to Bike Rodeos and other cycling education programs, and all schools will have an Active School Travel Plan to help students get to school actively and safely where possible. Educational efforts will also include public awareness campaigns designed to create better interactions between people driving and people cycling, as well as a focused campaign discussing the value of active transportation to the community.
- **Encouragement** – introducing new programs designed to get residents excited about cycling again is key to creating a culture of cycling. Brantford will host a variety of different events during Bike Month which will make it easy and fun for residents to get back on their bikes. Bike Valet will be provided at popular community events and high-demand locations to ease the burden on parking spaces, and more information about cycling will be available online. Community rides, signature cycling events and Open Streets events will be regular features in Brantford, and will help to grow the culture of cycling in the community.
- **Enforcement** – Brantford Police and local bylaw officers will patrol Brantford's trails and roads by bike more often, making cycling a more visible part of the City's identity. Brantford will have bylaws relating to cycling that will reflect best practices across the province, and will engage community partners, including the Brantford Police, in educating the public about changes to the Highway Traffic Act.
- **Evaluation & Planning** – Brantford will be a leader in Ontario in the field of data collection as it relates to cycling, including cataloguing near-misses, gathering trip to school data and utilizing technology to count active transportation users, including permanent counters and video detection. More information about active transportation in Brantford will be collected and shared publicly, including trail user surveys and economic impact assessments. Bike counters and GIS data will be collected regularly to assess the success of Brantford's cycling programs.

The Summary Report and Recommendations (included as ***Appendix B***) are organized under the 5 E's of the Bicycle Friendly Community Program (with the exception of Engineering), outlines recommended actions Brantford could take in the next two to three years to help it work towards achieving this 5 year vision. With more than 70 attendees between the workshop and World Café, it was not surprising that the initial list of potential actions was quite long and varied, and contained far more than would be realistic to achieve in a short time as outlined within the work plan. The initial list of brainstormed actions has been refined to include a number of high-impact activities, many of which are proven to be best practices in communities across North America.

It is important to remember that there are many ways to build a more bicycle-friendly community. The work plan contains suggestions for one path that could be followed to get there, however, it may be possible for Brantford to substitute other actions that are not included in this plan and still achieve this five year vision for increasing bicycling.

1.5.3 Public Information Center – Meeting #2: Foundations and Strategies

The Public Information Center took place on Thursday, May 17, 2018 from 6:00-8:30 PM at the Brantford & District Civic Centre. Approximately 80 people attended.

The purpose of this Public Information Center was to provide an update on the Official Plan Review, Master Servicing Plan, and Transportation Master Plan. Specifically, the PIC presented:

- The results of the draft Land Needs Assessment which will determine the amount of land to be added to the City's urban settlement area;
- The potential location of the future urban lands in the Boundary Expansion Lands based on the draft land needs;
- Proposed alternative targets for intensification in the City's Built-up Area;
- Proposed alternative density target in the City's Designated Greenfield Area; and
- Updates on the Master Servicing Plan and the Transportation Master Plan.

After the presentations, participants were invited to join one of five Discussion Groups: Land Use Planning; Transportation Master Plan Update; Master Servicing Plan Update; Natural Features; Agriculture; and Archaeology.

A summary of the TMP Update discussion is as follows:

- Cycling:
  - There are lots of north/south bike routes, need more east/west routes;
  - Need an east/west bike route in the north end, like North Park Street;
  - The transportation hierarchy should be pedestrians, active transportation and then transit;
  - Sharrows are not effective. Need to have separate bike lanes. Green corridors (a trail or linear park that is frequently created out of a disused railway, utility or similar right of way) would be even better;

  - Need to have secure bike parking (lockers, bike cage/room with secure entry);
  - What percentage of the capital budget will be designated to active modes of transportation?;
  - Active transportation needs to be encouraged to help fight climate change;
- Transit:
  - Need transit in Tutela Heights;
  - Connect transit to Six Nations Reserve;
- Downtown Transit Station:
  - Coordinate with VIA Rail;
  - Connect inter-city transit and create a hub;
  - Encourage transit connections (BIA shuttle between the VIA/GO hub and downtown);
- Intensification:
  - Like intensification projects;
  - Implementation timelines need to be accelerated;
  - Columbia Street in Waterloo is a good example for intensification;
- Other:
  - Like that the Transportation Master Plan is building on land use;
  - Make sure to coordinate with the Master Servicing Plan;
  - There should be a connection between the Official Plan and the Transportation Master Plan;
  - Traffic signal at Mount Pleasant and Conklin Roads;
  - Consider identifying priorities and creating an implementation plan for improvements;
  - Do not support the two-way conversion. Need to meet with EMS regarding requirements. Keep one way, reduce to one lane and add bike lanes and wider sidewalks;
  - Scatter the intersection;
  - Country Road 18 should be seen as a ring road. Avoid a single point of failure (flooding);
  - Wayne Gretzky Parkway needs alignment north of Powerline Road; and
  - Support the extension of Conklin Road.

1.5.4 Public Information Center – Meeting #3: Constraints and Opportunities

The Public Information Center took place on Monday, February 10, 2020 from 6:30-8:00 PM at the Brantford & District Civic Centre. Approximately 80 people attended.

The purpose of the Public Information Center was to provide an update on the Master Servicing Plan and Transportation Master Plan. Future servicing and transportation problems were identified and various solutions under consideration were presented. Input and feedback (including additional solutions) were received from the public related to the various servicing and transportation options under consideration.

A summary of the input and feedback received on the issue of transportation is as follows:

- Further consideration of the following problem areas (traffic flow) is required:
  - Erie Avenue;

- Clarence Street; and
- Eagle Avenue\Alfred Street.
- To aid "Manage Travel Demand" scenario right away:
    - ensure that Brantford Transit and schedules show up correctly on Google maps, Apple Maps, City Mapping and the Brantford Transit App; and
    - make it possible to track next bus in real time to allow for shorter waits and to encourage motorists to take the bus instead. At present, it's frustrating as no one ever knows when the bus might show up (10-15 minute range/margin).

1.5.5 Virtual Public Open House – Meeting #4: Preferred Future Network and Service Recommendations

This event was held as a Virtual Public Open House (with health officials advising that the best way to prevent the spread of COVID-19 is by practicing physical distancing and limiting gatherings to groups of ten people, engagement for this project was conducted online) to present the Preferred Future Network and Service Recommendations. Information slides and an accompanying video presentation were available online from June 9 to June 23, 2020.

This public consultation event presented the preferred and preliminary future recommendations for the public transit strategy, active transportation system (that includes cycling and walking), and the road network infrastructure requirements for the 2041 horizon. It provided an overview of the foundations chapter (existing conditions and growth), the complete streets chapter (the vision and design elements for each travel mode), and the transportation assessment.

1.6 Existing Road Network

The existing roadway network within the City of Brantford in ***Figure 1-1***, while ***Figure 1-2*** illustrates the County roadway network for the surrounding County of Brant under existing conditions (2016).

The major east-west route in the City is Highway 403 (under Provincial jurisdiction), which provides connections across the northern part of the City, connecting Brantford the GTA to the east and to Woodstock and London to the west. The City is presently served by five (5) interchanges with Highway 403: Garden Avenue, Wayne Gretzky Parkway, King George Road (Highway 24), Paris Road, and Oak Park Road. Highway flyovers exist at West Street, North Park Street, Tollgate Road, and Ewing Drive.

Other significant east-west arterials in the City include:

- Colbourne Street East (1-way eastbound from Brant Avenue to just east of Stanley Street);
- Dalhousie Street (1-way westbound from Brant Avenue to just east of Stanley Street);
- Colbourne Street West, with crossing of Grand River (Lorne Bridge);
- Veterans Memorial Parkway, with crossing of Grand River;
- Grey Street;
- Elgin Street;

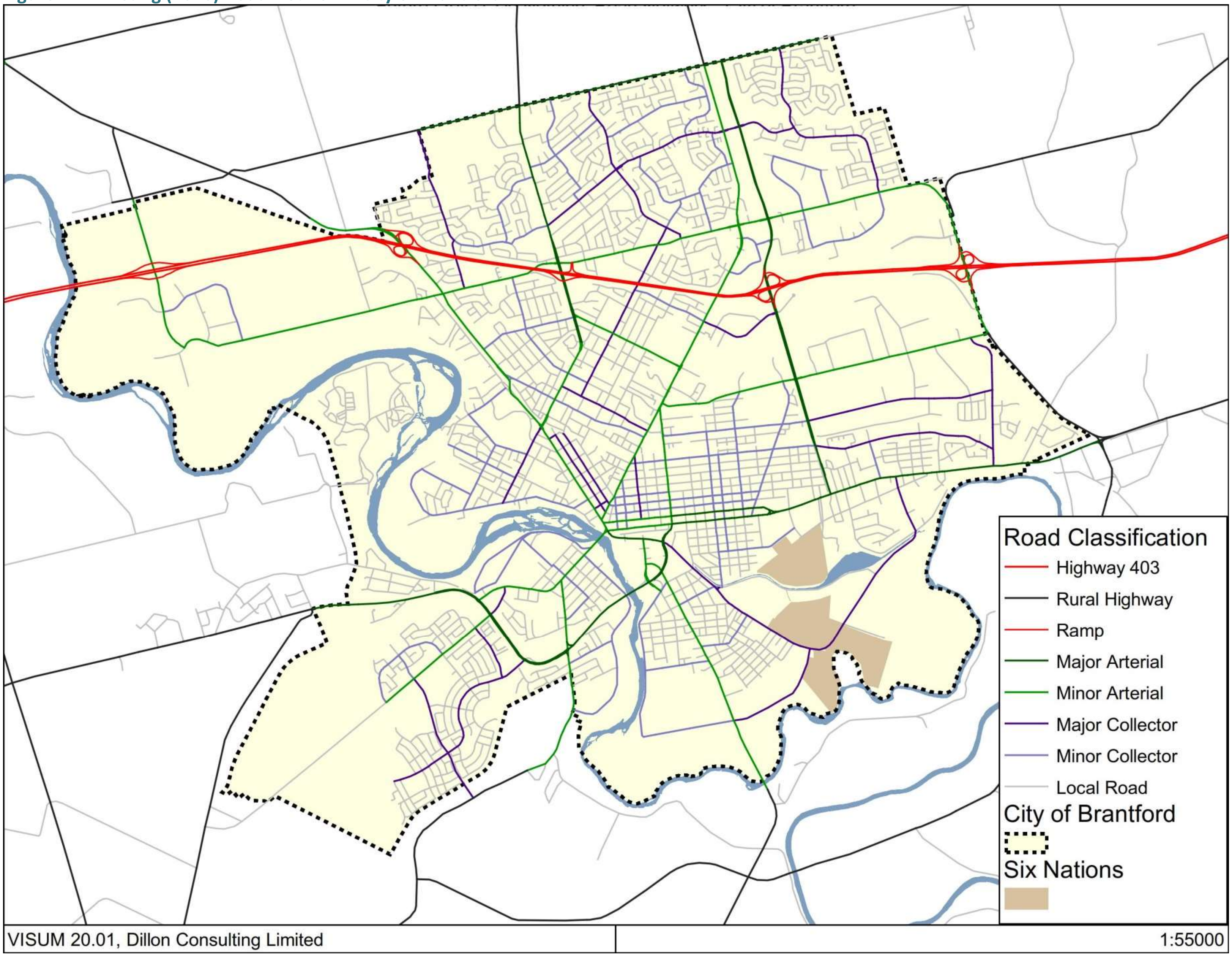
- Henry Street;
- Lynden Road/ Fairview Drive/Tollgate Road/Hardy Road;
- Dunsdon Street; and
- Powerline Road.

The major north-south routes in the City are:

- St. Paul Avenue/King George Road/Highway 24 which connects downtown Brantford to Highway 401 and to the Cambridge/Kitchener/Waterloo area;
- Wayne Gretzky Parkway which connects downtown Brantford to Highway 403;
- Paris Road/Brant Avenue which connects downtown Brantford to Highway 403 and to the Town of Paris;
- West Street which connects downtown Brantford to the City's commercial and residential areas north of Highway 403;
- Clarence Street;
- Mount Pleasant Road; and
- Erie Avenue, with crossing of the Grand River.

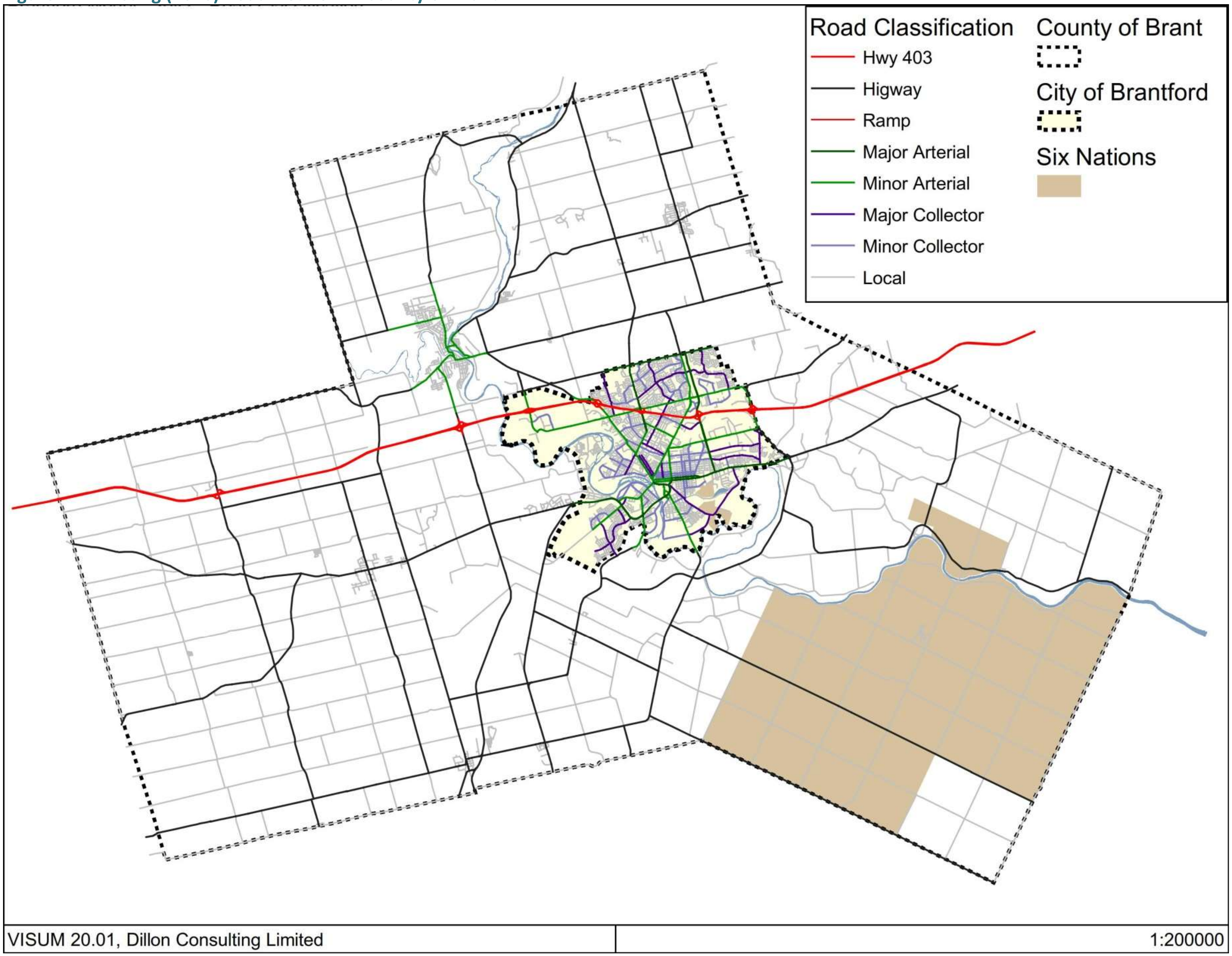
These roads provide integral service across the City, and connect into County and Provincial systems both within the City boundaries and beyond.

Figure 1-1: Existing (2016) Road Network - City of Brantford



Note: This figure displays the City of Brantford boundary is at it existed in 2016, prior to the municipal boundary adjustment that came into effect on January 1 2017.

Figure 1-2: Existing (2016) Road Network – County of Brant



Note: This figure displays the City of Brantford boundary is at it existed in 2016, prior to the municipal boundary adjustment that came into effect on January 1 2017.

1.7 Existing Local Roadway Travel Demands

1.7.1 Approach

Existing data was collected for critical screenlines within the City in June of 2018. Screenlines are imaginary lines, in which the locations are chosen strategically to capture traffic that crosses major arterial roads, rivers, or other major physical boundaries in an area. This traffic data was used to establish existing flows and to calibrate the transportation model. The transportation model was used to generate network wide traffic volume forecasts for the existing conditions and future horizon years.

For the new, current iteration of the City's travel demand model, the previous TransCAD model was migrated to PTV's Visum software platform. During this process, the model network was reviewed for accuracy and consistency against recent aerial photography imagery and other data (County of Brant Transportation Master Plan Update & City of Brantford Transportation Master Plan Update) provided by the City. The current road network contains nearly identical coverage and the same Transportation Analysis Zone (TAZ) system as the previous model iteration.

The new Visum platform provides additional enhancements to the model, which includes the ability to:

- Easily extract sub-areas of the model along with localized origin-destination trip tables (i.e. travel matrices) corresponding to the extracted sub-area;
- Add intersection detail representing geometric conditions (i.e. lane adds/drops, channelized turns, etc.) and traffic signal / detector placement; and
- Enhance the model through link geometry detail and intersection detail (described above) to make it "microsimulation-ready" or multi-resolution, meaning that an extracted Visum sub-area model can be exported through PTV's Abstract Network Model (ANM) process and easily imported into Vissim for additional microsimulation analysis.

The Transportation Tomorrow Survey (TTS) remains as the cornerstone of the model. Its findings were primarily used in the development of the transportation model (AM and PM peak hour auto assignment), and include the identification of peak travel periods, the development of trip generation rates, the identification of travel mode share (peak hour and daily auto, auto passenger, transit, walk and cycle), and the estimation of automobile occupancy, etc.

Appendix C provides more specific details related to the transportation models development and application.

The updated travel demand forecasting model was used to measure the following generalized traffic condition on the City's road network in the AM and PM peak hour, where PM peak hour is typical the worst-case/most congested condition. This condition is measured as the Volume-to-Capacity (V/C) ratio

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on major roads and the associated Level of Service (LOS) conditions. ***Table 1-1*** displays the thresholds for V/C ratios and LOS along with a general description of the corresponding traffic condition.

Table 1-1: Volume-to-Capacity (V/C) Ratios and Level of Service (LOS) Thresholds

V/C Ratio	LOS	General Traffic Condition
0.00 – 0.20	A	Excellent to Good
0.20 – 0.40	B	
0.40 – 0.60	C	
0.60 – 0.80	D	Fair
0.80 – 1.00	E	Poor – Mitigation Required
>1.00	F	Failure – Significant Mitigation Required

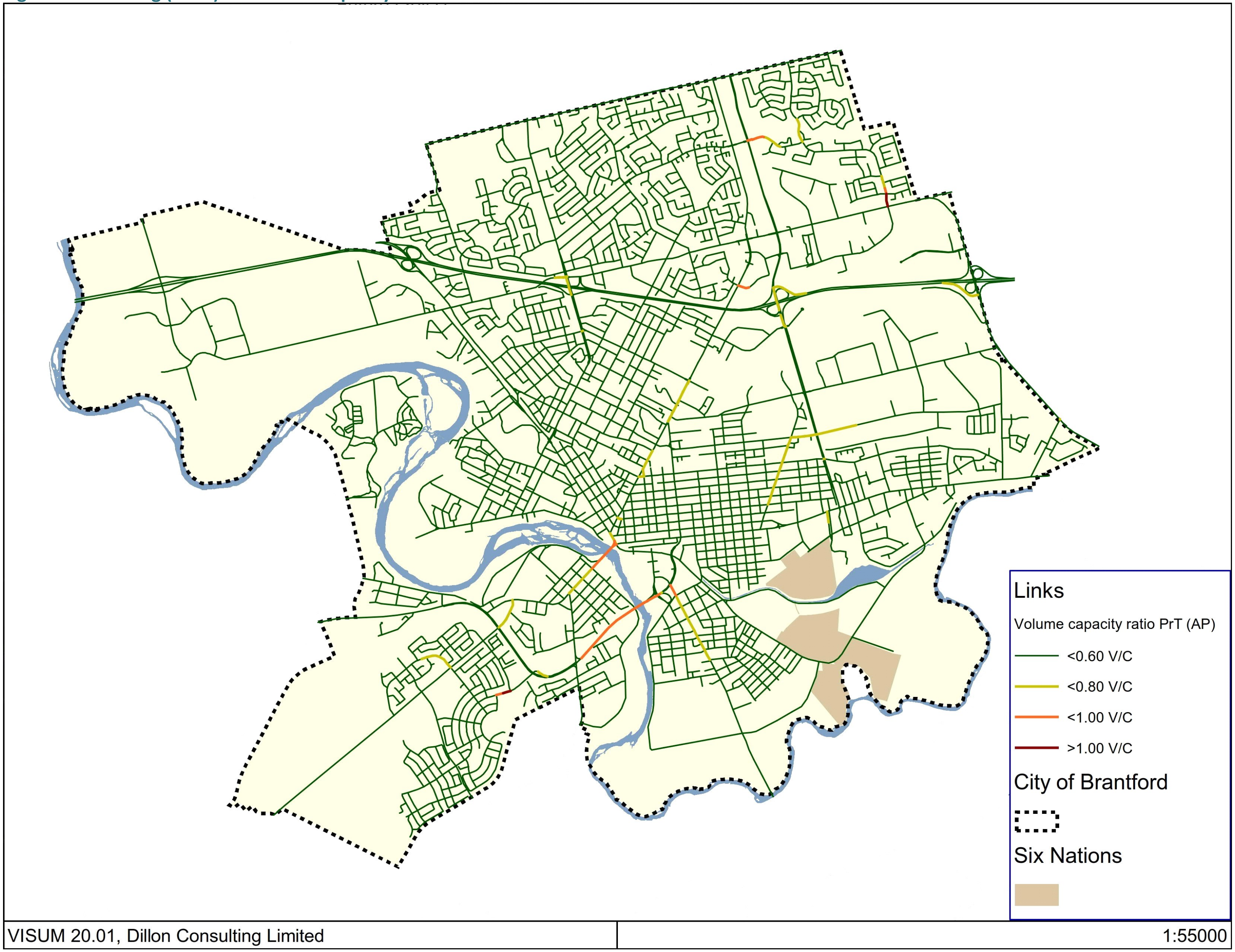
1.7.2 Existing Automobile Traffic Level of Service (LOS)

It is generally accepted that the goal of most communities is to maintain LOS A to D conditions on their road networks, address LOS E conditions on their roads and avoid any LOS F conditions in the long term through capacity enhancement and Transportation Demand Management (TDM) actions.

Brantford's existing (2016) V/C ratios during the PM peak hour are shown on ***Figure 1-3.*** The following is a summary of observations pertaining to Brantford's existing arterial/collector road network Level of Service (LOS):

- The PM peak hour vehicle demands are higher than the AM peak hour;
- Highway 403 interchanges with King George Road and Wayne Gretzky Parkway experience approaching capacity conditions during the PM peak hour due to high demands accessing/returning to the city;
- Highway 403 accesses to/from the downtown core are experiencing mild congestion during the PM peak hour:
  - King George Road Interchange via King George Road and Brant Avenue; and
  - Wayne Gretzky Parkway Interchange via the Parkway and Colborne Street / Dalhousie Street couplet;
- North of Highway 403, King George Road and Wayne Gretzky Parkway serve as the primary north-south corridors accessing east-west facilities, such as Lynden Road, Powerline Road, and Dunsdon Street. They are experiencing mild congestion and/or approaching capacity during the PM peak hour;
- The West Street corridor has high north-south vehicle demands and traverses Highway 403 (no access);
- The two bridge crossings of the Grand River, Colborne Street and Veterans Memorial Parkway provide the primary connections between the downtown core and southwest Brantford. They are experiencing mild congestion and/or approaching capacity in both peak hours;

Figure 1-3: Existing (2016) Volume-to-Capacity Ratio - PM Peak Hour



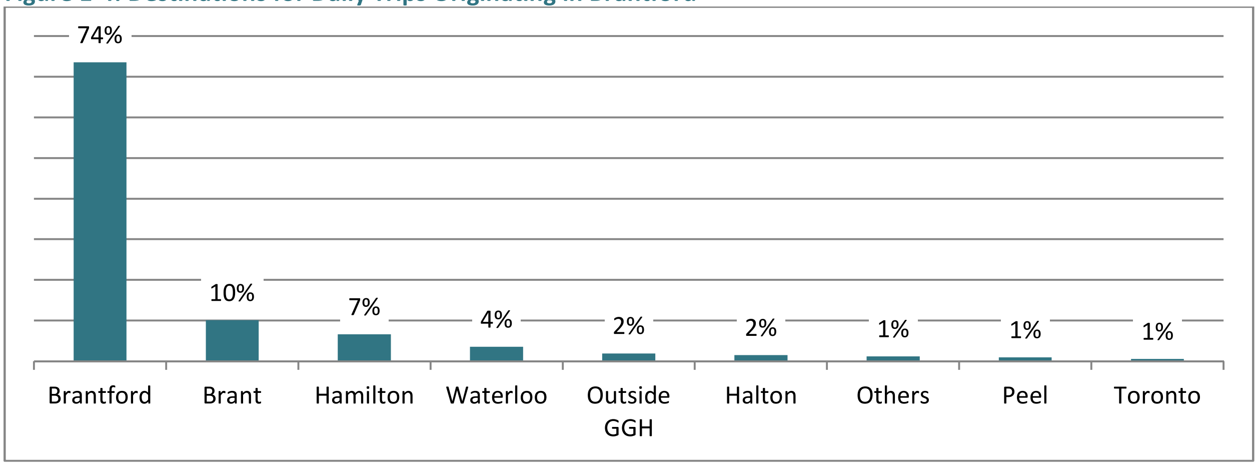
Note: This figure displays the City of Brantford boundary is at it existed in 2016, prior to the municipal boundary adjustment that came into effect on January 1 2017.

- Blackburn Drive in the vicinity of Veterans Memorial Parkway is approaching capacity in both peak hours; and
- Erie Avenue is approaching capacity in both peak hours in the vicinity of Veterans Memorial Parkway

1.7.3 Primary Trip Markets

Figure 1-4 illustrates the destinations and proportion of all daily trips that originated from within the City of Brantford based on the 2016 Transportation Tomorrow Survey (TTS)[1]. Not surprisingly, the vast majority of trips originated from within Brantford were also destined to locations within Brantford (74%). The remaining 26% of trips were destined for various locations outside of the City.

Figure 1-4: Destinations for Daily Trips Originating in Brantford



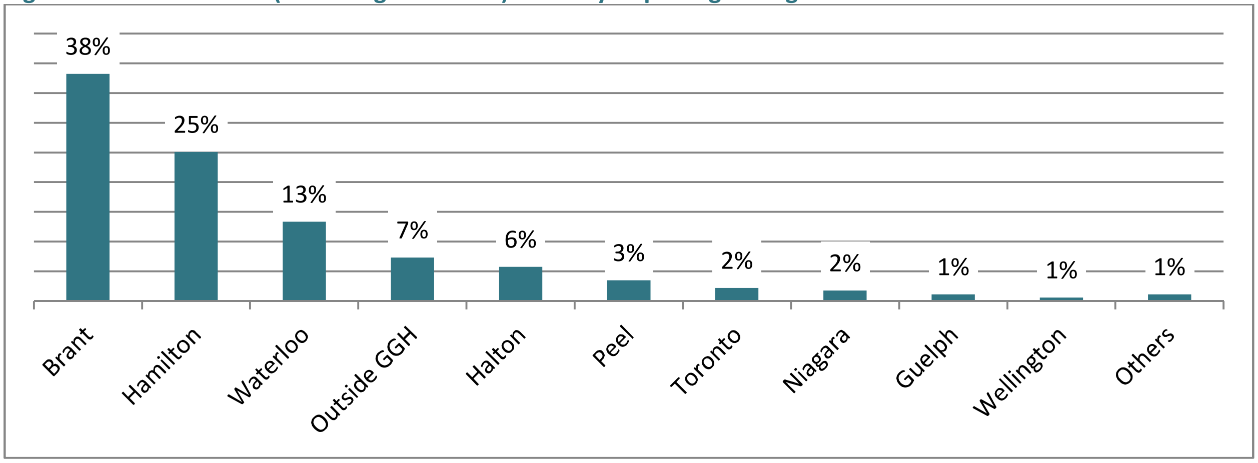
Source: 2016 Transportation Tomorrow Survey (TTS)

Figure 1-5 illustrates the destinations and proportion of all daily trips that originated from within the City of Brantford that were destined to locations outside of the City. Clearly, Brant County, Hamilton and Waterloo Region represent the three largest trip markets outside of Brantford, attracting 38%, 25% and 13% of Brantford's external trips respectively. Additionally, regions outside of the Greater Golden Horseshoe (GGH) and Halton Region attracted the majority, but a smaller individual share, of the remainder. However, Toronto attracted more transit trips from Brantford than any other municipality due to its size and existing transit connections.

In terms of actual trips (by all modes), Brant County attracts about 19,000 daily round trips, Hamilton about 12,500 daily round trips, and Waterloo Region about 6,650 daily round trips compared to about 1,100 daily round trips to/from Toronto.

[1] The Transportation Tomorrow Survey (TTS) is a cooperative effort by local and provincial government agencies to collect information about urban travel behaviour in the Greater Toronto and surround area. The survey has been undertaken every five years since 1986.

Figure 1-5: Destinations (excluding Brantford) for Daily Trips Originating in Brantford



Source: 2016 Transportation Tomorrow Survey (TTS)

1.8 Existing Transit Network Use

The Brantford Transit (BT) fleet comprises 31 conventional buses and 14 specialized transit vehicles. Service consists of 9 daytime and 5 evening and Sunday fixed routes including peak hour services. Brantford Transit's existing daytime routes are displayed in ***Figure 1-6***. A total of 77,400 revenue-hours of service are operated annually with over 1.435 million trips taken in 2017. Service is provided from 6:00 AM to 1:00 AM Monday to Saturday and 8:00 AM to 8:00 PM on Sundays and selected statutory holidays. Routes operate every 30 minutes during daytime hours Monday to Saturday, then hourly in the evenings and on Sundays and selected statutory holidays. Extra service is provided on certain routes in peak hours to handle high ridership levels.

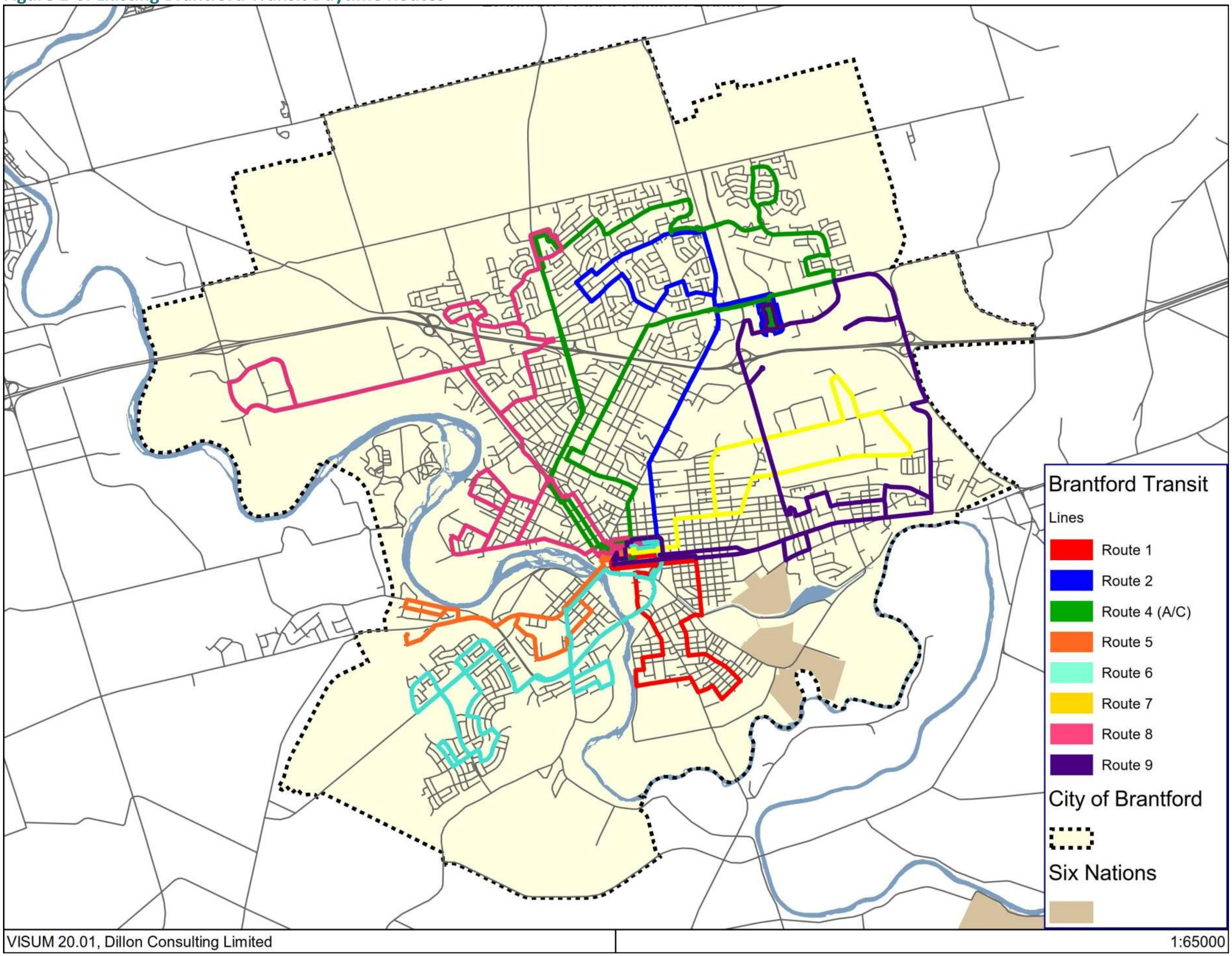
According to the 2016 Report: *Overview of Conventional and Specialized Transit Services*, the following route conditions were noted about Brantford's transit ridership:

- In both peak periods, Transit Routes 1, 2, 4A, 4C, 7, 8 and 9 showed good utilization with more than 100 riders on each route;
- Route 9 Echo Place is the best performing route, carrying about 20% of total daily ridership;
- Taken together, the Mall Link routes (4A and 4C) carry almost a third of weekday riders; and
- Routes 5 and 6, serving South West Brantford have poor utilization / the lowest ridership among weekday routes with less than 100 people riding on each route in each peak period. Together, the two routes only carry an average of slightly over 14 riders per trip.

In July of 2019, the federal and provincial government announced a $5 million public infrastructure funding grant. The funding is to be used to provide:

- New equipment to replace 21 buses – 13 conventional and 8 paratransit;
- New fare boxes and smart card technology;
- New bus pads and shelters; and
- Upgrade to the City's maintenance facility.

Figure 1-6: Existing Brantford Transit Daytime Routes



1.9 Existing Active Transportation

Brantford is very receptive to walking and recreational cycling as a result of the abundance of parks, open space, and off-road trails. Brantford's urban core provides attractive historic features and a compact street network with many route options for walking and cycling trips. With the recent addition of several high-quality bike facilities, such as bike lanes on sections of North Park Street, Dunsdon Street and Memorial Drive as the result of Road Diets and utilizing space within the existing right-of-way Brantford is taking strides to enhance Active Transportation (AT) within the City. Brantford's existing cycling and trails network is displayed in ***Figure 1-7***.

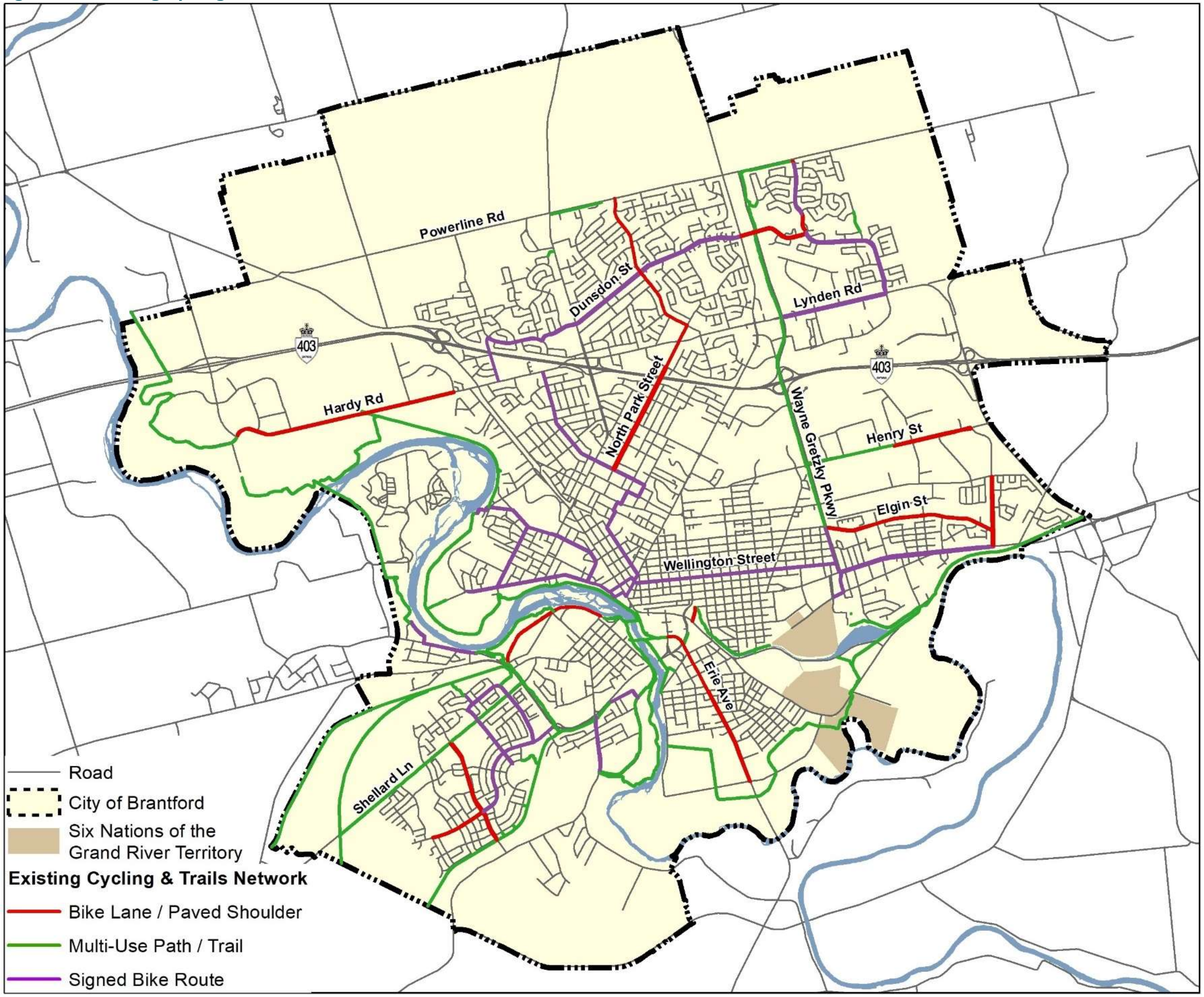
In addition to Brantford's existing AT infrastructure, Brantford has the unique opportunity to create additional multi-use paths as a result of the many abandoned rail corridors. Furthermore, Brantford has several proposed intensification corridors located along arterial roads (such as: King George Road, Wayne Gretzky Parkway and Colborne Street) with commercial, mixed use and more dense residential areas. These corridors provide the appropriate land use patterns that facilitate more short trips that are within the reach of walking and cycling.

However, some specific characteristics challenge the appeal of AT in Brantford. Perhaps most notable is the need for better infrastructure within the roadway system. In general, suburban residential neighbourhoods built in the 1950's and 1960's (such as Green Brier and Fairview) have fewer sidewalks compared to urban neighbourhoods located closer to the urban core. While signed bike routes exist throughout the city, there are currently no on-street bike exclusive facilities (i.e. bike lanes, cycle tracks, etc.) in Brantford's core, high-activity areas.

Between 2007 and 2014 Brantford made good progress towards implementing additional AT infrastructure. Brantford constructed: 46.7 km of new sidewalks (including new development and reconstruction); 12.0 km of new multi-use paths; 4.2 km of bike lanes; and 30.4 km of signed bike routes. This increased Brantford's total centreline kilometrage of on-road cycling facilities to 43.5 km and total kilometrage of off-road trails to 89.3 km. Overall, Brantford constructed approximately 76% (of the total length) of proposed facilities in the 2007 Cycling and Trails network. Unfortunately, the majority of these new facilities were signed bike routes, which have a low implementation cost, but given the current cycling mode share (shown in ***Table 2-4*** and ***Table 2-5***) the evidence suggests that additional signed routes did not sufficiently encouraged more cycling at a City-wide level.

Since 2014 Brantford has continued to make good progress towards implementing additional AT infrastructure. However, unlike the period between 2007 and 2014, the majority of recent infrastructure additions have been dedicated active transportation facilities within the road right-of-way. This has been an intentional strategy as dedicated active transportation facilities within the road right-of-way were lacking and there is already a strong presence of multi-use paths on non-roadway corridors throughout Brantford. Examples of recently built (since 2014) dedicated active transportation facilities within road right-of-way include: a multi-use path on Shellard Lane and bike lanes on sections of Erie Avenue, North Park Street, Dunsdon Street, Memorial Drive, Blackburn Drive and Garden Avenue. This increased Brantford's total centreline kilometres of on-road cycling facilities by 7.3 km to 50.8 km, and off-road trails facilities by 6.2 km to 95.5 km representing a 17% and 7% increase respectively over the 2014 totals.

Figure 1-7: Existing Cycling and Trails Network



2.0 Transportation Impacts of Growth

2.1 Population and Employment Growth

The most recent *Places to Grow* (May 2019) policies include growth forecasts for the City of Brantford with a residential population of 163,000 and an employment level of 79,000 by 2041.

As part of the City of Brantford's Official Plan Review process, the Ministry growth forecasts were incorporated into a Municipal Comprehensive Review (MCR) as input to the City's new Official Plan (undertaken by SGL Planning and Design Inc. (SGL)). The MCR Part 1 Report, identified an alternative intensification target for the delineated Built-up Area and an alternative Designated Greenfield Area (DGA) density target appropriate for the City of Brantford as well as lands to convert from employment use and whether there was a need for a settlement area boundary expansion and the quantum of that need. The MCR Part 2 Report identified what part of the Boundary Adjustment Lands will be included in the settlement area boundary expansion to accommodate the identified need for urban lands. A majority of the work for the MCR predates the Mohawk Lake District Plan.

The 2041 population and employment forecasts were disaggregated by SGL to match the Traffic Analysis Zone (TAZ) structure within the City's strategic transportation model. The allocations were based on intensification policies and targets, Schedule 1: Growth Management in the City's draft Official Plan, land use designations, and sites with known development potential.

At a summary level, the growth forecasts used in this TMP growth analysis are shown in ***Table 2-1*** and ***Table 2-2*** below for the City of Brantford and County of Brant respectively. Detailed TAZ level population and employment data for Brantford and Brant County (2016 and 2041) can be found in ***Appendix C***.

Table 2-1: City of Brantford Population and Employment to 2041

Horizon Year	Population (Persons)	Employment (Jobs)
2016	101,700	44,900
2021	111,300	53,600
2026	125,200	60,300
2031	139,000	67,000
2036	152,000	72,000
2041	163,000	79,000

Source: *Envisioning Brantford* -MCR Part 1 Report, SGL Planning and Design et al.

Table 2-2: County of Brant Population and Employment to 2041

Horizon Year	Population (Persons)	Employment (Jobs)
2016	36,700	22,100
2021 Est	39,000	22,000
2026 Est	44,000	22,000
2031	49,000	22,000
2036	53,000	24,000
2041	57,000	26,000

Source: *A Place to Grow: Growth Plan for the Greater Golden Horseshoe*, 2019

Applying updated growth forecasts, disaggregated to the TAZ level-of-detail, the City's model was utilized to forecast future travel demands (i.e. Future Conditions) resulting from population growth, employment growth, and future land use patterns and densities as provided by the City. These were further enhanced using output from the ongoing Official Plan Update. Forecasted Future Conditions and various alternative transportation strategies were subsequently assessed based on the strategic direction criteria are identified in ***Section 2.4*** and in ***Chapter 4.0***.

The population and employment forecasts for the City of Brantford and County of Brant indicate significant growth in the period from 2016 to 2041. The population and employment are expected to grow by 59% and 55% respectively during this 25-year period as shown on ***Table 2-3***.

Table 2-3: Population and Employment Growth - Brant and Brantford

Demographic Area	2016	2041	Growth
Population			
County of Brant	36,700	57,000	55%
City of Brantford	101,700	163,000	60%
Total	**138,400**	**220,000**	**59%**
Employment			
County of Brant	22,100	26,000	18%
City of Brantford	44,900	79,000	76%
Total	**66,990**	**104,000**	**55%**

Source: *A Place to Grow: Growth Plan for the Greater Golden Horseshoe*, 2019

Figure 2-1 and ***Figure 2-2*** present the pattern of population and employment growth by TAZ between 2016 and 2041. These figures include an expansion of the current urban boundary (Settlement Area) and assign population and employment growth to these areas in conjunction with the parallel Brantford Expansion Area study developed by Dillon in consultation with the City of Brantford. Based on current growth and growth anticipated in the expanded urban boundary, the following trends to the 2041 horizon year are noted:

- High employment growth in the Oak Park Road & Hardy Road (Northwest Industrial Park) and Henry Street/Wayne Gretzky (Braneida Industrial Park) areas;
- High employment growth in the expansion lands east of Garden Avenue at Highway 403 and north of Powerline Road just east of Paris Road;
- High population growth in the southern zones surrounding Shellard Lane, Mt Pleasant Road and Erie Avenue;
- High population growth in the northern expansion zones (north of Powerline Road) from Balmoral Drive in the west to Coulbeck Road in the east;
- High population and employment growth along the King George Road corridor; and
- High population and employment growth in the downtown core.

Intensification within downtown Brantford and along the King George Road corridor will increase the densities within these areas of the city. Denser, more urban areas contribute to modal shifts away from the single occupancy vehicle as the distance to many amenities will decrease, making them more bikeable and walkable, while transit service will increase, as higher densities support higher service frequency.

Figure 2-1: Population Growth by TAZ, 2016 to 2041

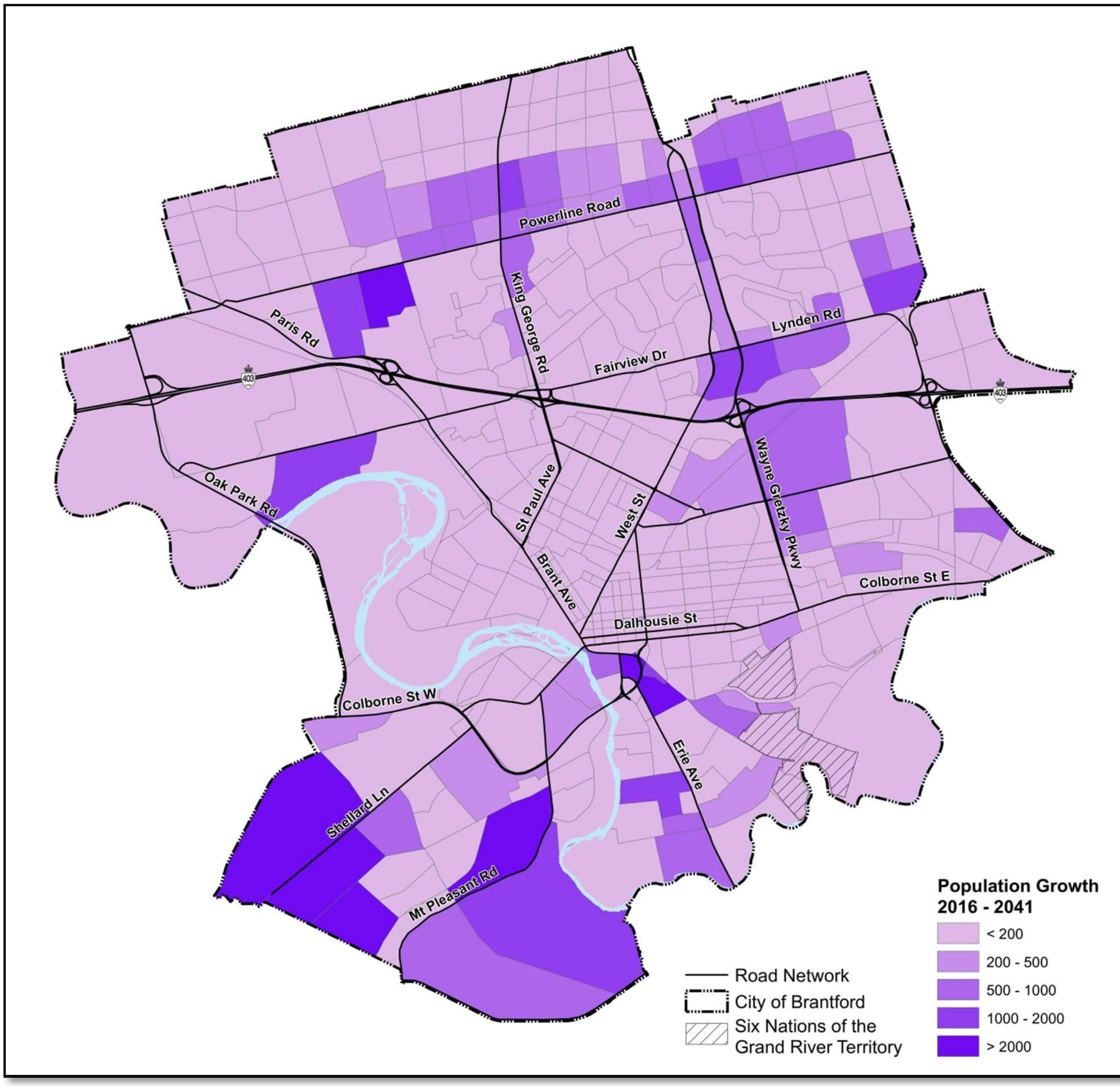
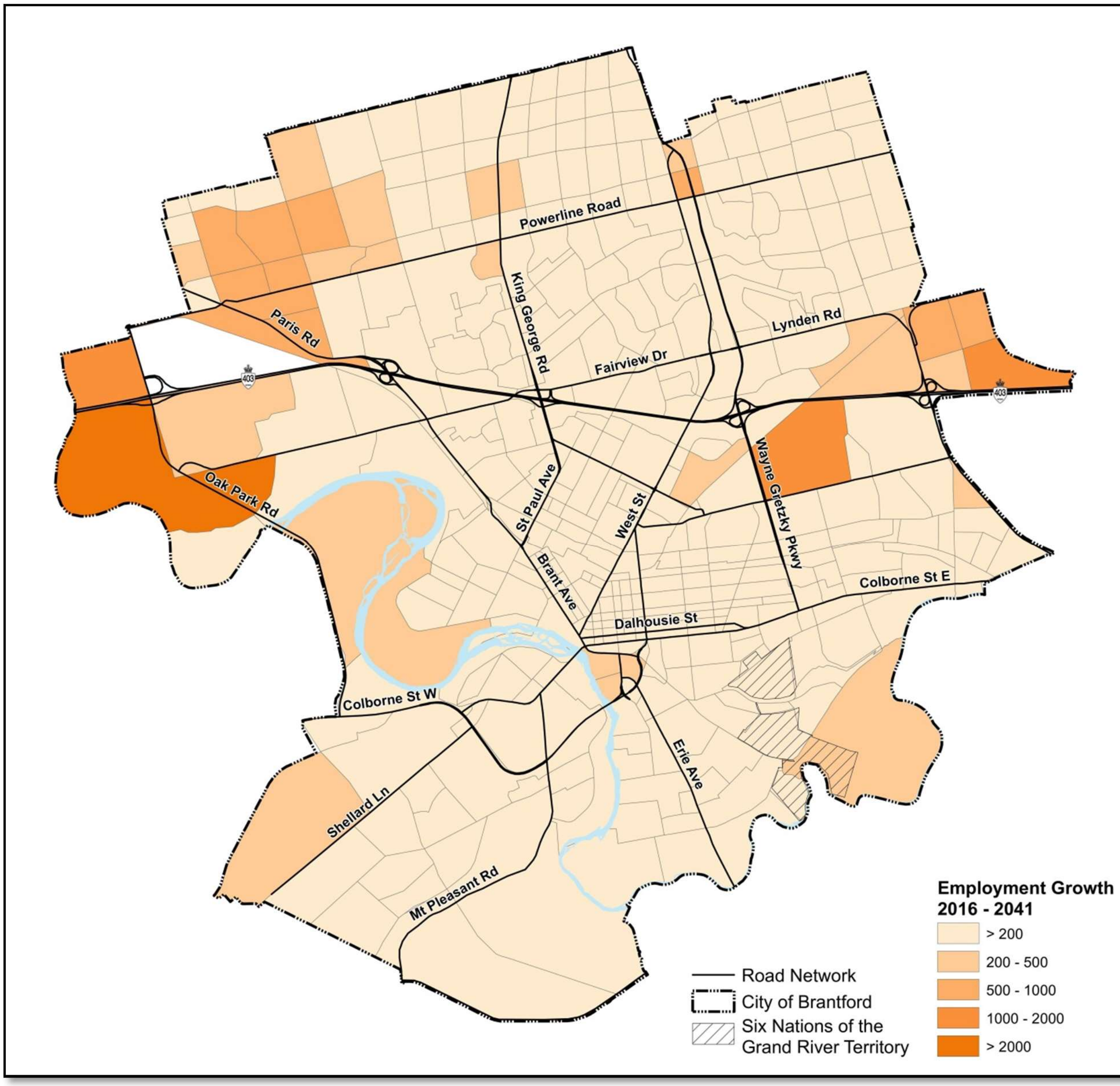


Figure 2-2: Employment Growth by TAZ, 2016 to 2041



2.2 Change in Travel Mode Choice

The daily travel mode share in Brantford has remained relatively static over the past decade (2006 - 2016) according to TTS, as displayed in ***Table 2-4*** and ***Table 2-5***. There has been modest growth (as a proportion of travel) in the use of active modes (cycle/walk) and transit but the largest growth has been to auto driver. The only mode that decreased its mode share was auto passenger. It is worth noting that the combined auto driver and auto passenger share has decreased slightly, with a swing towards active modes. Overall these trends are not surprising given Brantford's characteristics (location, size, geography, etc.) and investment in active modes of transportation and transit.

Table 2-4: Brantford Travel Mode Share: Internal Trips (Brantford to Brantford)

Mode \ Year	2006	2011	2016
Auto Driver	69.5%	68.8%	70.8%
Auto Passenger	18.3%	18.7%	14.6%
Transit	2.3%	2.6%	2.8%
Cycle/walk	6.6%	6.9%	7.8%
Other	3.3%	3.0%	4.0%
	100.0%	**100.0%**	**100.0%**

Source: 2006, 2011 & 2016 Transportation Tomorrow Survey (TTS)

Table 2-5: Brantford Travel Mode Share: Trips Originating in Brantford (Brantford to All)

Mode \ Year	2006	2011	2016
Auto Driver	71.7%	71.4%	74.2%
Auto Passenger	17.9%	18.1%	14.2%
Transit	2.0%	2.3%	2.3%
Cycle/walk	5.3%	5.4%	5.8%
Other	3.2%	2.9%	3.4%
	100.0%	**100.0%**	**100.0%**

Source: 2006, 2011 & 2016 Transportation Tomorrow Survey (TTS)

2.3 Local Travel Growth to 2041

The updated travel forecasting model forecasts travel in the City of Brantford and County of Brant in 2041 first under a “Do Minimal” scenario. In this case, the travel mode choices are unchanged from 2016, and no further capacity improvements (i.e. road widenings, extensions) are included in the model. However, a small number of infrastructure modifications that have been completed since 2016 were included along with the proposed arterial/collector road network for the expansion lands (Tutela Heights & North Brantford). As a result of the Tutela Heights Slope Stability EA, the closure of Tutela Heights Road in the vicinity of Davern Road is also incorporated.

Brantford’s forecasted growth will significantly alter the local travel demands within the City. ***Table 2-6*** displays the existing (2016) and forecast (2041) trips by mode that originate in Brantford during the AM peak period. By 2041 Brantford is forecast to generate more than 83,600 AM peak period person trips on an average weekday. That’s an increase of nearly 68% over 2016 person trips.

Table 2-6: Total trips by mode: Trips Originating in Brantford (Brantford to All) - AM Peak Period

Mode \ Year	2016		2041	
	Trips	%	Trips	%
Auto Driver	36,520	73.2%	61,680	73.8%
Auto Passenger	5,370	10.8%	9,080	10.9%
Transit	1,350	2.7%	1,880	2.2%
Bicycle	330	0.7%	470	0.6%
Walk	3,190	6.4%	5,040	6.0%
Other	3,130	6.3%	5,460	6.5%
Total	**49,890**	**100.0%**	**83,620**	**100.0%**

The total existing (49,890) and forecast (83,620) person trips can be further broken down based on where the trips are destined to. This is displayed in ***Table 2-7***.

Table 2-7: Total trips by destination: Trips Originating in Brantford - AM Peak Period

Destination \ Year	2016		2041	
	Trips	%	Trips	%
Brantford to Brantford	36,980	74.1%	64,810	77.5%
Brantford to Brant County	5,250	10.5%	8,450	10.1%
Brantford to External East (Hwy 403 east)	4,310	8.6%	5,800	6.9%
Brantford to External West (Hwy 403 west)	490	1.0%	700	0.8%
Brantford to External North (Hwy 24 north)	1,440	2.9%	1,930	2.3%
Brantford to External Other	1,420	2.8%	1,930	2.3%
Total (Brantford to All)	**49,890**	**100.0%**	**83,620**	**100.0%**

Table 2-7 indicates that in the 2041 forecasted scenario there is higher proportion (3.4 percentage points) of internal (Brantford to Brantford) trip making, while conversely an equal reduction of the proportion of Brantford to External trip making. The increase in local trips is likely the result of the significant increase in employment and participation rate that is forecast for Brantford.

2.4 2041 Local Travel Assignment and Network

The updated population and employment forecasts for the horizon year, travel mode choice, and trips distribution information, as described in Sections 2.1 through 2.3 above, were incorporated into the City's travel demand model and assigned to the horizon year network to produce future base year volume forecasts on the road network. This process and the resultant forecasts are described in the following sections.

2.4.1 Updated Mobility Model for Transportation

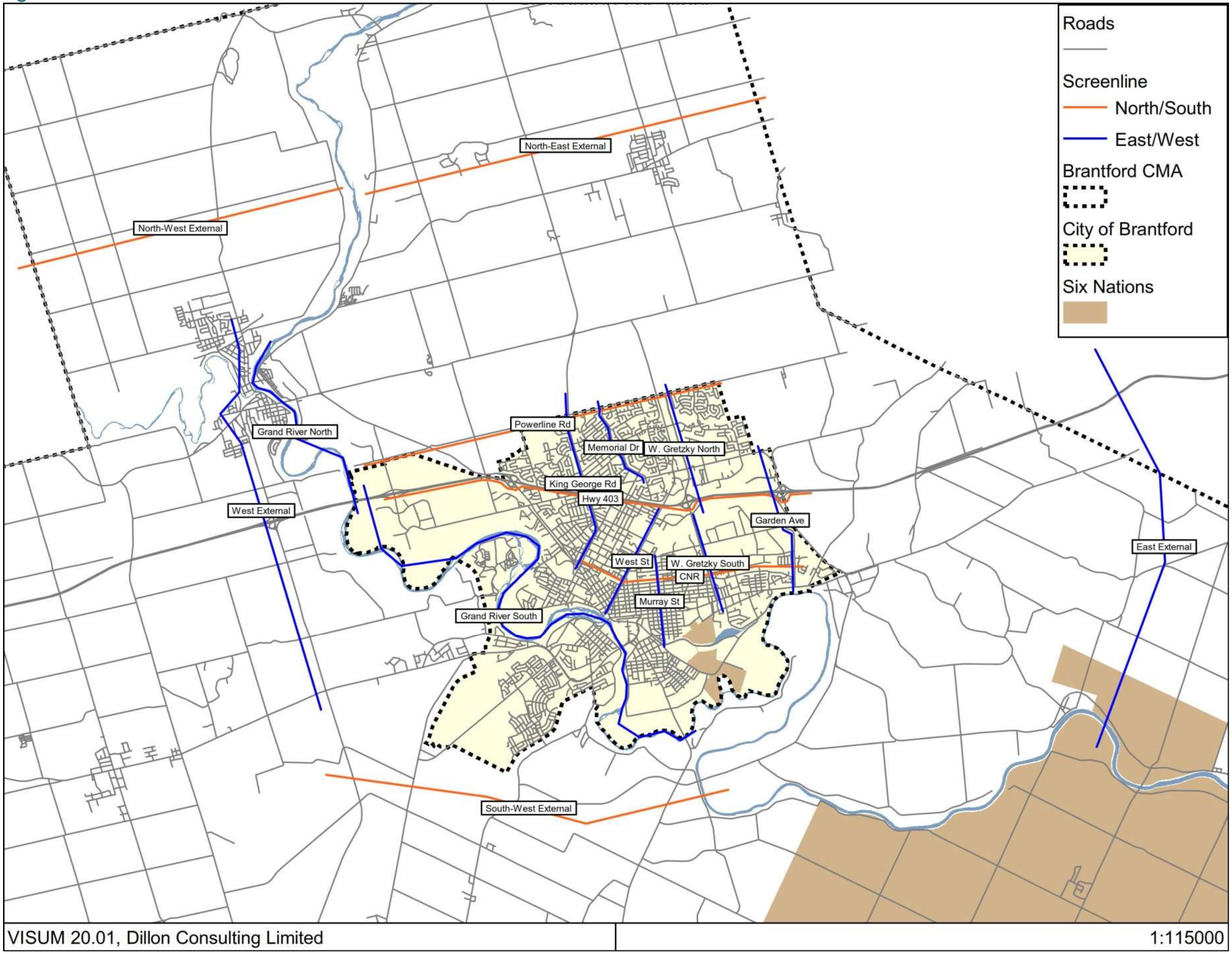
The City of Brantford's TransCAD travel demand model used for forecasting auto trips in the 2014 TMP was migrated to Visum and updated for this TMP Update. Visum is multi-resolution, making the model "microsimulation-ready" for operational analysis in Vissim. The model update included new 2016 base population and employment data for Brantford that was obtained from Statistics Canada and was disaggregated by SGL Planning & Design Inc. to match the Traffic Analysis Zone (TAZ) structure within the model. This land use data was used in conjunction with updated traffic counts and information on recent infrastructure changes to update the strategic transportation model to a 2016 base condition. The updates are detailed in the Transportation Model Update Report which is included in ***Appendix C*** of this TMP. Detailed in this report include:

- Foundational elements were reviewed and verified. The model foundations are reflective of 2016 TTS data;
- A 2016 base year, incorporating verified population and employment data and traffic counts;
- An updated road layer, incorporating all infrastructure and roadway classification changes;
- Implementation of Visum's "TFlowFuzzy" algorithm to provide parameter adjustments that improve base year validation and refine future year forecasts; and
- A range of model network or parameter adjustments to improve base-year validation and refine future-year forecasts.

Screenline analysis was used to validate AM and PM peak hour auto travel within the model. A screenline is an imaginary line that usually follows a linear feature such as a road, a river, a rail line or a municipal boundary that is used for the purpose of assessing the performance of the model. Screenline analysis provides a means of comparing the results of a traffic assignment with traffic count data. This is facilitated by comparing the directional sum of traffic count volumes across a screenline with the directional sum of the assigned traffic volumes across the same screenline. The locations of the 17 screenlines within the Brantford Model are presented in ***Figure 2-3***.

For transit, the model was validated against overall ridership and on individual routes against data in the City of Brantford 2016 Report: *Overview of Conventional and Specialized Transit Services*. The model is limited in forecasting stop-by-stop boarding and alighting due to the layout of centroid connectors that are shared with both the transit and auto assignments. However, many of the routes were consistently modelled with trends observed.

Figure 2-3: Screenline Locations



Note: This figure displays the City of Brantford boundary is at it existed in 2016, prior to the municipal boundary adjustment that came into effect on January 1 2017.

2.4.2 Private Auto Traffic

As previously reported in Section 2.1 of this TMP, population and employment forecasts for the City of Brantford are expected to grow by 59% and 55%, respectively, between 2016 and 2041. A 2041 'Do Minimal' scenario reflects no changes to peak hour mode shares and only short term committed projects (e.g. The 2020 Oak Park Road/Highway 403 interchange upgrade) and the arterial/collector roads required to support the expansion lands (Tutela Heights & North Brantford). ***Figure 2-4*** displays the 2041 'Do Minimal' road network. The proposed additional roads in Tutela Heights (Conklin Road Extension) and North Brantford (New East/West Road, etc.) are illustrated in this figure. ***Figure 2-5*** illustrates the assignment of private auto vehicles on the 2041 network in the PM peak hour and ***Figure 2-6*** illustrates the same assignment of private auto vehicles on the 2041 network measured against roadway capacity as a volume/capacity (V/C) ratio. ***Table 2-8*** provides an overview of the AM and PM screenline summaries, using the same screenlines defined for the model validation (illustrated previously in ***Figure 2-3***). Unlike the screenline analysis used to validate the auto travel within the model, the screenline summaries in ***Table 2-8*** evaluate the cumulative travel demand on the roadways crossing the screenline. The cumulative travel demand crossing the screenline is compared to the cumulative capacity crossing the screenline in order to establish V/C ratio, which provides an indication of how well a specific corridor/screenline is operating. It is important to note that while some screenlines are operating within capacity, there may be links on the screenline that have operating deficiencies, as identified in ***Figure 2-6***. Detailed link summary tables for each screenline can be found in ***Appendix C***.

The aforementioned figures and table illustrate the following 2041 PM peak hour capacity issues that are consistent with 2014 TMP model findings for the 2031 horizon:

- Wayne Gretzky Parkway between Henry Street and Highway 403;
- King George Road crossing Highway 403;
- Veterans Memorial Parkway between Mt. Pleasant Street and Market Street South;
- Colborne Street crossing the Grand River;
- Paris Road between Highway 403 and Powerline Road;
- Brant Avenue between St Paul Avenue and Colborne Street; and
- West Street between Charing Cross Street and Henry Street.

However, there are a few notable capacity issues that have emerged in 2041, most notably as a result of the settlement boundary expansion, that were not present in the 2014 TMP model findings for the 2031 horizon:

- Powerline Road between Paris Road and Wayne Gretzky Parkway;
- Wayne Gretzky Parkway north of Highway 403;
- Hardy Road between Ferrero Boulevard and Paris Road;
- Paris Road south of Highway 403; and
- Erie Avenue between Veterans Memorial Parkway and Birkett Lane.

Figure 2-4: Future (2041) 'Do Minimal' Road Network

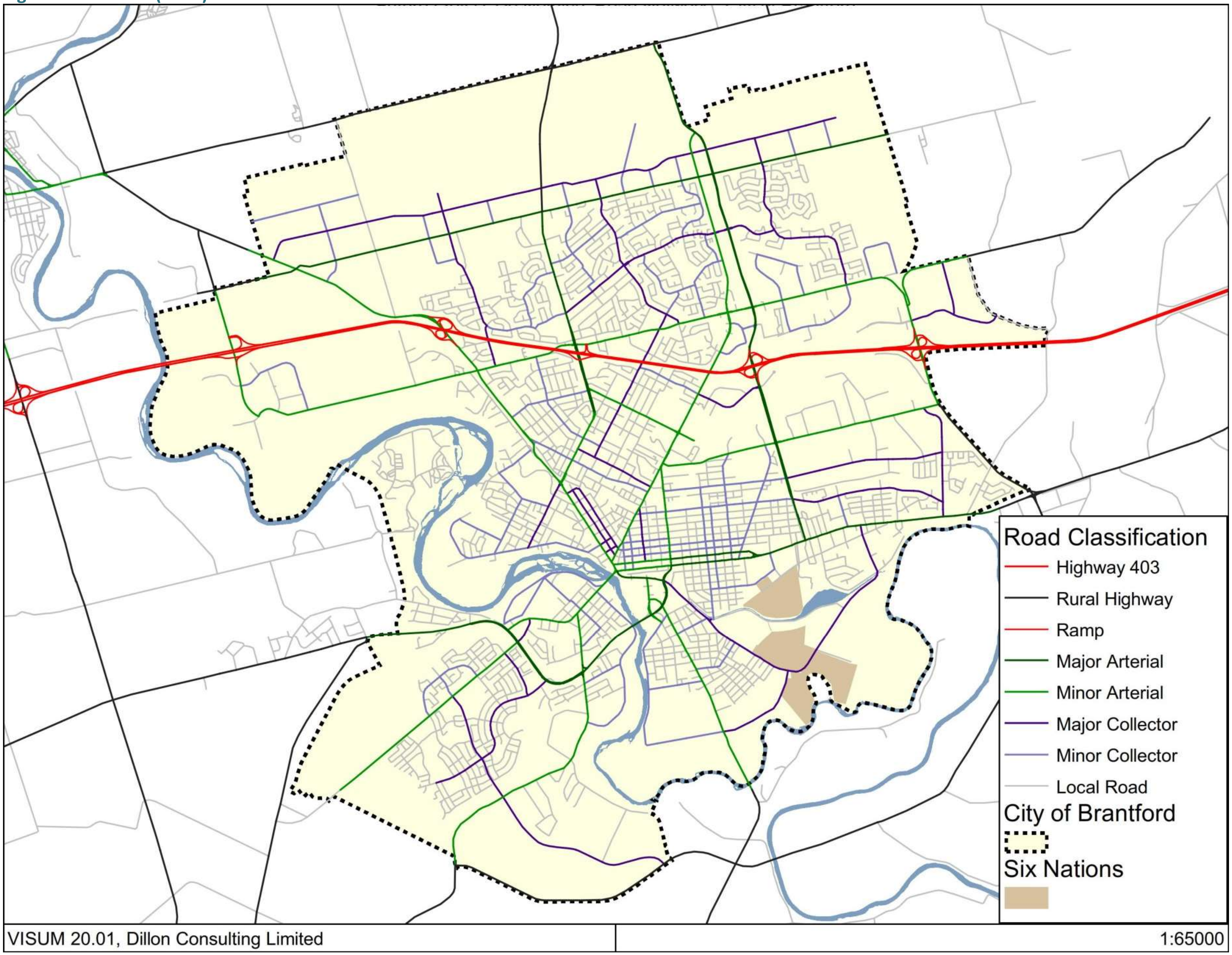


Figure 2-5: Future (2041) 'Do Minimal' Traffic Volumes- PM Peak Hour

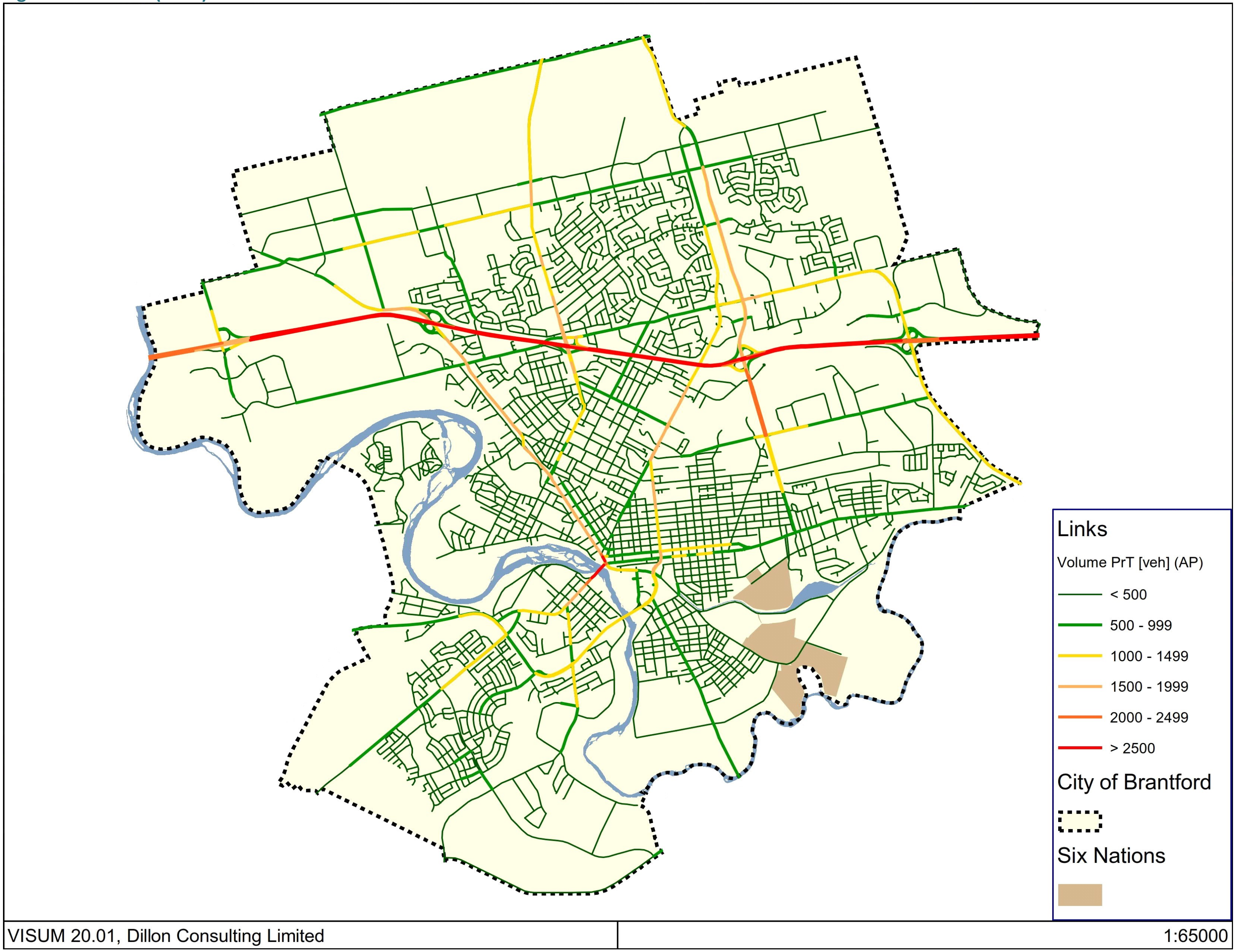


Figure 2-6: Future (2041) 'Do Minimal' Volume-to-Capacity Ratio - PM Peak Hour

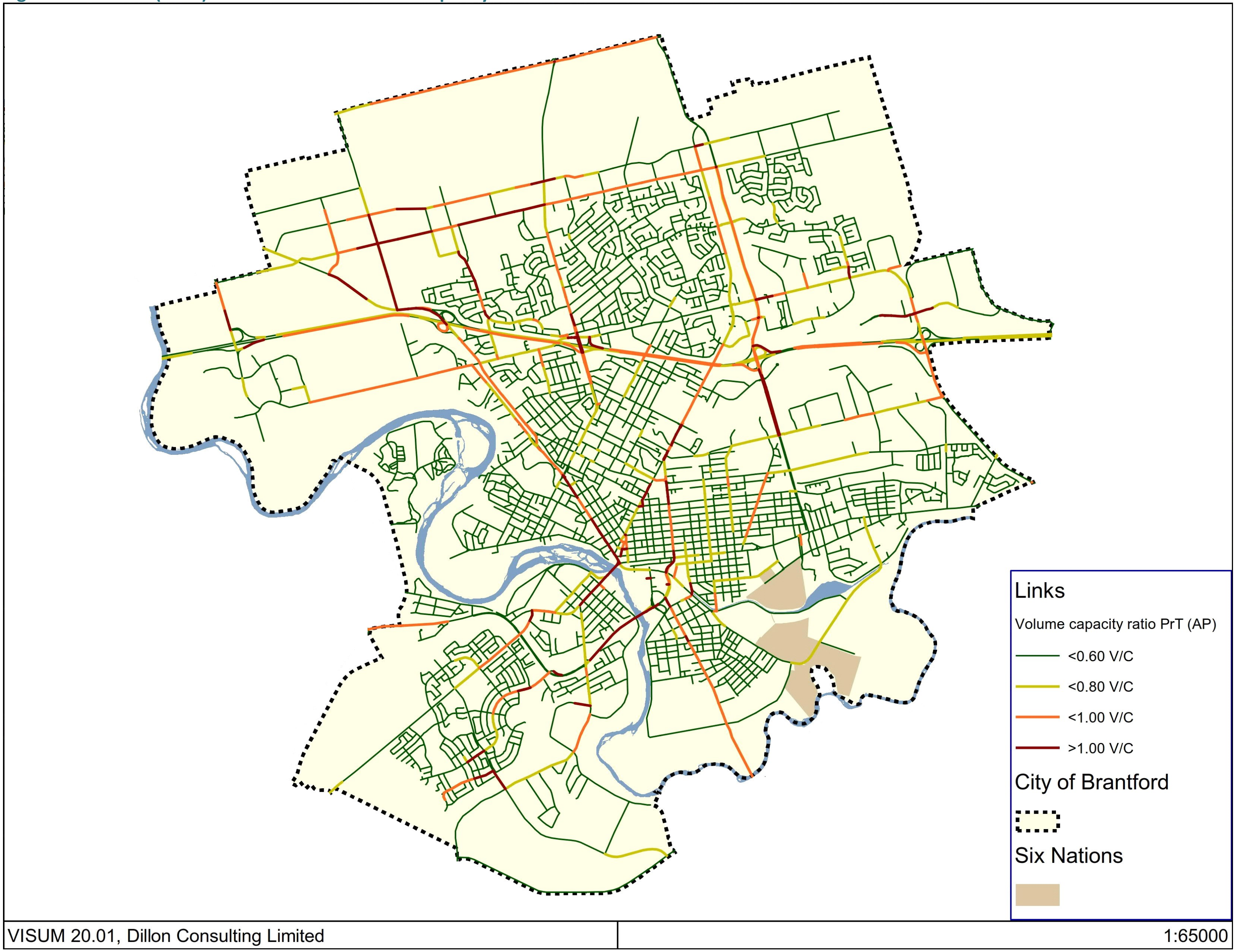


Table 2-8: Future (2041) 'Do Minimal' Screenline Summary

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	7	8,100	6,696	0.83	6,073	0.75
1	Grand River South	WB	7	8,100	4,404	0.54	7,450	0.92
2	Grand River North	EB	4	5,200	3,096	0.60	4,113	0.79
2	Grand River North	WB	5	6,000	2,756	0.46	3,822	0.64
3	Highway 403	NB	13	10,800	6,908	0.64	9,039	0.84
3	Highway 403	SB	13	10,800	7,296	0.68	9,254	0.86
4	King George Road	EB	11	9,600	5,201	0.54	8,413	0.88
4	King George Road	WB	11	9,600	6,792	0.71	7,269	0.76
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,399	0.58	6,210	0.82
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,312	0.70	5,827	0.77
6	Wayne Gretzky Parkway (South)	EB	7	4,900	1,986	0.41	2,302	0.47
6	Wayne Gretzky Parkway (South)	WB	7	4,900	1,600	0.33	2,822	0.58
7	Memorial Drive	EB	9	6,100	1,687	0.28	3,025	0.50
7	Memorial Drive	WB	9	6,100	2,339	0.38	2,599	0.43
8	West Street	EB	6	4,300	2,074	0.48	3,041	0.71
8	West Street	WB	6	4,300	2,671	0.62	3,032	0.71
9	CNR Corridor	NB	11	7,900	4,369	0.55	4,986	0.63
9	CNR Corridor	SB	11	7,900	4,231	0.54	6,068	0.77
10	Garden Avenue	EB	9	8,800	4,571	0.52	5,701	0.65
10	Garden Avenue	WB	9	8,800	4,389	0.50	6,052	0.69
11	Powerline Road	NB	13	9,400	4,158	0.44	5,843	0.62
11	Powerline Road	SB	13	9,400	4,671	0.50	6,092	0.65
12	Murray Street	EB	7	4,400	1,932	0.44	1,860	0.42
12	Murray Street	WB	8	5,200	1,589	0.31	2,381	0.46
13	West External	EB	7	7,300	1,711	0.23	2,241	0.31
13	West External	WB	7	7,300	1,664	0.23	2,190	0.30
14	South-West External	NB	4	4,300	1,560	0.36	1,168	0.27
14	South-West External	SB	4	4,300	949	0.22	1,632	0.38
15	East External	EB	5	6,900	2,931	0.42	3,448	0.50
15	East External	WB	5	6,900	2,996	0.43	3,634	0.53
16	North-East External	NB	3	3,200	1,355	0.42	1,614	0.50
16	North-East External	SB	3	3,200	1,168	0.37	2,281	0.71
17	North-West External	NB	3	3,300	780	0.24	929	0.28
17	North-West External	SB	3	3,300	791	0.24	978	0.30

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Note: i) Screenlines are illustrated in **Figure 2-3**.

ii) Total (capacity) = the total roadway vehicle capacity of all lanes that cross a particular screenline in a particular direction.

iii) Volume = the total number of vehicles that cross a particular screenline in a particular direction during a particular peak hour.

Additional analysis on the system behaviour was also extracted from the model. With population and employment growth, there will be an increase in demand on the road network. This means an increase in VKT, VHT, average travel time, and the percent of the network that is at or approaching capacity. The results of the system performance metrics for 2016 and 2014 'Do Minimal' road networks are summarized in ***Table 2-9***, which shows significant increases in travels times, due to the network congestion.

Table 2-9: Brantford Modeled System Performance - PM Peak Period

Network performance measure \ Year	2016	2041 (Do Minimal)
Vehicle Kilometres Travelled (VKT)	183,200	322,000
Vehicle Hours Travelled (VHT)	2,880	6,165
Average Trip Travel Time (minutes: seconds)	05:35	07:31
Percent of network approaching or over capacity	0.31%	6.03%

Note: All trips originating from or destined to Brantford

2.4.3 Transit Ridership

Overall transit person trips in Brantford are projected to grow significantly, between 2016 and 2041, as illustrated in ***Table 2-10***. This can be attributed to strong population and employment growth that is projected for Brantford over the same time period.

Table 2-10: Projected Transit Person Trip Growth, 2016 to 2041

Transit Service	AM Peak Period (6:00 – 9:00 AM)			PM Peak Period (3:00 – 6:00 PM)		
	Person Trips		Growth	Person Trips		Growth
	2016	2041		2016	2041	
Local (Brantford Transit)	1,188	1,617	36%	1,625	2,289	41%
Regional (GO Transit, VIA Rail, Greyhound, etc.)	241	352	46%	249	431	73%
Total	**1,429**	**1,969**	**38%**	**1,874**	**2,720**	**45%**

Likewise, transit ridership by route is also projected to grow significantly between 2016 and 2041, as illustrated in ***Table 2-11***. Transit route growth is directly related to the growth in population and/or employment that is planned in the immediate vicinity of the transit route. For example, significant population growth, illustrated previously in ***Figure 2-1***, is planned for the Shellard Lane area of Southwest Brantford and as a result ridership on Route 6 – West Brant/Shellard is expected to increase by 82% during the AM peak period and 102% during the PM peak period. Significant employment growth, illustrated previously in ***Figure 2-2***, is planned for the Northwest Industrial Area and as a result ridership on Route 8 – Holmedale/Mayfair is expected to increase by 74% during the AM peak period and 89% during the PM peak period.

Table 2-11: Projected Local Transit Route Ridership Growth, 2016 to 2041

Route	AM Peak Period (6:00 – 9:00 AM)			PM Peak Period (3:00 – 6:00 PM)		
	Ridership		Growth	Ridership		Growth
	2016	2041		2016	2041	
1 - Eagle Place	205	290	42%	228	357	56%
2 - West Street/Brier Park	216	281	30%	409	514	26%
4A - Mall Link	264	353	34%	372	485	30%
4C - Mall Link	217	295	36%	318	426	34%
5 - West Brant/Oakhill	84	96	14%	116	152	31%
6 - West Brant/Shellard	289	526	82%	215	433	102%
7 - East Ward/Braneida	197	219	11%	280	405	45%
8 - Holmedale/Mayfair	195	340	74%	239	451	89%
9 - Echo Place	230	309	34%	349	519	49%
Total	**1,897**	**2,708**	**43%**	**2,526**	**3,743**	**48%**

Note: i) Route ridership numbers are based on model assignments; and
ii) Total route ridership numbers exceed local transit persons trips (Table 2-10) because route ridership numbers include transfers.

Figure 2-7 and ***Figure 2-8*** illustrate the 2041 AM transit origin trips and the 2041 AM transit destination trips respectively. Collectively, these figures provide a high-level summary of where transit users are coming from and going to during the AM Peak Period.

Figure 2-7: Future (2041) Origin Transit Trips (per km²) by TAZ – AM Peak Period

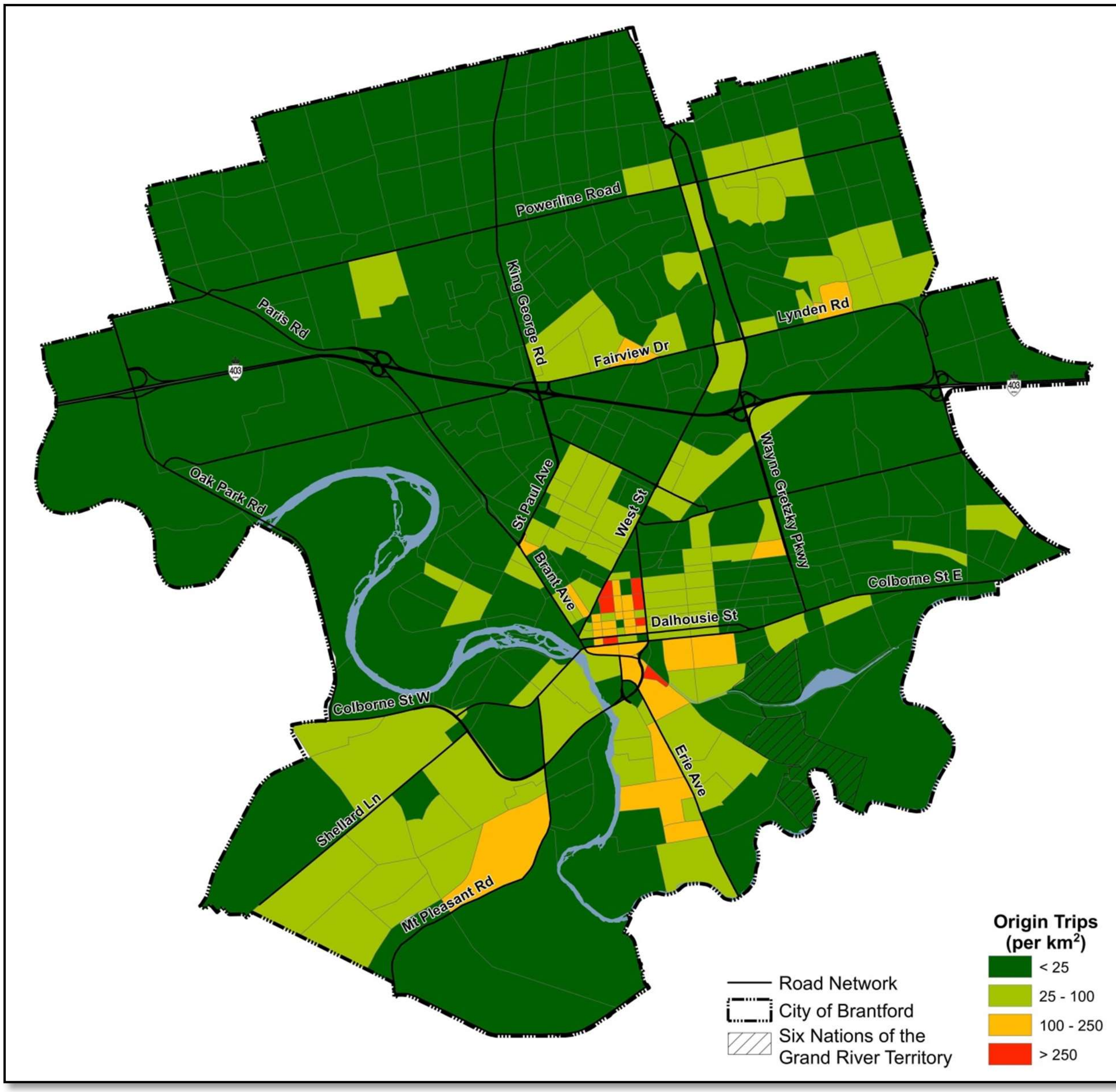
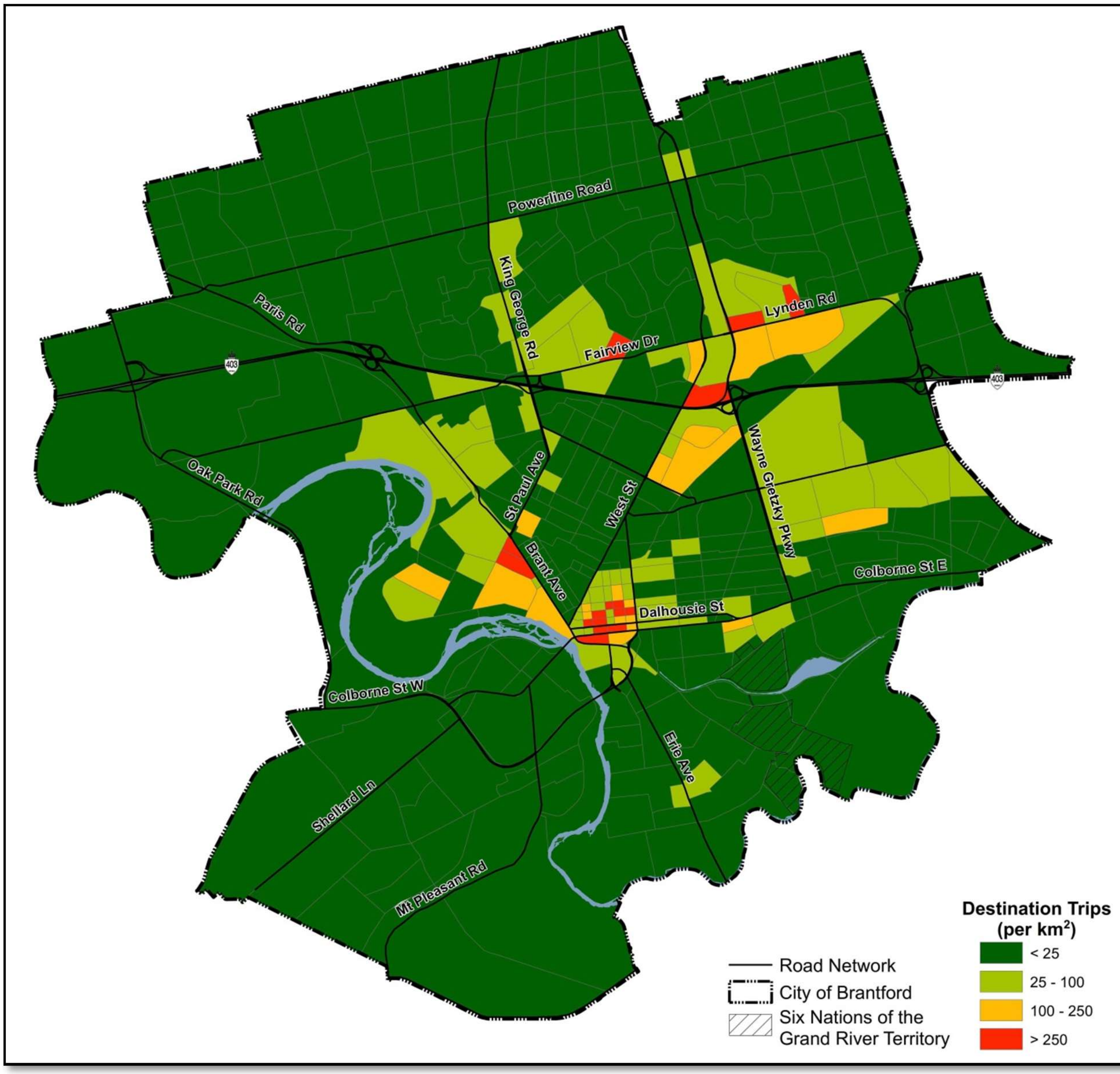


Figure 2-8: Future (2041) Destination Transit Trips (per km²) by TAZ – AM Peak Period



3.0 Complete Streets Framework

3.1 Introduction

This chapter provides decision-makers with a reference for transportation network planning and functional design as it relates to the City of Brantford transportation network. Ultimately decisions made in accordance with the framework in this chapter will help to advance the goals set out in the overall 2020 Transportation Master Plan Update and some of the guiding principles contained in the new City of Brantford Official Plan (2020 Draft).

This chapter includes the following sections:

Existing Policies and Plans: Provides an overview of the current transportation and infrastructure and design policies and planning for context.

Network Philosophy: Presents the complete streets approach taken to planning, designing, and constructing networks for all modes. It includes the logic for why streets should be designed to serve all modes of travel.

Network Elements: Describes the physical elements (such as sidewalks, bike lanes, etc.) of Brantford's transportation network. It outlines the modes of travel and types of trips that are considered in the transportation strategy.

Network Planning Guidelines: Presents guidance for how networks should be planned and designed to provide the required Levels of Service for their travellers. This includes a review of the street typology characteristics and roles within the context of complete streets.

Network Assessment: Outlines the goals and objectives for each network element that will allow the successful implementation of the complete streets approach to achieve a sustainable transportation network. Ultimately it compares the proposed transportation network against the network planning guidelines, to align the proposed network elements with the Network Philosophy.

3.1.1 Objective

The purpose of the City-Wide Complete Streets Planning Principles and Design Framework is to provide planning and design directions for the network in the City of Brantford. These principles and guidelines provide direction for new development, public realm investments and future planning studies along the City's major and minor road network.

These principles and guidelines should be used:

- In the evaluation of any Planning Act applications for development;
- In the preparation of secondary plans, strategies or initiatives that relate to an urban transportation corridor;
- In the preparation of any implementation tools, including Zoning By-laws, infrastructure projects, master plans, design standards, or other City projects or initiatives that impact the transportation network; and

- To communicate the important elements of transportation planning and infrastructure design to citizens and the development community.

3.1.2 Complete Streets

Key to achieving the City's vision for a transportation network to serve all modes, and understanding the design elements that facilitate this objective, is the concept of Complete Streets. Complete Streets are streets that are designed to be safe and comfortable for everyone: people who walk, bicycle, take transit, or drive, and people of all ages and abilities. A Complete Streets policy ensures that transportation planners and engineers consistently design and operate the entire street network for all road users, not only motorists. Complete Streets offer wide ranging benefits; they are cost effective, sustainable, safe, and encourage the continuation of the shift from auto to non-auto based travel.

3.2 Existing Policies and Plans

Land use and transportation infrastructure and service are mutually dependent. Policies help to shape the way that the transportation networks can support the principles of good land use planning. Therefore, a review was undertaken of the current transportation and infrastructure planning and design policies for context.

3.2.1 Draft Official Plan (2020)

The Official Plan is a comprehensive framework with a vision and guiding principles with which land use designations and policies will guide the future development of the City of Brantford. This planning framework will also assist Council, staff, and other public agencies in their consideration of public and private development proposals.

Chapter 7 in the Draft Official Plan includes policies for an integrated transportation system to complement the TMP and related direction on active transportation, public transit, parking, transportation demand management, goods movement and the road network.

3.2.2 Transportation Master Plan (2014)

A Transportation Master Plan (TMP) is a strategic planning document that establishes the vision for transportation services, assesses existing transportation system performance, forecasts future travel demand, and defines actions and policies to address road, transit, and active transportation needs within a community.

In 2014, an update to the 2007 Transportation Master Plan provided an opportunity to review and reconfirm the City's main transportation infrastructure and service plans. The update also addressed emerging issues involving changing economic and associated growth conditions, changes in the regional transportation context around Brantford (i.e., Highway 24, Highway 403, and GO Transit service), travel behaviour, and evolving public priorities for the transportation system, for example dealing with the new Complete Streets philosophy, expanding the emphasis on Active Transportation and new traffic management and calming measures (i.e., roundabouts).

Specific objectives and considerations carried forward from the 2014 TMP include:

- Make this a "made for Brantford" master plan reflecting the unique characteristics of Brantford and its context while still learning from successes in other similar-sized cities;
- Show the impacts of not making system improvements in terms of deficiencies, level-of-service and ability to meet planning targets;
- Coordinate TMP preparation with the City's concurrent Master Servicing Plan study in terms of growth forecasting, consultation activities and planning of cost efficiencies in the development of new transportation, sewer and water infrastructure;
- Integrate transportation and land use planning. Transportation and land use planning has been coordinated to identify bold transportation strategies that will be required to support an overall sustainability plan for transportation over the next 20 years, and translate these strategies into Official Plan policy;
- Define the future role of public transit. Reduce the City's environmental footprint by increasing transit use through improved service levels, by effectively serving newly developing areas, meeting the accessibility needs of residents, and by considering inter-municipal and inter-regional links. Incremental fixes have become increasingly limited in meeting Brantford's future transit needs; and
- The Complete Streets philosophy has been applied to this TMP Update so that streets are planned, built and maintained for all users.

This document is being prepared to support the update of the 2014 TMP. The revised TMP will address the updated land use forecasts to 2041 resulting from the new Official Plan land use allocations, including expansion.

3.2.3 Linear Municipal Infrastructure Standards

The Roads and Transportation, Design and Construction Manual, Linear Municipal Infrastructure Standards, (May 2020) provides the City, consulting engineers, contractors, developers and the general public with a common reference to ensure the consistent application of design and construction practices of road and related infrastructure within the City.

With regard to Design, the document outlines the minimum Right of Way requirements in achieving the City's policies regarding Complete Streets and Healthy communities, as set out by its latest Transportation Master Plan Update. The purpose of the policies is to focus on designing, maintaining and operating public streets in a manner that promotes active transportation. ***Table 3-1*** presents the characteristics used as a guide in the determination of street classification.

Table 3-1: Street Classifications

	Laneway	Local Streets (Up to 18.5 m ROW)	Minor Collector Streets (Up to 24.5 m ROW)	Major Collector Streets (Up to 30.5 m ROW)	Arterial Streets (Up to 40.0 m ROW)
Number of Through Lanes per Direction*	1	1	1	2	2
Typical Traffic Volumes (AADT)	Less than 1,000 vehicles per day	Less than 2,000 vehicles per day	2,000 to 8,000 vehicles per day	8,000 to 12,000 vehicles per day	8,000 to 12,000 vehicles per day
Posted Speed Range (km/h)	Preferred 30, up to 50	Preferred 40, up to 50	Preferred range of 40 to 50, up to 60	As low as 40, to a typical range of 50 to 60	Preferred 60, up to 80
Minimum Design Speed (km/h)	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed
Primary Design Vehicles (No Turning Encroachment)**	Passenger Car	Passenger Car	Passenger Car, Transit Bus, HSU	Passenger Car, Transit Bus, HSU, Snow Plow, Fire Truck	Passenger Car, Transit Bus, HSU, Snow Plow, Fire Truck, WB-20
Low Frequency Design Vehicle (Turning Encroachment Permitted)**	HSU, Snowplow	HSU, Snow Plow, Fire Truck	Snow Plow, Fire Truck	WB-20 for non-truck routes, non-commercial/ industrial zones	N/A
Optional Design Vehicle (No Turning Encroachment)**	Fire Truck	N / A	WB-20 for truck routes, commercial / industrial zones	WB-20 for truck routes, commercial/ industrial zones	Long Combination Vehicles (LCVs)

HSU = Heavy Single Unit Truck
WB-20 = Tractor-Semitrailer with standard 53 foot trailer
* Does not include turning lane requirements
** Minimum intersection curb radius to be determined in conjunction with design vehicle of intersecting road using turning templates.
Minimize over design by using design vehicles from the lower road class.

Source: Table 1, Roads and Transportation, Design and Construction Manual, *Linear Municipal Infrastructure Standards*, 4-May-2020.

The chapter further identifies cross-section, geometric, and traffic control requirements on above and below grade infrastructure for local, minor collector, major collector and arterial (minor and major) roads.

3.3 Network Philosophy

The majority of travel in Brantford occurs on the City's streets, with the balance of travel occurring on off-street paths and trails, i.e. outside the street right of way. In order for the transportation network to serve all modes of travel, many of Brantford's streets will need to serve multiple, in some cases, all modes of travel. The "Complete Streets" approach to street planning and design seeks to create streets that provide safe mobility for users of all modes of travel, regardless of their age and ability. The Complete Streets approach is recommended to confirm that all mobility needs are being met, and to provide guidance for design retrofits to existing streets in Brantford, if needed, as well as for new streets in Brantford.

A complete transportation network for Brantford will include many complete streets, but those streets will not be uniform in design. Street design should change according to the transportation context (where the street is located in the transportation network for each mode of travel) and the land use context (what the lands along the street are used for). For example, ***Figure 3-1*** shows a complete street in a rural context, ***Figure 3-2*** shows a complete street in a suburban context, and ***Figure 3-3*** shows a complete street in an urban context.

Figure 3-1: Complete Street – Rural: Arundel Street Thunder Bay, ON

Image Credit: Google Maps

Figure 3-2: Complete Street – Suburban: Shellard Lane Brantford, ON

Image Credit: *Complete Street Transformations in the Greater Golden Horseshoe Region*, 2016

Figure 3-3: Complete Street – Urban: Bay Street Hamilton, ON

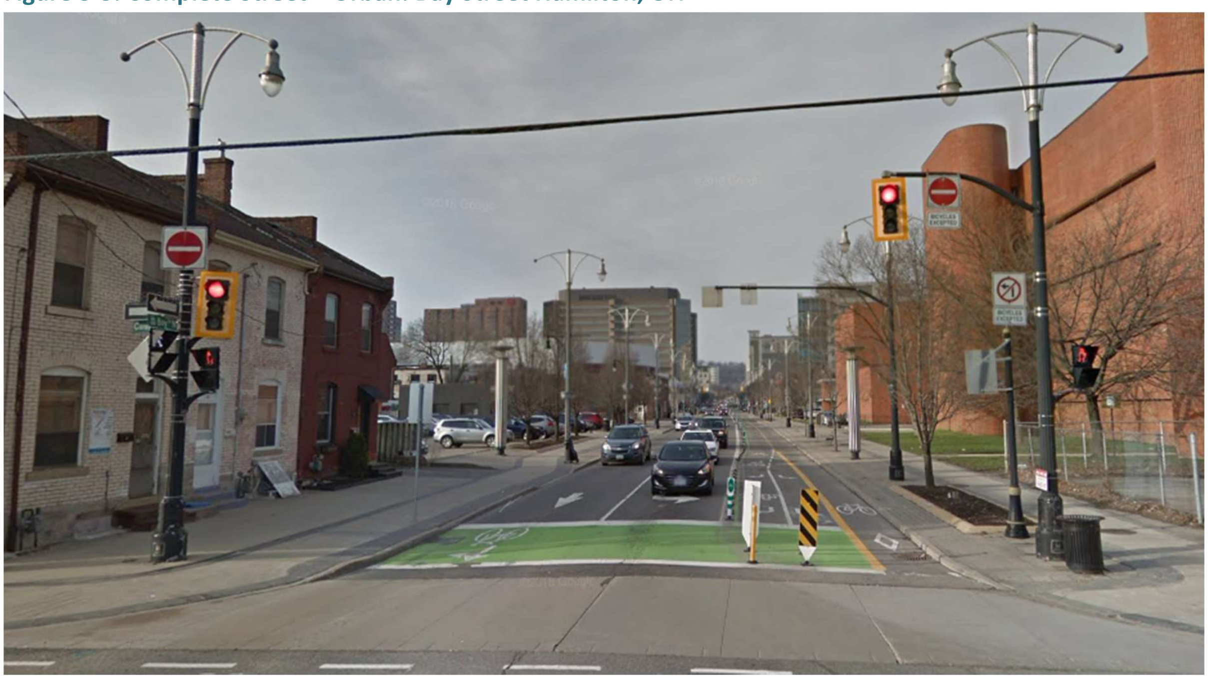


Image Credit: Google Maps

A complete transportation network for Brantford will also make use of off-street paths and trails to provide connections and close gaps in the walking and cycling networks. Paths and trails can also allow the walking and cycling networks to serve recreational trips, in addition to utilitarian trips.

A practitioner following a Complete Streets approach will consider the following questions when designing a retrofit to an existing street, or when designing a new street:

- What is the function of the street with respect to each mode of transportation?
- What features are required to provide safe mobility for all users, given the transportation functions of the street?
- What is the adjacent land use context?
- What features are appropriate for each mode of travel in this context?
- Does the available right-of-way allow for these features to be provided?
- If not, which modes should be prioritized?
- What are the trade-offs of deprioritizing the other modes?
- How can the trade-offs be addressed such that the transportation network still provides safe mobility for the modes that were deprioritized on the street in question?

The following sections provide information intended to help practitioners and decision-makers answer these questions.

3.4 Network Elements

Brantford's transportation network should serve the following modes of travel:

- Walking
  - Including mobility devices or wheelchairs, skateboards, roller blades and scooters
- Cycling
  - For both utilitarian and recreational trips
- Public Transit
  - Including Brantford Transit, Brantford Lift, regional bus service, and inter-regional train service
- Goods Movement
  - Including local deliveries and long-distance freight trips
- Automobile

In this chapter, references to "all modes of travel" or "all modes" refer to the modes of travel listed above. "All users" refers to all people using any of the modes listed above.

The following sections outline specific elements of Brantford's transportation network that provide safe mobility for each mode of travel. Each element is described in terms of its physical characteristics, the types of trips that it serves, and the context in which it is most appropriate.

3.4.1 Walking

3.4.1.1 Sidewalks

Sidewalks are dedicated paths for walking within street rights-of-way, usually parallel to the travel lanes. They are found on most of Brantford's streets, and they allow people to walk for utilitarian purposes, connect to local transit network, and for recreation. Cycling on sidewalks is prohibited. Where buildings line the street, sidewalks provide building access, in addition to mobility. ***Figure 3-4*** shows a typical sidewalk.

Figure 3-4: Sidewalk – Gaitwin Street and Hallmark Street Brantford, ON

Image Credit: Google Maps

3.4.1.2 Multi-Use Paths

Multi-Use Paths (MUP) provide a shared space for people walking and cycling. They are typically paved and provided within street rights-of-way (classified as "on-road"), typically offset from the curb by a grass or planted buffer space. They are also found outside of the road right of way (i.e. "off road") in parks and public reserves. Multi-use paths serve utilitarian and recreational walking and cycling purposes. Multi-use paths can be a solution to provide safe mobility for people walking and cycling when right-of-way constraints preclude separate facilities for those modes. Multi-use paths can also be used on streets with high traffic speeds and volumes, provided they are set back from the curb or shoulder. ***Figure 3-5*** and ***Figure 3-6*** illustrate examples of a typical multi-use path.

Figure 3-5: Multi-Use Path – Shellard Lane Brantford, ON

Image Credit: Google Maps

Figure 3-6: Multi-Use Path – Wayne Gretzky Parkway Brantford, ON

Image Credit: City of Brantford

3.4.1.3 Trails

Trails are paths located in public reserves (parks, open spaces and some natural areas), and are not found within the street right-of-way. They can be surfaced in crushed aggregate in rural areas and possibly paved with asphalt in high use or urban areas. The difference between a multi-use path and an off-road trail is that the trail may be designed for only a single user type, either pedestrians or cyclists, or they may be multiuse. Since trails are found off-street and are often intended primarily for recreational travel, they are best applied in contexts where the natural environment is attractive, such as along the Grand River, or in other non-road corridors, such as abandoned railway lines, hydro corridors, or industrial areas. They can also provide direct walking and cycling connections in rural areas where the street network is dispersed or in urban areas to provide connectivity within communities. ***Figure 3-7*** provides an example of a typical paved off-road trail.

Figure 3-7: Off-Road Trail (Paved) – Fordview Trail Brantford, ON

Image Credit: Google Maps

3.4.1.4 Crossings

Crossings can be classified as two types: uncontrolled and controlled. Ontario Traffic Manual (OTM) Book 15 provides practical guidance and application information on the planning, design, and operation of pedestrian roadway crossings treatments. The design and implementation of design standards should apply to all potential crossing in the City.

Uncontrolled locations are where pedestrians cross without any control measures or dedicated pedestrian right of way. Drivers are not required to yield right of way, meaning the onus is on the pedestrian to ensure that the way is clear to cross the roadway or intersection. In these conditions, signage can be provided to generate awareness for drivers and pedestrians that potential conflicts may arise. These conditions are generally found on low speed, low volume roadways where pedestrian use is also low, or in rural areas. ***Figure 3-8*** shows an uncontrolled pedestrian crossing with signage.

Figure 3-8: Uncontrolled Crossing (with Signage) – Erie Avenue at Dorothy Street Brantford, ON

Image Credit: Google Maps

Controlled crossings provide protection to pedestrians through controlled and dedicated space environments. The alternative crossing treatments include:

- Supervised School Crossing
- Stop Controlled or Yield Controlled Intersections (Crosswalk)
- Pedestrian Crossovers (PXO)
    - Level 1 Type A
    - Level 2 Type B
    - Level 2 Type C
    - Level 2 Type D
- Traffic Signals
    - Full Traffic Control Signals (Crosswalk)
    - Intersection Pedestrian Signals (IPS or half signals)
    - Mid-block Pedestrian Signals (MPS)

Supervised school crossings are locations close to schools where school children have to cross on route between home and school. School crossings are supervised by school crossing guards during specified hours and during regular school periods.

Stop Controlled or Yield Controlled Intersections use signs as a form of traffic control to assign and regulate right-of-way at intersections with the potential for conflict. Vehicles approaching a STOP / YEILD sign in advance of a crosswalk are required to stop / slow down or stop when necessary to yield the right-of-way to vehicular traffic and pedestrians whose arrival preceded theirs before proceeding.

Pedestrian Crossovers are designated locations for people to cross a roadway on foot. They can consist of as little as regulatory and warning signs, and pavement markings (Level 2 Type D) to regulatory signs, illuminated overhead warning signs, flashing amber beacons, and pavement markings (Level 1 Type A). The type of PXO is determined predominately by traffic speeds, vehicle volumes and pedestrian volumes. As traffic speeds and vehicle and/or pedestrian volumes increase, so too does level and type of PXO that would be required.

Traffic Signals alternate right-of-way between conflicting streams of vehicular traffic (Full Traffic Control Signals) or conflicting movements between vehicular traffic and pedestrians crossing a road (Pedestrian Signals) by displaying instructions through light emitted indications. Traffic Signals can be located in intersections or at mid-block locations.

Figure 3-9 shows pedestrian crosswalks at a stop controlled intersection, ***Figure 3-10*** shows the pedestrian crossover and ***Figure 3-11*** shows an Intersection Pedestrian Signal (IPS).

Figure 3-9: Stop Controlled Crossing – Darling Street at George Street Brantford, ON

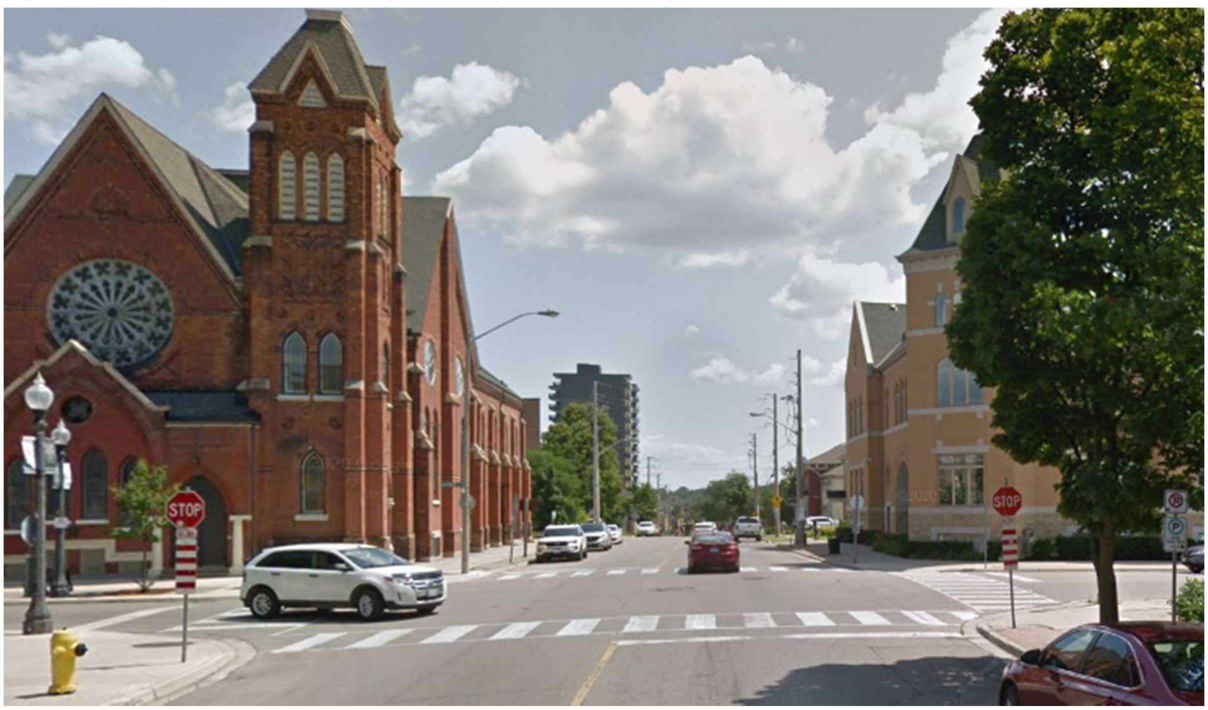


Image Credit: Google Maps

Figure 3-10: Pedestrian Crossover – Hollybush Drive Waterdown, ON

Image Credit: Google Maps

Figure 3-11: Intersection Pedestrian Signal – Shellard Lane at Assumption College Brantford, ON

Image Credit: Google Maps

3.4.2 Cycling

The multi-use paths, and trails described in the "Walking" section can serve cycling trips in addition to walking trips. The cycling network also includes the following elements.

3.4.2.1 Signed Bike Route

A signed bike route or shared roadway is a road where both motorists and cyclists share the same vehicular travel lane. Facilities include signage indicating the designation as a signed bike route, and may include shared use lane (sharrow) pavement markings. ***Figure 3-12*** shows an example of a signed bike route.

Figure 3-12: Signed Bike Route – Dufferin Avenue Brantford, ON

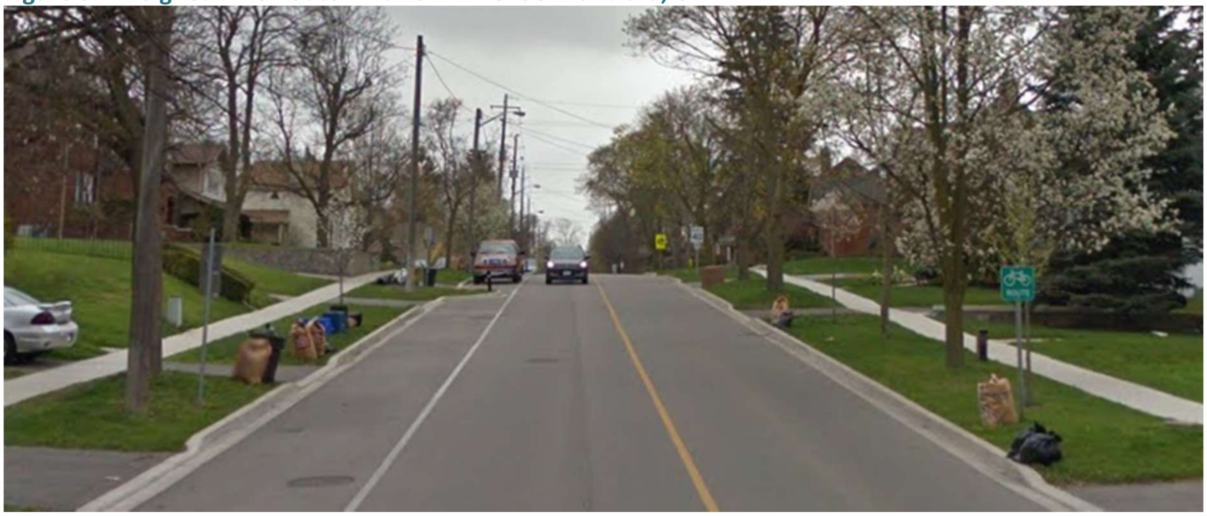


Image Credit: Google Maps

3.4.2.2 Bicycle Priority Street

Bicycle priority street or bicycle boulevards are streets where traffic volumes and speeds are limited to the extent that the entire roadbed provides safe cycling mobility. They may include traffic calming features to limit traffic speeds and volumes, and signage indicating the designation as a bicycle priority street. They serve utilitarian and recreational cycling trips. ***Figure 3-13*** shows an example of a bicycle priority street.

Figure 3-13: Bicycle Priority Street – Hay Street Winnipeg, MB

Image Credit: Google Maps

3.4.2.3 Paved Shoulders

Where a street has paved shoulders, instead of curbs and gutters, cycling trips can sometimes be safely accommodated on the shoulder. Paved shoulders can provide safe cycling mobility in low to moderate traffic speed and volume environments. Streets with shoulders are more common in rural areas with dispersed street networks than in urban or suburban areas. Rural areas often have more dispersed street networks, so paved shoulders may be the only cycling facility for some distance, and thus they may serve both utilitarian and recreational cycling trips. ***Figure 3-14*** shows typical paved shoulders.

Figure 3-14: Paved Shoulders – Centre Road Waterdown, ON

Image Credit: Google Maps

3.4.2.4 Bike Lanes

Bike lanes are spaces reserved for cyclists, delineated by painted lines and pavement markings. They typically are located within the street rights-of-way, on the road bed. Bike lanes are appropriate for streets with low to moderate traffic speeds and volumes. They can serve both utilitarian and recreational cycling trips. ***Figure 3-15*** shows conventional bike lanes.

Figure 3-15: Bike Lanes – North Park Street Brantford, ON

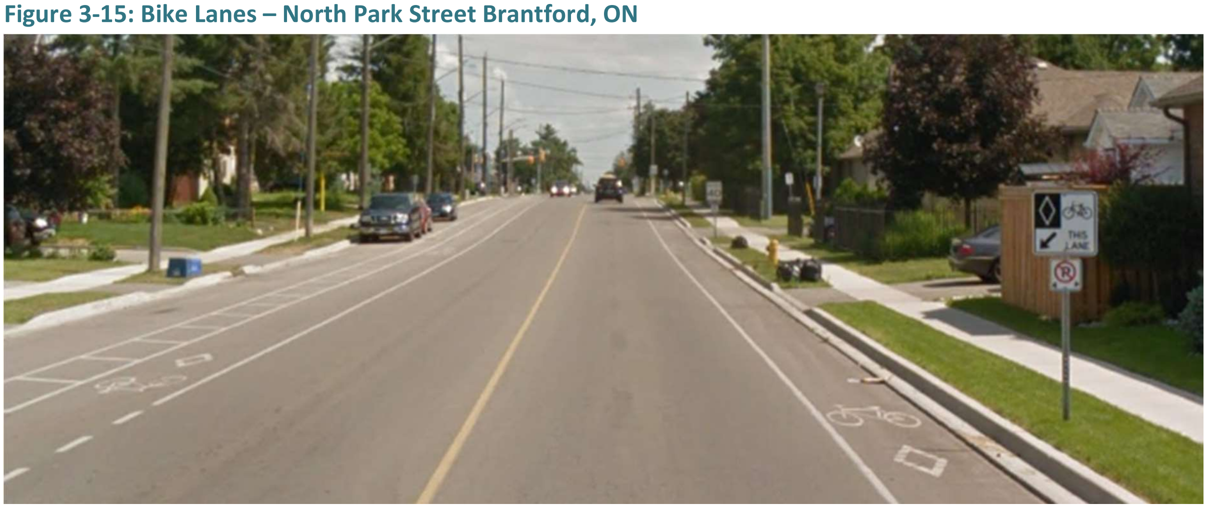


Image Credit: Google Maps

3.4.2.5 Buffered Bike Lanes

Buffered bike lanes are bike lanes separated from vehicular traffic by a painted buffer space. They are located within street rights-of-way, on the road bed. Buffered bike lanes are appropriate for streets with moderate traffic volumes and speeds. They can serve both utilitarian and recreational cycling trips. ***Figure 3-16*** shows buffered bike lanes.

Figure 3-16: Buffered Bike Lanes – York Boulevard Hamilton, ON

Image Credit: Google Maps

3.4.2.6 Cycle Tracks

Cycle tracks are bike lanes protected from vehicular traffic by physical barriers. These barriers can be bollards, purpose-built concrete, jersey barriers, planters, or other physical impediments. Cycle tracks can also be created by placing a bike lane near the curb, and dedicating space to parking between the bike lane and travel lanes. Cycle tracks can be used in pairs of single-direction cycle tracks, or as wider, two-way cycle tracks. Cycle tracks are located within street rights-of-way, either on the road bed or outside of the curb, at sidewalk level. They are appropriate on streets with moderate to high traffic speeds and volumes. ***Figure 3-17*** shows a one-way parking protected cycle track, ***Figure 3-18*** shows a two-way cycle track and ***Figure 3-19*** shows a one-way raised cycle track.

Figure 3-17: One-way Parking Protected Cycle Track – Herkimer Street Hamilton, ON

Image Credit: Google Maps

Figure 3-18: Two-Way Cycle Track – Cannon Street East Hamilton, ON

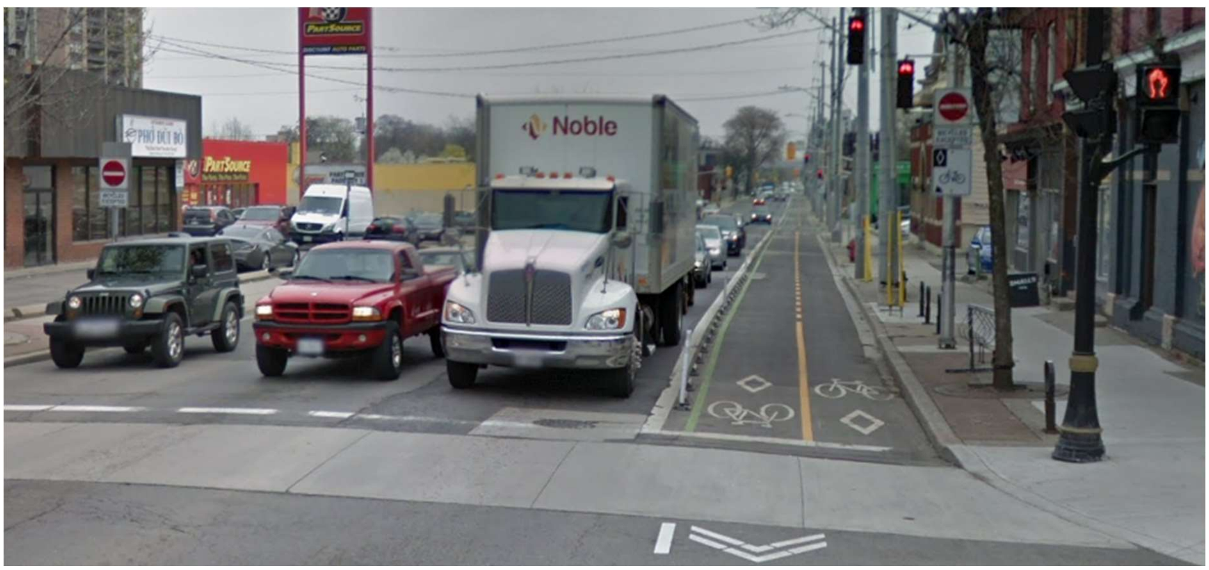


Image Credit: Google Maps

Figure 3-19: One-way Raised Cycle Track – Main Street Ottawa, ON

Image Credit: Google Maps

3.4.2.7 Crossrides

Crossrides are the equivalent of crosswalks, but for cyclists. They allow cyclists to cross intersections without dismounting. They are typically used at intersections on streets with cycle tracks or multi-use paths, and they can allow one or two-way crossings. They are distinguished by painted block tracks (known as Elephant's Feet) through the crossing, and they can include painted bicycle icons and/or coloured paint. Cross-rides can be designed to provide; separate, combined or mixed crossing spaces for cyclists and pedestrians. ***Figure 3-20*** shows an example of a separate crossride, ***Figure 3-21*** shows an example of a combined crossride and ***Figure 3-22*** shows an example of a mixed crossride.

Figure 3-20: Separate Crossride – Dundas Street West at Third Line in Oakville, ON

Image Credit: Google Maps

Figure 3-21: Combined Crossride – Shellard Lane at McGuiness Drive (east) Brantford, ON

Image Credit: Google Maps

Figure 3-22: Mixed Crossride – Shellard Lane at McGuiness Drive (west) Brantford, ON

Image Credit: Google Maps

3.4.3 Transit

Transit service in Brantford includes local service in the form of Brantford Transit and Brantford Lift, and regional service in the form of the GO Bus service, Greyhound regional transit, and Via Train Service. Elements of the transit networks include the following.

3.4.3.1 **Streets**

Brantford's streets allow Brantford Transit and Brantford Lift to provide local transit service. They also serve regional service for Greyhound regional transit and GO Bus service.

3.4.3.2 **Terminals**

Terminals are end or transfer points for transit service. They typically include space for transit vehicles to circulate and wait, as well as facilities for people waiting to board transit service. The lone transit terminal in Brantford is the shared Brantford Transit/Greyhound/GO Bus terminal at 64 Darling Street. ***Figure 3-23*** shows the transit terminal at 64 Darling Street.

Figure 3-23: Darling Street Transit Terminal

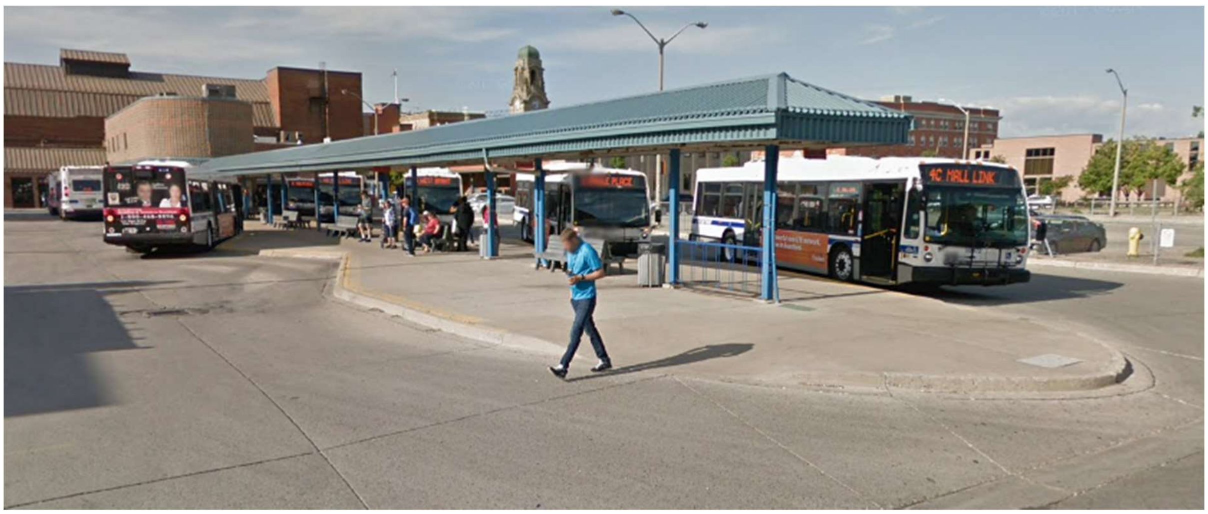


Image Credit: Google Maps

3.4.3.3 **Stops**

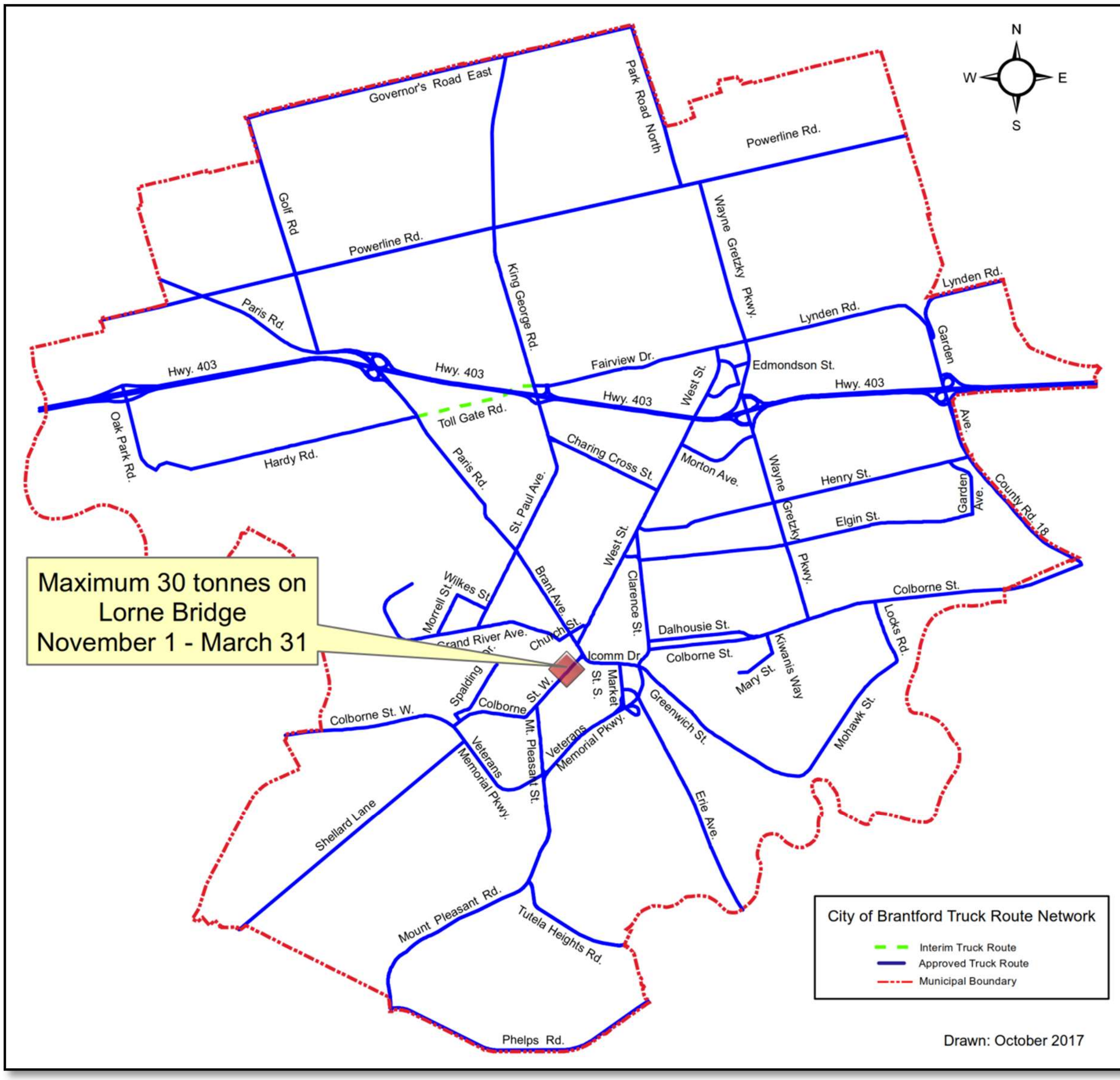
Transit stops are designated locations where Brantford Transit buses stop to allow people to board or disembark from buses. At a minimum, stops include signs indicating the routes that service the stop, and curbside concrete pads for people to board or disembark from buses. These pads should be connected to the sidewalk network. Stops can include benches and/or shelter structures. Stops serve people travelling on Brantford Transit service.

3.4.4 Goods Movement

3.4.4.1 **Truck Routes**

Brantford's streets generally permit delivery of goods to and from endpoints. Some streets are designated as truck routes, which serve regional goods movement and local activity centres for truck traffic. Truck routes are indicated by signage. Truck routes are appropriate in areas where land use is predominantly industrial, and they can be appropriate in commercial areas. Truck routes are less appropriate but sometimes required on lower-order streets with fronting residences. ***Figure 3-24*** illustrates Brantford's approved Truck Routes.

Figure 3-24: Brantford Truck Routes



3.4.5 Automobiles

3.4.5.1 Streets

Brantford's street network serves trips by automobile. Streets have varying characteristics depending on their role and function, as outlines in ***Table 3-1***. Classes of street vary in the number of lanes provided, speed limits, and forms of traffic control at intersections depending on their role and function, whether for mobility or for access.

Design and control measures are integral to mitigating the impacts of automobile use depending on the nature of the vehicles using the street and the land use adjacent to the street. As much as possible automobile speeds should be limited to low to moderate speeds in residential areas and in the Downtown, moderate speeds in commercial areas, and moderate to high speed where posted limits allow on higher classification roadways (e.g. Wayne Gretzky Parkway).

3.4.5.2 Intersections

An intersection is an at-grade junction where two or more streets meet. These locations have significant potential for conflicts (vehicle-vehicle and or vehicle-bike/pedestrian movements) and delay (reduction in the capacity of a road segment due to these conflicts). To manage these issues, where warranted by volume and safety considerations, traffic control measure are implemented to designate priority to specific movements.

Based on the concept of volumes and priorities, intersections can be divided into traffic control categories according to whether they are uncontrolled, stop/yield control (unsignalized, simple priority), signal control (time sharing), roundabout (space sharing), or grade separated (interchanges, with or without signal control).

The Roads and Transportation, Design and Construction Manual, Linear Municipal Infrastructure Standards (4-May-2020), provides the general requirements and assessment tools to be used in the assessment of the most appropriate traffic control to be implemented.

Over the course of the last three to four years, a specific vision for intersections has been developed which promotes the application of roundabouts as the preferred method of traffic, where volumes, types of activity, land availability, and cost permit. Specifically, on March 21, 2017 Council directed through a Resolution, for:

- Staff to INVESTIGATE and report back to Council with a process to develop a policy, standards and appropriate traffic control/parking by-law amendments to support the implementation of modern roundabouts in the City of Brantford, considering the policies in adjacent communities, such as the Region of Waterloo; and
- Staff to DEVELOP these policies and report back to Council with candidate locations for roundabouts in the community where a feasibility study can be implemented in conjunction with approved road construction projects in the City's ten-year capital forecast.

Further to this Council Resolution, staff investigated and developed policy positions toolkits for calming and roundabout implementation, as is documented in the following staff reports:

- April 16, 2019 (Report No. 2019-164), Roundabout Installation Policy Development;
- October 8, 2019 (Report No. 2019-377), Roundabout Installation Policy Development Update; and
- March 2, 2020 Vision Zero Road Safety Committee – Traffic Calming Update [Financial Impact – None], 2020-159 and Traffic Calming Policy – Amendment [Financial Impact – None], 2020-160.

The culmination of these investigations was Policy Number: Public Works-021, Roundabout Installation Policy. To summarize:

- Policy Statement: To provide a guideline for the City of Brantford to determine if a roundabout is the appropriate intersection control for arterial or collector roadways in new subdivisions, and provide for a standardized procedure for the planning, design and implementation of such.
- Objective: Roundabouts should be considered the default intersection control for new developments unless all way stop or signal control is proven to be a superior choice, particularly at two-lane road intersections. As such, the goal of this policy is to develop a set of procedures to screen and assess whether subject intersections should be roundabout controlled: define a roundabout and its core elements, in comparison to other types of circular intersections; discuss principles of considerations (advantages vs. disadvantages); lay out the initiation, planning (screening and assessment phases), review and approval process.

This procedural and analysis tool kit to achieve this objective relative to intersection control has now been incorporated into the Linear Design Manual and the City's Roundabout Installation Guidelines.

3.5 Network Planning Guidelines

Brantford's transportation network for each mode of travel should allow people to access all of Brantford on safe and convenient transportation facilities that are in harmony with the adjacent land use context. This is a "complete" transportation network.

3.5.1 Principles

The following principles should guide the planning and design of Brantford's transportation network:

- Create complete, continuous, networks for each mode of travel.
- Balance the needs of users travelling along the street with the needs of people living, working, and playing adjacent to the street.
- Protect and enhance natural features and ecological systems.
- Maximize social and economic activities.
- Manage vehicle speeds to create more hospitable environments for pedestrians, cyclists, and transit users.

3.5.2 Guidelines

The following guidelines can be used to help plan and design Brantford's transportation network according to the principles listed above:

- Provide appropriately spaced, connected, high-quality facilities for each mode of travel:
    - Walking: include sidewalks on both sides of all streets. Sidewalk design should include tactile plates and ramping to improve accessibility and should avoid curb-faced sidewalks wherever possible;

   - Cycling: cycling facilities (paths, lanes) should be spaced every 200 m (or less). Refer to the Cycling Street Types (**Section 3.5.4.2**) for the types of cycling facilities appropriate for each street type. Cross-rides (intersection control treatments) should be used where any of these facilities cross collector or arterial streets;
   - Transit: space transit routes a maximum of 800 m apart (i.e. maximum of 400 m walking distance);
   - Goods Movement: space truck routes 1,600 m (or less) apart where the road network permits; and
   - Automobiles: include collector streets at 800 m (or less) spacing, and arterial streets at 1,600 m (or less) spacing, where the road network permits, while maintaining Transportation Association of Canada (TAC) recommended minimum spacing.
- Limit street block lengths. Blocks should be 150 to 175 m in length. Where blocks exceed these lengths, use alleys, multi-use paths, and trails to create pedestrian and cyclist crossings at these intervals;
- Improve pedestrian accessibility within blocks. Provide connections via alleys, service courts, and other access connections;
- Provide multiple street connections between neighborhoods. Rather than forcing inter-neighborhood travel out onto major collector and arterial streets, connect lower order streets between neighborhoods;
- Provide multiple community access points, minimize use of cul-de-sacs to ensure that communities are accessible and connected at all times (maximum 250 m dead end distance to be observed).;
- Maintain pedestrian and cyclist connections across barriers. Provide separate, dedicated pedestrian and cyclist connections over or under freeways and geographic barriers such as rivers;
- Maintain network quality and growth. Allow the network to grow and expand through development, revitalization, intensification, and redevelopment. Avoid increasing street widths or the number of travel lanes;
- Provide on-street curbside parking on the local and minor collector streets where possible. Parking restrictions should be considered on high volume, high speed roads, or locations where the right-of-way is constrained resulting in limited space and that space is required to accommodate alternative active travel mode(s).;
- Limit design speeds. All local and collector streets should have their design speed match the desired operating speed. To control speeds on long, straight streets, reduce driver comfort at high speeds by using context appropriate traffic controls, narrow lane widths, traffic calming, and boulevard features.;
- Discourage poor-performing features. Maintain a highly functioning network by discouraging:
   - On-street parking in areas with constrained right of way, allowing for better active mode allocations (wider sidewalks, enhanced streetscapes, bike lanes, or other means that enhance the public realm);
   - Gated streets and communities;
   - Widening of streets;

  - Conversion of city streets to limited access facilities; and
  - Streets lacking street trees.
- Create streets that increase network "completeness". The "completeness" index is described below; and
- Roundabouts should be considered the default intersection control for new developments unless all way stop or signal control is proven to be a superior choice.

3.5.3 Performance Measures

3.5.3.1 Completeness

A "complete" transportation network for Brantford will allow people to use each mode of travel to access all of Brantford via safe, convenient transportation facilities that are in harmony with the adjacent land use context. In order to evaluate how complete Brantford's transportation network is for a given mode of travel it is helpful to ask: "how much of Brantford can I get to by this mode of travel, using only safe (low risk for collisions or injury, comfortable environment), convenient transportation facilities that are in harmony with the adjacent land use?"

The answer to that question will be a percentage value representing the portion of Brantford that you can access. That percentage will vary depending on the mode of travel, and the starting location. If that question were asked and answered for every property in Brantford, and the results averaged, the result would be a percentage value indicating how complete Brantford's transportation network is for that mode of travel. The process could be completed for each mode of travel, giving a percentage value indicating how complete Brantford's transportation network is for each mode of travel.

It is unrealistic to expect every street to serve every mode at a high level, and some travel on less than optimal facilities is to be expected at the start and end of most trips. To account for this, each mode of travel has an acceptable "buffer distance" at the start and end of trips. Properties within the straight-line buffer distance from a high-quality facility are considered to have access to that facility, any other facilities that it is directly connected to, and any properties within the buffer distance of those facilities.

Buffer distances are consistent with the spacing guidelines from the preceding section. Buffer distances are:

- Walking: 1m, in order to be considered connected, properties must have a sidewalk/multi-use path on the street directly in front of the property;
- Cycling: 100 m;
- Transit: 400 m;
- Goods Movement: 800 m; and
- Automobile: 400 m from a collector street or 800 m from an arterial street.

3.5.4 Street Types

The City of Brantford's Roads and Transportation Design and Construction Manual (May 2020) presents five main types of streets, each having different right-of-way widths and intended functions. ***Table 3-1*** in ***Section 3.2.3*** provides description of the street classification characteristics.

Local streets have a single lane in each direction, and carry low volumes of traffic at low to moderate speeds. These streets are primarily for access to neighbourhoods / individual properties. Minor collector streets carry low to moderate traffic volumes at low to moderate speeds, and can be designed to accommodate transit buses. Major collector streets have two travel lanes in each direction, and carry moderate traffic volumes at low to moderate speeds. Collector streets have a balanced role between land access and mobility. Arterial streets carry moderate traffic volumes at high speeds, and can be designed for tractor-trailers. These streets primarily serve a mobility function (limited access).

Collector and arterials streets can be designed with varying design speeds and design vehicles, and can utilize a range of design speeds. The appropriate selection of design speed, posted speed, and design vehicle depends on three main factors:

- Adjacent land use context, particularly building orientation;
- Presence or absence of on-street parking; and
- Existing or expected heavy vehicle traffic.

Where buildings are placed close to the street right-of-way and on-street parking is permitted, the street may be considered a "main street", and lower design speed and posted speeds should be used.

Each of the street types serves different functions, and prioritizes the travel modes differently. ***Table 3-2*** outlines the prioritization for each mode of travel on each street type.

Table 3-2: Mode Priority by Street Type

Street Type	Walking	Cycling	Transit	Goods Movement	Automobile
Arterial	🟡	🟢	🟢	🟢	🟢
Major Collector	🟢	🟢	🟢	🟡	🟡
Minor Collector	🟢	🟢	🟡	🟡	🟡
Local	🟢	🟡	🟡	🔴	🟡

🟢 Accommodated at a high level of service
🟡 Accommodated with variable standards
🔴 Not required, or poor performance is acceptable

The functional categories and characteristics, as detailed in ***Table 3-1***, can be overlaid with the modal priority characteristics in ***Table 3-2***, to provide an enhanced Street Mobility Characteristic as shown on ***Table 3-3***.

Table 3-3: Street Classifications Update

	Laneway	Local Streets (Up to 18.5 m ROW)	Minor Collector Streets (Up to 24.5 m ROW)	Major Collector Streets (Up to 30.5 m ROW)	Arterial Streets (Up to 40.0 m ROW)
Number of Through Lanes per Direction*	1	1	1	1-2	1-3
Typical Traffic Volumes (AADT)	Less than 1,000 vehicles per day	Less than 2,000 vehicles per day	2,000 to 8,000 vehicles per day	8,000 to 12,000 vehicles per day	8,000 to 20,000 vehicles per day
Posted Speed Range (km/h)	Preferred 30, up to 50	Preferred 40, up to 50	Preferred range of 40 to 50, up to 60	As low as 40, to a typical range of 50 to 60	Preferred 60, up to 80
Minimum Design Speed (km/h)	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed	0-10 km/h > Posted Speed
Primary Design Vehicles (No Turning Encroachment)**	Passenger Car	Passenger Car	Passenger Car, Transit Bus, HSU	Passenger Car, Transit Bus, HSU, Snow plow, Fire Truck	Passenger Car, Transit Bus, HSU, Snow plow, Fire Truck, WB-20
Low Frequency Design Vehicle (Turning Encroachment Permitted)**	HSU, Snowplow	HSU, Snow plow, Fire Truck	Snow plow, Fire Truck	WB-20 for non-truck routes, non-commercial / industrial zones	N/A
Optional Design Vehicle (No Turning Encroachment)**	Fire Truck	N / A	WB-20 for truck routes, commercial / industrial zones	WB-20 for truck routes, commercial / industrial zones	Long Combination Vehicles (LCVs)
Mobility Function vs Land Access	Access primary role	Access primary role	Equal role in mobility and access role	Equal role in mobility and access role	Mobility movement primary role
Flow Type	Interrupted flow	Interrupted flow	Interrupted flow	Moderate interruption to flow	Minimal interruption to flow
Accommodation for pedestrians	Sidewalk on one or both sides	Sidewalk both sides	Sidewalk both sides	Sidewalk both sides OR MUP both sides	Sidewalk both sides OR Sidewalk one side with MUP the other
Accommodation for cyclists	Shared in road	Shared in road	On road bike lane both sides	On road bike lane both sides OR MUP both sides	On road buffered / protected bike lane both sides OR MUP one side
Parking	On street parking both sides	On street parking both sides	On street parking one or both sides	Parking restricted or prohibited	Parking prohibited

HSU = Heavy Single Unit Truck
WB-20 = Tractor-Semitrailer with standard 53 foot trailer
* Does not include turning lane requirements
** Minimum intersection curb radius to be determined in conjunction with design vehicle of intersecting road using turning templates. Minimize over design by using design vehicles from the lower road class.

The following sections provide detail on how each mode of travel can be accommodated on each of the street types.

3.5.4.1 Walking

Sidewalks can accommodate walking on all street types. Where design and posted speeds are greater than 50 km/h, sidewalks should be buffered from the travel lanes by at least 2.0 m. Since walking should be accommodated at high levels of service on local streets and collector streets, those streets should have sidewalks on both sides. Arterial streets should include sidewalks or one of sidewalk and MUP, on each side of the road, and sidewalks should be included on both sides where buildings are set close to the street right-of-way.

Pedestrian crosswalks should be provided at all signalized intersections, on all legs, involving collector or arterial streets (except under special circumstances, i.e. where intersection is under jurisdiction of the Ministry of Transportation of Ontario). Mid-block signals or guard-controlled crossovers should be provided in order to provide safe and efficient pedestrian environments at the spacing outlined in the network planning guidelines, where pedestrian activity warrants. Tactile plates and ramping should be used at all pedestrian crossing locations in order to improve accessibility.

3.5.4.2 Cycling

Appropriate cycling facilities vary based on the street type. Local streets can be designated as bicycle priority streets, where the only infrastructure required is measures to maintain low vehicle speeds and volumes. For minor collector streets, lanes, buffered lanes, cycle tracks, and multi-use paths are appropriate. For major collector and arterial streets, cycle tracks or multi-use paths are appropriate.

Cross-rides are appropriate for intersections between bicycle priority streets and collector or arterial streets, and for intersections along streets with cycle tracks or multi-use paths.

3.5.4.3 Transit

Transit routes are typically not included on local streets. Collector and arterial streets serve transit routes, and as such, transit stops can be included along each of these types of streets. Stops can be included close to intersections with local streets to provide convenient access to the local streets.

3.5.4.4 Goods Movement

Truck routes are inappropriate for local streets, although local streets do provide basic access for deliveries. Minor collector streets are normally not designated as truck routes. Major collector streets and arterial streets typically make up the truck route network to allow for through movement of trucks.

3.5.4.5 Automobiles

Table 3-1 presents some of the key features for automobiles, including design and posted speeds and number of travel lanes.

3.6 Network Assessment

Goals and objectives were established for each mode of travel, based on a technical review and based on input from stakeholders and the public. The following sections describe these goals/objectives.

3.6.1 Walking

3.6.1.1 Goals and Objectives

GOAL: Be a complete, accessible, and pedestrian-friendly community with networks that integrate with transit, paths and trails, neighbourhood amenities, parks, open space, and schools.

OBJECTIVES:
1. Facilities provide a high level of pedestrian connectivity.
2. Walking environment is safe for users.
3. Pedestrian accessibility, comfort, and mobility levels of user support walking as a preferred mode.

3.6.1.2 Projects

The provision of walking infrastructure should conform to the Linear Municipal Infrastructure Standards. The typical right of way cross sections identified in the standards provide reasonable guidance related to horizontal design elements for the allocation of space in the right of way, by street classification. ***Table 3-4*** provides an overview of the right of way by road type, and the associated requirement for pedestrian space.

Table 3-4: Cross Section Design Elements – Walk

Road Type	R.O.W. (m)	Road Width (m)	Sidewalk (m)	M.U.P. (m)
Local	18.5	10.2	1.5 – both sides	-
Minor Collector	24.5	12.9 to 15	1.8 – both sides	-
Major Collector	27.5	18.8	1.8 – both sides	-
Major Collector	30.5	18.0	-	3.0 - both sides
Arterial	40	21.4	1.8 – both sides	-
Arterial	40	22.7	1.8 – one side	3.0 - one side

Consideration might be given to providing 2 m sidewalk widths in areas of high student pedestrian traffic or with high mobility device use such as hospitals or retirement homes and the like. With vulnerable users, especially those of primary school age where bicycle use maybe prevalent, consideration might also be given to the provision of multi-use paths on minor collector type streets.

3.6.2 Cycling

3.6.2.1 Goals and Objectives

GOAL: Provide safe and convenient bicycle routes suitable for all user types: utilitarian (commuting), recreational (personal or family discretionary), and sport (advanced, high level recreational).

OBJECTIVES:
1. There is a continuous network of safe and direct bicycle routes.
2. There is an ability to navigate the bicycle network with ease.
3. End-of-trip facilities support cycling as a preferred mode of transportation.
4. The bicycling environment is safe.
5. Provide unique and specific design environments appropriate for the different types of users.

3.6.2.2 Projects

The provision of cycling infrastructure should conform to the Linear Municipal Infrastructure Standards. The typical right of way cross sections identified in the standards provide reasonable guidance related to horizontal design elements for the allocation of space in the right of way, by street classification. ***Table 3-5*** provides an overview of the right of way by road type, and the associate requirement for cyclist space.

Table 3-5: Cross Section Design Elements – Cycle

Road Type	R.O.W. (m)	Road Width (m)	Bike Lane (m)	M.U.P. (m)
Local	18.5	10.2	-	-
Minor Collector	24.5	12.9 to 15	1.9 – both sides	-
Major Collector	27.5	18.8	1.9 – both sides	-
Major Collector	30.5	18.0	-	3.0 - both sides
Arterial	40	21.4	1.9 – both sides (buffered)	-
Arterial	40	22.7	1.9 – one side	3.0 - one side

Again, areas with vulnerable users, especially those of primary school age where bicycle use maybe prevalent, consideration might also be given to the provision of MUP on minor collector type streets.

3.6.3 Transit

3.6.3.1 Goals and Objectives

GOAL: Foster an efficient, affordable, safe, and accessible transit system that is an attractive alternative to the private vehicle and integrates with all other elements of the transportation system.

OBJECTIVES:

1. Transit contributes to a more environmentally sustainable community.
2. Transit is well integrated with all other transportation modes.
3. A robust frequent transit network serves the community.
4. There are high levels of bus stop accessibility and safety.
5. There is public awareness that transit is an attractive alternative to the private vehicle.
6. Design of the system must not neglect the design of the vehicle and the design of facilities, remembering that transit needs to provide the rider with a great experience to develop and maintain strong ridership levels.

3.6.3.2 Projects

The short- and medium-term service elements for transit have been identified in the City's 2016 Transit Service Plan (TRANSformation2021). To maintain the current mode share of transit at a minimum and to further expand service into new development areas, significant investment is required in the transit system. A long-term transit strategy is required to achieve the objectives noted above. To that end, a transit specific master plan study is required to lay out the infrastructure, equipment, and operational needs of the City's transit service.

3.6.4 Goods and Services Movement

3.6.4.1 Goals and Objectives

GOAL: Maintain and enhance the efficient movement of goods and service (including emergency and municipal services).

OBJECTIVES:

1. Truck traffic (except delivery service) avoids areas designated for high-density residential, mixed use, and pedestrian- and transit-oriented development.
2. There is a high level of goods and emergency services mobility on major regional routes.
3. Goods and municipal and emergency services are being delivered at a local level.
4. High level of accessibility and mobility for emergency services.
5. While there is a focus on street design for placemaking, continued accommodation of appropriate design vehicles, including local deliveries and long-distance freight trips, is necessary.

3.6.4.2 Projects

Provisions for goods movement in the City needs to be reflected in the design of the transportation network. In order to ensure that streets can be designed for placemaking, it is important that major destinations for truck traffic be connected via major corridors. Truck infiltration to roadways that are not designed for truck traffic occurs when destinations are not connected appropriately or consistently.

Road network design is vital to defining a comprehensive and effective goods movement plan.

3.6.5 Road Network

3.6.5.1 Goals and Objectives

GOAL: Provide for responsible planning and development of roads, and transportation connections to facilitate the efficient movement of people. Ensure that traffic control is considered that places emphasis on safe, efficient, and sustainable for all modes.

OBJECTIVES:

1. Provide road network connectivity that supports local and regional mobility.
2. There is a balance between traffic congestion and mobility performance.
3. All systems integrate and work together to move people, goods, and services.
4. Roads adapt to accommodate the future, including appropriate traffic controls.

3.6.5.2 Projects

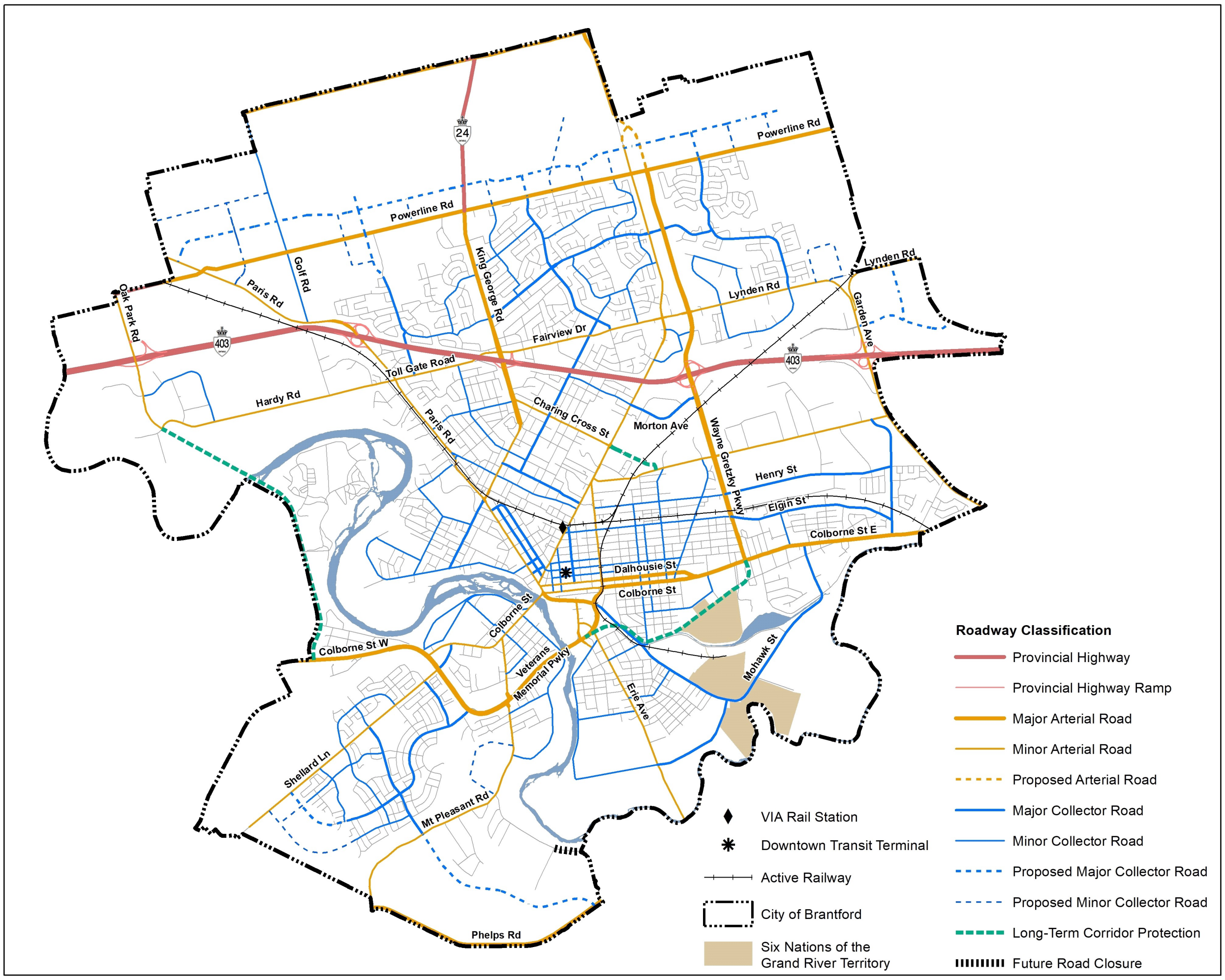
The provision of vehicle (auto, transit, truck) infrastructure should conform to the Linear Municipal Infrastructure Standards. The typical right of way cross sections identified in the standards provide reasonable guidance related to horizontal design elements for the allocation of space in the right of way, by street classification. ***Table 3-6*** provides an overview of the right of way by road type, and the associated requirement for vehicle space.

Table 3-6: Cross Section Design Elements – Private / Public Vehicle

Road Type	R.O.W. (m)	Road Width (m)	Travel Lane	Permitted Vehicle
Local	18.5	10.2	3.5 m – 1 lane per direction	auto / some transit / local truck
Minor Collector	24.5	12.9 to 15	3.5 m – 1-2 lanes per direction	auto / some transit / local truck
Major Collector	27.5 to 30.5	18.8	3.5 m – 1-2 lanes per direction	transit / truck
Arterial	40	21.4 to 22.7	3.7 m – 1-3 lanes per direction	transit / truck

A review of the City's roadway network was undertaken in consideration of these design elements, and the functional classification confirmed as shown in ***Figure 3-25.***

Figure 3-25: Roadway Classification



4.0 Transportation Assessment

This chapter describes the process of assessing the future 2041 travel conditions, evaluating alternative strategies for addressing identified issue, and selecting a strategic recommended plan for transportation planning in Brantford to 2041. The assessment builds on the data and analysis approach identified in the ***Study Foundation*** (Chapter 1) and ***Complete Streets Framework*** (Chapter 3).

The performance of the transportation system was assessed using the City's strategic travel demand forecasting model. This model accounts for land-use (at a traffic zone level of detail, as provided by the Municipal Comprehensive review process) trip generation, trip distribution, and mode split in assigning travel demands to the transportation network. The assigned vehicle volumes are then compared to the capacity of the infrastructure at a corridor and roadway link level (i.e. volume to capacity assessment). This analysis tool also allows for the detailed evaluation of the origins and destinations for trips using specific infrastructure.

Travel demands were then used to identify the impacts of the alternative strategies on the corridor performance and assist in the identification of the impact of alternatives considered to address the identified roadway constraint.

It is important to understand that infrastructure and service provisions in one corridor can have impacts, positive and negative, in other corridors. Problems identified and solutions assessed during the transportation analysis are mindful of this interdependency between corridors.

The resulting recommended plan includes a combination of: optimising existing transportation infrastructure, adding additional transportation infrastructure, and managing travel demand.

4.1 Do Minimal

The capacity constraints by 2041, accounting for proposed growth under a transportation network scenario with minimal improvements over today's condition, were identified. The changes to the road network include only short term committed projects (e.g. The Oak Park Road/Highway 403 interchange upgrade), collector roads required to support the expansion growth areas (required to provide access to future development), and the closure of Tutela Heights Road in the vicinity of Davern Road (as a result of the Tutela Heights Slope Stability EA). An overview of the link and screenline capacity and performance in the PM peak hour for the 2041 Do Minimal network are illustrated ***Figure 4-1*** and ***Table 4-1*** respectively.

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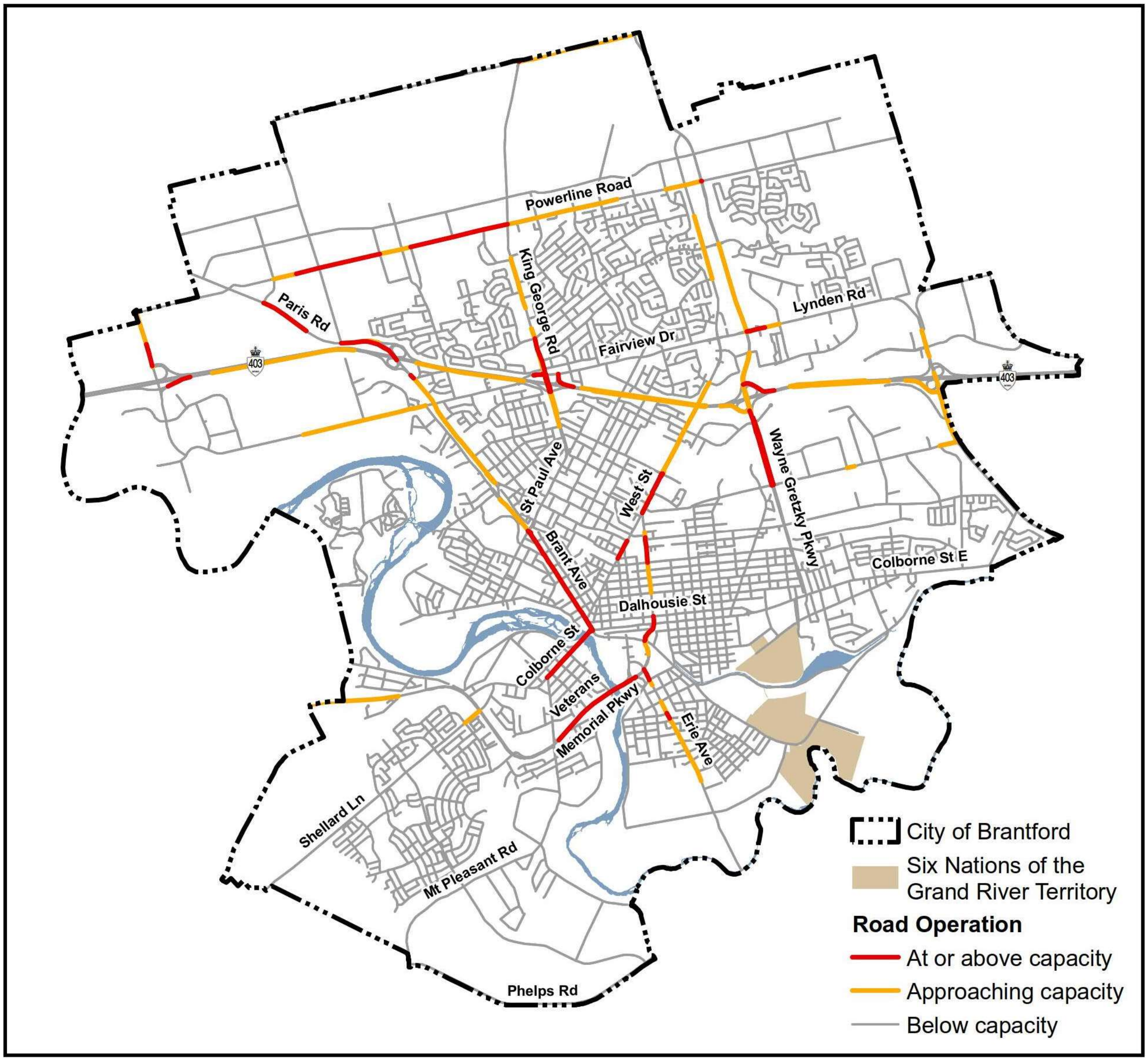
Figure 4-1: 2041 Do Minimal Network: Capacity Constraints



Overall, the 2041 Do Minimal network assessment shows that many of the arterial roads will be operating at or above capacity in the PM peak hour. Growth in travel has resulted in a significant decrease in network performance. Existing issues crossing Highway 403 and the Grand River are exacerbated by growth, and new issues have emerged (as a result of boundary expansion) along the north-south roadways connecting the downtown and growth areas to Highway 403.

Table 4-1: 2041 Do Minimal: Screenline Assessment

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	7	8,100	6,696	0.83	6,073	0.75
1	Grand River South	WB	7	8,100	4,404	0.54	7,450	0.92
2	Grand River North	EB	4	5,200	3,096	0.60	4,113	0.79
2	Grand River North	WB	5	6,000	2,756	0.46	3,822	0.64
3	Highway 403	NB	13	10,800	6,908	0.64	9,039	0.84
3	Highway 403	SB	13	10,800	7,296	0.68	9,254	0.86
4	King George Road	EB	11	9,600	5,201	0.54	8,413	0.88
4	King George Road	WB	11	9,600	6,792	0.71	7,269	0.76
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,399	0.58	6,210	0.82
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,312	0.70	5,827	0.77
6	Wayne Gretzky Parkway (South)	EB	7	4,900	1,986	0.41	2,302	0.47
6	Wayne Gretzky Parkway (South)	WB	7	4,900	1,600	0.33	2,822	0.58
7	Memorial Drive	EB	9	6,100	1,687	0.28	3,025	0.50
7	Memorial Drive	WB	9	6,100	2,339	0.38	2,599	0.43
8	West Street	EB	6	4,300	2,074	0.48	3,041	0.71
8	West Street	WB	6	4,300	2,671	0.62	3,032	0.71
9	CNR Corridor	NB	11	7,900	4,369	0.55	4,986	0.63
9	CNR Corridor	SB	11	7,900	4,231	0.54	6,068	0.77
10	Garden Avenue	EB	9	8,800	4,571	0.52	5,701	0.65
10	Garden Avenue	WB	9	8,800	4,389	0.50	6,052	0.69
11	Powerline Road	NB	13	9,400	4,158	0.44	5,843	0.62
11	Powerline Road	SB	13	9,400	4,671	0.50	6,092	0.65
12	Murray Street	EB	7	4,400	1,932	0.44	1,860	0.42
12	Murray Street	WB	8	5,200	1,589	0.31	2,381	0.46
13	West External	EB	7	7,300	1,711	0.23	2,241	0.31
13	West External	WB	7	7,300	1,664	0.23	2,190	0.30
14	South-West External	NB	4	4,300	1,560	0.36	1,168	0.27
14	South-West External	SB	4	4,300	949	0.22	1,632	0.38
15	East External	EB	5	6,900	2,931	0.42	3,448	0.50
15	East External	WB	5	6,900	2,996	0.43	3,634	0.53
16	North-East External	NB	3	3,200	1,355	0.42	1,614	0.50
16	North-East External	SB	3	3,200	1,168	0.37	2,281	0.71
17	North-West External	NB	3	3,300	780	0.24	929	0.28
17	North-West External	SB	3	3,300	791	0.24	978	0.30

<u>Legned:</u>		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Notes: i) For more details on sreeenlines in general please see *C**hapter 2.0.Transportation Impacts of Growth***.

ii) Screenlines are illustrated in ***Figure 2-3*** .

iii) Total (capacity) = the total roadway vehicle capacity of all lanes that cross a particular screenline in a particular direction.

iv) Volume = the total number of vehicles that cross a particular screenline in a particular direction during a particular peak hour.

The following critical deficiencies were identified in the road network for the PM peak hour:

- Inter-regional (significant number of trips in the corridor are to/from areas outside of Brantford)
  - Brant Avenue - St Paul Avenue to Colborne Street
  - Wayne Gretzky Parkway - Henry Street to Highway 403
  - Wayne Gretzky Parkway - North of Highway 403
  - King George Road - Crossing Highway 403
  - Paris Road - Highway 403 to Powerline Road
- Intra-regional (significant number of trips in the corridor are to/from areas within Brantford)
  - Lorne Bridge (Colborne Street) - Grand River Crossing
  - West Street - Charing Cross Street to Henry Street
  - Veterans Memorial Parkway - Mt. Pleasant Street to Market Street
  - Paris Road - South of Highway 403
  - Powerline Road - Paris Road to Wayne Gretzky Parkway
  - Hardy Road - Ferrero Boulevard to Paris Road
  - Erie Avenue - Veterans Memorial Parkway to Birkett Lane
- Local System (trips primarily local in nature)
  - Clarence Street/Clarence Street South – Dalhousie Street to Icomm Drive
  - Colborne Street West – County Road 7 (Pleasant Ridge Road) to D'Aubigny Road

4.2 Alternative Transportation Strategies

The 2020 TMP's strategic transportation direction follows the previous 2007 and 2014 TMP's closely. The 2007 and 2014 strategies were built on two principle themes:

- Increase the supply of transportation infrastructure (optimize, expand and new facilities); and
- Manage travel demand (cost, behaviour, land use).

The 2020 TMP update refines these themes as follows:

- **Travel Demand Management** (TDM) - Manage travel demand (cost, behaviour [including mode choice], land use);
- **Transportation System Management (TSM)** - Manage the transportation infrastructure to optimize efficiency and safety for all modes (provide space and operating environment for all modes); and
- **Infrastructure Enhancements** - Increase the supply of transportation infrastructure (expand existing and add new facilities).

The impacts of these strategies have been updated to reflect the new growth forecasts and network capacity improvements to the 2041 horizon year. Ultimately when implementing these strategies, minimizing impacts to the environment, including properties, and City finances are significant considerations.

4.2.1 Travel Demand Management

Travel Demand Management (TDM) is a wide range of policies, programs, services and products that influence how, why, when, and where people travel to create a more sustainable transportation network. The objectives are to encourage individuals to:

- utilize alternate modes of transportation (walk, cycle, take transit or carpool instead of driving alone);
- travel less (telework, link several purposes in one trip); or
- change trip times or routes (choose off-peak hours or less congested roads).

Ultimately, a TDM strategy focuses on the modification of travel behaviour by encouraging people to use sustainable modes of transportation, rather than driving alone, or making fewer trips by car. For example: increased use of transit, increased cycling and walking for shorter distance trips, and taking advantage of ride sharing opportunities would address the growth of traffic in the City by achieving new mode share targets in 2041 (as illustrated in ***Table 4-2***). They include a reduction in the auto driver/passenger mode share from 85% in 2016 to 0% in 2041, a significant increase in the transit mode share from 2.8% today to 5.8% in 2041 and an increase in the Active Transportation mode share from 7.8% today to 10% in 2041.

Table 4-2: Brantford Travel Mode Share Targets: Internal Trips (Brantford to Brantford)

Mode \ Year	2016	2041	Difference
Auto Driver	70.8%	67.1%	- 3.7%
Auto Passenger	14.6%	12.7%	- 1.9%
Transit	2.8%	5.8%	+ 3.0%
Cycle/walk	7.8%	10.0%	+ 2.2%
Other	4.0%	4.4%	+ 0.4%
	100.0%	**100.0%**	**0.0%**

This TDM strategy does not include any increases to the roadway network capacity that would be provided by roadway widening, extensions and/or additions. However, improvements (expansion, higher frequency) to the transit system would be required to facilitate the penetration of new or underserved markets in the City.

Travel Demand Management initiatives do not completely replace the need for road improvements or system expansion. They are, however, effective in deferring costly infrastructure improvements or expansion. In deferring the need for infrastructure improvements and supporting alternative modes of travel, TDM provides for health and environmental benefits, consistent to OP goals.

Active Transportation

Active Transportation includes walking and cycling modes of travel. For these modes to reach their full potential, the network and user environment must be planned and implemented with specific goals and objectives in place.

The principles of Complete Streets have been applied to define the goals and objectives for each mode.

The established goal for the Walk mode is as follows:

Be a complete, pedestrian-friendly community with networks that integrate with transit, paths and trails, neighbourhood amenities, parks, open space, and schools. This will be achieved through providing high level of connectivity, ensuring a safe environment, and supporting accessibility.

The established goal for the Cycling mode is as follows:

Provide safe and convenient bicycle routes suitable for all user types: utilitarian (commuting), recreational (personal or family discretionary), and sport (advanced, high level recreational). This will be achieved through facility continuity, ensuring ease of navigation, providing end of trip facilities, ensuring a safe environment, provide appropriate environments for different user types.

Transit

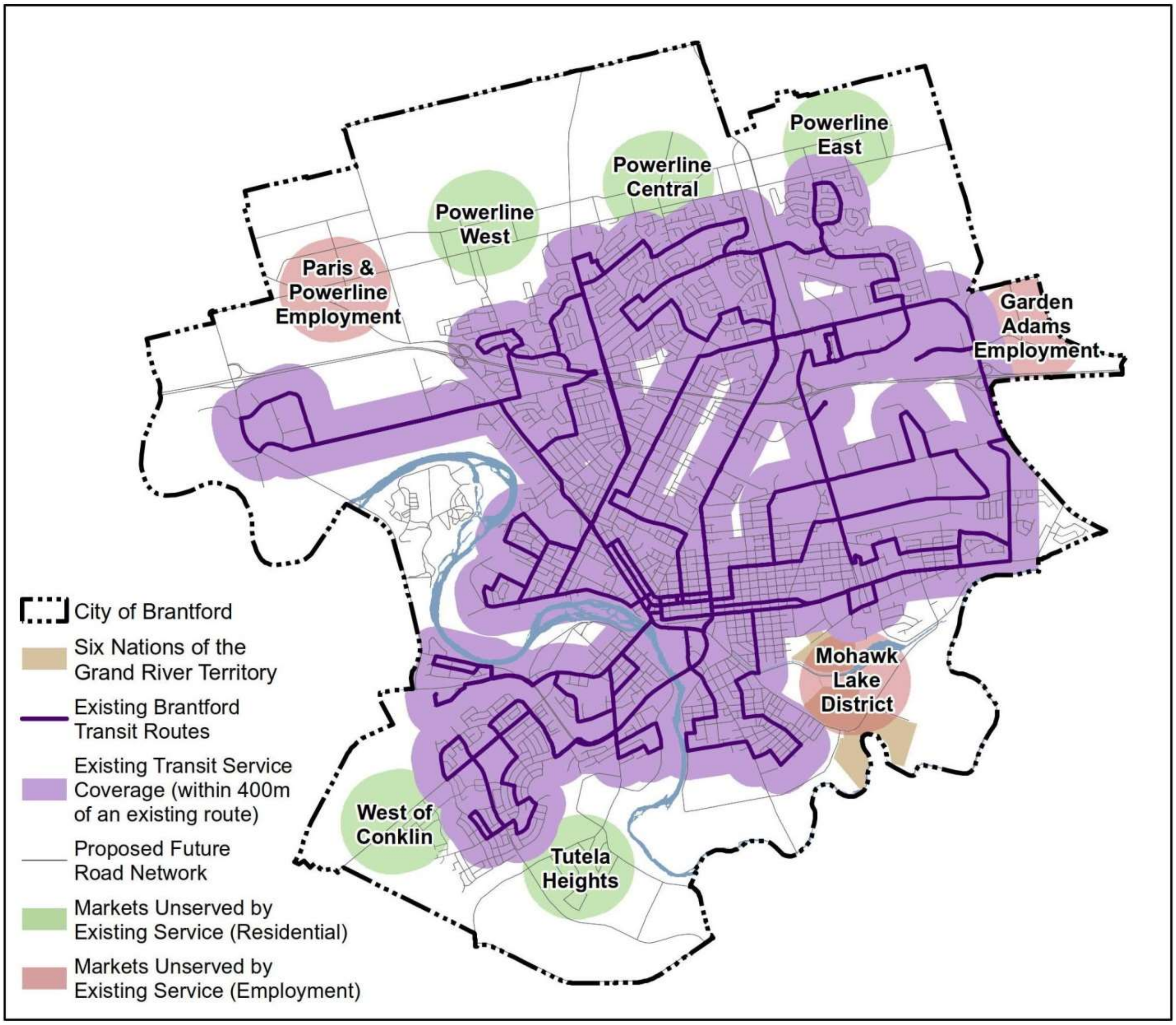
Travel Demand Management relies heavily on the use of transit. While the use of transit is growing, today approximately 3% of weekday peak hour trips are made by transit. The success of transit depends on the availability, convenience and reliability of service, and the proximity of that service to residences, jobs, and schools. The greater the access to transit for people and jobs, the higher the potential for transit ridership.

The approach to determining the future potential for transit in Brantford was as follows:

- Assess existing transit system coverage;
- Review existing mode splits to transit for traffic zones;
- Set appropriate targets for land use type and density, and in consideration of available transit;
- Apply targets to 2041 trip ends;
- Adjust total travel demands for vehicles;
- Assign transit trips to enhanced/expanded transit service coverage; and
- Outcome:
  - Overall system improvement in transit use results in reduction of vehicle trips;
  - Corridor transit use increase;
  - Increase in transit use, decreases auto trips; and
  - Capacity analysis reassessed using reduced auto demand scenario (TDM).

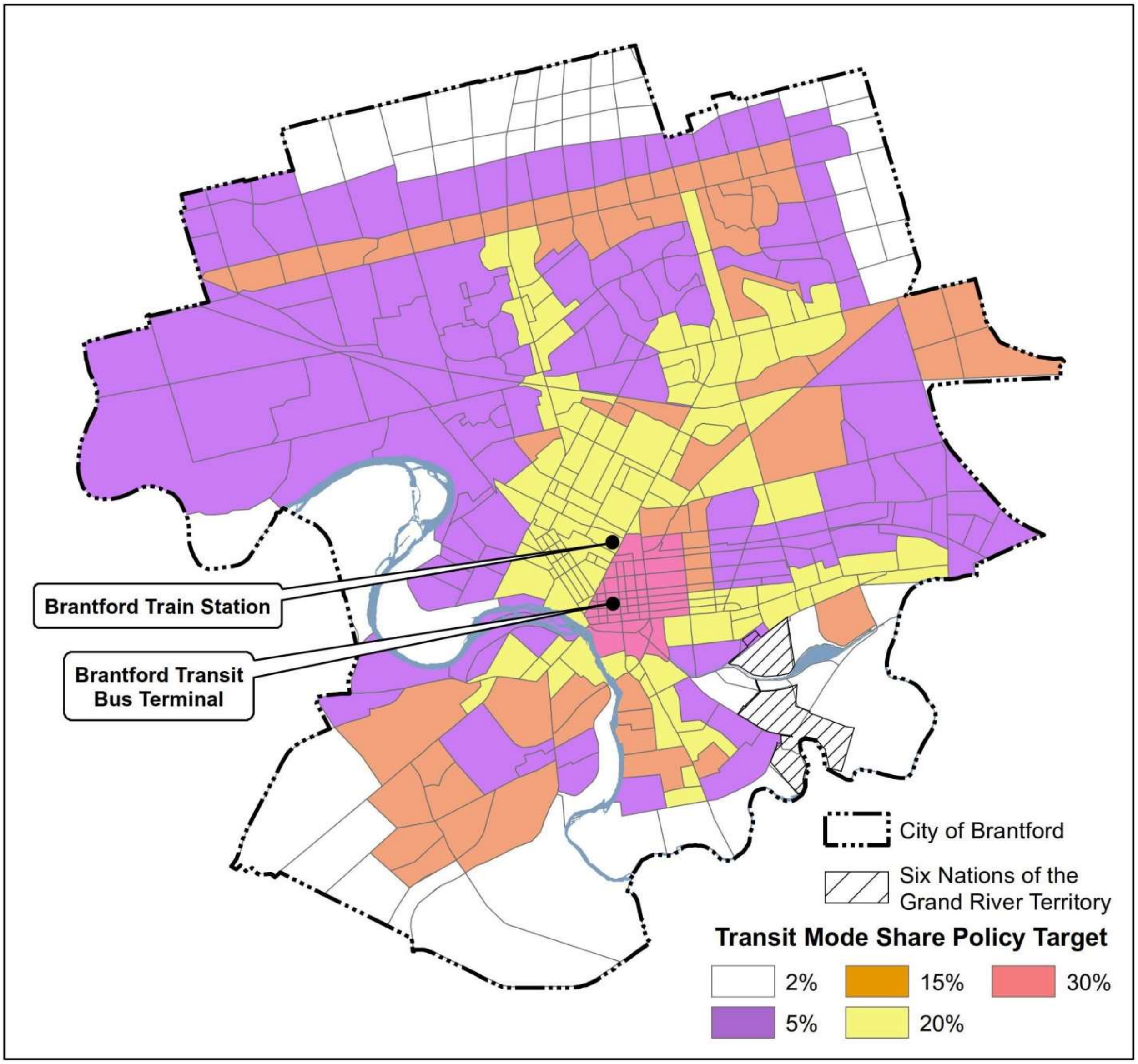
Achieving these increases requires significant expansion of existing service (new routes) and service frequency (more buses, smaller headways between buses) to serve existing areas more efficiently and to provide service in new areas. ***Figure 4-2*** identifies the existing transit system coverage and future market opportunities.

Figure 4-2: Existing Transit System Coverage and Future Market Opportunities



A review of existing mode splits was undertaken to establish the penetration of the transit market. Population and employment densities in the 2041 condition were reviewed to identify areas where transit service would have the most impact. New mode share targets were identified and applied to future trip generation to establish new transit ridership levels and make corresponding adjustments to the auto trip making. ***Figure 4-3*** identifies the 2041 mode split targets for transit.

Figure 4-3: 2041 Transit Mode Split – Zone Policy Targets

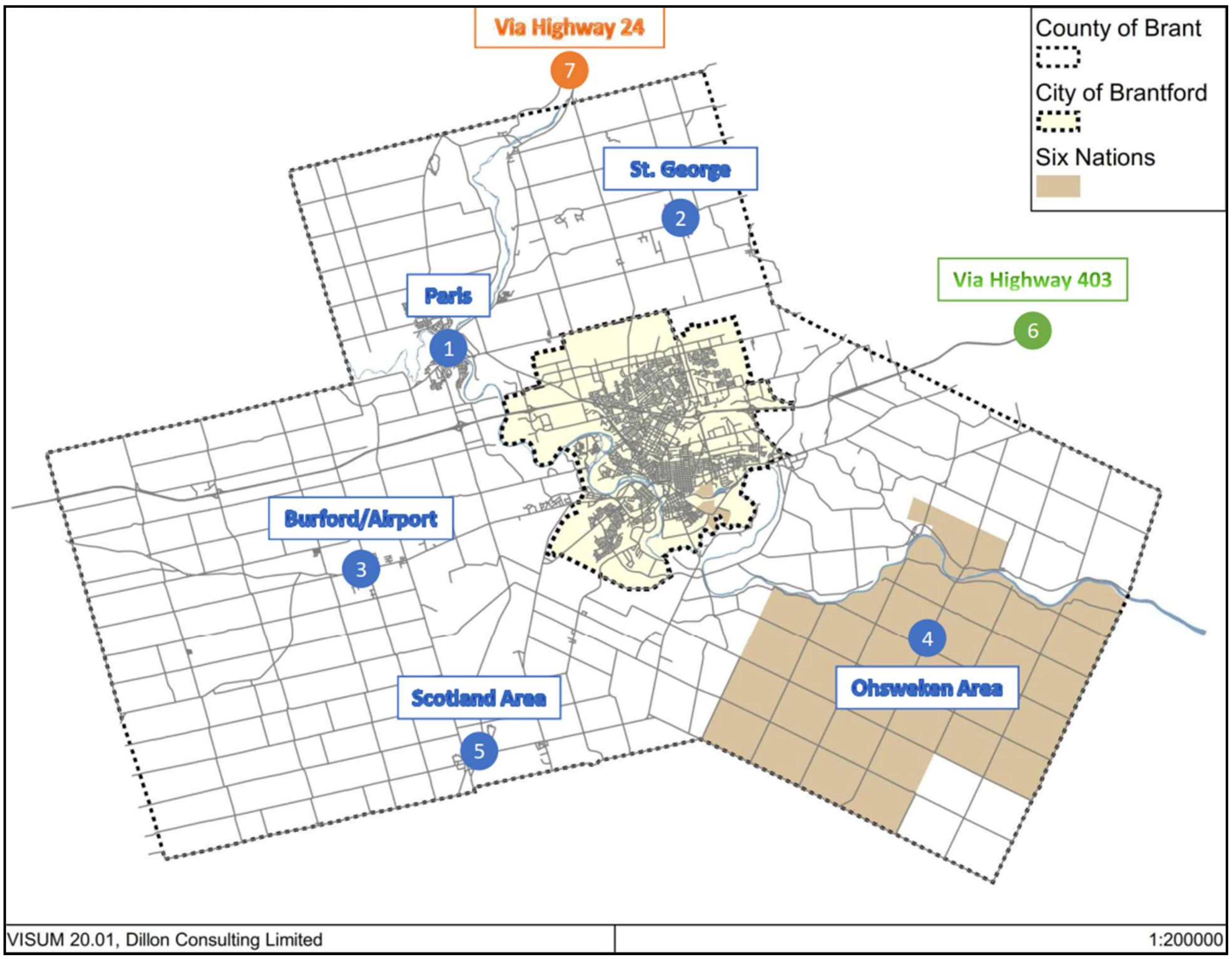


The application of the new transit mode share targets results in a significant increase in transit ridership. Overall, the city-wide transit mode share is forecast to increase from 2.8% in 2016 to 5.8% in 2041. This mode share target is aggressive (more than double the current share) but achievable if married to land use intensification strategies identified in the OP and if a commitment is made to transit service improvements and expansion as identified in the City's 2016 transit service plan.

The impact of this increased focus on transit is a tripling of route ridership (remembering that route ridership includes transfers between multiple routes by a single rider to facilitate their trip). Such a service expansion will require significant investment in capital and operating costs. The current transit system comprises approximately 175 km of linear routes, which would need to expand to over 220 km of linear routes to access the growth areas. This reflects a 25% increase in transit coverage in the City that will also require additional vehicle hours to maintain the required service levels to meet demand.

In addition to the local Brantford to Brantford transit service, there are opportunities to partner with other agencies to connect communities outside the City limits by public transit. While there is some existing regional transit via GO Transit to Hamilton, McMaster University, and Aldershot GO Station (Burlington), these markets are under served, and the County connections are very limited. Providing more consistent transit connectivity will reduce the vehicle travel demands resulting in benefits to the City's road system performance. Travel markets to/from Brant County, the GTA, and the Tri-Cities (Cambridge/Kitchener/Waterloo) are significant. They are displayed in ***Figure 4-4*.**

Figure 4-4: Inter-Regional Transit Opportunities



A review of the forecasted 2041 PM peak period person trips identified the following market potentials:

- From Brantford to Brant:
  - (1) Paris - 5,000 person trips (all modes)
  - (2) St. George - 1,000 person trips (all modes)
  - (3) Burford/Airport - 250 person trips (all modes)
  - (4) Ohsweken area - 200 person trips (all modes)
  - (5) Scotland area - 650 person trips (all modes)
- From Brantford to GTA:
  - (6) Via Hwy 403 - 4,500 person trips (all modes)
- From Brantford to Cambridge/Kitchener/Waterloo
  - (7) Via Hwy 24 - 1,300 person trips (all modes)

Not all of these trips are divertible to transit, but even achieving 2%-5% market penetration could result in significant auto trip reduction on critical roadways. This inter-regional potential would also be beneficial to captive ridership (i.e. seniors, students, and mobility challenged users).

The development of such service has the potential to reduce auto volumes on the critical north-south arterials within the City but will require inter-agency collaboration (at both ends of trip) to implement (e.g. planning and funding).

Manage Travel Demand Assessment

The effect of the 5.8% transit mode share, in combination with a 10% mode share to active modes (walking and cycling) significantly reduces the 2041 vehicle demand on the network. This TDM scenario, as assigned to the Do Minimal network, results in a noticeable improvement in network operations across the city compared with the 2041 Do Minimal forecasts. ***Figure 4-5*** illustrates an overview of the link capacity constraints in the 2041 TDM network, while ***Table 4-3*** displays the screenline capacity results in the 2041 TDM network.

The TDM network is forecast to work much more reliably in the downtown area and crossing Highway 403. However, specific problem areas still remain: Paris Road between Highway 403 and Golf Road, King George Road crossing Highway 403, and the Grand River Crossings.

A TDM strategy alone does not address all of the transportation network system constraints. Transportation issues remain in the north along Powerline Road and on the two Grand River vehicle bridge crossings (Lorne Bridge [Colborne Street] and Veterans Memorial Parkway).

Figure 4-5: 2041 Manage Travel Demand Network: Capacity Constraints

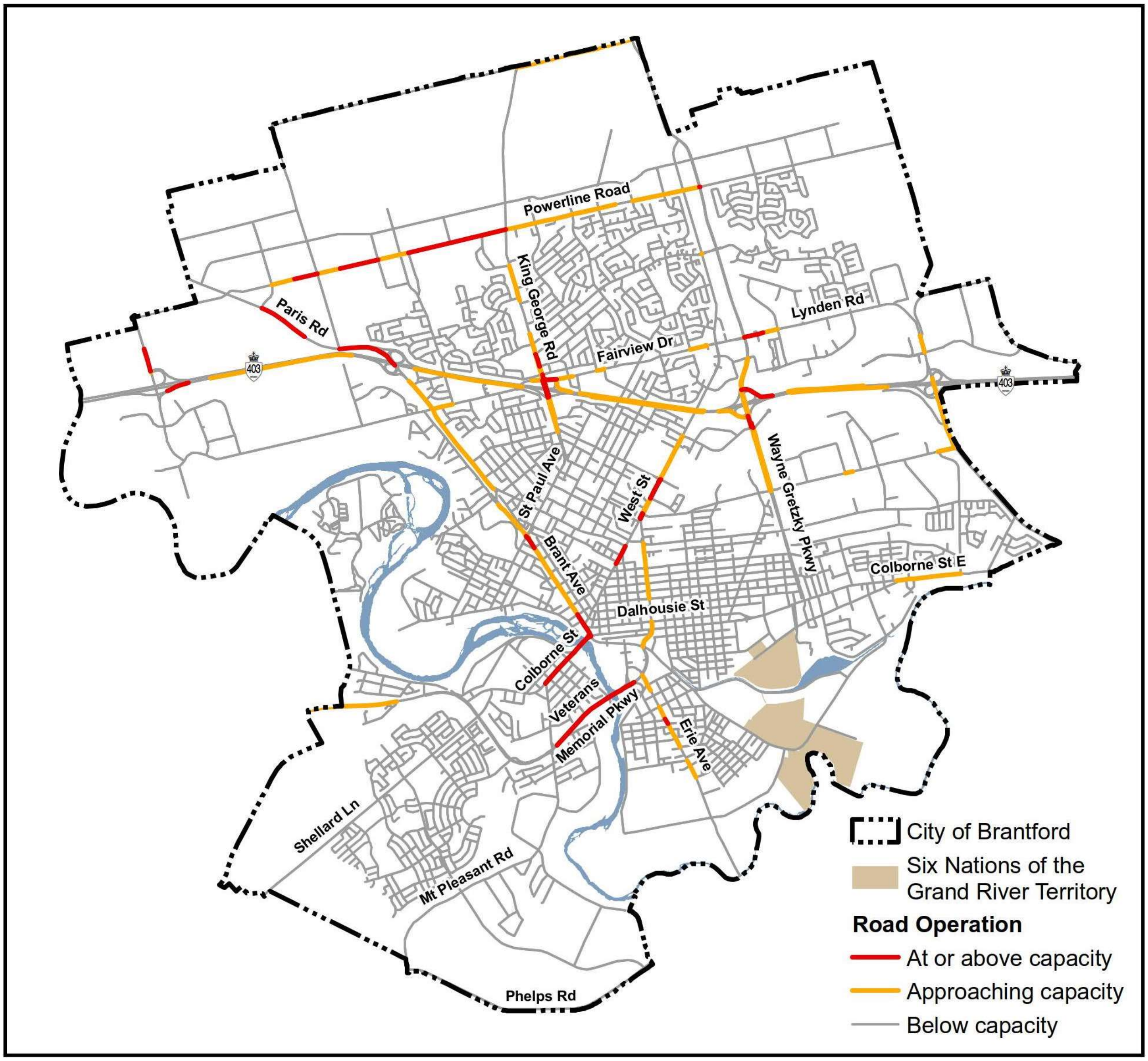


Table 4-3: 2041 Manage Travel Demand: Screenline Assessment

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	7	8,100	6,367	0.79	5,794	0.72
1	Grand River South	WB	7	8,100	4,035	0.50	6,973	0.86
2	Grand River North	EB	4	5,200	2,941	0.57	3,977	0.76
2	Grand River North	WB	5	6,000	2,565	0.43	3,587	0.60
3	Highway 403	NB	13	10,800	6,422	0.59	8,432	0.78
3	Highway 403	SB	13	10,800	6,994	0.65	8,736	0.81
4	King George Road	EB	11	9,600	4,996	0.52	8,046	0.84
4	King George Road	WB	11	9,600	6,415	0.67	6,743	0.70
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,264	0.56	5,965	0.78
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,147	0.68	5,624	0.74
6	Wayne Gretzky Parkway (South)	EB	6	4,100	1,911	0.47	2,146	0.52
6	Wayne Gretzky Parkway (South)	WB	6	4,100	1,467	0.36	2,650	0.65
7	Memorial Drive	EB	7	4,900	1,594	0.33	2,775	0.57
7	Memorial Drive	WB	7	4,900	2,181	0.45	2,374	0.48
8	West Street	EB	6	4,300	1,916	0.45	2,951	0.69
8	West Street	WB	6	4,300	2,579	0.60	2,952	0.69
9	CNR Corridor	NB	11	7,900	4,080	0.52	4,694	0.59
9	CNR Corridor	SB	11	7,900	3,935	0.50	5,748	0.73
10	Garden Avenue	EB	8	8,000	4,462	0.56	5,421	0.68
10	Garden Avenue	WB	8	8,000	4,317	0.54	5,807	0.73
11	Powerline Road	NB	12	9,000	3,965	0.44	5,521	0.61
11	Powerline Road	SB	12	9,000	4,487	0.50	5,740	0.64
12	Murray Street	EB	7	4,400	1,916	0.44	1,734	0.39
12	Murray Street	WB	8	5,200	1,528	0.29	2,326	0.45
13	West External	EB	7	7,300	1,664	0.23	2,211	0.30
13	West External	WB	7	7,300	1,602	0.22	2,141	0.29
14	South-West External	NB	4	4,300	1,548	0.36	1,161	0.27
14	South-West External	SB	4	4,300	935	0.22	1,637	0.38
15	East External	EB	5	6,900	2,940	0.43	3,444	0.50
15	East External	WB	5	6,900	3,007	0.44	3,648	0.53
16	North-East External	NB	3	3,200	1,341	0.42	1,599	0.50
16	North-East External	SB	3	3,200	1,161	0.36	2,253	0.70
17	North-West External	NB	3	3,300	755	0.23	912	0.28
17	North-West External	SB	3	3,300	788	0.24	937	0.28

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Notes: i) For more details on sreeenlines in general please see C***hapter 2.0.Transportation Impacts of Growth***.

ii) Screenlines are illustrated in ***Figure 2-3*** .

iii) Total (capacity) = the total roadway vehicle capacity of all lanes that cross a particular screenline in a particular direction.

iv) Volume = the total number of vehicles that cross a particular screenline in a particular direction during a particular peak hour.

4.2.2 Transportation System Management

A Transportation Systems Management (TSM) is a set of techniques used to increase the capacity / improve the performance of a piece of transportation infrastructure while maximizing the safety and mobility of people and goods without increasing its physical size. In the context of the Brantford TMP this would include re-allocating / providing space and amenities within transportation corridors to safely separate and control active modes of transportation, as well as implementing operational improvements along corridors to optimize efficiency. Examples of transportation system management include: providing auxiliary lanes at key intersections, signalizing intersections to improve flow, coordinating traffic signal control along a corridor during critical time periods to benefit peak flows, or introducing roundabout intersection control where feasible.

4.2.3 Increase Infrastructure

The Increase Infrastructure strategy addresses travel demands on the City's road network by enhancing the carrying capacity of the network through strategic road widenings and extensions. The main impact of this strategy is the ability to maintain an acceptable and efficient Level-of-Service on Brantford roads over the next 20 years. ***Figure 4-6*** illustrates an overview of the link performance with respect to capacity in the 2041 Increased Infrastructure network, while ***Table 4-4*** displays the screenline demand to capacity results in the 2041 Increased Infrastructure network. The Increase Infrastructure strategy includes short-term committed improvements, as well as a full program of infrastructure projects as was identified in the 2014 Transportation Master Plan (excluding a Veteran's Memorial Parkway extension, due to recent Council Resolution regarding use of lands under the jurisdiction of Six Nations of the Grand River (i.e. Glebe Farm Lands) for a transportation corridor.

The increased infrastructure network will operate significantly better than the 2041 Do Minimal network in the following ways:

- Reducing congestion along Hardy Road and Brant Avenue as a result of the Oak Park Road extension; and
- Eliminating congestion on Wayne Gretzky Parkway as a result of a widening to six lanes.

However, the two main crossings of the Grand River are still anticipated to be significantly over capacity even with the addition of the Oak Park Road Grand River crossing (4 lanes) and a widening of the Veteran's Memorial Parkway Grand River crossing (2 to 4 lanes).
It is noted that improvements to the network required to support development in the expansion areas have not been specifically identified as strategic network needs, as they are driven by local development needs.

In short, the network will still experience some residual capacity issues under the 2041 growth scenario even with significant investment in infrastructure improvements (as recommended in the 2014 TMP).

Figure 4-6: 2041 Increased Infrastructure Network: Capacity Constraints

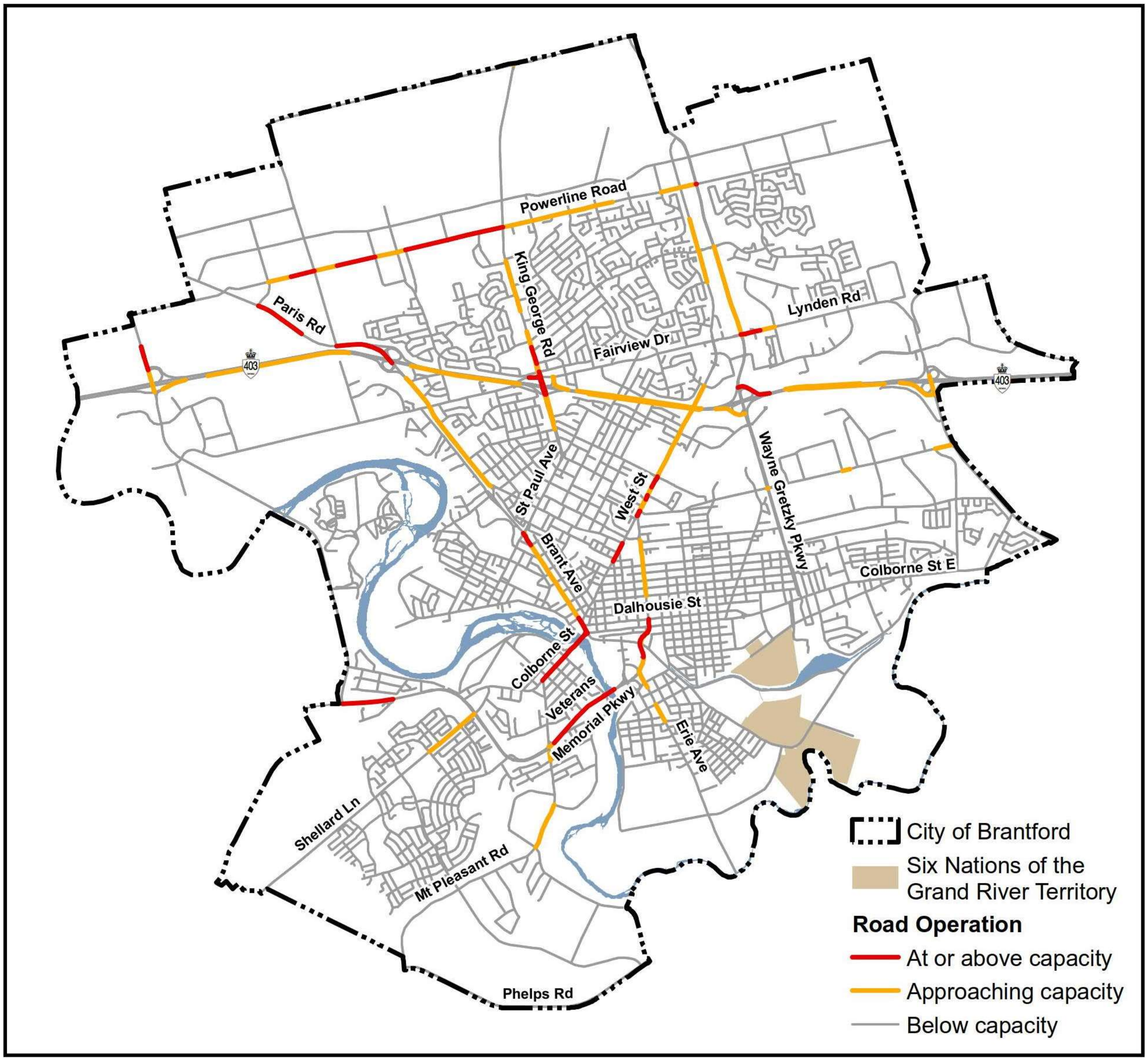


Table 4-4: 2041 Increase Infrastructure: Screenline Assessment

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	10	11,100	6,261	0.56	7,118	0.64
1	Grand River South	WB	10	11,100	5,359	0.48	7,336	0.66
2	Grand River North	EB	4	5,200	2,872	0.55	4,232	0.81
2	Grand River North	WB	5	6,000	2,819	0.47	3,652	0.61
3	Highway 403	NB	14	11,800	7,192	0.61	9,095	0.77
3	Highway 403	SB	14	11,800	7,291	0.62	9,712	0.82
4	King George Road	EB	11	9,600	5,167	0.54	8,054	0.84
4	King George Road	WB	11	9,600	6,409	0.67	7,125	0.74
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,496	0.59	6,279	0.83
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,281	0.69	5,910	0.78
6	Wayne Gretzky Parkway (South)	EB	7	4,900	1,991	0.41	2,298	0.47
6	Wayne Gretzky Parkway (South)	WB	7	4,900	1,656	0.34	2,957	0.60
7	Memorial Drive	EB	9	6,100	1,700	0.28	2,989	0.49
7	Memorial Drive	WB	9	6,100	2,302	0.38	2,577	0.42
8	West Street	EB	6	4,300	2,032	0.47	3,005	0.70
8	West Street	WB	6	4,300	2,513	0.58	3,063	0.71
9	CNR Corridor	NB	12	8,800	4,362	0.50	5,143	0.58
9	CNR Corridor	SB	12	8,800	4,225	0.48	6,085	0.69
10	Garden Avenue	EB	9	8,800	4,717	0.54	5,601	0.64
10	Garden Avenue	WB	9	8,800	4,378	0.50	6,081	0.69
11	Powerline Road	NB	13	9,400	4,145	0.44	5,828	0.62
11	Powerline Road	SB	13	9,400	4,689	0.50	6,125	0.65
12	Murray Street	EB	7	4,400	1,989	0.45	1,800	0.41
12	Murray Street	WB	8	5,200	1,635	0.31	2,681	0.52
13	West External	EB	7	7,300	1,716	0.24	2,249	0.31
13	West External	WB	7	7,300	1,666	0.23	2,155	0.30
14	South-West External	NB	4	4,300	1,597	0.37	1,208	0.28
14	South-West External	SB	4	4,300	965	0.22	1,727	0.40
15	East External	EB	5	6,900	2,929	0.42	3,447	0.50
15	East External	WB	5	6,900	2,996	0.43	3,635	0.53
16	North-East External	NB	3	3,200	1,355	0.42	1,616	0.51
16	North-East External	SB	3	3,200	1,168	0.37	2,278	0.71
17	North-West External	NB	3	3,300	779	0.24	929	0.28
17	North-West External	SB	3	3,300	791	0.24	978	0.30

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Notes: i) For more details on sreeenlines in general please see *C**hapter 2.0.Transportation Impacts of Growth***.

ii) Screenlines are illustrated in ***Figure 2-3*** .

iii) Total (capacity) = the total roadway vehicle capacity of all lanes that cross a particular screenline in a particular direction.

iv) Volume = the total number of vehicles that cross a particular screenline in a particular direction during a particular peak hour.

4.3 Network Constraints and Solutions

While the TDM and Increased Network Infrastructure scenarios show significant potential to reduce congestion and delay in the network, neither strategy completely addresses the needs of the 2041 condition in isolation.

The next step in the transportation analysis was to assess the need for improvements in each of the constrained corridors, and consider the impact of each strategy (TDM, TSM, Increased Supply) on the constraint. This was done by assessing the 2041 Do Minimal scenario network performance to determine the magnitude performance issue (volume to capacity) and the travel characteristics of the demand in the corridor (select link analysis: origin and destination markets for future users).

Based on the critical deficiencies in the 2041 Do Minimal network alternative, an assessment of the impact of each strategy on each deficiency was undertaken, as well as an assessment of the alternatives for remediation. This analysis was primarily conducted for the PM peak hour which is considered the critical time period as it has the highest travel demands, unless otherwise noted.

4.3.1 Brant Avenue - St Paul Avenue to Colborne Street

4.3.1.1 Problem

Brant Avenue between St Paul Avenue and Colborne Street is a particularly busy stretch of roadway as it is just south of the convergence of two major roadways, Brant Avenue / Paris Road and St Paul Avenue / King George Road. These intersecting roadways provide significant routes into the downtown area from Highway 403 (Paris Road connecting to Paris and further west), and St Paul Avenue / King George Road (connecting to Cambridge, via Highway 24, and further north). Brant Avenue between St Paul Avenue to Colborne Street (Lorne Bridge) is forecast to experience significant volumes and to be at or over capacity in 2041, as illustrated in ***Figure 4-7*** and ***Figure 4-8*** respectively.

Brant Avenue between St Paul Avenue to Colborne Street has significant auto demand in both directions, however southbound is the critical direction during the PM peak hour. Overall, the volumes forecast do not significantly exceed capacity (V/C ratio fluctuates around 1.00), as much of the over flow demand for the corridor uses the adjacent, parallel one-way pair of William Street and Albion Street. However, there are more considerable capacity constraints on the short sections of Brant Avenue in the vicinity of the roads that connect to the aforementioned parallel routes. These include Brant Avenue between:

- St Paul Avenue and Bedford Street (V/C ratio of 1.13); and
- Church Street and Colborne Street (V/C ratio of 1.06 – 1.84).

Figure 4-7: Brant Avenue – St Paul Avenue to Colborne Street: 2041 PM Peak Hour Volumes

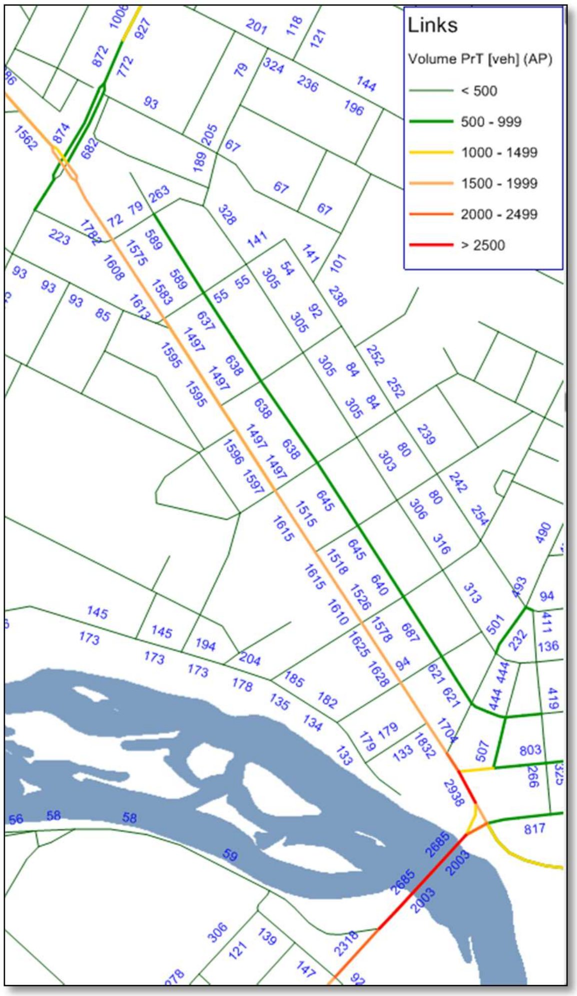
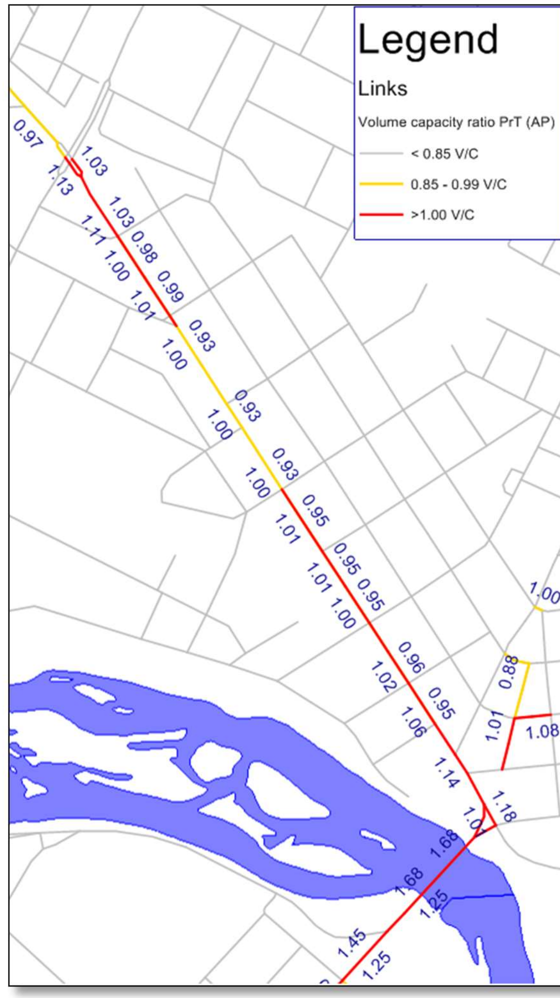


Figure 4-8: Brant Avenue – St Paul Avenue to Colborne Street: 2041 PM Peak Hour V/C Ratios



4.3.1.2 Assessment

The capacity issue on Brant Avenue is strategic in nature. The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) appears to be one of the main issues as a considerable amount of traffic is traveling between these two areas is forced to travel east towards downtown in order to cross the Grand River only to travel back to the west to reach their destination. ***Figure 4-9*** and ***Figure 4-10*** (southbound and northbound respectively) illustrate the number and distribution of vehicle trips in the PM peak hour that are using Brant Avenue to travel between Northwest Brantford and Southwest Brantford. Approximately 600 southbound PM peak hour vehicle trips travel from north of St Paul Avenue and cross over the Lorne Bridge on Colborne Street. It is estimated that between 50-80% of these trips could be diverted away from Brant Avenue and the Lorne Bridge if there were an alternative north-south connection that crossed the river in west Brantford.

Figure 4-9: Brant Avenue PM Peak Hour Trip Distribution - NW Brantford to SW Brantford – Southbound

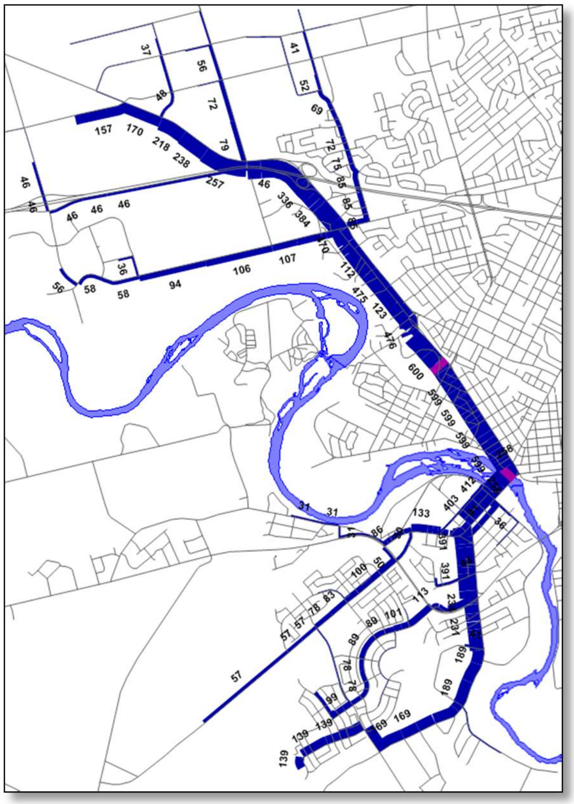
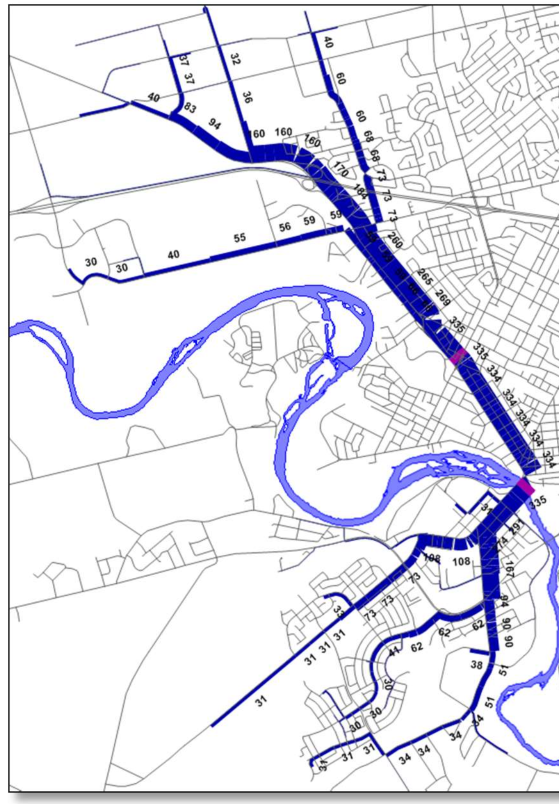


Figure 4-10: Brant Avenue PM Peak Hour Trip Distribution - SW Brantford to NW Brantford – Northbound



There was 2 hour on-street parking permitted on the section of Brant Avenue between St Paul Avenue and West Street. The time periods when on-street parking is permitted vary block by block and by side of the street. On the east side of the street (northbound), on-street parking is consistently permitted for 2 hours from 9:00 AM – 6:00 PM Monday to Saturday. On the west side of the street (southbound) on-street parking varies from being totally prohibited (between Lorne Crescent/Richmond Street and Waterloo Street) to being permitted for 2 hours from 9:00 AM – 3:30 PM Monday to Saturday (between St Paul Avenue and Lorne Crescent/Richmond Street).

The on-street parking that occurs during the peak hours and the peak hour shoulders, coupled with turning movements, can create impediments to the continuous flow of the two lanes in each direction. It is noted that this segment of the road is of heritage value and therefore not designed or intended to carry long distance travel and through movement of heavy vehicles. It is also noted that as a result of the congestion during the peak hours, there is a high potential for traffic infiltration to the neighbourhoods along the William/Albion one way-pair.

4.3.1.3 Alternatives

The alternative solutions to the identified capacity constraints on Brant Avenue between St Paul Avenue and Colborne Street are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

The existing design of Brant Avenue is a basic 4-lane roadway with the allowance of curb lane parking in both directions, and sidewalks with small boulevard buffer between the travelled lanes and the sidewalk. There are no specific allocations (i.e. a signed bike route) or dedication space (i.e. a bike lane) to cycle. The nature of the parking allowance impedes the logical flow of bicycles along the curb lane and forces cyclists to travel in the “door zone”. This makes cycling on Brant Avenue very uncomfortable for even experienced cyclists.

Opportunities to dedicate cycling space on the one-way pair of William Street and Albion Street parallel to Brant Avenue would provide excellent opportunities for increased mode share to cycling in the Brant Avenue corridor.

Transit

There are several Brantford transit routes that service the residential and employment areas in the vicinity of Brant Avenue: Route 4A/4C (Mall Link) and Route 8 (Holmedale Mayfair).

St Paul Avenue/King George Road is identified as an intensification corridor in the future. With higher densities, increased service frequency will be required to promote and facilitate high transit use. Development in Northwest Brantford will also provide an additional market for Route 8 with significant employment planned along Hardy Road and into the north expansion area.

Service enhancement in the form of additional routes or route modifications (including increase frequency, reduced headways) has the potential to improve the Brant Avenue corridor transit mode share from 9% today to 26% in the future. This increase in mode share would result in an approximate vehicle reduction of 175-350 vehicles on Brant Avenue during the peak hours.

While this alternative results in increased travel by transit within the corridor, the effective automobile volume reduction is not significant and congestion will remain, as the vehicles currently diverting away from the corridor through area collector roads would divert back to fill the released capacity. This alternative should be carried forward as a supplement solution but not as a stand-alone initiative.

Transportation System Management

Brant Avenue is classified as a Minor Arterial Roadway yet it carries peak hour traffic volumes similar to many of the major arterial roadways in Brantford. Providing a character and design consistent with a Major Arterial is not feasible because of the access considerations in the corridor, the space constraints, and the designation of Brant Avenue between St Paul Avenue and the Lorne Bridge as part of the Brant Avenue Heritage Conservation District.

However, the roadway's traffic flow could be optimized through a combination of non-infrastructure improvements. This efficiency could be achieved through the use of expanded on-street parking restriction/prohibitions and additional restriction/prohibitions on left turns at all but critical roadways.

Consideration of implementing additional on-street parking restrictions during the peak travel periods would provide optimal traffic flow during critical periods. Prohibiting parking completely would be more consistent with the roadway's arterial classification, providing consistent capacity along the entire length of the street, as well as providing an opportunity to incorporate a dedicated or shared bicycle facility along the corridor. Per Council direction, the City recently implemented more stringent parking restrictions on Brant Avenue and other measures to improve its operation.

With regard for turn prohibitions, currently northbound left turns are prohibited onto Scarfe Avenue, Palmerston Avenue, and Ada Avenue. There are no left turn prohibitions in the southbound direction which is the peak direction of travel. Prohibiting left turns along this section of Brant Avenue (with the exception of Bedford Street to allow access to William Street) would ensure continuous travel flow southbound.

Another way to minimize delay and maximize vehicle flow is to coordinate the signals along the corridor. This would provide a continuous flow or 'green wave' in the peak direction of travel. The City currently monitors the signal coordination along major corridors. As growth in corridor travel occurs over time, modifications to the corridor signal timings can be implemented. Initiatives to achieve this are being implemented by the City and should the impacts on and needs of the corridor should continue to be monitored.

These policy changes to manage the system performance during critical time periods will improve traffic operations and will slightly increase the overall carrying capacity of the roadway. However, on their own, these measures will not increase roadway capacity enough to mitigate delays and improve the level of service to an acceptable level.

Increase Infrastructure

Oak Park Road Extension

This facility is currently the subject of a Municipal Class EA study. It is estimate that there are 300-500 vehicle trips in the PM peak hour using Brant Avenue as there is no closer alternative roadway for north-south travel that crosses the river in West Brantford. The extension of Oak Park Road to Colborne Street would provide a north-south connection in West Brantford and an additional vehicle crossing over the Grand River. As described in ***section 4.3.1.2***, peak hour traffic traveling between Northwest Brantford and Southwest Brantford is forced to travel east towards downtown in order to cross the Grand River only to travel back to the west to reach their destination. The diversion of these trips to an alternative route will decrease the demand on Brant Avenue.

Although this alternative will not increase the capacity of Brant Avenue, it will reduce the demand on the corridor through market diversion. This diversion has the benefit of protecting the heritage nature of the corridor by minimizing the exposure to excess traffic in the peak periods.

The reduction in demand will likely be offset in part by demand that that may divert back to Brant Avenue that is currently using parallel routes. As such, this alternative should be coupled with TDM and TSM initiatives.

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on Brant Avenue between St Paul Avenue and Lorne Bridge are as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the Brant Avenue corridor by reducing vehicle travel demands.
- Corridor TSM – expanded recently implemented parking restrictions, additional left turn prohibitions and enforcement, and monitoring recently implemented traffic signal coordination will improve the efficiency of the available travel lanes.
- Increase Infrastructure – provide additional transportation capacity for all modes and Grand River crossing connecting Oak Park Road to Colborne Street West.

4.3.2 Wayne Gretzky Parkway - Henry Street to Highway 403

4.3.2.1 Problem

Wayne Gretzky Parkway (WGP) between Henry Street and Highway 403 is forecast to have significant 2041 traffic volumes, as illustrated in ***Figure 4-11.*** WGP is the main access form the City to / from Highway 403 and the section between Henry Street and Highway 403 is forecast to be at or over capacity in 2041, as illustrated in ***Figure 4-12***.

Wayne Gretzky Parkway between Henry Street and Highway 403 is forecast to have significant auto demand in both directions, reaching highs of roughly 2,000 to 2,200 vehicle trips. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour. Overall, WGP is expected to operate just over capacity throughout this area, with the exception of the short section between Morton Avenue/Holiday Drive and Highway 403 where the volume to capacity ratios equal or exceed 1.10.

Figure 4-11: Wayne Gretzky Parkway – Henry Street to Highway 403: 2041 PM Peak Hour Volumes

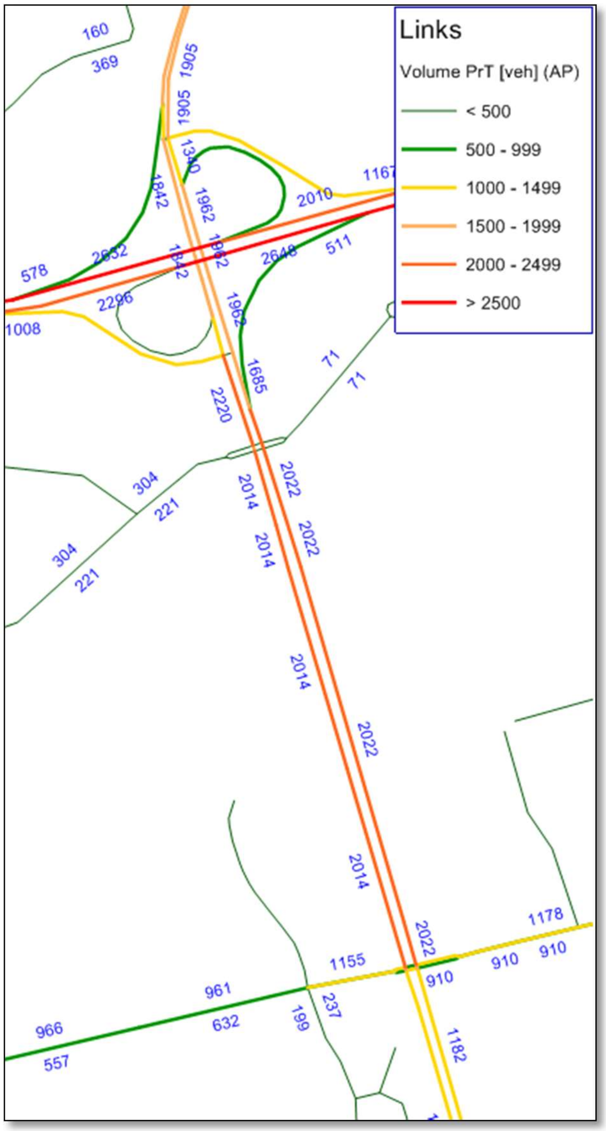
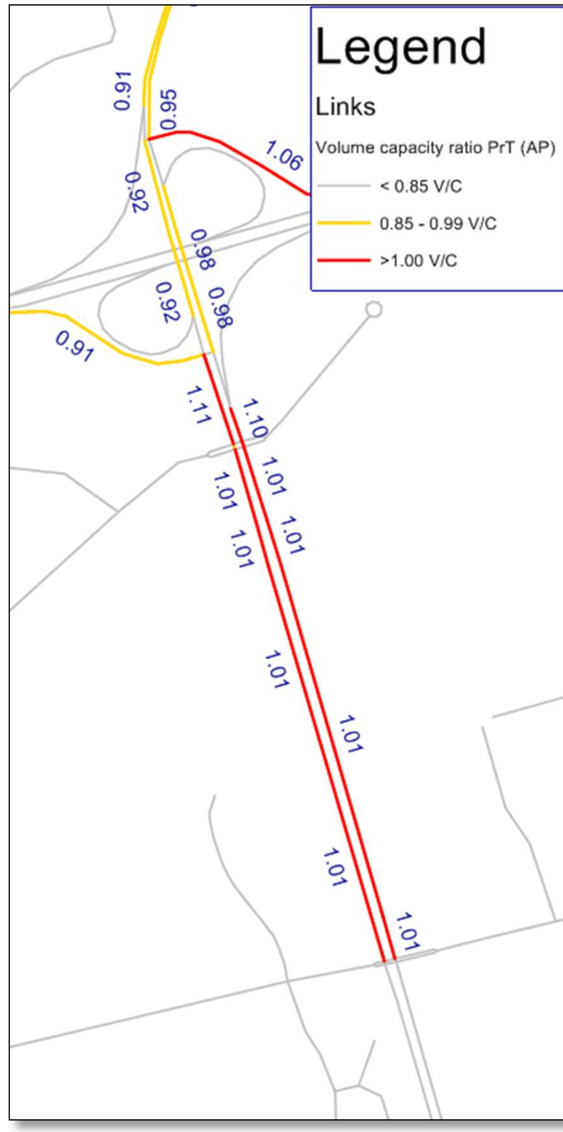


Figure 4-12: Wayne Gretzky Parkway – Henry Street to Highway 403: 2041 PM Peak Hour V/C Ratios



4.3.2.2 Assessment

The capacity issues on Wayne Gretzky Parkway between Henry Street and Highway 403 are strategic in nature, focusing on the immediate corridor. I.e. the demand on WGP south of Highway 403 originates or is destined to areas within the corridor and not related to pass through traffic. WGP is a limited-access major arterial roadway that provides access to and from Highway 403 and is one of the major north-south roadways in Brantford. As a result of the growth that is forecast for Brantford, more and more trips that originate or are destined to areas adjacent to WGP require the use of the roadway. Specifically, there is significant employment growth planned for the Braneida Industrial Park, with the most significant growth happening in the lands surrounding the intersection of Henry Street and Wayne Gretzky Parkway. ***Figure 4-13*** and ***Figure 4-14*** (southbound and northbound respectively) illustrate the number and distribution of PM peak hour vehicle trips that are using busiest portion of WGP (just south of Highway 403). The trip distribution patterns confirm the corridor specific nature of the capacity issues on WGP and highlight the significant demands originating from and destined to the Braneida Industrial Park.

Figure 4-13: Wayne Gretzky Parkway (just South of Highway 403) PM Peak Hour Trip Distribution – Southbound

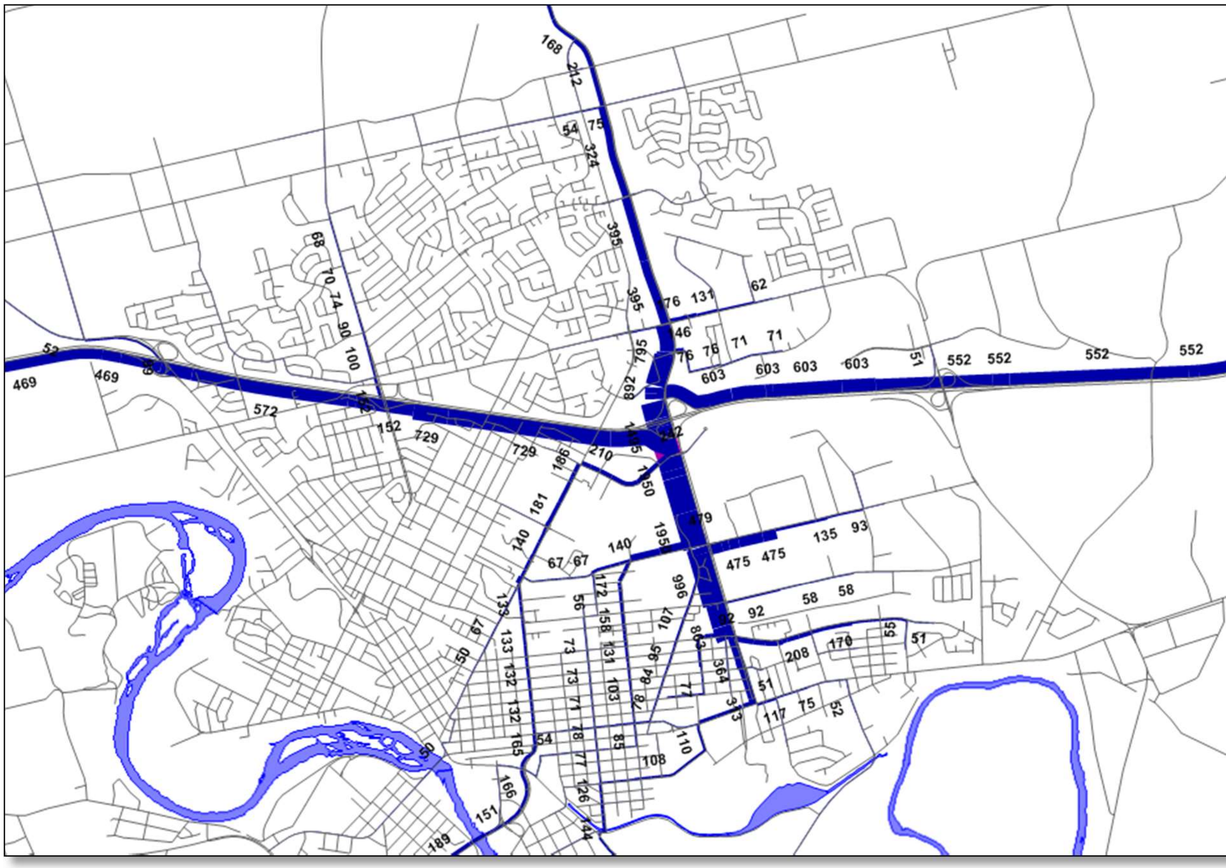
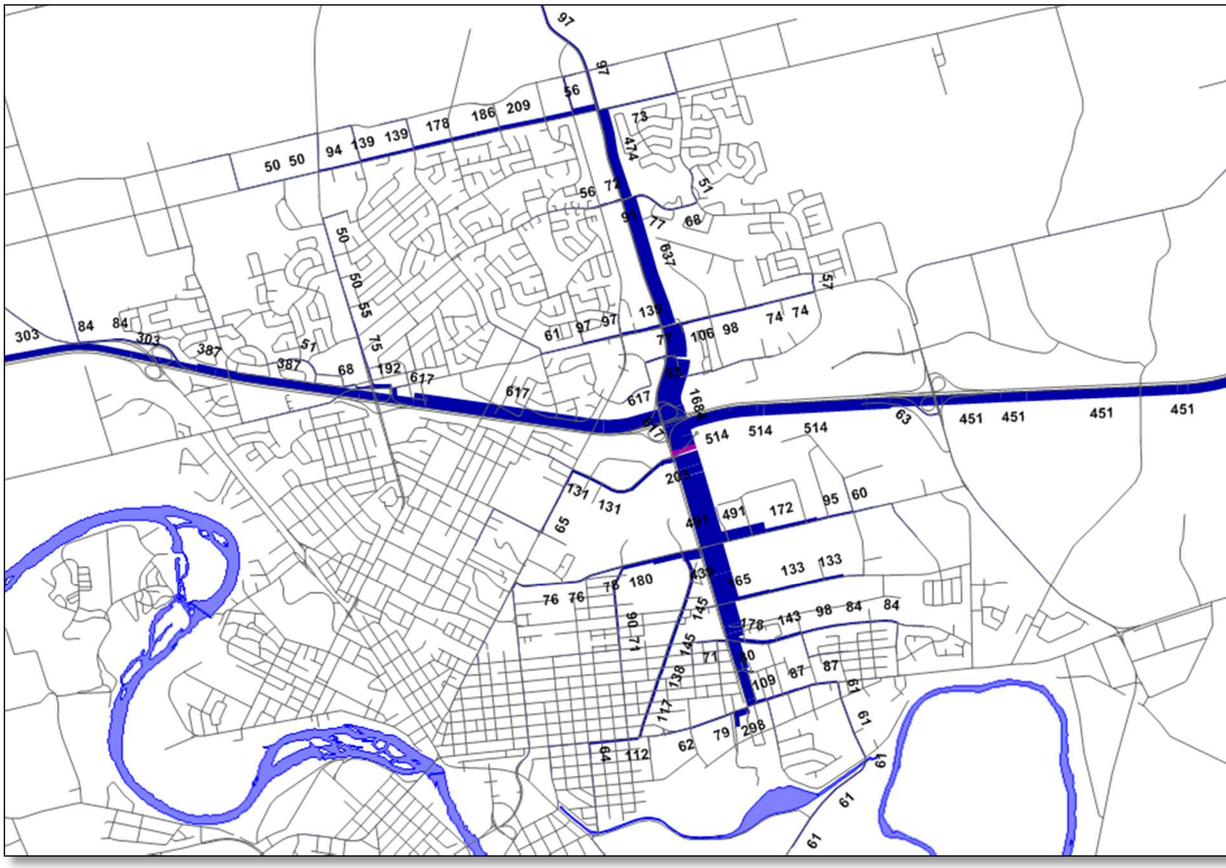


Figure 4-14: Wayne Gretzky Parkway (just South of Highway 403) PM Peak Hour Trip Distribution – Northbound



4.3.2.3 Alternatives

The alternative solutions to the identified capacity constraints on Wayne Gretzky Parkway (south of Highway 403) are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Based on the narrow distribution patterns for trips on Wayne Gretzky Parkway that originate and are destined to the corridor there is opportunity for implementing/increasing Transportation Demand Management (TDM) measures within the WGP corridor. Increasing TDM in the WGP corridor would reduce auto demand on WGP and could potentially alleviate the need for infrastructure investments.

Active Transportation

Wayne Gretzky Parkway has an existing in-boulevard multi-use path from Grey Street to Powerline Road. This All Ages and Abilities (AAA) trail could be further enhanced by provided additional priority and amenities to active transportation users, thus encouraging more trips to be made by bicycle and on foot. Specific enhancement could include: additional and/or enhanced (covered) bike parking at major destinations and transit stops, a bicycle repair station on the Wayne Gretzky Parkway Trail, and Cross-rides at all signalised intersections on the Wayne Gretzky Parkway Trail. Large employers should also be encouraged / incentivised to provide end of trip facilities. This could include secure bicycle parking, change rooms with showers and lockers, and other amenities like air pumps for servicing bicycles. A combination of some, or all of these TDM measures could increase Active Transpiration use along the WGP corridor and help to reduce auto demand.

Transit

There are two Brantford transit routes that service the residential and employment areas in the vicinity of WGP: Route 7 (East Ward Braneida) and Route 9 (Echo Place). However, these routes are ineffective in reducing vehicle travel demands on WGP, as they do not connect directly where people are coming from and going to outside of connecting to downtown. Providing a north-south transit route that connects the Braneida Industrial Park to Lynden Park Mall, and the northern neighbourhoods surrounding WGP, would encourage transit use along the WGP corridor. Any increase in transit use on WGP would help reduce auto demand.

Service enhancement in the form of route additions or modifications has the potential to improve the corridor transit mode share from 5% today to 14% in the future. This increase in mode share would result in an approximate vehicle reduction of 100-200 vehicles on WGP during the peak hours.

Transportation System Management

As a major arterial roadway, the network provisions, (i.e. limited access, intersection configurations, traffic control), are significant / maximized already. Traffic signal coordination could be considered to maximized the efficiency of peak hour, peak direction flow, however, given the duality of the peak conditions (peak direction is only marginally higher than the off-peak direction) this may not achieve the desired efficiency in the off-peak direction. Future intersection control review should include review of potential for roundabout implementation.

Increase Infrastructure

Wayne Gretzky Parkway Widening

Widening Wayne Gretzky Parkway from 4 lanes to 6 lanes between Henry Street and Highway 403 would provide the additional capacity required to meet 2041 demands. The majority of WGP (Henry Street to Morton Avenue/Holiday Drive) is forecast to be over capacity, with the busiest section of WGP, a 150 metre section between Morton Avenue/Holiday Drive to Highway 403, forecast to be over capacity by 225 vehicles.

Improve Parallel Road Capacity

As a majority of the demands on WGP are focussed on accessing land use in the corridor, primarily to and from Highway 403, improving a parallel roadway such as Garden Avenue would have little impact on the future demands on WGP.

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on Wayne Gretzky Parkway between Henry Street and Highway 403 are as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the WGP corridor;
- Review TSM opportunities (including the potential for roundabout implementation); and
- Increase Infrastructure – Widen WGP to provide basic 6-lane cross section from Henry Street to Highway 403.

4.3.3 Wayne Gretzky Parkway - North of Highway 403

4.3.3.1 Problem

Wayne Gretzky Parkway (WGP) north of Highway 403 is forecast to experience considerable PM peak hour traffic volumes (***Figure 4-15***) but delays are expected to be minor. The high volumes on WGP are consistent with its role as a major arterial roadway that provides access to/from Highway 403. The PM peak hour vehicle travel demands on sections of WGP immediately north of Highway 403 are forecast to be approaching capacity in 2041, as illustrated in ***Figure 4-16***.

Volumes on WGP north of Highway 403 are forecast to reach highs of roughly 1,800 to 1,900 vehicle trips in the PM peak hour, which reflects full capacity conditions. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour. Overall, the capacity constraints forecast for WGP north of Highway 403 are less of an issue farther north of Highway 403.

Figure 4-15: Wayne Gretzky Parkway – North of Highway 403: 2041 PM Peak Hour Volumes

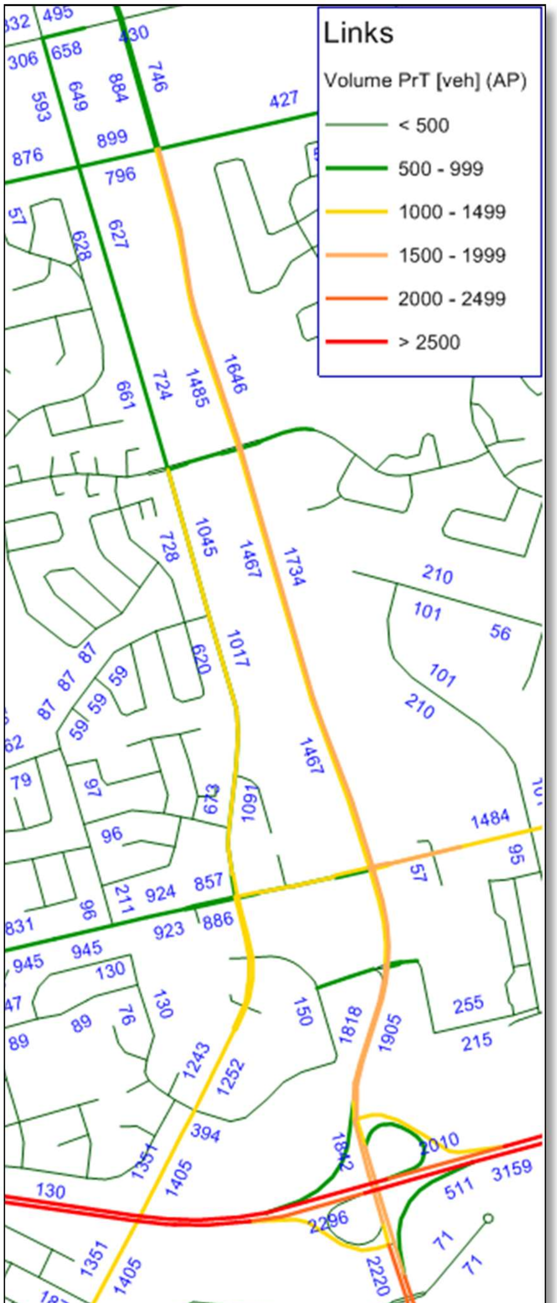


Figure 4-16: Wayne Gretzky Parkway – North of Highway 403: 2041 PM Peak Hour V/C Ratios

4.3.3.2 Assessment

WGP is a limited-access major arterial roadway that provides access to and from Highway 403 and is one of the major north-south roadways in Brantford. As a result of the growth that is forecast for Brantford, more and more trips that originate or are destined to areas adjacent to WGP or major perpendicular roadways require the use of the roadway. Specifically, there is significant population growth planned for the North Brantford, with the most significant growth happening in the lands north of Powerline Road between Balmoral Drive and Coulbeck Road. ***Figure 4-17*** and ***Figure 4-18*** (northbound and southbound respectively) illustrate the number and distribution of PM peak hour vehicle trips that are using WGP north of Highway 403. The trip distribution patterns confirm the corridor specific nature of the capacity issues on WGP and highlight the significant demands originating from and destined to the boundary expansion lands in North Brantford.

Figure 4-17: Wayne Gretzky Parkway (North of Highway 403) PM Peak Hour Trip Distribution – Northbound

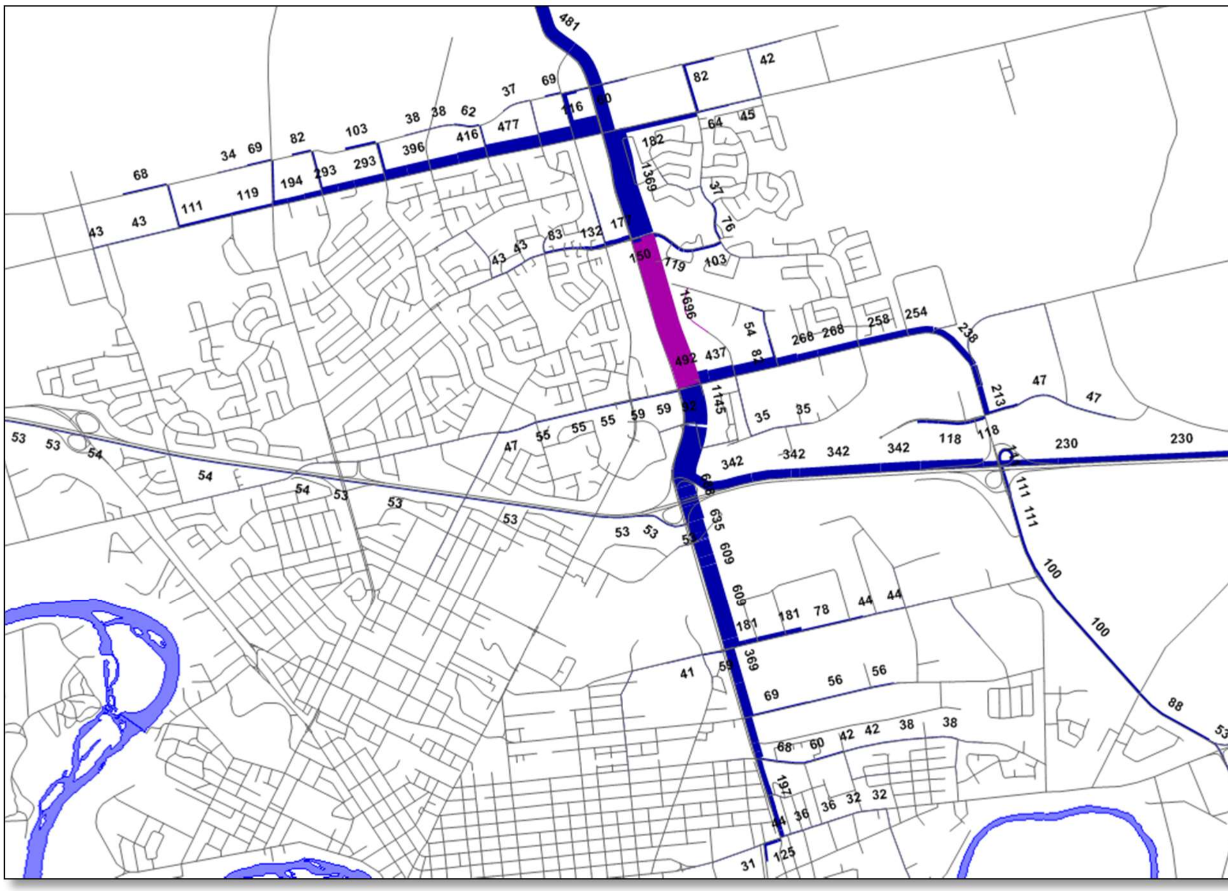
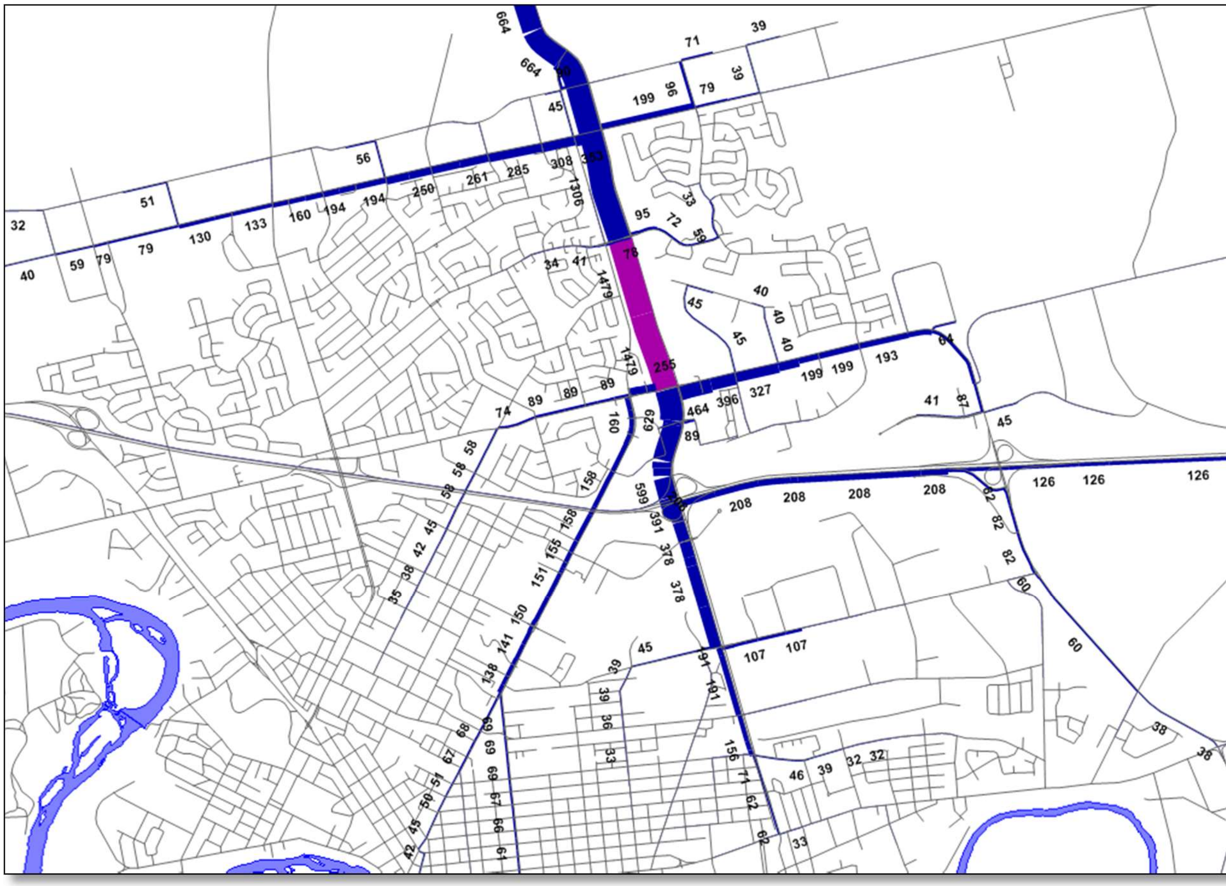


Figure 4-18: Wayne Gretzky Parkway (North of Highway 403) PM Peak Hour Trip Distribution – Southbound



The capacity issues on Wayne Gretzky Parkway north of Highway 403 appear to be operational in nature related to access to/from Highway 403. The actual corridor specific capacity although approaching capacity is adequate from a strategic capacity perspective.

4.3.3.3 Alternatives

The alternative solutions to the identified capacity constraints for Wayne Gretzky Parkway (north of Highway 403) are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Based on the narrow distribution patterns for trips on Wayne Gretzky Parkway that originate and are destined to the corridor, there is opportunity for implementing/increasing Transportation Demand Management (TDM) measures within the WGP corridor. Increasing TDM in the WGP corridor would reduce auto demand on WGP and could potentially alleviate the need for infrastructure interventions.

Active Transportation

As described in ***Section 4.3.2.3***, Wayne Gretzky Parkway has an existing in-boulevard multi-use path from Grey Street to Powerline Road. This All Ages and Abilities (AAA) trail could be further enhanced to provide additional priority and amenities to active transportation users, thus encouraging more trips to be made by bicycle and on foot. Specific enhancement could include: additional and/or enhanced (covered) bike parking at major destinations and transit stops, a bicycle repair station on the Wayne Gretzky Parkway Trail, and Cross-rides at all signalised intersections on the Wayne Gretzky Parkway Trail. Large employers should also be encouraged / incentivised to provide end of trip facilities. This could include secure bicycle parking, change rooms with showers and lockers, and other amenities like air pumps for servicing bicycles. A combination of some, or all of these TDM measures could increase Active Transpiration use along the WGP corridor and help to reduce auto demand.

Transit

There are several Brantford Transit routes that service the residential and employment areas in the vicinity of WGP north of Highway 403: Routes 2 (West Street Brier Park), Route 4A/4C (Mall Link), and Route 9 (Echo Place). While these routes provide good collecting ridership from the residential areas destined to the downtown, they are less effective in terms of providing connections to commercial activity nodes north of Highway 403. Providing a north-south transit route that connected the Braneida Industrial Park to Lynden Park Mall, and the northern neighbourhoods surrounding WGP, would encourage transit use along the WGP corridor. Any increase in transit use on WGP would help reduce auto demand.

Service enhancement in the form of route additions or modifications has the potential to improve the WGP corridor transit mode share from 0% today to 8% in the future. This increase in mode share would result in an approximate vehicle reduction of 80-160 vehicles on WGP during the PM peak hour.

Transportation System Management

As a major arterial roadway the network provisions, i.e. limited access, intersection configurations, traffic control, are significant / maximized already. Traffic signal coordination could be considered to maximized the efficiency of peak hour, peak direction flow, however, given the duality of the peak conditions (peak direction is only marginally higher than the off-peak direction) this may not achieve the desired efficiency in the off-peak direction. Future intersection control review should include review of potential for roundabout implementation.

The most congested area of this corridor is between the Highway 403 interchange to Fairview Road. This is due to the nature of the intersection operations. Alternative signal timing and lane arrangements would help prioritize poorly performing movements, particularly at the E-NS ramp terminal (i.e. widen ramp to reflect dual westbound left turn and a direct E-N movement).

Increase Infrastructure

Wayne Gretzky Parkway Widening

Widening Wayne Gretzky Parkway from 4 lanes to 6 lanes across Highway 403 bridge and north of Lynden Road is not considered a necessity to accommodate adequate levels of service in 2041. An additional lane in each direction between Fairview and the E-NS ramp terminal and the N-W direct ramp would allow for improved flow in the critical sections of WGP. In the long-term, consideration may be required for upgrades to the interchange ramp terminal (this will require review with and study by MTO).

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on Wayne Gretzky Parkway north of Highway 403 are as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the WGP corridor;
- Corridor TSM – modify lane arrangements on the E-NS ramp from Highway 403 to accommodate dual left turns and a direct, free-flow E-N movement; and
- Increase Infrastructure – Widen WGP to provide an additional lane in each direction between Fairview and the E-NS ramp terminal and the N-W direct ramp.

4.3.4 King George Road - Crossing Highway 403 to Dunsdon Street

4.3.4.1 Problem

King George Road (Highway 24 north of Highway 403) is the main highway commercial corridor in Brantford. It also provides access to and egress from Highway 403 and provides a significant regional connection to the north. The King George Road Bridge over Highway 403 has a 5-lane cross-section (2 northbound through lanes, 2 southbound through lanes and a southbound left turn lane) that including a 1 m median. Between Fairview Drive/Toll Gate Road and Dunsdon Road, King George Road also has a 5-lane cross section with 2 northbound though lanes, 2 southbound through lanes and a 2-way left turn lane. The King George Road crossing Highway 403 and the section of road immediately north of the bridge are forecast to experience significant volumes and to be at or over capacity in 2041, as illustrated in ***Figure 4-19*** and ***Figure 4-20*** respectively.

King George Road crossing Highway 403 is forecast to have significant auto demand in both directions, reaching highs of roughly 1,700 to 1,800 vehicle trips in the PM peak hour. Both directions (northbound and southbound) have similar volumes and would appear to be equally critical during the PM peak hour. More than 60% of the traffic using King George Road to cross Highway 403 does so as a result of regional travel on Highway 403 or Highway 24. Overall, the capacity constraints forecast for King George Road are moderately high as the volume to capacity ratios equal or exceed 1.08 on the bridge and exceed 1.00 south of Dunsdon Street.

Figure 4-19: King George Road – Crossing Highway 403 to Dunsdon Street: 2041 PM Peak Hour Volumes

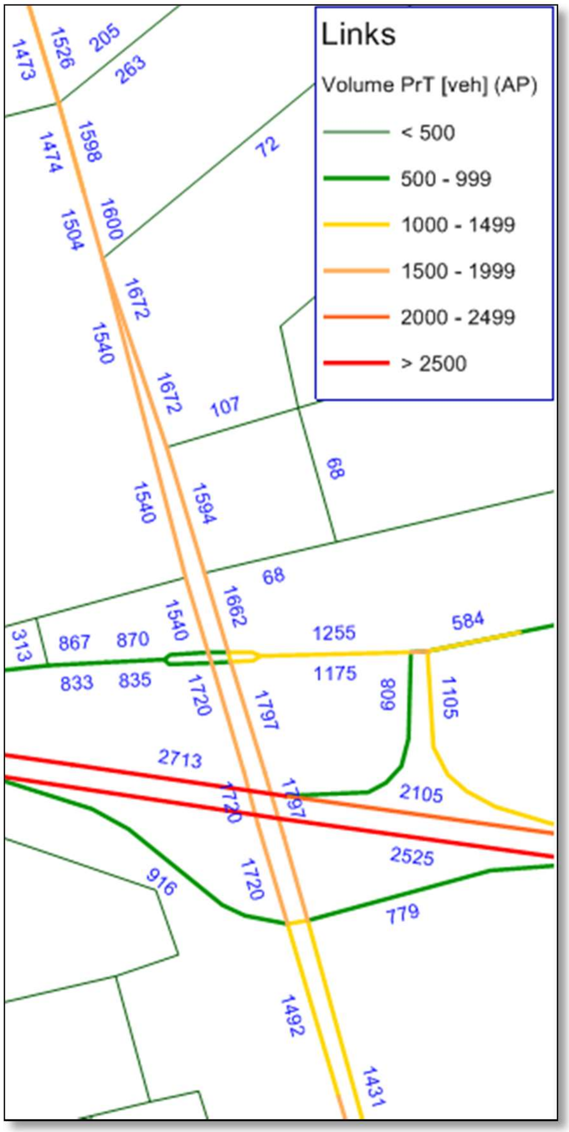
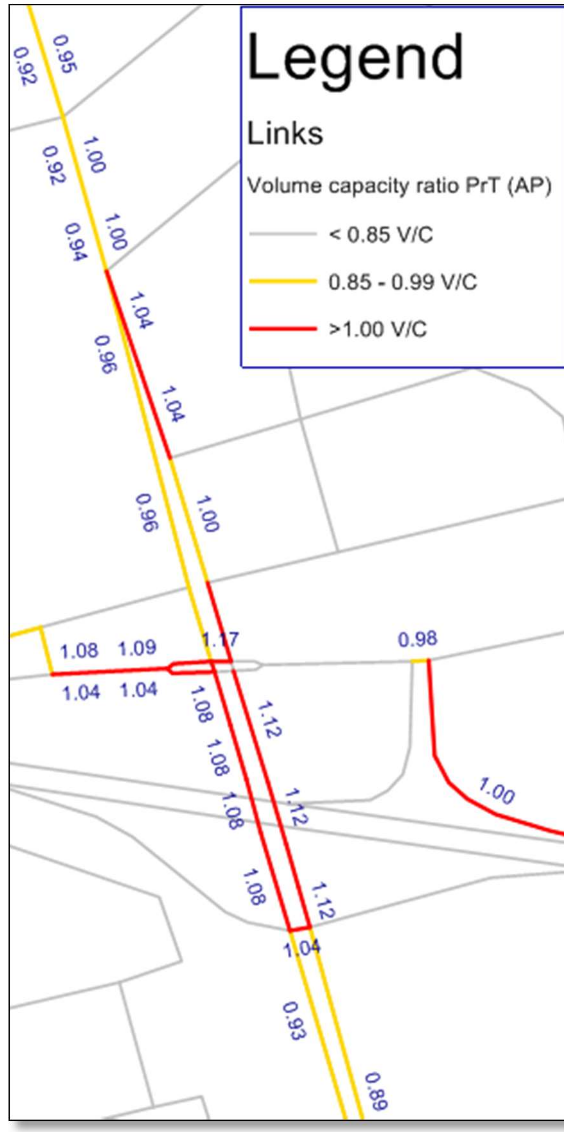


Figure 4-20: King George Road – Crossing Highway 403 to Dunsdon Street: 2041 PM Peak Hour V/C Ratios



4.3.4.2 Assessment

King George Road is a major arterial roadway that provides access to and from Highway 403 and is the main highway commercial corridor in Brantford. Regionally, King George Road is considered an MTO connecting link between Highway 24 (north of Powerline Road) and Highway 403 and provides a regional connection to Cambridge/Kitchener/Waterloo and Highway 401. As a result of these multiple roles, the King George Road capacity issue is a complex blend of strategic (local and regional) and operational concerns.

Approximately 45% of the demand on the King George Road Bridge over Highway 403 originates or is destined to areas adjacent to the roadway. ***Figure 4-21*** and ***Figure 4-22*** (Southbound and Northbound respectively) illustrate the number and distribution of local (internal to Brantford) vehicle trips that are using busiest portion of King George Road (the Highway 403 overpass). The trip distribution patterns confirm the corridor specific nature of the capacity issues on King George Road and highlight the significant demands originating from and destined to the commercial area adjacent to King George Road, particularly between Highway 403 and Powerline Road.

Figure 4-21: King George Road Local PM Peak Hour Trip Distribution – Southbound

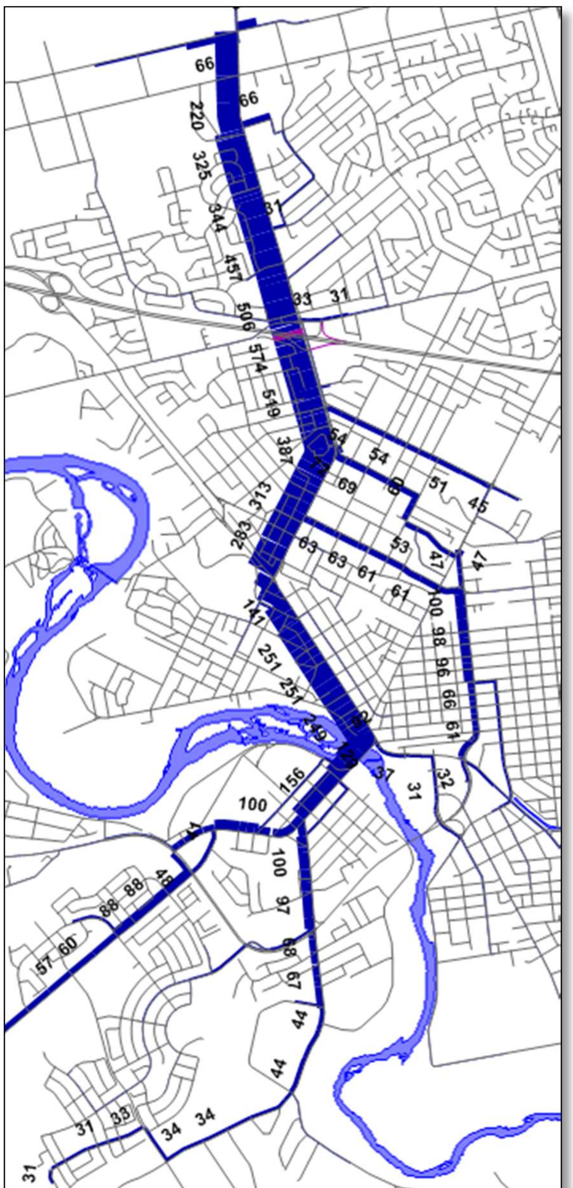
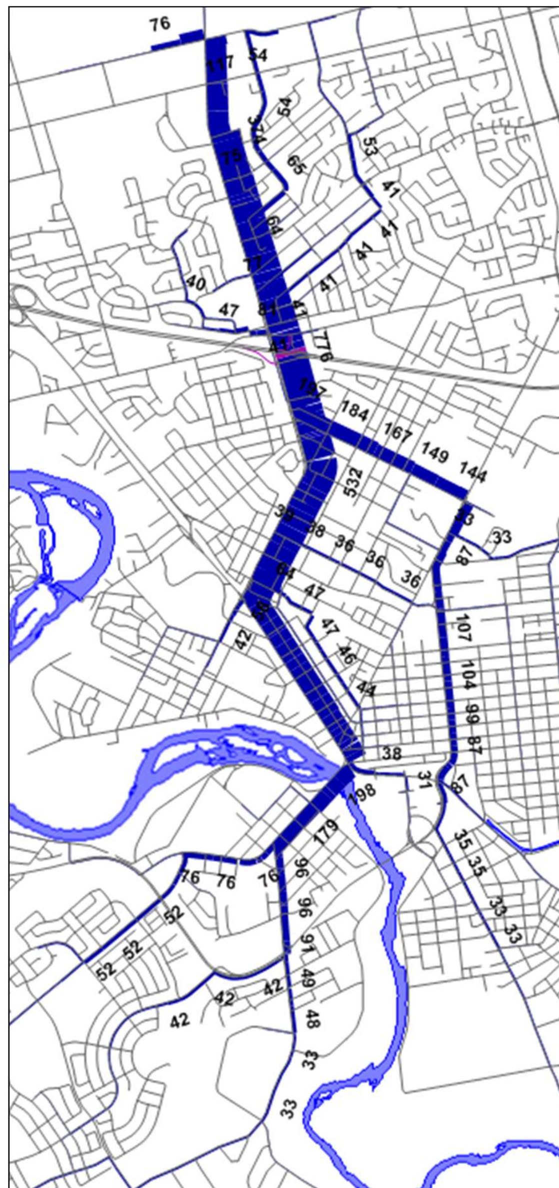


Figure 4-22: King George Road Local PM Peak Hour Trip Distribution – Northbound



The remaining 55% of the volume is destined to and from Highway 403, resulting in significant volume exchange on the King George Road Bridge over the highway. Also, the intersection spacing between Fairview Drive/Toll Gate Road and the W-NS/NS-E ramp terminals is relatively short, approximately 225 m. This high, mixed purpose volume in a relatively short space with traffic signal control results in reduced efficiency of the travel lanes on the bridge, and in the vicinity of the two intersections.

4.3.4.3 Alternatives

The alternative solutions to the identified capacity constraints for King George Road are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Given the narrow distribution patterns and the short length of trips of 45% of the volume in this King George Road corridor, there is opportunity for the implementation of Transportation Demand Management (TDM) measures to have a significant impact on traffic volumes. Increasing TDM in the King George Road corridor would reduce auto demand and could alleviate some of the forecasted congestion.

Active Transportation

Currently, there are sidewalks on both sides of King George Road but there is no cycling infrastructure. Given its 5-lane cross section and heavy vehicle volumes it is unlikely that cyclists would consider traveling on King George Road. From an active transportation perspective, the road could be significantly improved by providing an in-boulevard multi-use path. This would provide an All Ages and Abilities (AAA) two-way cycling and walking facility that would encourage more trips to be made by bicycle and on foot. Additional enhancement could include: additional and/or enhanced (covered) bike parking at major destinations and transit stops, a bicycle repair station and Cross-rides at all signalised intersections on the multi-use path. Commercial business should also be encouraged to provide bike racks and larger employers should also be encouraged / incentivised to provide end of trip facilities. This could include secure bicycle parking, change rooms with showers and lockers and other amenities like pumps. A combination of some, or all of these TDM measures could increase Active Transpiration use along the King George Road corridor and help to reduce auto demand.

However, the in-boulevard multi-use path would be difficult to implement on the bridge given the existing space constraints. Improvements to the bridge deck would be required to facilitate significant improvements to the active transportation conditions.

Transit

Brantford transit Route 4A/C (Mall Link) currently runs on King George Road to service the commercial nature of King George Road and to connect the northern residential areas to downtown. This route does a good job of directly connecting between from where people are coming, to where they are going.

Increased service frequency on these routes would encourage additional transit use along the King George Road corridor. Initiative to improve this service on King George Road would result in reduced auto demand.

Service enhancements in the form of route additions or modifications have the potential to improve the King George Road corridor transit mode share from 5% today to 12% in the future. This increase in mode share would result in an approximate 75-150 vehicle reduction on King George Road during the peak hours.

Transportation System Management

As King George Road is a major arterial and connecting link between Highway 403 and Highway 24, north of Powerline Road, it should have limited access, optimized intersection configurations and traffic control.

Traffic signal coordination could be considered to maximized the efficiency of peak hour, peak direction flow, however, given the duality of the peak conditions (peak direction is only marginally higher than the off-peak direction) this may not achieve the desired efficiency in the off-peak direction.

The most congested area of this corridor is between the Highway 403 interchange to Fairview Street/Toll Gate Road. This is likely due to the nature of the intersection operations and the effect of the short intersection spacing has on the capacity efficiency of the travel lanes.

Between Fairview Street and Dunsdon Street the principles of limited access/access control have been difficult to enforce due to the commercial activity and legacy access. There are several opportunities, especially on the west side, to eliminate/combine accesses to reduce the number of turning locations and minimize the turning movement conflicts. Consideration should be given to undertaking an access management study in the corridor.

Increase Infrastructure

King George Road Widening

Providing an additional lane in each direction between Dunsdon Street and the W-NS/NS-E ramp terminal would allow for significantly improved flow in the critical sections of King George Road. Between Fairview Street and Dunsdon Street this could be done in one of two ways:

- Adjust lane and boulevard allocations within the existing sidewalks - To accommodate an additional lane in each direction, existing lane widths would have to be narrowed and the boulevard separation between the sidewalk and the travel lanes would be lost. This would require relocation of utilities and acceptance of narrower lane dimensions than prescribed in the City’s Linear Infrastructure Design Manual.
- Expand beyond existing sidewalks - This would have significant impacts on property on both sides of the road.

Wayne Gretzky Parkway Extension

Diverting long distance trips from King George to a parallel route would provide relief to the forecast capacity issue in the area of Highway 403. A 4-lane Wayne Gretzky Parkway extension north of Powerline Road has the potential to provide this alternative capacity. The connection of travel demand back to the Highway 24 corridor using Governors Road would relive the congested sections of King George Road.

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on WGP crossing Highway 403 to Dunsdon Street are as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the King George corridor;
- Corridor TSM – Undertake an access management plan for the King George Corridor north of Highway 403; and
- Increase Infrastructure – Construct 4-lane extension of WGP north from Powerline Road to connect with Park Road North.

With improved transit service, good access management, and the extension of WGP, a general road widening of King George Road across Highway 403 and north to Dunsdon Street is not considered a necessity to accommodate adequate levels of service in 2041.

4.3.5 Paris Road - Highway 403 to Powerline Road

4.3.5.1 Problem

Paris Road between Highway 403 and Powerline Road is forecast to experience significant growth in traffic (***Figure 4-23***) as a result of the commercial/industrial developments planned for the area. It will provide the main accesses to Highway 403 (along with the Oak Park Road) for the development. As well, it will continue to serve as the main connection between Paris and Highway 403 and Paris and Downtown Brantford. The majority of Paris Road between Highway 403 and Powerline Road is forecast to be approaching capacity or over capacity in 2041, as illustrated in ***Figure 4-24***.

Paris Road between Highway 403 and Powerline Road has significant auto demand in both directions, however during the PM peak hour, southbound is the critical direction. Southbound between Golf Road and Highway 403, volumes are forecast to surpass 1,800 vehicle trips in the PM peak hour, which will exceed capacity by 15% (V/C ratio of 1.15). The northbound volumes on Paris Road are not forecast to exceed capacity, but some sections come very close to reaching capacity.

Figure 4-23: Paris Road – Highway 403 to Powerline Road: 2041 PM Peak Hour Volumes

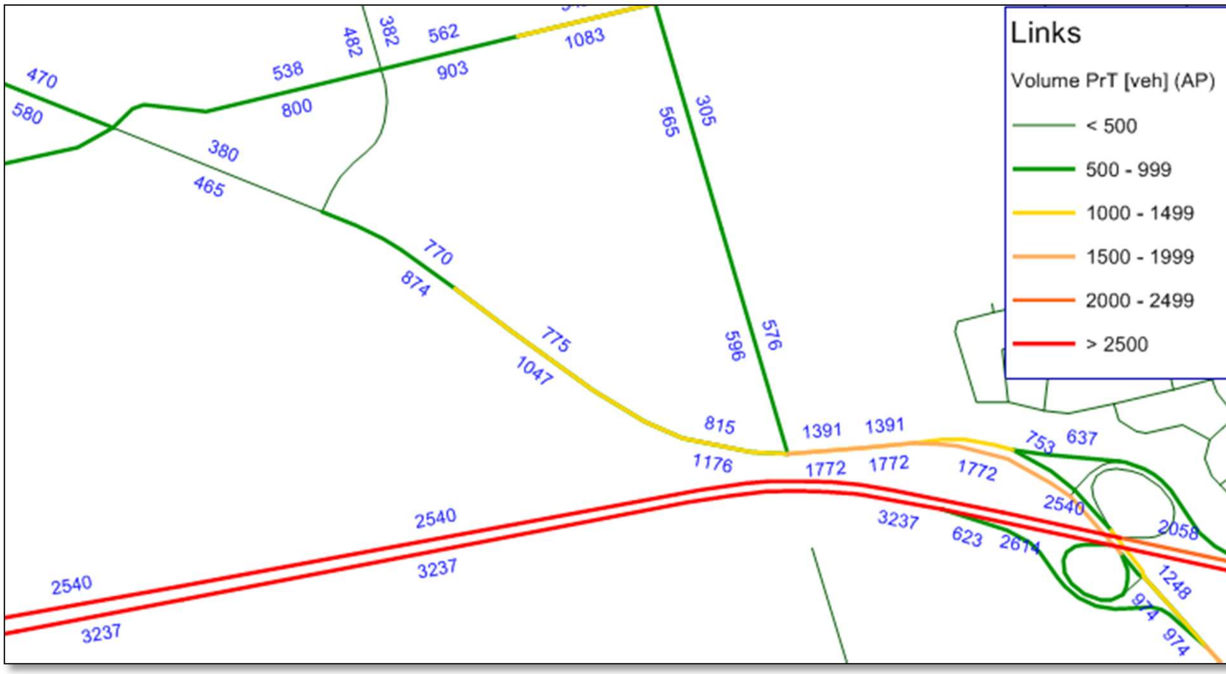
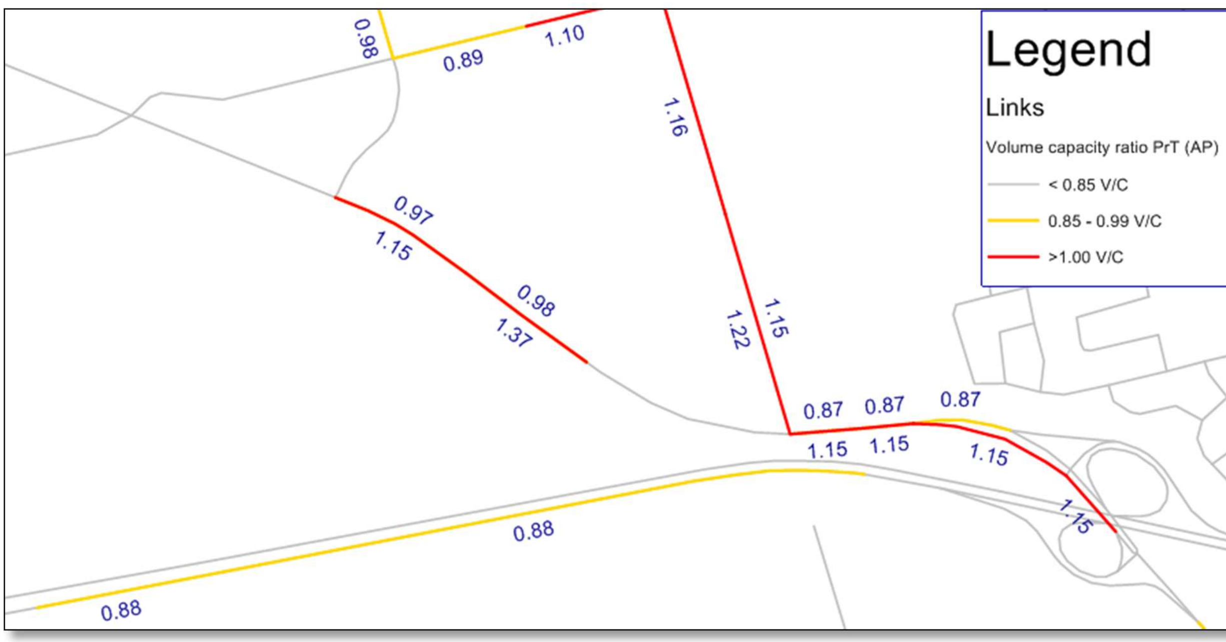


Figure 4-24: Paris Road – Highway 403 to Powerline Road: 2041 PM Peak Hour V/C Ratios



4.3.5.2 Assessment

The capacity issue on Paris Road between Highway 403 and Powerline Road is strategic in nature. The 2-lanes, from 500 m north of Golf Road to beyond Powerline Road, will be insufficient to accommodate the demand in 2041.

The PM peak hour, peak direction demands on this section of Paris Road can be broken down as follows: 25% of vehicles are destined to south of the Grand River via Lorne Bridge; 50% of vehicles are destined to Highway 403 eastbound, and 25% of the vehicles are destined for downtown/central Brantford. This trip distribution patterns is illustrated in ***Figure 4-25.***

Figure 4-25: Paris Road (north of Highway 403) PM Peak Hour Trip Distribution – Southbound

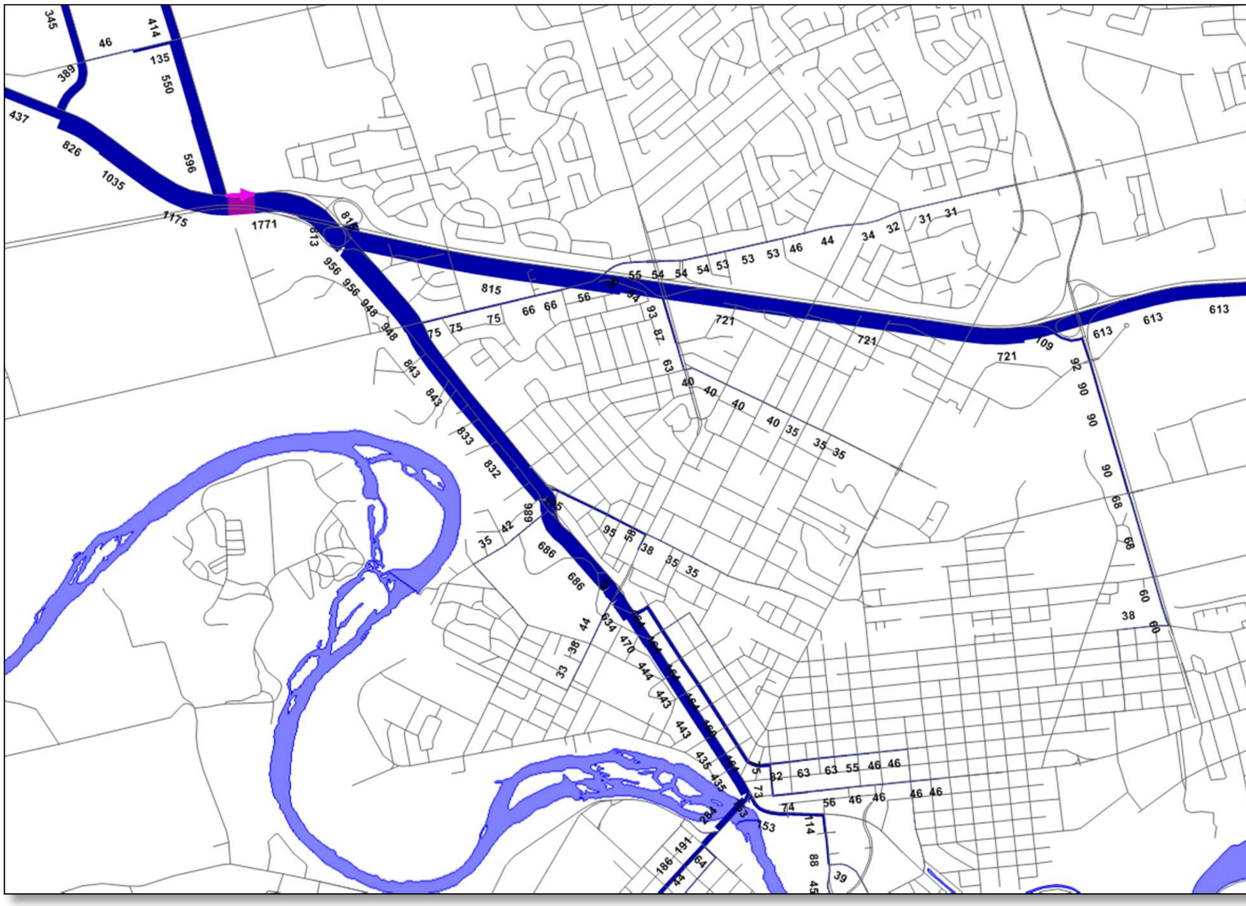


Figure 4-26 and ***Figure 4-27*** (southbound and northbound respectively) illustrate the number and distribution of vehicle trips in the PM peak hour that are using Paris Road (from north of Highway 403) to travel between Northwest Brantford and Southwest Brantford.

The order of magnitude volume problem is approximately 300 vehicles, i.e. a reduction or removal of 300 vehicles from Paris Road would result in satisfactory traffic operations.

Figure 4-26: Paris Road (north of Highway 403) PM Peak Hour Trip Distribution - NW Brantford to SW Brantford – Southbound

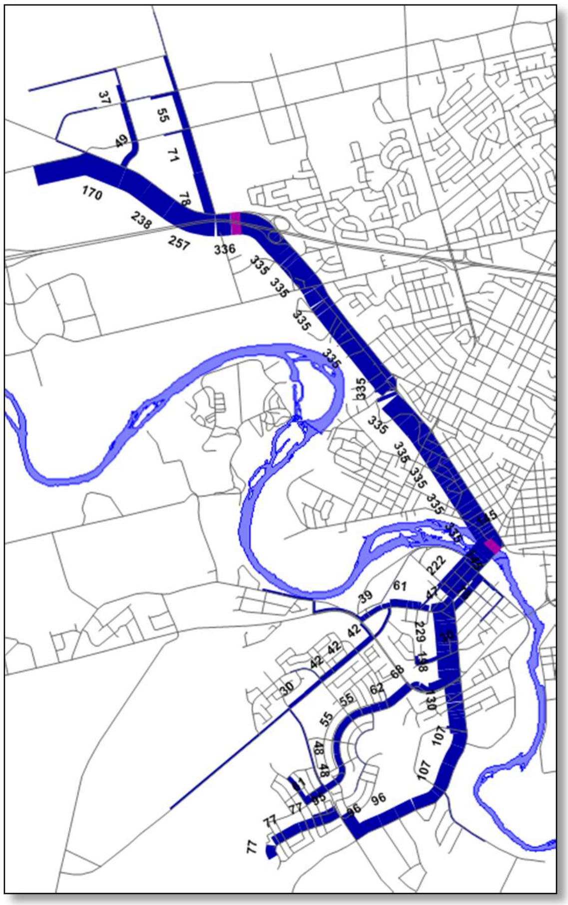
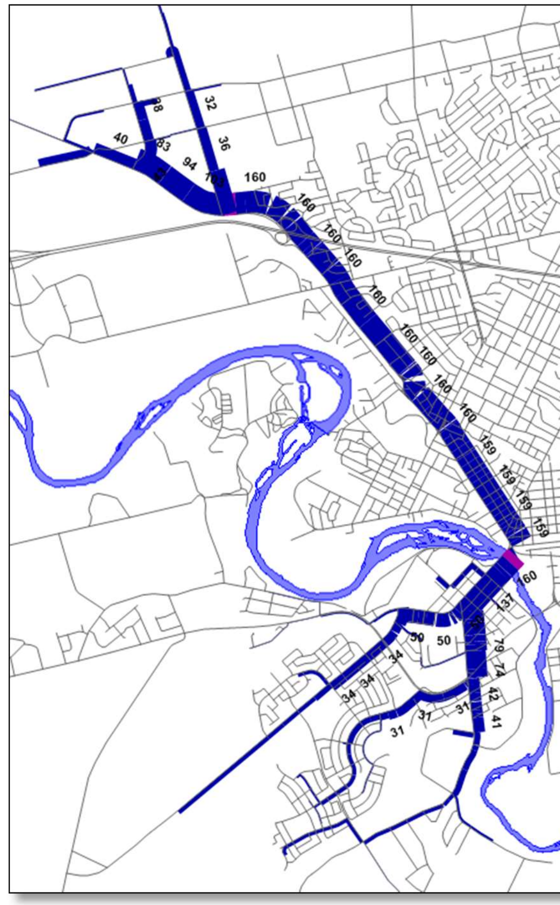


Figure 4-27: Paris Road (north of Highway 403) PM Peak Hour Trip Distribution - SW Brantford to NW Brantford – Northbound



4.3.5.3 Alternatives

The alternative solutions to the identified capacity constraint for Paris Road (north of Highway 403) are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

<u>**Travel Demand Management**</u>

Active Transportation

Currently, Paris Road north of Highway 403 provides no dedicated space for pedestrian or cycling activity. As a rural cross section, gravel shoulders are provided, therefore any pedestrian activity would have to occur on this soft shoulder and any cycling would have to occur within the travel lanes.

With growth in area employment and population, this section of Paris Road will become urbanized. As an urban arterial it should be designed using Complete Streets principles providing dedicated space for all modes. The design of the cross section should include sidewalks, multi-use path(s) and on-road cycling accommodation that falls within the City's design standards.

These provisions are unlikely to significantly reduce the number of vehicles on the roadway as a significant proportion of trips will continue to be longer distance in nature (to / from outside the City). This alternative is not a standalone solution to the capacity need, but it is important that the future infrastructure accommodate the safe and efficient operation of all modes.

Transit

Currently, there is no regular local transit service on Paris Road north of Highway 403. With significant employment growth forecasted in the area, there is an opportunity to extend local transit into the north expansion area.

The provision of new transit service to connect the future employment areas with the residential areas south of Highway 403, as well as to commercial areas, approaching and within downtown, has the potential to improve the Paris Road corridor transit mode share from 0% today to 25% in the future. This increase in mode share would result in an approximate 175-350 vehicle reduction on Paris Road during the peak hours.

Transportation System Management

Both the area surrounding Paris Road north of Highway 403 and the roadway itself are currently rural in nature. As development occurs, the area will transition to an urban environment. Signalization of the intersections of Paris Road and Golf Road and Paris Road and Oak Park Road may be required. Lane allocation at the current signalized intersection of Paris Road and Powerline Road may also have to be revisited to provide a separate northbound left turn lane.

Before the area surrounding Paris Road north of Highway 403 is urbanization, the paving of the shoulders could be considered as it increases the existing capacity of the roadway by increasing driver comfort, and also provides a dedicated space for cyclists. This alternative by itself will only provide a minor increase to the roadways capacity and should be coupled with other alternatives.

Increase Infrastructure

Paris Road Widening

Paris Road from about 500 m north of Golf Road to Brant Avenue has a 4-lane cross section. However, from about 500 m north of Golf Road to beyond Powerline Road, Paris Road only has a 2-lane cross section. Widening this constrained section of Paris Road would provide some much need capacity as a result of the development in the area.

A widened Paris Road from 500 m north of Golf Road to Oak Park Road would alleviate the capacity constrains forecast for this section of Paris Road. It would not however alleviate the capacity constraints approaching Highway 403.

Oak Park Road Extension

As identified in ***Figure 4-26***, approximately 350 vehicles in the PM peak hour use Paris Road for north-south travel to connect across the river into Southwest Brantford. The extension of Oak Park Road (currently in EA stage) to Colborne Street West would provide a north-south connection in West Brantford and an additional vehicle crossing of the Grand River. As described in previous sections, the traffic in the north-south corridor is traveling between Northwest Brantford / Paris area and Southwest Brantford is forced to travel east towards Downtown Brantford in order to cross the Grand River only to travel back to the west to reach their destination. The diversion of these trips from Paris Road would alleviate the capacity problem on Paris Road north Highway 403.

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on Paris Road north of Highway 403 are as follows:

- City Wide TDM – improved transit service in the City will not significantly impact the demands on Paris Road north of Highway 403;
- Corridor TSM – in the short term, pave the Paris Road shoulders to improve the driver level of comfort and to provide opportunities for cycling in the corridor; in the longer term (by 2041) signalize major intersection at Golf Road and Oak Park Road and provide appropriate auxiliary lanes;
- Increase Infrastructure – widen Paris Road from 500 m north of Golf Road to Oak Park Road to address development related pressures on the road; and
- Increase Infrastructure – provide new multi-modal facilities and river crossing connecting Oak Park Road to Colborne Street West.

4.3.6 Colborne Street (Lorne Bridge) - Crossing the Grand River

4.3.6.1 Problem

The Colborne Street crossing of the Grand River (Gilkison Street to Brant Avenue / Icomm Drive) is forecast to have a significant capacity deficiency. It is one of only two existing vehicle crossings of the Grand River (the other being Veterans Memorial Parkway) connecting South and West Brantford to the rest of the city. The 2041 PM peak hour volume and volume-to-capacity conditions in 2041 are illustrated in ***Figure 4-28*** and ***Figure 4-29*** respectively.

Figure 4-28: Colborne Street (Lorne Bridge) – Crossing the Grand River: 2041 PM Peak Hour Volumes

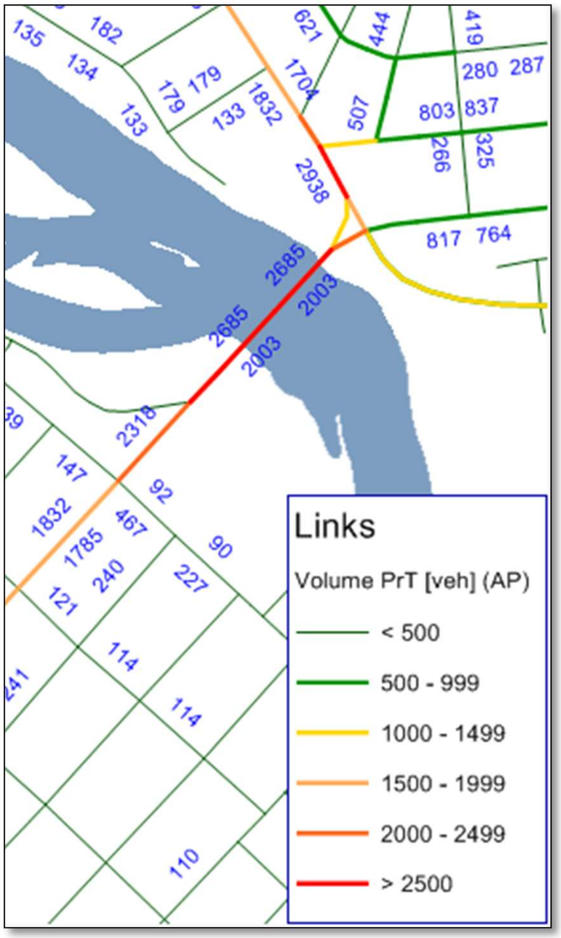


Figure 4-29: Colborne Street (Lorne Bridge) – Crossing the Grand River: 2041 PM Peak Hour V/C Ratios

The Lorne Bridge has significant auto demand in both directions, however during the PM peak hour, westbound is the critical direction. The peak hour volume in the westbound direction is forecast to reach almost 2,700 vehicle trips which will exceed capacity by over 65% (V/C ratio of 1.68). The westbound congestion is significant enough to result in considerable downstream neighbourhood infiltration onto parallel routes in an attempt to avoid Colborne Street. Ballantyne Drive to Sherwood Drive and Gilkison Street to Balfour Street are the two routes that are anticipated to see considerable "cut-through" traffic volumes.

4.3.6.2 Assessment

The capacity issue on the Lorne Bridge is strategic in nature. There is a significant lack of a capacity crossing the Grand River, specifically connecting Southwest Brantford (West Brant and Tutela Heights) to the rest of Brantford. ***Figure 4-30*** and ***Figure 4-31*** (westbound and eastbound respectively) illustrate the distribution patterns of vehicle trips that are using Colborne Street to cross the Grand River.

Figure 4-30: Colborne Street (Lorne Bridge) PM Peak Hour Trip Distribution – Westbound

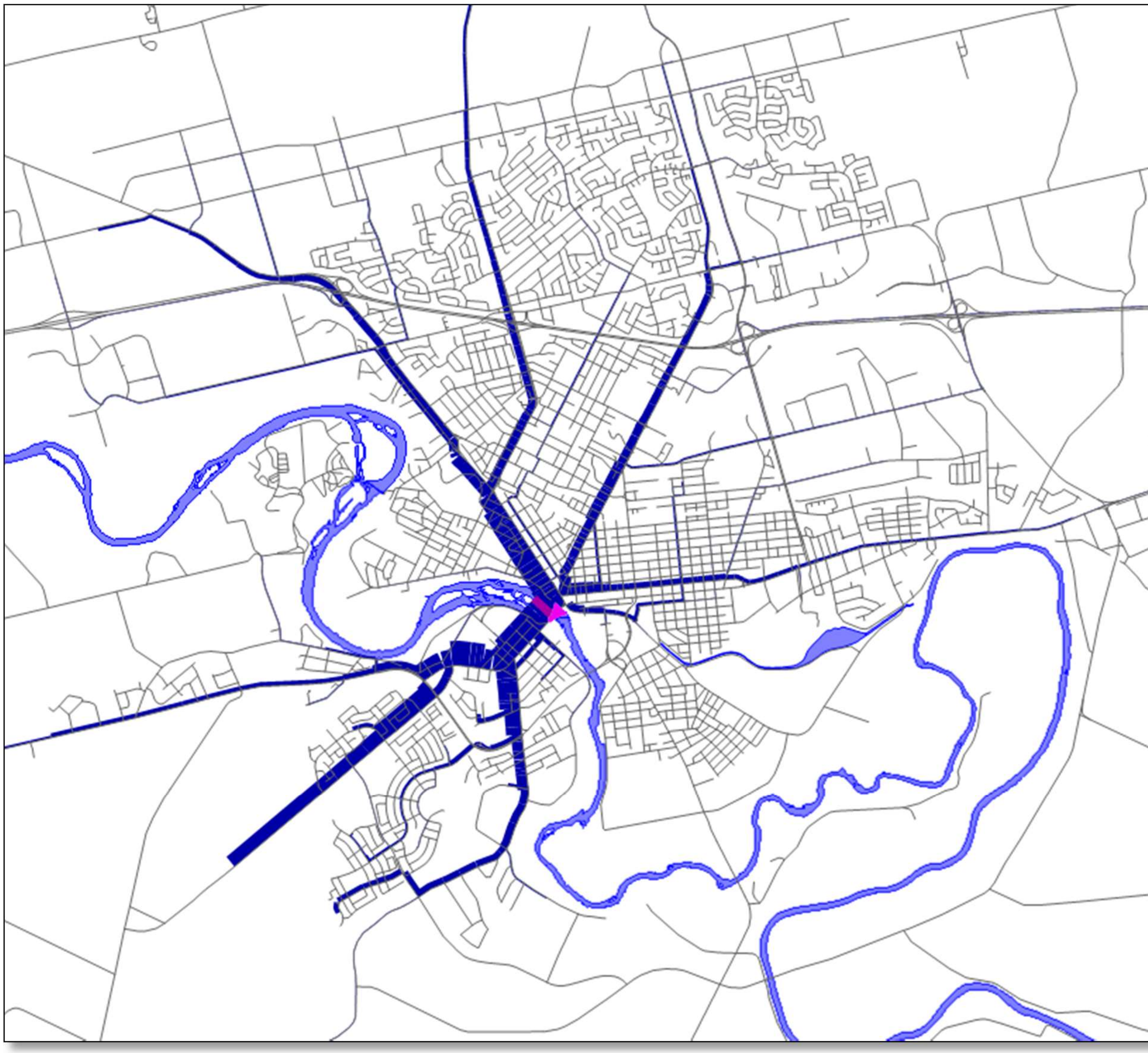
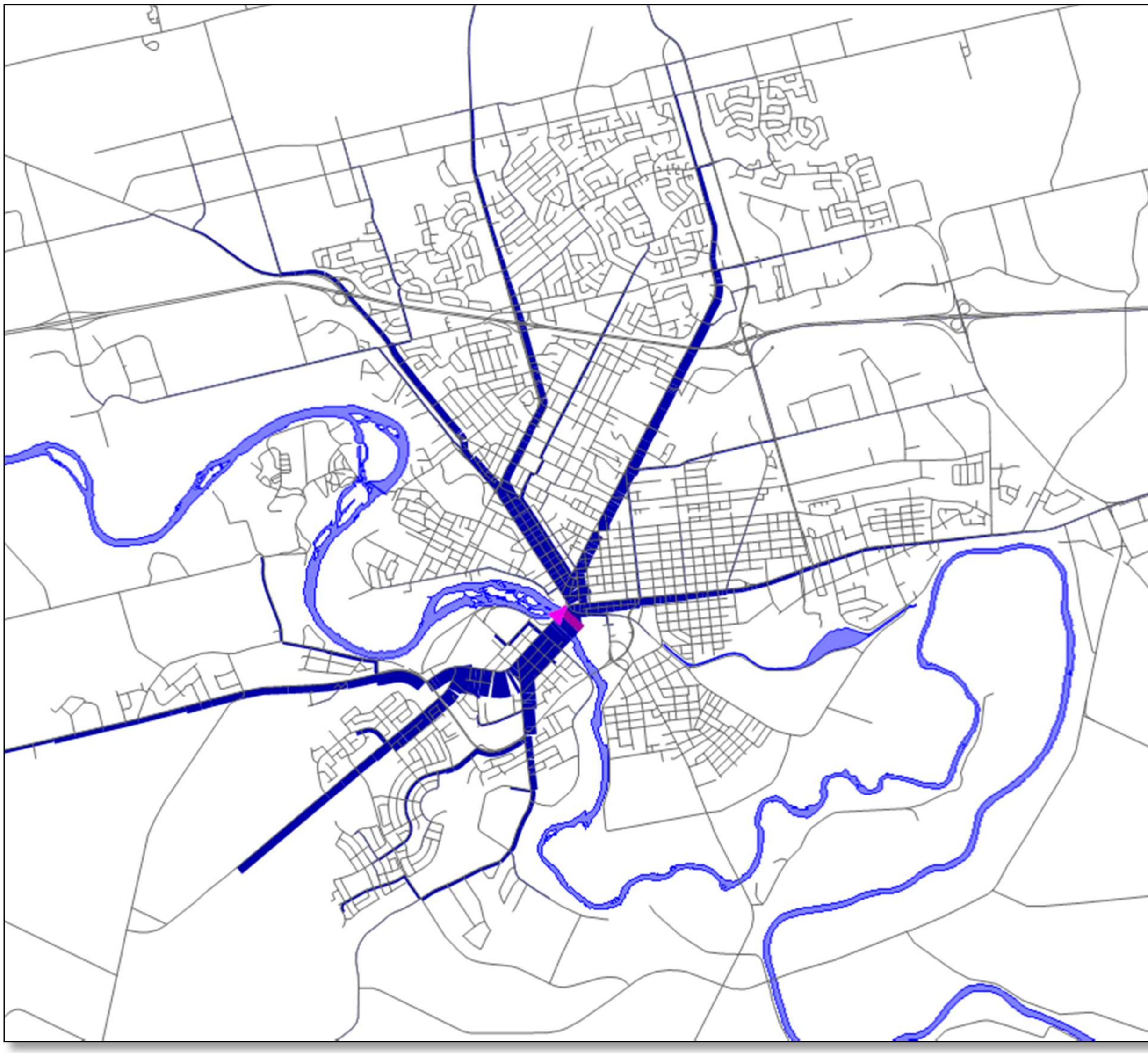


Figure 4-31: Colborne Street (Lorne Bridge) PM Peak Hour Trip Distribution – Eastbound



Both the westbound and eastbound trip distribution patterns are noticeably similar and seem to reach all corners of the city. The distribution of trips indicates that a significant amount of traffic is traveling between the southwest area of Brantford and areas north of Highway 403 using the Lorne Bridge.

4.3.6.3 Alternatives

The alternative solutions to the identified capacity constraint for Colborne Street crossing the Grand River are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

The Colborne Street crossing the Grand River (Lorne Bridge) provides protected (by barrier) sidewalks on both sides of the bridge. There is little opportunity to provide additional separated space for cyclists.

At best, shared lanes could be signed but this would not provide the desired environment for recreational and novice level riders. Reconfiguration of the laneways on the bridge deck would be required to facilitate significant improvements to the active transportation conditions.

Transit

There are two Brantford Transit routes that service the residential areas in the vicinity of the Lorne Bridge: Route 5 (West Brant Oakhill) and Route 6 (West Brant Shellard). These routes effectively target residential travel to/from the downtown.

Service enhancements in the form of route additions or modifications have the potential to improve the Lorne Bridge transit mode share from 3% today to 16% in the future. This increase in mode share would result in an approximate 75-150 vehicle reduction on Lorne Bridge during the peak hours.

Transportation System Management

Given the strategic nature of the demand, i.e. crossing the river and the order of magnitude of the deficiency, minor tweaks in the system operation will not significantly improve the actual carrying capacity of the bridge.

That said, alternative intersection control, in the form of a roundabout, at the intersection of Colborne Street East/Colborne Street West/Brant Avenue/Icomm Drive could improve the efficiency of the intersection such that the significant eastbound left turn lane length could be reduced, allowing for alternative lane allocation across the bridge.

Increase Infrastructure

Widen Lorne Bridge

A widening of the bridge to 6-lanes would address the issue but operational constraints on either side of the bridge would limit the effectiveness of the widening. It is noted that there are seasonal load restrictions on the bridge and that there is an ongoing EA for the three bridges (including two pedestrian crossings of the Grand River) to improve all modes of travel and address improvements for load restrictions.

Veterans Memorial Parkway Extension and Bridge Improvements

A large number of trips, about 30% of the peak hour demand on the Lorne Bridge, are traveling to and from the east (via the Colborne Street / Dalhousie Street parallel one-way pair). The diversion of these trips to an improved Veterans Memorial Parkway would result in an improved Level of Service on Lorne

Bridge (bringing the V/C down to 1.13 from 1.68 in the peak direction). While the VMP is also forecast to experience capacity issues, there is more potential to improve the lane allocation across the VMP bridge to gain a lane of capacity.

While a widening of the Veterans Memorial Parkway provides some river crossing capacity relief, it does not address the primary origin-destination pattern for Lorne Bridge users (i.e. to the northwest and north central areas of Brantford).

Oak Park Road Extension

As described in ***section 4.3.1.2***, some 300 to 500 vehicle trips in the PM peak hour are estimated to use the Lorne Bridge to cross the Grand River as there is no alternative roadway for north-south travel that crosses the river in West Brantford. The extension of Oak Park Road to Colborne Street would provide an alternative route for these 300-500 trips. This improvement alone would result in a decrease in the V/C ratio on the bridge from 1.68 to 1.38 (if 500 trips were removed).

Alone, this alternative will only solve a portion of the problem and will need to be coupled with other alternatives that address the capacity shortage across the Grand River.

Conclusion

The preferred alternatives for addressing the 2041 capacity issue on the Lorne Bridge are as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the Grand River crossings;
- Corridor TSM – the potential for a roundabout at the east end of the bridge should be considered. This might improve delays to the critical movements and allow the opportunity to re-designate the lane allocation on Lorne Bridge;
- Increase Infrastructure – provide new facility and river crossing connecting Oak Park Road to Colborne Street West; and
- Increase Infrastructure – subject to the preferred solution for the VMP crossing capacity issue, these additional capacity improvements when coupled with the Oak Park Road extension will provide the strategic capacity to address the Lorne Bridge capacity shortfall.

4.3.7 West Street - Charing Cross Street to Henry Street

4.3.7.1 Problem

West Street between Charing Cross Street and Henry Street is identified as a pinch point in the north-south network. The majority of West Street between Charing Cross Street and Henry Street is forecast to experience significant volumes and to be approaching capacity or over capacity in 2041, as illustrated in ***Figure 4-32*** and ***Figure 4-33*** respectively.

Figure 4-32: West Street – Charing Cross Street to Henry Street: 2041 PM Peak Hour Volumes

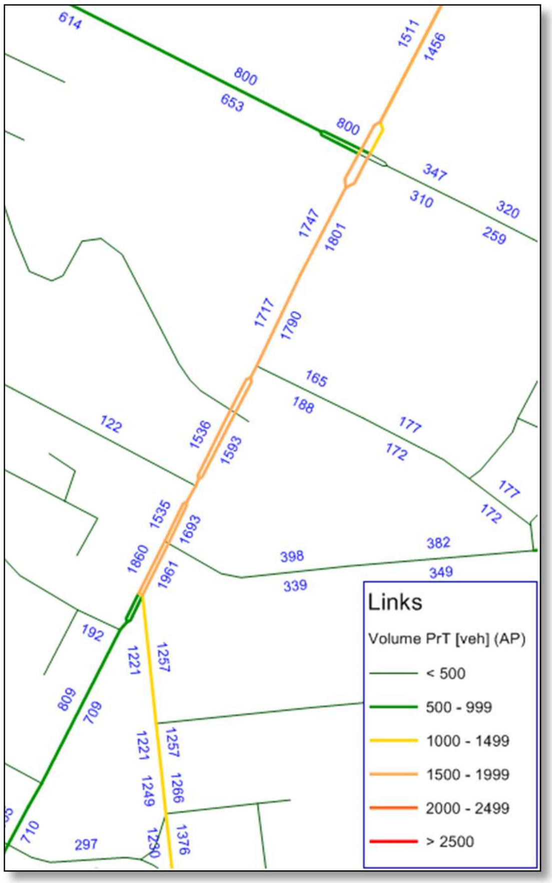
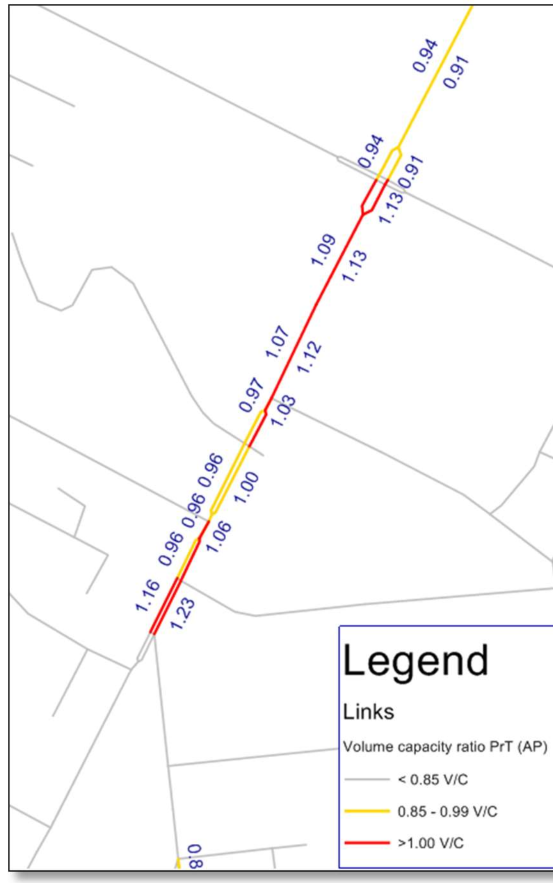


Figure 4-33: West Street – Charing Cross Street to Henry Street: 2041 PM Peak Hour V/C Ratios



West Street between Charing Cross Street and Henry Street has significant auto demand in both directions, however the critical direction during the PM peak hour is northbound. Overall, the capacity constraints forecast for West Street are quite significant but they do vary considerably block by block. West Street between Charing Cross Street and Harris Avenue is the section of West Street that is forecast to experience the most significant volumes / delays.

4.3.7.2 Assessment

The capacity issues on West Street are both strategic and operational in nature. Due to a lack of continuous east-west capacity south of Highway 403, a significant amount of east-west traffic to/from Charing Cross Road is using West Street to connect from/to Henry Street. ***Figure 4-34*** and ***Figure 4-35*** (southbound and northbound respectively) illustrate the number and distribution of PM peak hour vehicle trips that are using West Street (and Harris Street within the forecasting model) to travel between Henry Street and Charing Cross Street. There are approximately 130 southbound vehicle trips and 150 northbound vehicle trips that could be removed from West Street between Charing Cross and Henry Street during the peak hour with the provision of a continuous east-west connection in the vicinity that crossed West Street.

Figure 4-34: East – West PM Peak Hour Trips using West Street – Southbound

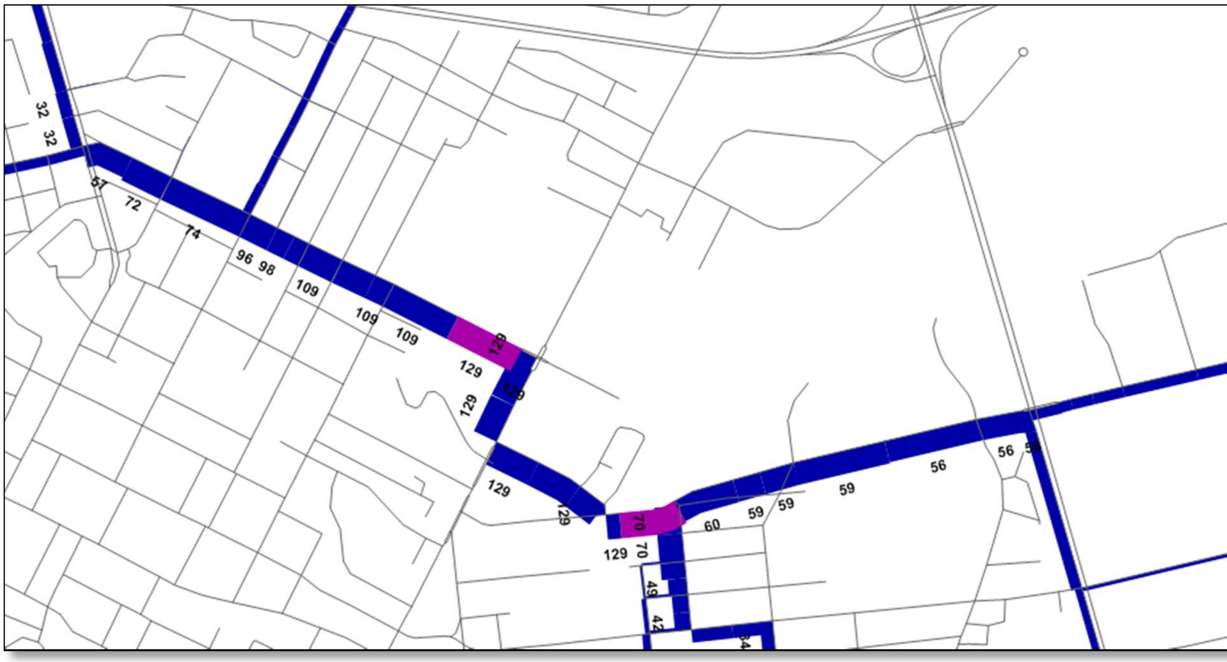
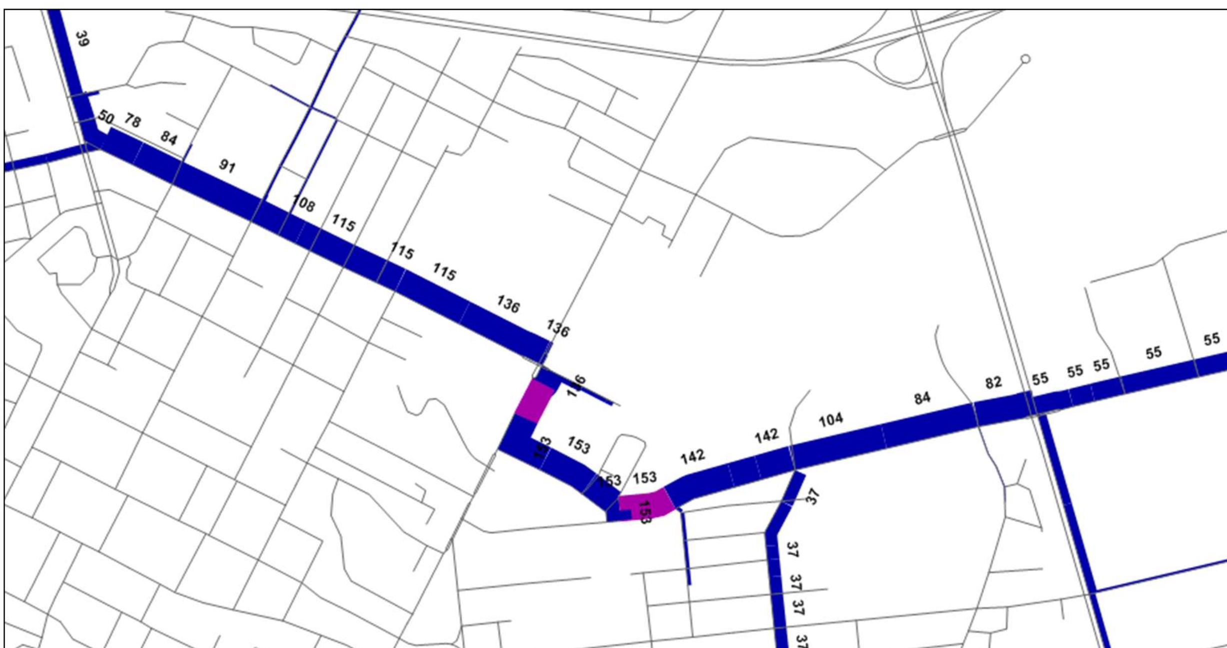


Figure 4-35: East – West PM Peak Hour Trips using West Street – Northbound



In addition to this strategic east-west traffic flow issue, the resultant southbound left turning movements from West Street onto Harris Avenue and Henry Street are significant and the auxiliary lanes, if provided, do have sufficient storage to protect the queues from the through lane. The southbound left turn lane at Harris Street can accommodate 2 vehicles without impeding the travel lane and Henry Street does not have a separated left turn lane.

4.3.7.3 Alternatives

The alternative solutions to the identified capacity constraint for West Street are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

West Street, between Henry Street and Charing Cross Road, provides sidewalks on both sides of the road. Because of the right of way constraints, the sidewalks abut the curb (i.e. no boulevard/buffer) and there is no specific accommodation for cycling.

West Street is a busy secondary north-south route used by trucks and vehicles as an alternative route to avoid WGP or King George Road when connecting between North Brantford and downtown. As such it would be a good multimodal connection. To do so would require a widening of the cross section to provide the road design requirements for a minor arterial that accommodates all modes.

Transit

The West Street corridor is served by one Brantford Transit route: Route 2 (West Street Brier Park). This route provides significant connections between downtown and neighbourhoods north of Highway 403. West Street connects intensification areas and has good potential to provide enhanced transit connectivity in the future.

Service enhancements in the form of route additions or modifications have the potential to improve the West Street transit mode share from 6% today to 14% in the future. This increase in mode share would result in an approximate 75-150 vehicle reduction on West Street during the peak hours.

Transportation System Management

West Street is classified as a minor arterial road, however, it is forecasted to have high future volumes and the longer distance nature of these trips (connecting from north of Highway 403 to downtown) suggests a role and function more aligned with a major arterial. While its basic cross section is limited by the right of way and the adjacent land use, there are some design features could be enhanced to more closely align with its role and function.

Currently there are no prohibited turns on West Street between Henry Street and Charing Cross Street. Consideration could be given to prohibiting left turns where left turn storage is not provided during the peak periods. This could include the northbound left from West Street to Kennedy Street and the southbound left from West Street to Henry Street.

In addition, traffic signal coordination would minimize delay and maximise vehicle flow. This would provide a continuous flow or 'green wave' in the peak direction of travel.
This alternative will improve traffic operations and will slightly increase the overall carrying capacity of the roadway. However, on its own, this alternative will not increase roadway capacity enough to mitigate delays and improve the level of service to an acceptable level.

Increase Infrastructure

West Street Widening

The West Street capacity issue is confined to the short (approximately 500 m) section between Charing Cross Street. A widening of the road from 4 lanes to 6 lanes would address the capacity issue but this would have significant property impacts.

Providing left turn lanes with adequate storage in both directions at all intersections, would effectively be providing a 5-lane cross section. This would slightly improve the effective capacity of each travel lane. Assuming a 10% increase in efficiency would bring West Street to an 'at capacity' condition. However, this would also have significant property impacts for a very small advantage.

There are approximately 130 southbound vehicle trips and 150 northbound vehicle trips in the PM peak hour that could be diverted from West Street between Charing Cross Street and Henry Street with the provision of a continuous east-west connection in the vicinity. It is noted that there is an EA for the intersection improvement at this intersection.

It is also noted that any such improvements to West Street would continue to facilitate the current east-west travel patterns. These existing travel patterns result in two issues that are not strictly capacity based:

- Role and Function of Harris Street – Harris Street is a minor collector road that serves as access for commercial and industrial property, as well as residential property on the north. It was not intended to function as a by-pass of the West Street / Henry Street intersection as it does today. In addition to the high volume, the diversion places pressure on its unsignalized intersections with West Street and Henry Street; and
- Henry Street Underpass – Henry Street is a 2-lane minor arterial road west of Brock Street that includes the narrow rail underpass. In 2041 Henry Street at the underpass is expected to be operating at approaching capacity conditions (V/C ratio of 0.87). With an improved West Street, volume flows on Henry Street would potentially increase and the capacity under the bridge would become a constraint. As well, the current underpass with its narrow lane widths and sidewalk on one side does not provide an environment that aligns with the multi-modal vision for the community. There are no good opportunities for on-road cycling facilities or improved pedestrian space without reconstructing the rail bridge

A road widening of West Street would address the capacity shortfall between Charing Cross Street and Henry Street, but there would be significant property impacts and secondary infrastructure impacts that would also require mitigation.

Charing Cross Street Extension

There are approximately 200-300 peak hour trips in the peak direction (150 trips from Harris Street alone) that are using West Street to facilitate a broader east-west trip. The extension of Charing Cross Street from West Street to Henry Street (approximately 850 m) would provide that continuous east-west connection and would also provide additional capacity across the rail corridor for all modes. The diversion of 200-300 trips in the peak direction would reduce the volume to capacity on West Street to less than 1.00.

This 2-lane extension alternative will relieve capacity West Street to below full capacity levels. The reductions in demand are modest but should be enough to bring West Street between Charing Cross Street and Henry Street under capacity. However, this alternative includes potentially significant costs (New CNR crossing) and property impacts (City yard).

Conclusion

The preferred alternative for addressing the 2041 capacity issue on West Street between Charing Cross Street and Henry Street is as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the West Street corridor;
- Corridor TSM – provision of left turn auxiliary lane at the West Street/Henry Street intersection; and
- Increase Infrastructure – provide new facility connecting Charing Cross Street at West Street to Henry Street (including rail overpass). A new extension will provide new opportunities for active mode provisions and connections in the network.

4.3.8 Veterans Memorial Parkway - Mt. Pleasant Street to Market Street

4.3.8.1 Problem

The Veterans Memorial Parkway (VMP) crossing of the Grand River (Mt. Pleasant Street to Market Street) is forecast to be one of the more congested links in the City by 2041. It is one of two existing crossings of the Grand River connecting South and West Brantford to the rest of the city. The VMP forecast volume and volume-to-capacity performance is illustrated in ***Figure 4-36*** and ***Figure 4-37*** respectively.

The VMP crossing of the Grand River has significant auto demand in both directions, however during the PM peak hour, westbound is the critical direction. The volume in the westbound direction is forecast to surpass 1,350 vehicle trips which will exceed capacity by over 35% (V/C ratio of 1.35).

Figure 4-36: Veterans Memorial Parkway – 2041 PM Peak Hour Volumes

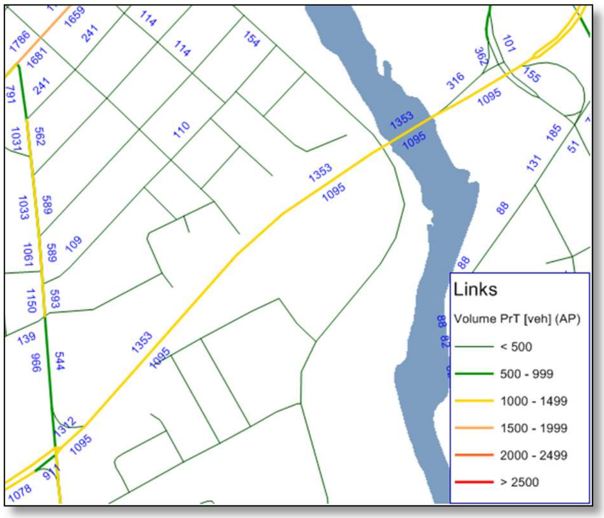
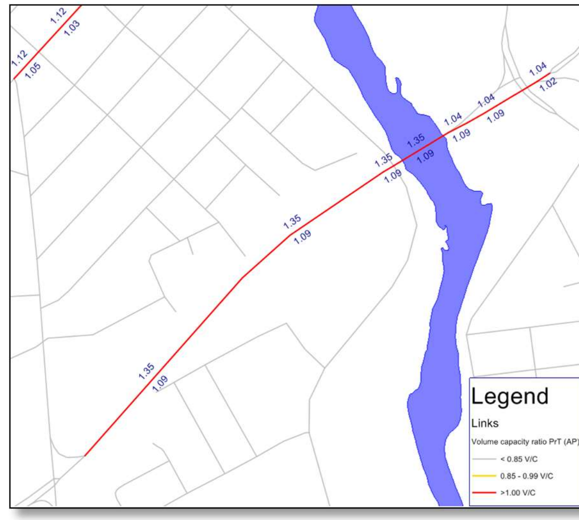


Figure 4-37: Veterans Memorial Parkway – 2041 PM Peak Hour V/C Ratios



4.3.8.2 Assessment

The capacity issue on VMP (crossing of the Grand River) is strategic in nature. There is a significant lack of capacity crossing the Grand River, specifically connecting Southwest Brantford (West Brant and Tutela Heights) to East Brantford. ***Figure 4-38*** and ***Figure 4-39*** (westbound and eastbound respectively) illustrate the distribution patterns of vehicle trips that are using VMP to cross the Grand River.

The distribution of PM peak hour trips reveals the following:

- 15% of trips originate from the east (Hamilton/GTA) via Highway 403;
- 20% of trips originate from north of Highway 403; and
- 65% originate from Central / Downton Brantford.

Travel markets to the Northwest Brantford and Paris and west (Woodstock-London) markets are not served by this crossing.

VMP west of Mt Pleasant Road has a 4-lane cross section (2 lanes in each direction) while VMP between Mt. Pleasant Street and Erie Street has predominantly a 2-lane cross section. The bridge crossing itself is a complicated mix of lane adds and drops. Westbound from Erie Street, VMP is 2 lanes until the overpass crossing of Market Street where 1-lane drops. The second lane is picked up again as the N-W Market Street direct ramp joins to cross the river. The second lane drops again at the end of the structure and 1-lane continues on the Mt Pleasant Street. Eastbound from Mt. Pleasant Street, VMP carries 1 lane onto and across the river crossing. A right turn slip lane is provided at the end of the bridge to access the ramp to Market Street/Eagle Street. From this Market Street/Eagle Street ramp

VMP opens up into 2 through lanes, a separate right turn lane and separate left turn lane at the Erie Street/Clarence Street intersection.

The problem is that consistent capacity is needed for 1,300 vehicles in the peak direction (eastbound in the AM peak hour and westbound in the PM peak hour, from Market Street to Mt Pleasant Street. The current capacity on the bridge is 2,000 vehicles per hour westbound and 1,000 vehicles eastbound, while on the section between the bridge and Mt Pleasant Street is 1,000 vehicles per hour in each direction.

Figure 4-38: Veterans Memorial Parkway Bridge PM Peak Hour Trip Distribution – Westbound

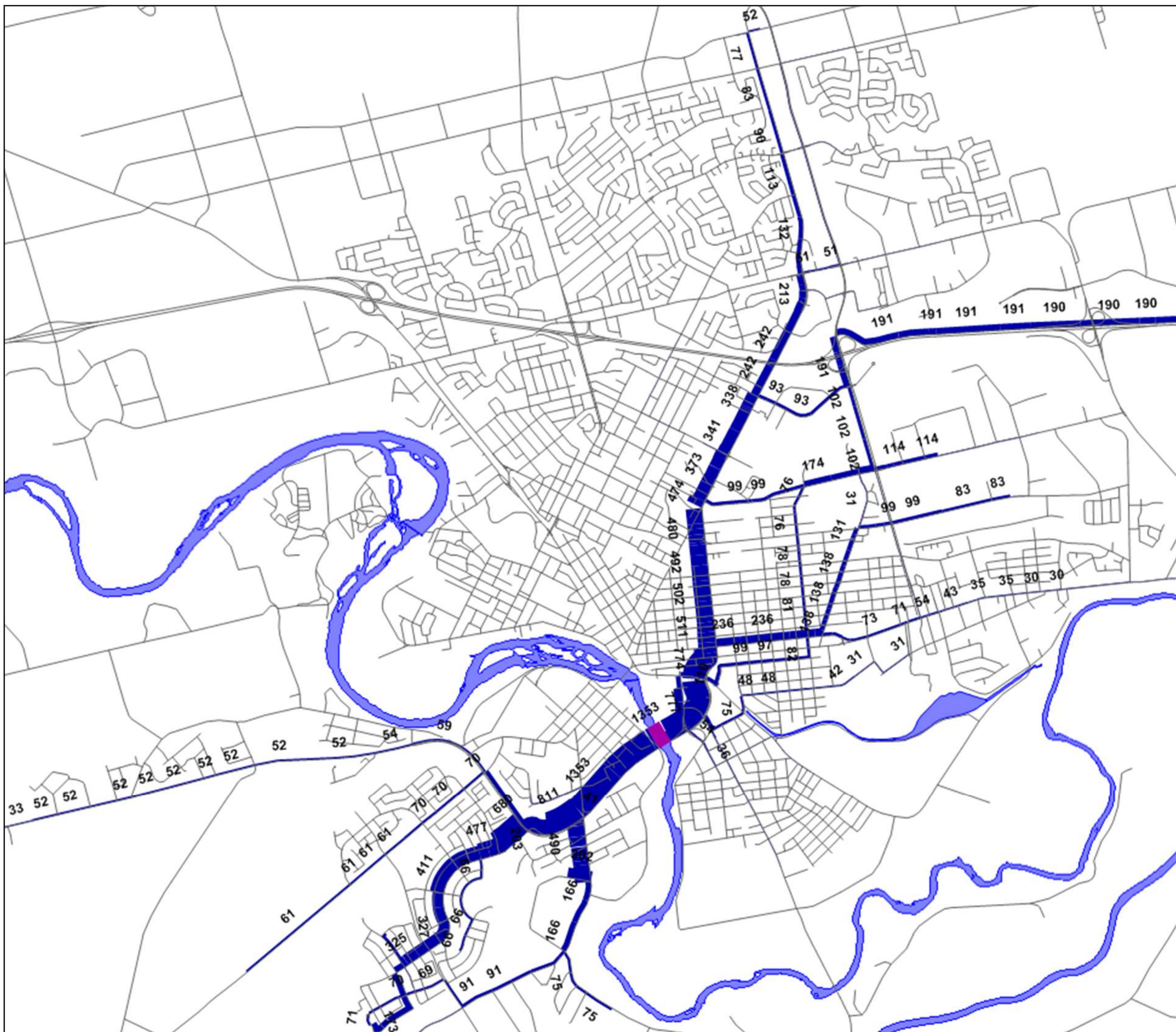
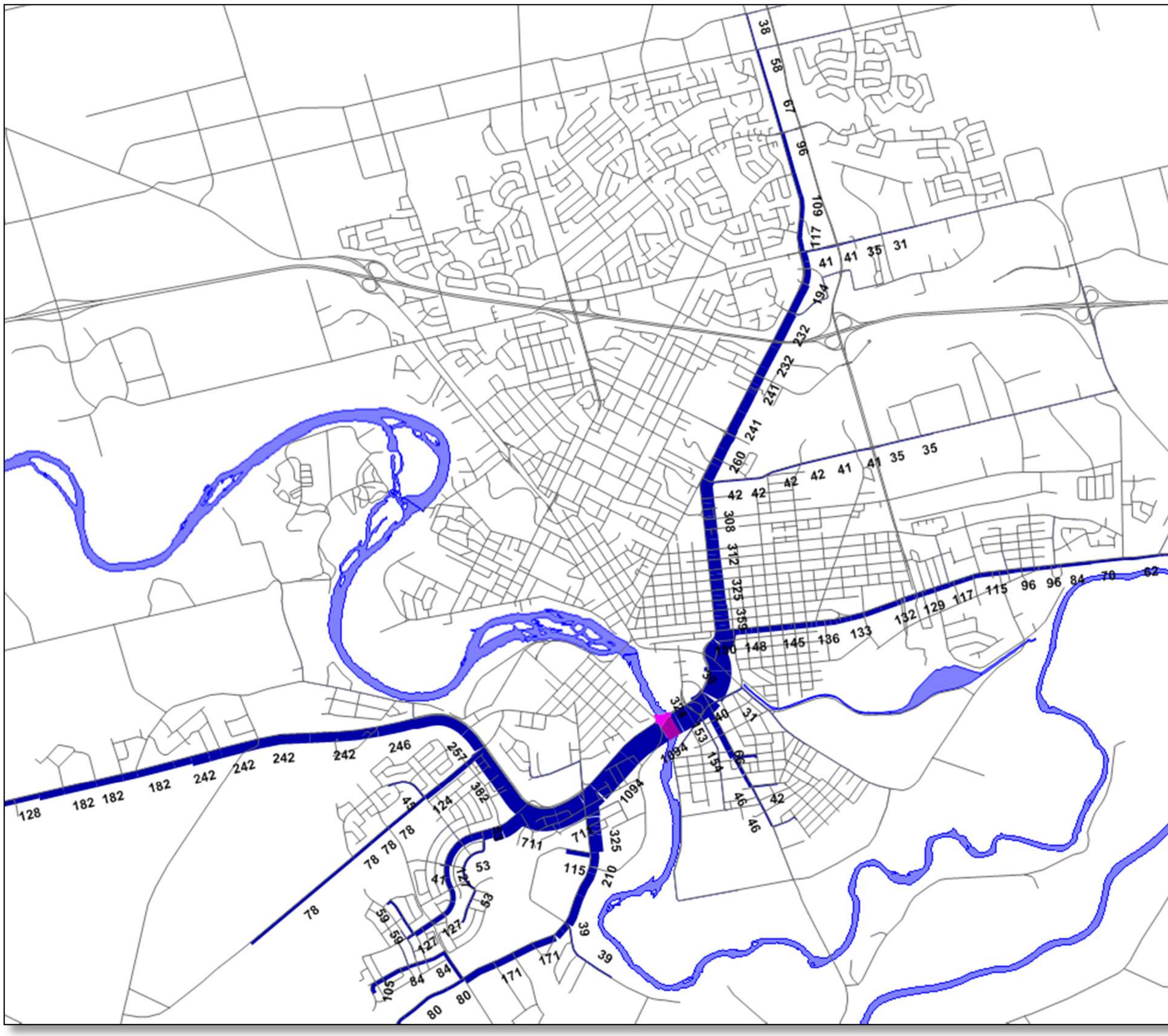


Figure 4-39: Veterans Memorial Parkway Bridge PM Peak Hour Trip Distribution – Eastbound



4.3.8.3 Alternatives

The alternative solutions to the identified capacity constraint for VMP are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

Currently there are no provisions for active transportation along this section of VMP. With a bridge widening, protections for on-road cycling could be provided. With respect to pedestrian activity, the roadway function and adjacent land use access restrictions do suggest the need for pedestrian space allocation. A multi-use path would satisfy both cyclists and pedestrians.

Transit

The VMP corridor is served by one Brantford Transit route: Route 6 (West Brant Shellard). Transit service enhancements in the form of bus route additions or modifications have the potential to improve the Veterans Memorial Parkway crossing transit mode share from 8% today to 23% in the future. This increase in mode share would result in an approximate 150-300 vehicle reduction on the VMP Bridge during the peak hours.

Transportation System Management

The VMP bridge deck is approximately 15 m wide. It is possible to restructure the lane allocations to provide 2 lanes in each direction which would address the capacity deficiency on the bridge. The issues with this potential would be:

- The reduction of the 1 m shoulder on each side of the roadway to 0.5 m on each side (design minimums would have to be considered;
- Carrying 2 westbound through lanes from Market Street will eliminate the merge lane from the Market Street ramp; and
- There is no opportunity for adding space for any active modes across the bridge.

Increase Infrastructure

Veterans Memorial Parkway Widening

Providing additional width on the bridge to accommodate an additional lane (such that both directions have 2 carrying lanes[2]) while providing adequate design space for the shoulders and active mode considerations would require either an extension or replacement of the bridge deck. The full replacement is possible but would potentially have a very high cost, environmental impacts and a high impact on traffic during construction. The expansion of the deck, while still expensive, would be less impactful from both perspectives.

Adding a lane in each direction from the bridge to Mt. Pleasant appears to be feasible in terms of right of way space and limited impacts to utilities and property. However, alternative crossings of the Grand River that would serve the origin-destination patterns observed for the Veterans Memorial Parkway are limited.

Brant County Road 18 (Phelps Road) Upgrades

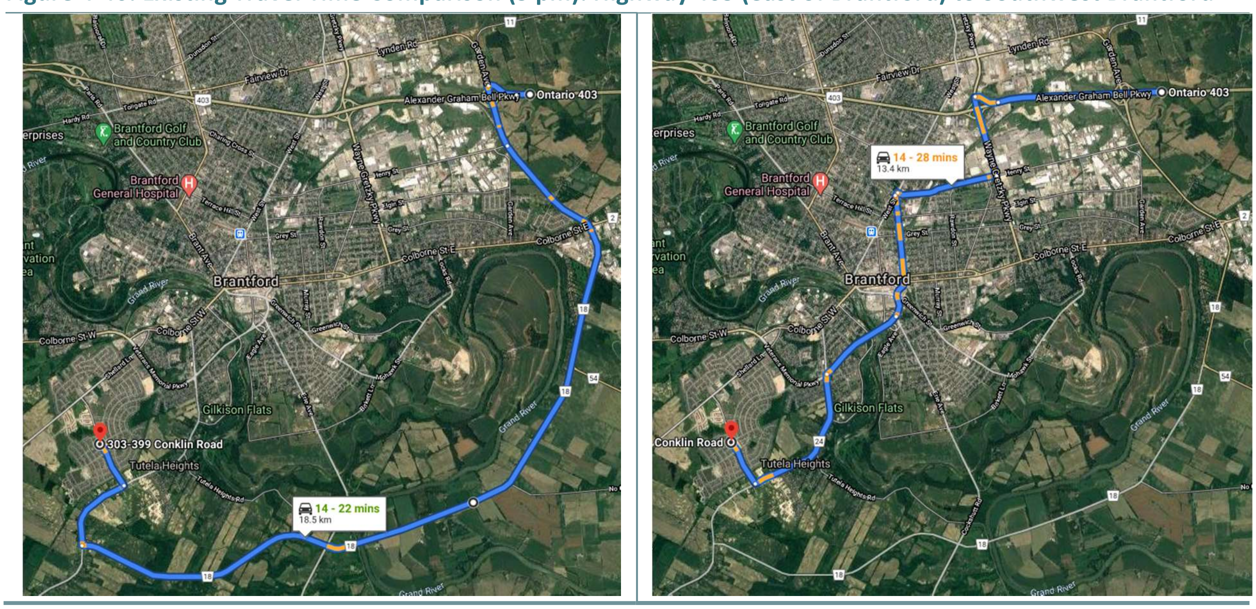
Brant County Road 18 is rural arterial roadway within Brant County that connects Mt. Pleasant Road in the south to Highway 403 (via Garden Avenue) in the east. It also intersects with Cockshutt Road / Erie Avenue and Colborne Street East, to provide an alternative route to/from the city and to/from the east for trips from/to southwest Brantford and County of Brant. The Brant County Road 18 route effectively

[2] A six lane cross section (or 3 carrying lanes per direction) on the VMP bridge was not considered as a result of upstream / downstream roadway capacity constraints, though it can be investigated further as part of a future EA study.

provides a by-pass function around the southern and eastern portions of Brantford and another crossing of the Grand River.

Of the 1,350 westbound vehicles in the PM peak hour that are forecast to cross the VMP Bridge, approximately 200 originate from Highway 403 east of Brant County Road 18 (Garden Avenue) as illustrated previously in ***Figure 4-38***. With appropriate signage and modest route upgrades, these vehicles could be encouraged to divert to the Garden Avenue/County Road 18 route from the current Wayne Gretzky Parkway route to reach Southwest Brantford. As illustrated in ***Figure 4-40***, the current PM peak hour travel time comparison between the Garden Avenue/County Road 18 route and the WGP/VMP route shows that while the County Road 18 route is 5.1 km longer but the travel time difference is negligible or favours County Road 18 (6 minutes faster in a worst case scenario). This advantage will be even more pronounced in the long term as the VMP bridge becomes more congested, while traffic flow on County Road 18 should remain uninterrupted. With the potential diversion of 200 vehicles to this route were to be realized, this would address 50% of the volume that is creating the overcapacity condition on VMP crossing the Grand River.

Figure 4-40: Existing Travel Time Comparison (5 pm): Highway 403 (east of Brantford) to Southwest Brantford



Source: Google Maps

Note: These figures depict existing conditions for trip starting at Hwy 403 east of Garden Avenue at 5PM destined to Conklin Road. With higher volumes and increased congestion, travel times through downtown Brantford and across the downtown bridges would be significantly higher in a 2041 condition.

The Brant Country Road 18 upgrades that could encourage the aforementioned volume diversion could include, but are not be limited to, the following:

- Improved signage and lighting;
- Roadway improvements:
  - Paved shoulders – increases existing capacity by increasing driver comfort;

  - Easterly extension of Conklin Road from Mt. Pleasant to County Road 18 (recommended as part of the Tutela Heights Urban expansion area);
  - Widening of Mt. Pleasant Road to 3 or 4 lanes from Tutela Heights Road to County Road 18;
- Intersection specific improvements:
  - Addition of turning lanes – reduces delay on through traffic; and
  - Signal timing modifications – reduces delay by prioritising Brant County Road 18.

While the estimated diversion would only be in the order of 200 vehicles in the PM peak hour, a capacity deficiency would remain on VMP. However, the County Road 18 route provides broader network benefits beyond the easterly river crossing and access to Highway 403, i.e. potential to reduce volumes on WGP, Clarence Street/Clarence Street South, Dalhousie Street, Colborne Street East and West, including Lorne Bridge.

It is acknowledged that this alternative relies significantly on the use of infrastructure under the jurisdiction of the County of Brant. However, the benefits of implementing relatively easy TSM initiatives would provide broad reaching benefits to both City and County travel. A partnership would be required to coordinate and implement a suitable plan to achieve these benefits.

Conclusion

The preferred alternative for addressing the 2041 capacity issue on the VMP between Mt. Pleasant Road and Market Street South is as follows:

- City Wide TDM – improved transit service from the Southwest to the downtown will benefit the VMP corridor;
- Corridor TSM – limited opportunities to improve the efficiency without sacrificing city geometric design guidelines;
- Increase Infrastructure – Widen VMP bridge to facilitate additional lane of carrying capacity in eastbound direction;
- Increase Infrastructure – Widen VMP from Mt. Pleasant to Grand River crossing to 2 lanes in each direction;
- Increase Infrastructure – Improve signage and design elements of County Road 18 between Mt. Pleasant Road and Colborne Street East to encourage it as a route to Highway 403 from southwest Brantford. This will include planning and coordination between the City and County to successfully implement;
- Increase Infrastructure – Extend Conklin Road east of Mt. Pleasant Road to County Road 18; and
- Increase Infrastructure – Widen Mt. Pleasant Road from Tutela Heights to County Road 18.

4.3.9 Paris Road - South of Highway 403 to Hardy Road

4.3.9.1 Problem

Like Paris Road north of Highway 403, Paris Road south of Highway 403 is forecast to be experience significant growth in traffic volumes (***Figure 4-41***) as a result of employment and population growth north of Highway 403. South of Highway 403, it will continue to serve as the main connection between Paris and downtown Brantford, and vehicles entering the City from the west on Highway 403. The majority of Paris Road south of Highway 403 is forecast to be approaching capacity in 2041, as illustrated in ***Figure 4-42***.

Figure 4-41: Paris Road – South of Highway 403: 2041 PM Peak Hour Volumes

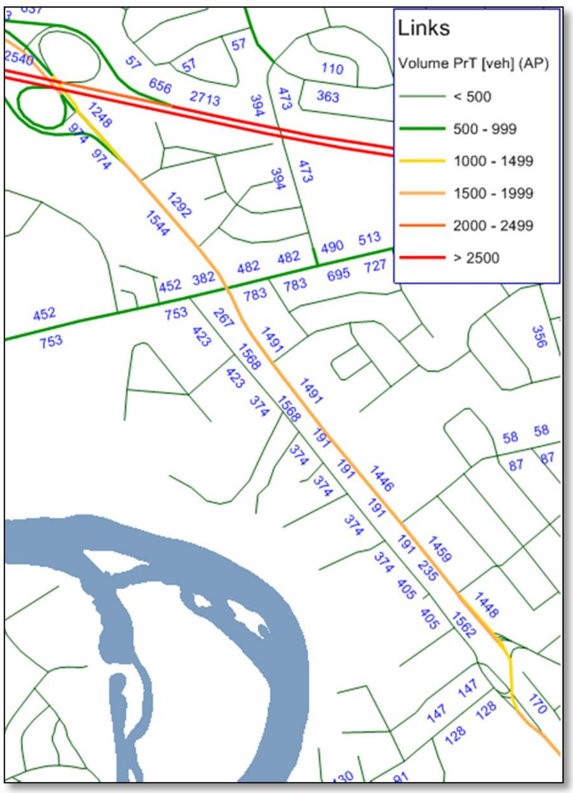
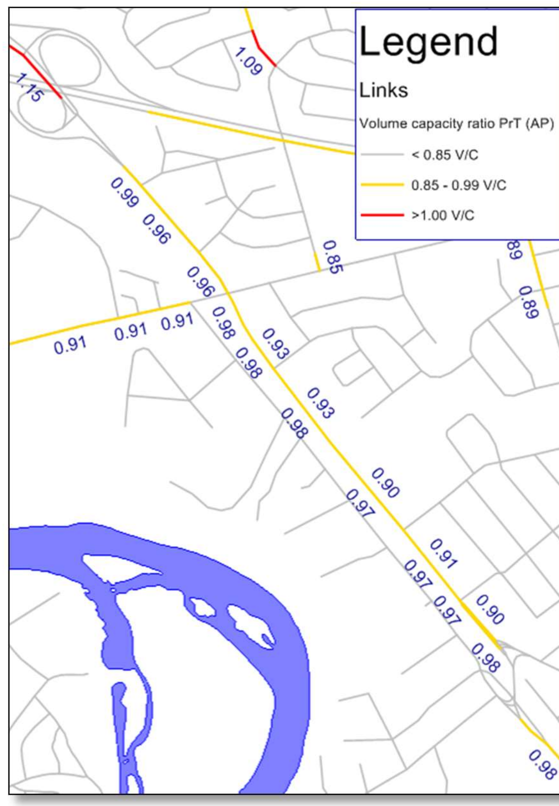


Figure 4-42: Paris Road – South of Highway 403: 2041 PM Peak Hour V/C Ratios



Paris Road south of Highway 403 has significant auto demand in both directions, however southbound is the critical direction during the PM peak hour. While V/C ratios do not exceed capacity, they are approaching capacity. This near capacity condition will result in a considerable number of vehicles using Ava Road, the collector road immediately west of and parallel to Paris Road, in order to avoid delays on Paris Road.

4.3.9.2 Assessment

The capacity issue on Paris Road south of Highway 403 is strategic in nature. The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) results in a significant number of vehicles traveling between these two areas using Paris Road towards downtown in order to cross the Grand River. ***Figure 4-43*** and ***Figure 4-44*** (southbound and northbound respectively) illustrate the number and distribution of vehicle trips that are using Paris Road travel between Northwest Brantford and Southwest Brantford. There are more than 350 southbound vehicle trips and 150 northbound vehicle trips that could be potentially diverted from Paris Road south of Highway 403, during the peak hour, if there were an alternative north-south connection that crossed the river in west Brantford.

Figure 4-43: Paris Road (south of Highway 403) PM Peak Hour Trip Distribution - NW Brantford to SW Brantford – Southbound

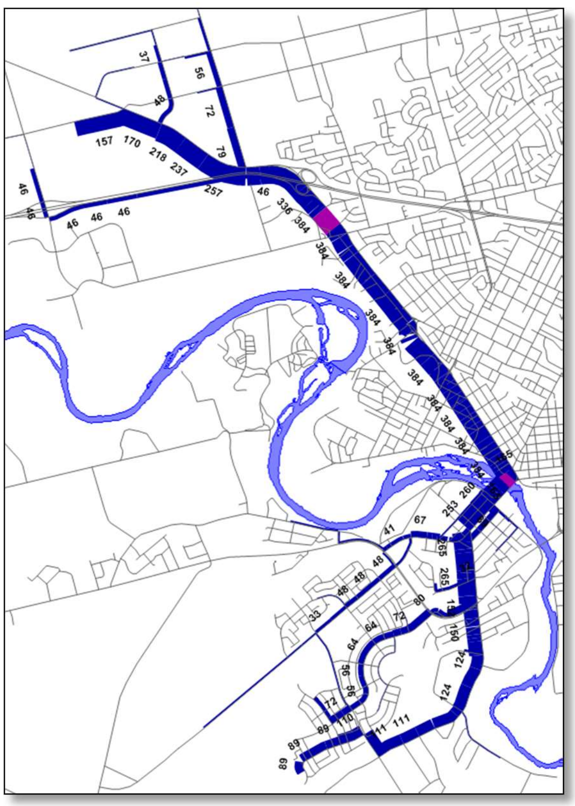
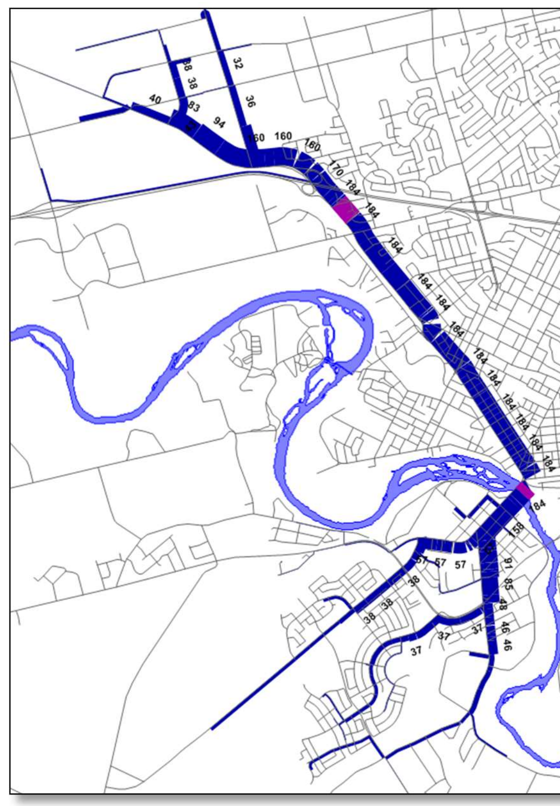


Figure 4-44: Paris Road (south of Highway 403) PM Peak Hour Trip Distribution - SW Brantford to NW Brantford – Northbound



The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) results in a significant number of vehicles traveling between these two areas using Paris Road towards downtown in order to cross the Grand River. Hardy Road is also an alternative but is constrained by its Right of Way and the at grade rail crossing west of Paris Road.

4.3.9.3

Alternatives

The alternative solutions to the identified capacity constraint for Paris Road south of Highway 403 are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

Currently there is an existing sidewalk on the east side of Paris Road from Terrace Hill Street to Hardy Road / Tollgate Road. From Hardy Road /Toll Gate Road to approximately 230 m north of the intersection, sidewalks are available on both sides of the road. From that point north to a point 50 m south of Seneca Crescent the sidewalk is provided on the west side only.

There are no current provisions on this section of roadway for cyclists. It should be acknowledged that Ava Avenue, which run parallel to Paris Road between Hardy Road and Brant Avenue, is a signed bike route but is separated from Paris Road by a railway corridor. This physical barrier between the two roadways limits opportunity for active transportation demand on Paris Road to use Ava Avenue as an alternative.

Consistency in the active mode provisions through the corridor would enhance the user experience and provide better connectivity for pedestrians and cyclists. The provision of sidewalks or multi-use path on each side of the roadway, with logical start and end points, would be more efficient. A multi-use path on the west side from Hardy Road / Toll Gate Road to Terrace Hill and Brant Avenue would provide a significantly improved active mode environment.

A combination of some, or all of these TDM measures could increase Active Transpiration use along the Paris Road corridor and help to reduce auto demand.

Transit

Paris Road south of Highway 403 is served by one Brantford transit route: Route 8 (Holmedale Mayfair). Transit service enhancement in the form of bus route additions or modifications has the potential to improve the Paris Road transit share from 12% today to 40% in the future. This increase in mode share would result in an approximate 300 vehicle reduction on Paris Road during the peak hours.

Transportation System Management

Paris Road south of Highway 403 is a 4-lane roadway to St Paul Avenue (a distance of 3 km) with only one signalized intersection, at Hardy Road/Toll Gate Road. Auxiliary lanes are provided at key intersections with the NS-E Highway 403 ramp, Hardy Road/Toll Gate Road, Terrace Hill Street, and St Paul Avenue. As Paris Road parallels the rail corridor for most of this section, access to and from Paris Road is from the east side only. The overpass just south of Terrace Hill Street provides uninterrupted flow across the rail line. Given these conditions, Paris Road is an extremely attractive road for travel with very little more than can be done from a TSM perspective.

The best TSM option is for a continuous southbound left turn lane to be provided between Hardy Road /Toll Gate Road and the Terrace Hill Street. With the rail corridor on the west side of the road there is available space for the 4 m widening that would be required, without impacting utilities.

Increase Infrastructure

Paris Road Widening

As Paris Road south of Highway 403 is only just approaching capacity, there is not a compelling reason to add an additional lane of capacity in each direction. Such a widening would have significant impacts in on utilities (i.e. relocation).

Oak Park Road Extension

As identified in ***Figure 4-43***, approximately 350 vehicles use Paris Road in the PM peak hour for north-south travel to connect across the river into Southwest Brantford. The extension of Oak Park Road to Colborne Street West would provide a north-south connection in West Brantford and an additional crossing of the Grand River. As described in previous sections, the traffic in the north-south corridor is traveling between northwest Brantford / Paris area and southwest Brantford is forced to travel east towards downtown Brantford in order to cross the Grand River only to travel back to the west to reach their destination. The diversion of these trips from Paris Road would provide relief to Paris Road south of Highway 403.

This alternative will reduce demand on Paris Road. However, the reduction in demand will likely be offset (at least be partially) by demand that is using Ava Road and others local routes that may be impacted by Paris Road congestion.

Conclusion

The preferred alternative for addressing the 2041 capacity issue on Paris Road south of Highway 403 is as follows:

- City Wide TDM – improved transit service in the City will result in some benefit to Paris Road, especially south of Hardy Road/Toll Gate Road;
- Corridor TDM - Provide improved active mode environment (sidewalk / MUP) on each side of the road with logical start and end points;
- Corridor TSM – provide a center southbound left turn lane to provide a safe environment for vehicles accessing/egressing Paris road to/from the residential areas to the east; and
- Increase Infrastructure – provide new facility and river crossing connecting Oak Park Road to Colborne Street West.

4.3.10 Powerline Road - Paris Road to Wayne Gretzky Parkway

4.3.10.1 Problem

Powerline Road between Paris Road and Wayne Gretzky Parkway is forecast to experience significant growth in traffic volumes (***Figure 4-45***) as a result of the urban expansion to the north, with the section west of King George Road expected to see the highest traffic volumes (due to mix of residential and employment lands). Overall, the majority of Powerline Road, in the PM peak hour, is forecast to be approaching capacity or over capacity in 2041, as illustrated in ***Figure 4-46***.

Figure 4-45: Powerline Road – Paris Road to Wayne Gretzky Parkway: 2041 PM Peak Hour Volumes

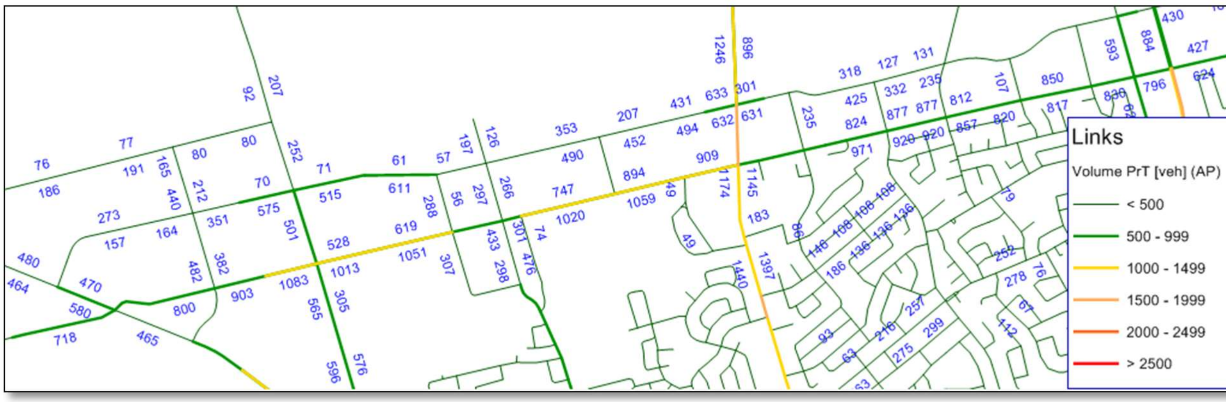
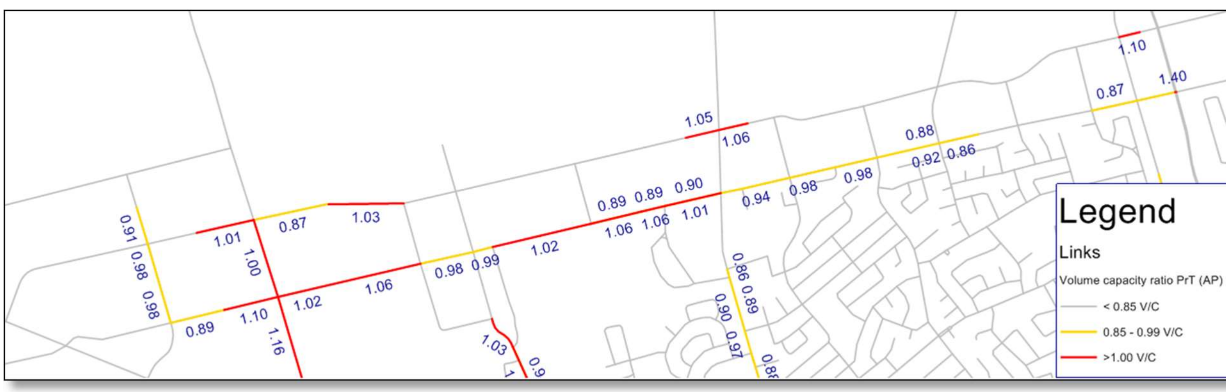


Figure 4-46: Powerline Road – Paris Road to Wayne Gretzky Parkway: 2041 PM Peak Hour V/C Ratios



Powerline Road between Paris Road and Wayne Gretzky Parkway has considerable auto demand in both directions, however the critical direction during the PM peak hour is eastbound. The eastbound capacity constraints on Powerline Road are indicative of an emerging issue and fluctuate between intersections. Westbound volumes on Powerline Road are not forecast to exceed capacity, but some sections will experience delays.

4.3.10.2 Assessment

The capacity issues on Powerline Road appear to be strategic and operational in nature.

From a strategic perspective, there are significant residential and commercial/industrial developments forecast for the lands north of Powerline Road that are generating significant traffic volumes. These trips are originating from / destined to the north and south. Powerline Road provides the east-west connectivity to the major north-south routes that connect to Cambridge, Paris, Downtown Brantford, and Highway 403 (for more interregional connections to the GTA and London areas).

Figure 4-47 and ***Figure 4-48*** (eastbound and westbound respectively) illustrate the trip distribution patterns that demonstrate the corridor specific nature of the demand issues on Powerline Road. ***Figure 4-47*** highlights the significant demands originating from commercial/industrial developments. While ***Figure 4-48*** highlights the significant demands destined to the residential developments.

Figure 4-47: Powerline Road PM Peak Hour Trip Distribution – Eastbound

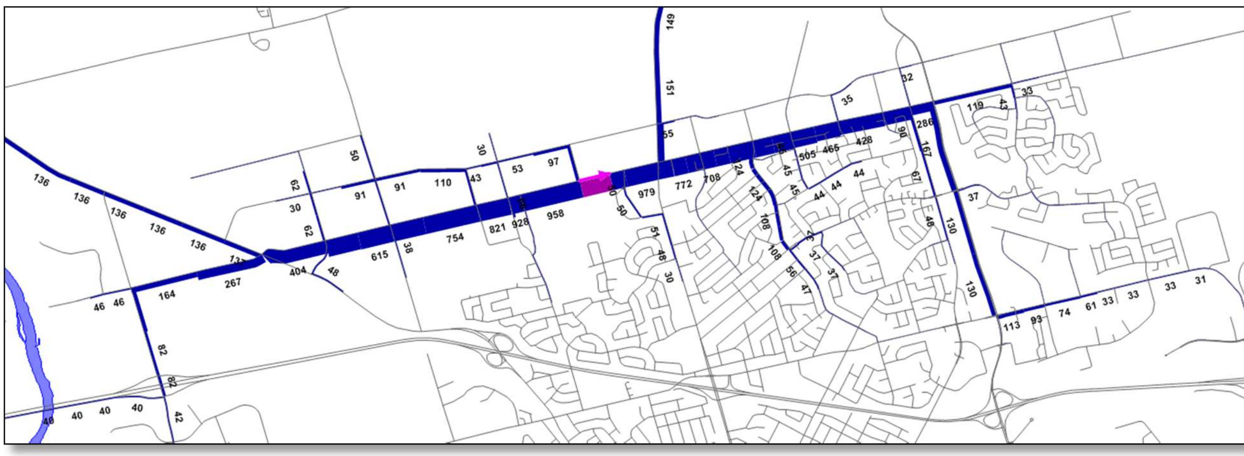
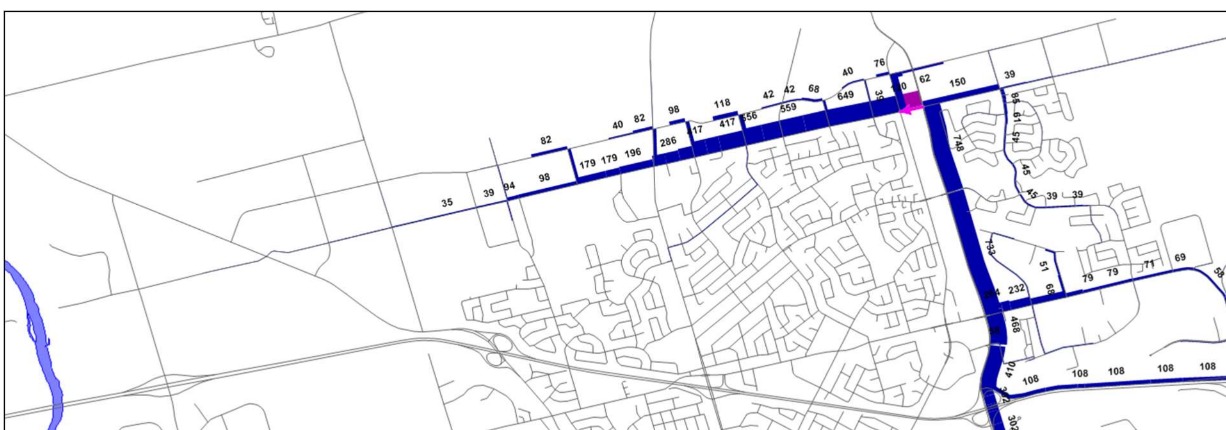


Figure 4-48: Powerline Road PM Peak Hour Trip Distribution – Westbound



4.3.10.3 Alternatives

The alternative solutions to the identified capacity constraint for Powerline Road are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Based on the distribution patterns and the short length of trips that are internal to Brantford, there is opportunity for implementing/increasing Transportation Demand Management (TDM) measures within the Powerline Road corridor. Increasing TDM in the Powerline Road corridor would reduce auto demand and could alleviate some of the forecasted congestion.

Active Transportation

Currently Powerline Road is a rural roadway that is predominantly void of pedestrian and/or cycling infrastructure. It does, however, have two sections with an in-boulevard multi-use path (the Powerline Trail) on the south side of the road. One section is between King George Road and Rosedale Estates (422 Powerline Road) and the other is between Wayne Gretzky Parkway (where it connects to the Wayne Gretzky Parkway Trail) and Brantwood Park Road (where it connects to a bicycle route and sidewalks).

Given the anticipated cross section, classification of the roadway (major arterial) and the anticipated truck traffic, it is unlikely that cyclists would consider traveling on Powerline Road. Completing the missing sections of the existing Powerline Trail would provide a safe active transportation facility that would significantly improve the corridor from an active transportation perspective. This trail would provide a safe All Ages and Abilities (AAA) east-west cycling and walking corridor that would connect to the Wayne Gretzky Parkway Trail, an AAA north-south cycling and walking corridor. This significant addition in continuous kilometrage of AAA Trail will encourage more trips to be made by bicycle and on foot. Coordination between transportation and utility agencies will be require to overcome corridor constraints.

Additional enhancement could include: additional and/or enhanced (covered) bike parking at major destinations and transit stops, a bicycle repair station and Cross-rides at all signalised intersections on the multi-use path. Commercial business should also be encouraged to provide bike racks and larger employers should also be encouraged / incentivised to provide end of trip facilities. This could include secure bicycle parking, change rooms with showers and lockers and other amenities like pumps.

A combination of some, or all of these TDM measures could increase Active Transpiration use along the Powerline Road corridor and help to reduce auto demand.

Transit

Transit service enhancement in the form of bus route additions has the potential to improve the Powerline Road transit share from 0% today to 25% in the future. This increase in mode share would result in an approximate 200-300 vehicle reduction on Powerline Road during the peak hours.

Currently there are no Brantford Transit routes that service the planned residential and employment areas on the north of Powerline Road as they do not currently exist. However, the 2041 'Do-Minimal' model assumes the equivalent of basic transit service mode shares equal to comparable residential and employment zones south of Powerline Road. These mode shares, coupled with the existing route structure do not directly connect where people are coming from and going to. Providing an east-west transit route that connected the planned development commercial/industrial development to Brantford Commons and the existing neighbourhoods south of Powerline Road would encourage transit use along the Powerline Road corridor. Any increase in transit within the Powerline Road corridor would help reduce auto demand.

Transportation System Management

Currently Powerline Road is a two-lane rural road. Upgrades to the road are required to urbanize and provide appropriate traffic control at mid-block locations between major arterials (signalized today). With the move to an urban cross section, appropriate auxiliary lanes, or use of roundabouts as per current policy should be provided to maximize the efficiency of the basic lanes.

Increase Infrastructure

Powerline Road Widening

Widening Powerline Road from 2 lanes to 4 lanes between Paris Road and Wayne Gretzky Parkway would provide the additional capacity that is required to meet 2041 demands. Given the classification of the roadway (major arterial), the growth in residential and commercial/industrial development, and the anticipated truck traffic associated with commercial/industrial development, the widening of Powerline Road is critical.

As the growth in auto trips (volume) on Powerline Road is directly related to the adjacent future development, alternative corridors would not address the basic transportation need fulfilled by Powerline Road.

Conclusion

The preferred alternative for addressing the 2041 capacity issue on Powerline Road between Paris Road and Wayne Gretzky Parkway is as follows:

- City Wide TDM – new transit routes are need to extend transit service into the urban expansion area;

- Corridor TSM – TSM initiatives need to be incorporated into the redesign of the road to an urban cross section (intersection control, auxiliary lane provisions, traffic signal coordination, roundabouts where feasible); and
- Increase Infrastructure – widen and urbanize Powerline Road to provide a basic 4-lane cross section from Paris Road to Coulbeck Road.

4.3.11 Hardy Road - Ferrero Boulevard to Paris Road

4.3.11.1 Problem

Hardy Road between Ferrero Boulevard to Paris Road is forecast to experience significant growth in traffic volumes by 2041 (***Figure 4-49***). The increases in peak hour traffic volumes are a result of the planned development within the Oak Park Road corridor and Northwest Business Park. Overall, the eastern section of Hardy Road is forecast to be approaching capacity in 2041, as illustrated in ***Figure 4-50***.

Figure 4-49: Hardy Road – Ferrero Boulevard to Paris Road: 2041 PM Peak Hour Volumes

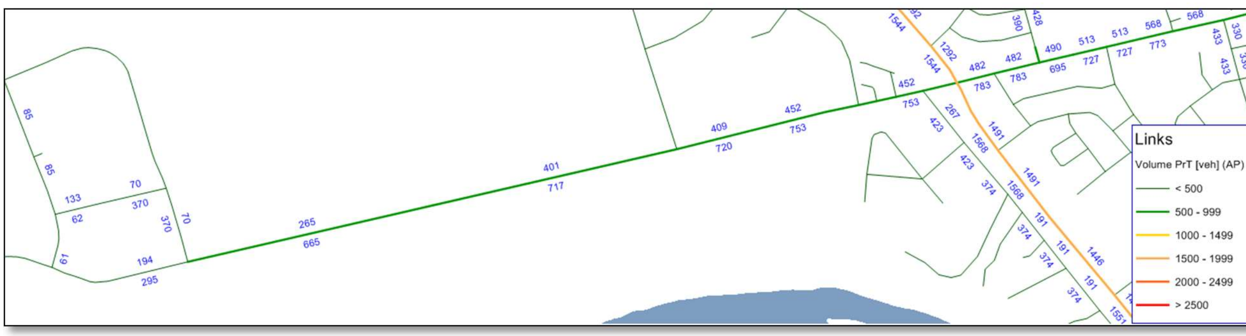


Figure 4-50: Hardy Road – Ferrero Boulevard to Paris Road: 2041 PM Peak Hour V/C Ratios

Hardy Road between Ferrero Boulevard to Paris Road has considerable auto demands in the eastbound direction with peak hour volume to capacity ratios reaching 0.91. Westbound volumes on Hardy Road are not forecast to approach capacity, with the busiest section (east of Golf Road) using less than 60% of the available capacity.

4.3.11.2 Assessment

The capacity issues on Hardy Road between Ferrero Boulevard to Paris Road are strategic in nature. The lack of a direct connection between Northwest Brantford (commercial/industrial) and Southwest Brantford (residential) is the main generator of growth in traffic as it provides a connection to Paris Road/Brant Avenue to connect the two areas. ***Figure 4-51*** and ***Figure 4-52*** (eastbound and westbound respectively) illustrate the number and distribution of vehicle trips that are using Hardy Road to get to Paris Road in order to travel between Northwest Brantford and Southwest Brantford. Approximately 100 eastbound vehicle trips and 50 westbound vehicle trips in the PM peak hour could be diverted away from Hardy Road if there were an alternative north-south connection that crossed the river in West Brantford.

Figure 4-51: Hardy Road PM Peak Hour Trip Distribution - NW Brantford to SW Brantford – Eastbound

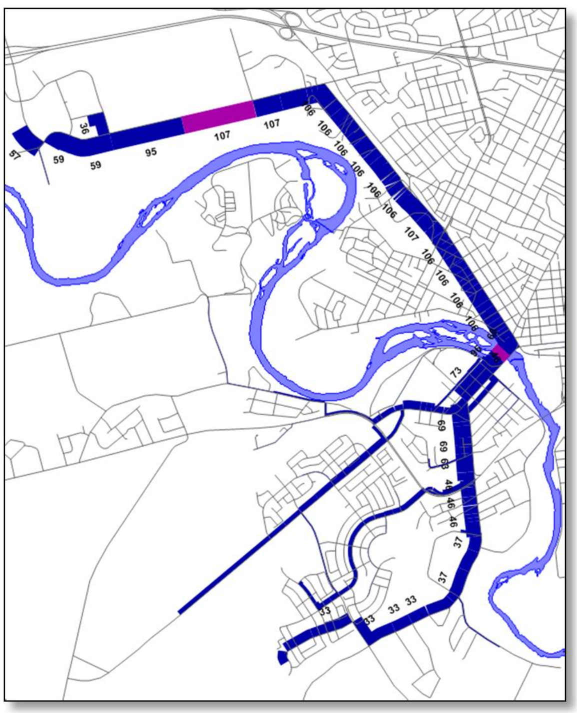
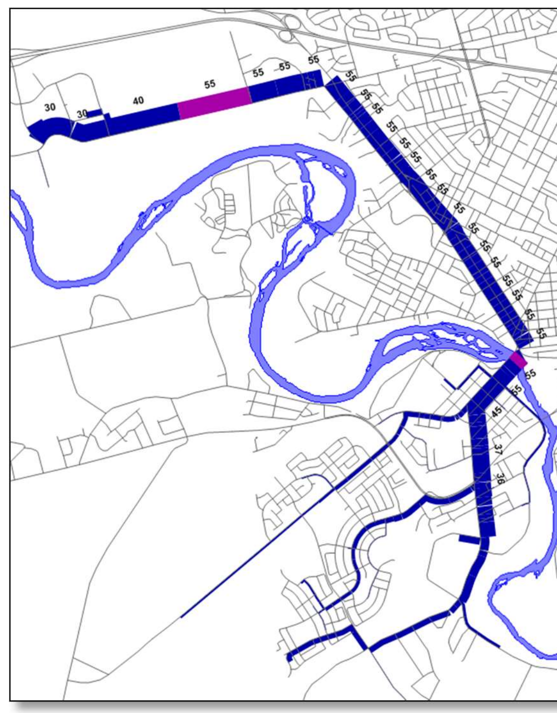


Figure 4-52: Hardy Road PM Peak Hour Trip Distribution - SW Brantford to NW Brantford – Westbound



4.3.11.3 Alternatives

The alternative solutions to the identified capacity constraint for Hardy Road are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

Currently there is an existing sidewalk on the north and south side of the short section of Hardy Road from Paris Road to Ava Road. Westerly from Ava Road to St. Andrews Drive there is a sidewalk on the north side. West of St. Andrews Drive to Oak Park Road, no sidewalk is provided.

A 1.8 m bike lane is provided on each side of the road between St. Andrews Drive and Oak Park Road. There are areas along this rural stretch of road where the width of these lanes varies and the quality of the pavement is below standard.

Hardy Road volumes are expected to increase significantly in the long term and while it may remain a rural cross section, its role in connecting the Northwest Industrial Park Area to the existing residential areas to the east will magnify. The provision of improved facilities (wider bike lane with improved buffer and pavement) will enhance the user experience and promote/facilitate increased use by active modes.

Transit

Hardy Road is currently served by one Brantford transit route: Route 8 (Holmedale Mayfair). Transit service enhancement in the form of bus route additions or enhancement has the potential to improve the transit mode share from 18% today to 55% in the future. While 55% is a very high mode share, this is based on future ridership targets that would conceivably be split over two corridors (i.e. Hardy Road and future Oak Park Road extension). This increase in mode share would result in an approximate 200-300 vehicle reduction on Hardy Road during the peak hours.

Transportation System Management

Hardy Road from Paris Road to Ferrero Boulevard is approximately 2.5 km of uninterrupted arterial flow. On-road bike lanes are provided in both directions, adjacent to intermittent paved and unpaved, narrow shoulders.

An upgrade of the road to provide wider bikes lanes and wider formal paved shoulders throughout would provide for a more comfortable user experience for all modes. This would also improve the efficiency of the existing two vehicle lanes.

Increase Infrastructure

Hardy Road Widening

Widening Hardy Road to 2-lanes in each direction would address the emerging long-term capacity issue. However, this widening would have significant impacts on property, utilities (i.e. relocation), and the adjacent natural heritage system. As well, the CN rail crossing is a potential constraint to capacity and costs for improvements (as grade separation may be required at the crossing).

As the roadway is only just approaching capacity (marginal issue), there is not a compelling reason to add an additional lane of capacity in each direction. In addition, the capacity of Hardy Road is constrained by the capacity of the intersection with Paris Road.

Oak Park Road Extension

From the forecasts, it is estimated that approximately 15-20% of the future volume on Hardy Road originates from or is destined to southwest Brantford via Paris Road/Brant Avenue/Lorne Bridge. The extension of Oak Park Road to Colborne Street West would provide a north-south connection in West Brantford and an additional crossing of the Grand River. This route would have the potential to reduce the volume on Hardy Road to an extent that would mitigate the emerging long term capacity issue.

Conclusion

The preferred alternative for addressing the 2041 capacity issue on Hardy Road between Ferrero Boulevard and Paris Road is as follows:

- City Wide TDM – improved transit service in the City to promote transit mode will benefit the Hardy Road Corridor;
- Corridor TDM – widened / improve bike lanes;
- Corridor TSM – wider formal paved shoulders will improve the safety and efficiency of the available travel lanes; and
- Increase Infrastructure – provide new facilities for all travel modes and Grand River crossing connecting Oak Park Road to Colborne Street West.

4.3.12 Erie Avenue - Veterans Memorial Parkway/Clarence Street South to Birkett Lane

4.3.12.1 Problem

Erie Avenue provides both a local and regional function. Locally, Erie Avenue is the main north-south corridor in South Brantford, providing a connection between Eagle Place and the rest of Brantford, while regionally it provides a connection to/from Brant County as one of only three roadways within the City of Brantford that cross the Grand River. Many sections of Erie Avenue between Veterans Memorial Parkway and Birkett Lane are forecast to have significant auto volumes and to be approaching capacity in 2041, as illustrated in ***Figure 4-53*** and ***Figure 4-54*** respectively.

Erie Avenue between Veterans Memorial Parkway and Birkett Lane is forecast to have modest auto demand in both directions, reaching highs of roughly 600 to 800 vehicle trips, however the critical direction during the PM peak hour is southbound. Overall, the capacity constraints forecast for Erie Avenue are only indicative of an emerging issue (potential), as 2041 forecast volumes do not generally exceed capacity, and tend to decrease to the south towards Brant County.

Figure 4-53: Erie Avenue – Veterans Memorial Parkway/Clarence Street to Birkett Lane: 2041 PM Peak Hour Volumes

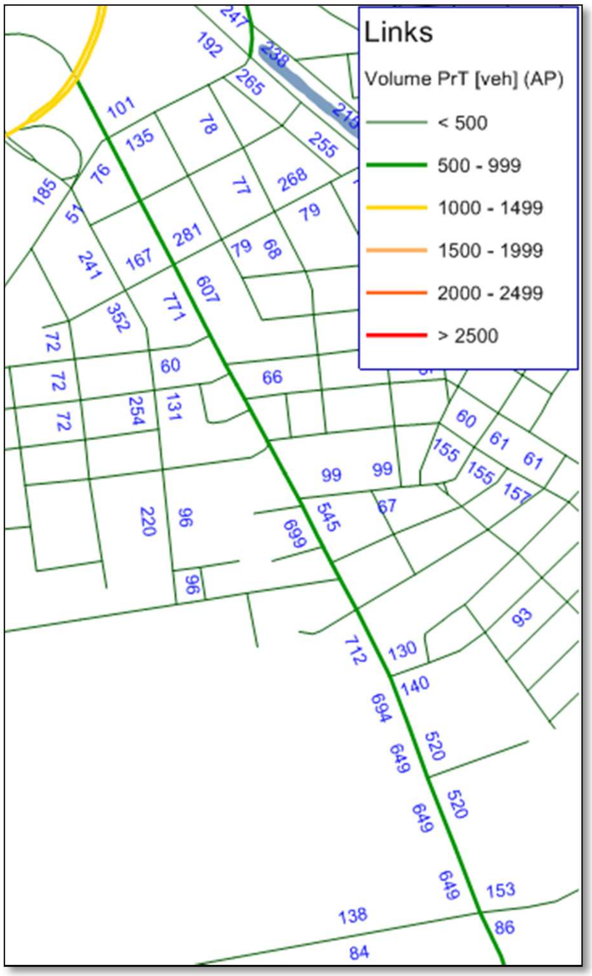
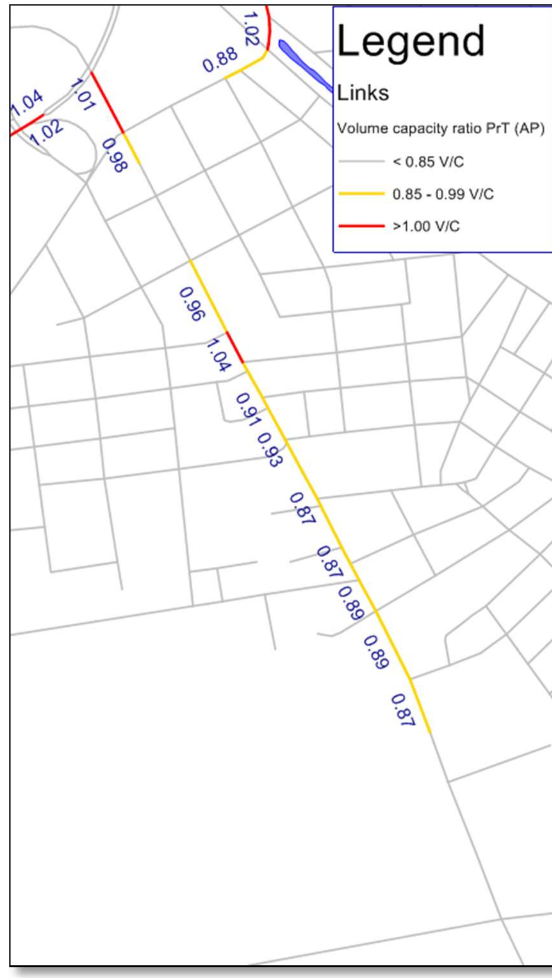


Figure 4-54: Erie Avenue – Veterans Memorial Parkway/Clarence Street to Birkett Lane: 2041 PM Peak Hour V/C Ratios



4.3.12.2 Assessment

The capacity issues on Erie Avenue between Veterans Memorial Parkway and Birkett Lane appear to be both strategic and localized in nature. Strategically, there is a lack of both the number of crossings and overall capacity crossing the Grand River. This has put significant demand pressures (i.e. delay) on the two main river crossings; Colborne Street (Lorne Bridge) and Veterans Memorial Parkway. As a result, Erie Avenue has become the fastest way for many trips to cross the river, even if this adds length to the overall trip, especially in the long-term growth scenario to 2041. ***Figure 4-55*** and ***Figure 4-56*** (southbound and northbound respectively) illustrate the distribution patterns of vehicle trips that are using Erie Avenue between Veterans Memorial Parkway and Birkett Lane simply to cross the Grand River. Approximately 50% of the volume on Erie Avenue is longer distance travel to/from the south of the City from/to downtown and central Brantford (Wayne Gretzky Parkway corridor via Clarence Street and West Street).

Figure 4-55: Erie Avenue – Veterans Memorial Parkway/Clarence Street South to Birkett Lane: PM Peak Hour Trip Distribution – Southbound

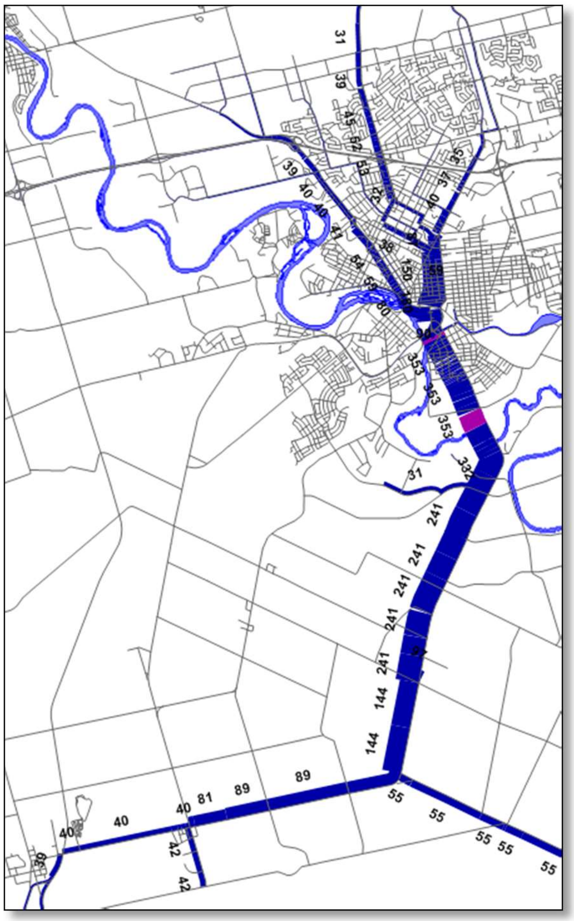
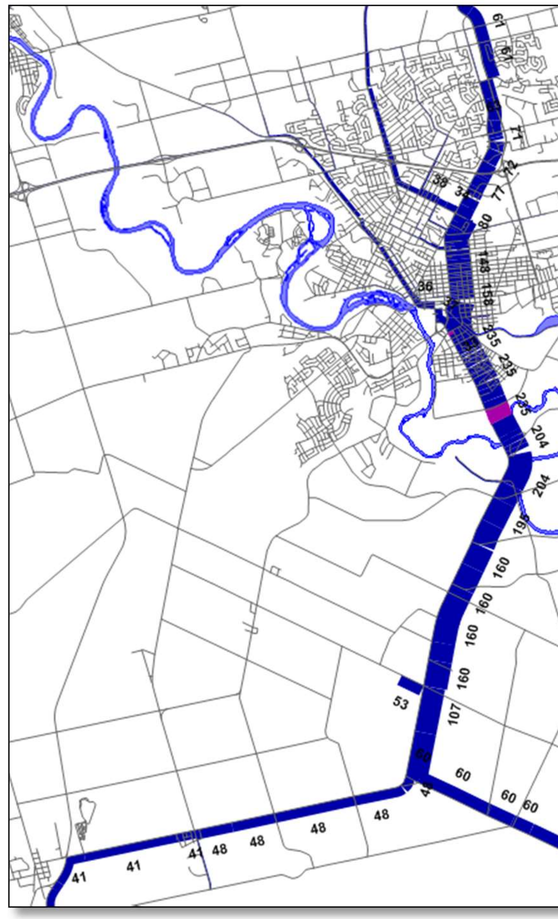


Figure 4-56: Erie Avenue – Veterans Memorial Parkway/Clarence Street South to Birkett Lane: PM Peak Hour Trip Distribution – Northbound



The remaining 50% of the demand is local Eagle Place travel. Erie Avenue is the main north-south corridor in south Brantford, providing the connection between Eagle Place and the rest of Brantford via Clarence Street South. Eagle Place is planned to experience significant population growth, particularly in the Erie Avenue corridor. This growth will generate and attract additional trips and as Eagle Place is predominantly residential, most of these trips will be southbound (during the PM peak hour) as many residents are returning home at the end of the work day.

4.3.12.3 Alternatives

The alternative solutions to the identified capacity constraint for Erie Avenue are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Based on the distribution patterns and the short length of trips that are internal to Brantford, there is opportunity for implementing/increasing Transportation Demand Management (TDM) measures within the Erie Avenue corridor. Increasing TDM in the Erie Avenue corridor would reduce auto demand and could alleviate some of the forecasted congestion.

Active Transportation

Currently Erie Avenue has sidewalks on both sides of the street between Birkett Lane and Market Street, bike lanes from Birkett Lane to Strathcona Avenue and is signed as a Bike Route from Cayuga Street to Market Street. Given the classification of the roadway (minor arterial) and the anticipated truck traffic, the current active transportation infrastructure does a good job accommodating all pedestrians but the cycling facilities on Erie Avenue only accommodates strong and confident cyclists.

Completing the missing section of the existing Erie Avenue bike lanes (sections of which are currently underway) and upgrading the entire corridor to a protected facility would provide a safe active transportation facility that would significantly improve the corridor from an active transportation perspective. The addition of protected cycling infrastructure would provide a safe All Ages and Abilities (AAA) north-south cycling corridor that would connect two sections of the Dike Trail, an AAA off-road recreation trail, that are currently joined by an "on road connection" that has no formal cycling infrastructure.

This significant addition in continuous kilometrage of AAA cycling infrastructure will encourage more trips to be made by bicycle. Additional enhancement could include: additional and/or enhanced (covered) bike parking at major destinations and transit stops and a bicycle repair station. Commercial business should also be encouraged to provide bike racks and larger employers should also be encouraged / incentivised to provide end of trip facilities. This could include secure bicycle parking, change rooms with showers and lockers and other amenities like pumps. A combination of some, or all of these TDM measures could increase Active Transpiration use along the Erie Avenue corridor and help to reduce auto demand.

Transit

The Erie Avenue corridor is served by one Brantford Transit route: Route 1 (Eagle Place). Transit service enhancement in the form of bus route additions or enhancement has the potential to improve transit mode share from 24% today to 52% in the future (note that this is based on area trip generation rather that link share, as service on Erie Avenue is limited to short section where service crosses over the road). This increase in mode share would result in an approximate 300-400 vehicle reduction from the area during the peak hours.

Transportation System Management

Erie Avenue is classified as a minor arterial road. There are opportunities to enhance its design features to align with the high vehicle demand expected in the long-term future. Currently there are no prohibited turns on Erie Avenue between Veterans Memorial Parkway/Clarence Street South and Birkett Lane. Consideration should be given prohibiting left turns where left turn storage is not provided during the peak periods.

As well, traffic signal coordination could be considered to minimise delay and maximise vehicle flow. This would provide a continuous flow or 'green wave' in the peak direction of travel.

This alternative will improve traffic operations and will slightly increase the overall carrying capacity of the roadway. However, on its own, this alternative will not increase roadway capacity enough to mitigate delays and improve the level of service to an acceptable level.

Increase Infrastructure

Erie Avenue Widening

Providing an additional lane in each direction would address the emerging capacity issue. However, this widening would have significant impacts on property and utilities (i.e. relocation).

As the roadway is only just approaching capacity (marginal issue), there is not a compelling reason to add an additional lane of capacity in each direction.

Veterans Memorial Parkway Widening

The Veterans Memorial Parkway widening and extension (to Murray Street) would provide additional Grand River crossing capacity and alternative east-west connectivity to Murray Street and Wayne Gretzky Parkway. From a review of the volume market (auto trips) for Erie Avenue it was identified that there are relatively few trips that would divert to this facility (approximately 50-100 vehicles, to/from the southwest). Trips destined for central Brantford could easily divert from Erie Avenue to Murray Street or Wayne Gretzky Parkway today by using Mohawk Street. The analysis of long-term volume forecasts suggests that the Veterans Memorial Parkway widening and extension has limited potential to reduce volumes on Erie Avenue.

Conclusion

The preferred alternative for addressing the 2041 capacity issue on Erie Avenue south of VMP/Clarence Street South is as follows:

- City Wide TDM – improved transit service into Eagle Place with connectivity into Central Brantford will provide opportunities for reduction in local vehicle volume on Erie Avenue;
- Corridor TSM – consider peak hour turning movement restrictions at minor roadways and provide auxiliary left turn lanes at significant intersections to improve the efficiency of the available travel lanes;

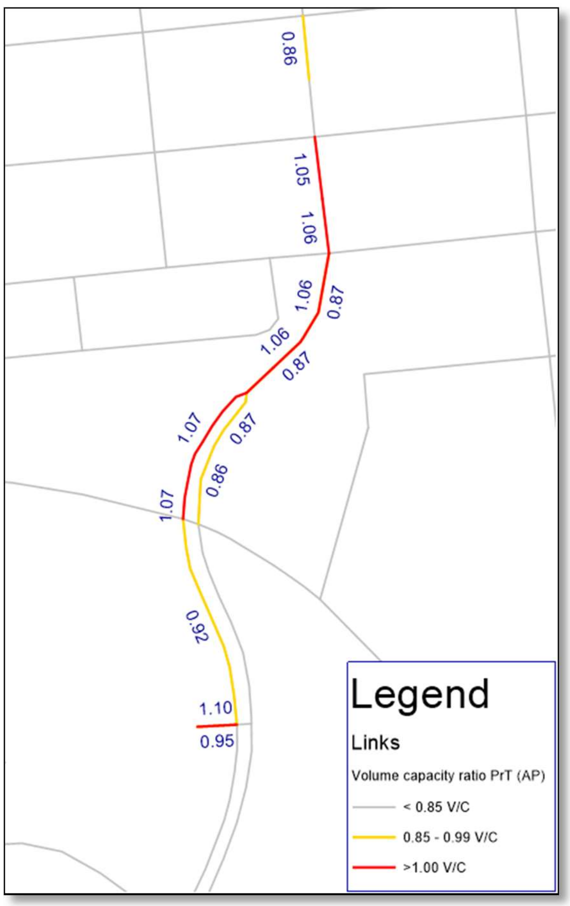
- Increase Infrastructure – widening of Erie Street has significant impacts to property and utilities to address what is considered to be a marginal capacity issue, and is therefore not considered necessary in the 2041 condition; and
- Increase Infrastructure – widening VMP would have system benefits, including a minor benefit to Erie Avenue, however, it is not justified based solely on benefits to Erie Avenue.

4.3.13 Clarence Street/Clarence Street South – Dalhousie Street to Icomm Drive

4.3.13.1 Problem

Clarence Street/Clarence Street South is forecast to be operating at approximately 5-10% over capacity by 2041, as illustrated in ***Figure 4-57***. The critical direction in the PM peak hour is southbound.

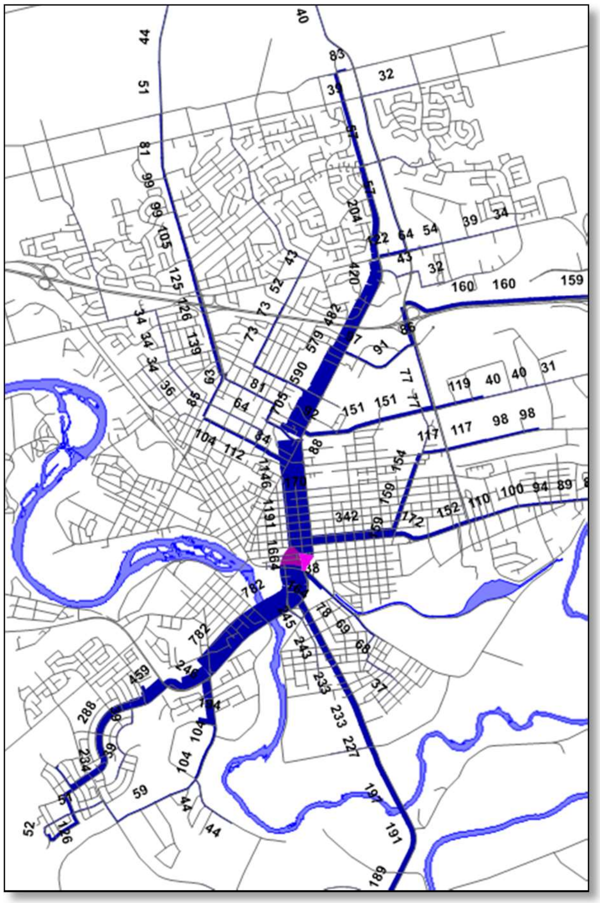
Figure 4-57: Clarence Street/Clarence Street South – Dalhousie Street to Icomm Drive: 2041 PM Peak Hour V/C Ratios



4.3.13.2 Assessment

A majority of trips on Clarence Street/Clarence Street South are travelling from north-central Brantford (i.e. north of Highway 403) to the south side of the river via West Street, as illustrated in ***Figure 4-58***.

Figure 4-58: Clarence Street/Clarence Street South PM Peak Hour Trip Distribution – Southbound



4.3.13.3 Alternatives

The alternative solutions to the identified capacity constraint for Clarence Street are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

Clarence Street, between Icomm Drive and West Street, provides sidewalks on both sides of the road north of Nelson Street. South of Nelson Street sidewalk is only provided on the west side, as rail siding occupies the east side.

West Street is a busy secondary north-south route used by trucks and vehicles as an alternative route to avoid WGP or King George Road when connecting in/out of the downtown. As such it would be a good multimodal connection. To do so would require an improvement of the cross section to provide the road design requirements for a minor arterial that accommodates all modes.

Transit
The Clarence Street corridor is served by one Brantford Transit route: Route 2 (West Street Brier Park). This route provides significant connections between downtown and neighbourhoods north of Highway 403. Clarence Street connect to West Street and the intensification areas, and has good potential to provide enhanced transit connectivity in the future.

Service enhancements in the form of route additions or modifications have the potential to improve the Clarence Street transit mode share from 6% today to 14% in the future. This increase in mode share would result in an approximate 75-100 vehicle reduction on West Street during the peak hours.

Transportation System Management
Clarence Street is classified as a minor arterial road, however, it is forecasted to have high future volumes and the longer distance nature of these trips (connecting from north of Highway 403 to downtown) suggests a role and function more aligned with a major arterial. While its basic cross section is limited by the right of way and the adjacent land use, there are some design features could be enhanced to more closely align with its role and function.

Currently there are few provisions for auxiliary turn lanes. Consideration could be given to either prohibiting specific left turns or providing left turn storage in the form of an auxiliary left turn lane at key intersections.

In addition, traffic signal coordination would minimize delay and maximise vehicle flow. This would provide a continuous flow or 'green wave' in the peak direction of travel.
This alternative will improve traffic operations and will slightly increase the overall carrying capacity of the roadway. This alternative, in combination is likely to provide the required roadway capacity enough to mitigate delays and improve the level of service to an acceptable level to the long term.

Increase Infrastructure
A widening of Clarence Street/Clarence Street South would result in significant property impacts, and would be constrained by the railway spur line on the east side (limiting widening options to the west side).

The Veterans Memorial Parkway extension (to Murray Street) provides an opportunity for an alternative route out of downtown via Murray Street. The TDM and TSM initiatives are expected to resolve the prevailing future capacity concern. However, this situation should be monitored. An extension of the Veterans Memorial Parkway could be considered beyond 2041 to address potential long-term issues and should be protected for as an alternative to Clarence Street/Clarence Street South.

4.3.13.4 Conclusion

The preferred alternative for addressing the 2041 capacity issue on Clarence Street is as follows:

- City Wide TDM – improved transit service on Route 2 will provide opportunities for reduction in local vehicle volume on Clarence Street; and
- Corridor TSM – consider peak hour turning movement restrictions at minor roadways and provide auxiliary left turn lanes at significant intersections to improve the efficiency of the available travel lanes. This condition should be monitored over time to ensure that emerging issue are identified.

4.3.14 Colborne Street West – County Road 7 to D'Aubigny Road

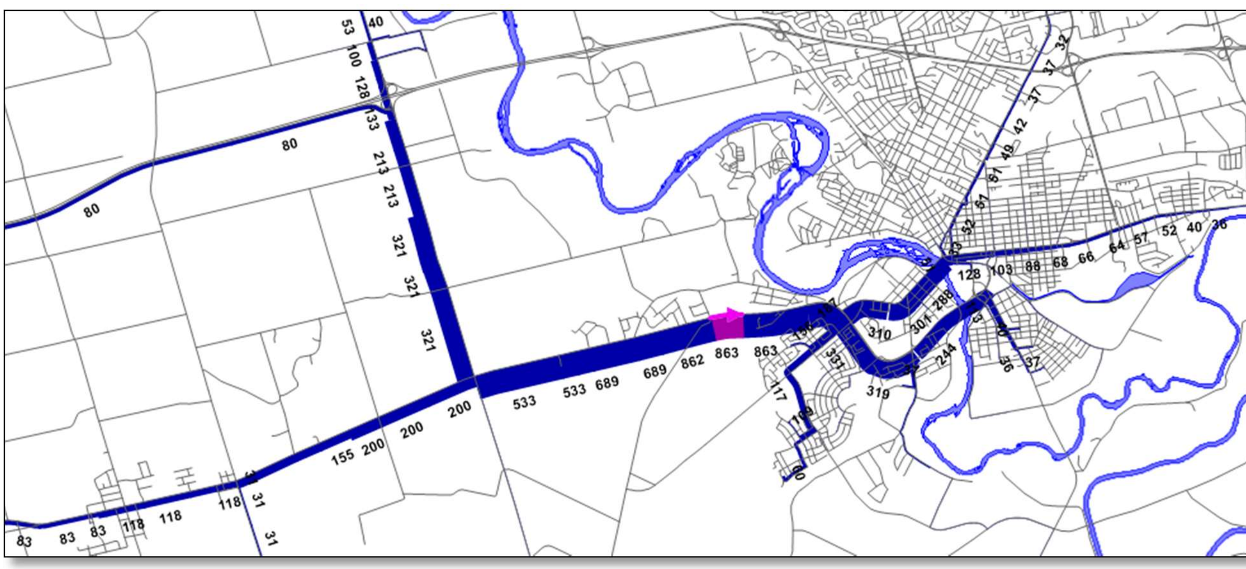
4.3.14.1 Problem

Colborne Street West between County Road 7 and the existing 4-lane section is forecast to be an emerging issue in 2041. The nature of this section's 2 lanes westbound and 1 lane eastbound results in poorer operating conditions in the morning peak hour than the evening peak hour.

4.3.14.2 Assessment

Colborne Street West plays a significant role in moving trips from the west into Downtown Brantford. As Colborne Street connects to the Lorne Bridge, effective opportunities to provide parallel capacity are limited. A majority of trips using Colborne Street are to/from the west via Rest Acres Road to access the downtown, as illustrated in ***Figure 4-59***.

Figure 4-59: Colborne Street West PM Peak Hour Trip Distribution – Eastbound



4.3.14.3 Alternatives

The alternative solutions to the identified capacity constraint for Colborne Street West are described below. They range from small scale policy changes to large scale infrastructure projects. The following describes each alternative.

Travel Demand Management

Active Transportation

Colborne Street West between County Road 7 and D'Aubigny Road is a 3-lane road section with narrow gravel shoulders and no provisions for pedestrians and cyclists. East of D'Aubigny Road the road widens to 2-lanes in each direction and a sidewalk is provided on the south side.

The land use adjacent to the subject section of road is very rural and is likely to continue into the longer term. Pedestrian traffic is likely to continue to be very limited. Provision of a better cycling environment (hard shoulders) would increase the potential for cycling mode in this corridor but is unlikely to significantly affect the auto level of service.

Transit

There are two Brantford Transit routes that service the residential areas in the vicinity of Colborne Street West: Route 5 (West Brant Oakhill) and Route 6 (West Brant Shellard). These routes effectively target residential travel to/from the downtown.

Service enhancements in the form of route additions or modifications have the potential to improve transit mode share from 3% today to 16% in the future. This increase in mode share would result in an approximate 50-75 vehicle reduction on Colborne Street West during the peak hours.

Transportation System Management

The current rural cross section is relatively short within the City limits, with few side street accesses. In the future, the Oak Park Road Extension will potentially access Colborne Street from the north within the subject section. With increased volume, consideration should be given too good intersection control at the new intersection (signalization or roundabout).

Increase Infrastructure

With growth, capacity issues are forecast for Rest Acres Road and Colborne Street accessing the City, requiring the widening of Colborne Street West. With the potential for an Oak Park Road Extension connection and an additional influx of approximately 300-500 peak hour peak direction volumes, the widening of Colborne Street would accommodate the forecast volumes.

4.3.14.4 Conclusion

The preferred alternative for addressing the 2041 capacity issue on Clarence Street is as follows:

- City Wide TDM – improved transit service in southwest Brantford will provide opportunities for reduction in local vehicle volume, and provide cycling facilities (paved shoulder row widen lanes);
- Corridor TSM – consider intersection control (signals or roundabout) at the future intersection with Oak Park Road extension;
- Provide additional eastbound lane to align with 4 lane section east of D'Aubigny Road, The rod should be designed to be consistent with the Complete Street design criteria for a major arterial, including provisions for all modes (including cycling and pedestrian design features).

4.3.15 Overall Combined Improvement Scenario Assessment

The preferred solution network to address the forecast growth of the City to 2041 is a combined scenario that includes the following elements: transit service improvement/enhancements to promote increased transit use; the provision of active mode infrastructure to promote increased cycling and walking; and network infrastructure improvements to address the capacity constraints in the network. This solution results in a network and demand solution that addresses the identified long-term network deficiencies.

The performance of this combined scenario 2041 Recommended Plan shows that almost all of the anticipated roadway capacity issues identified for 2041 Do-Minimal condition (where no long-term investment was made in transit service, active transportation, or infrastructure) are resolved.

Figure 4-60 identifies the few remaining capacity/operational issues in the 2041 Recommended Network while ***Table 4-5*** displays the screenline capacity results in the 2041 Recommended Network. The remaining capacity/operational issues include the Lorne Bridge, Clarence Street South between Icomm Drive and Colborne Street East, and Paris Road. The transportation assessment suggests that while these are identified as capacity constraints in the long term, the magnitude of the issue has been significantly reduced. These issues are now forecast to be marginal and can be successfully managed in the near- and mid-term. These locations should continue to be monitored to identify the significance of any emerging issue.

Figure 4-60: 2041 Recommended Network: Capacity Constraints

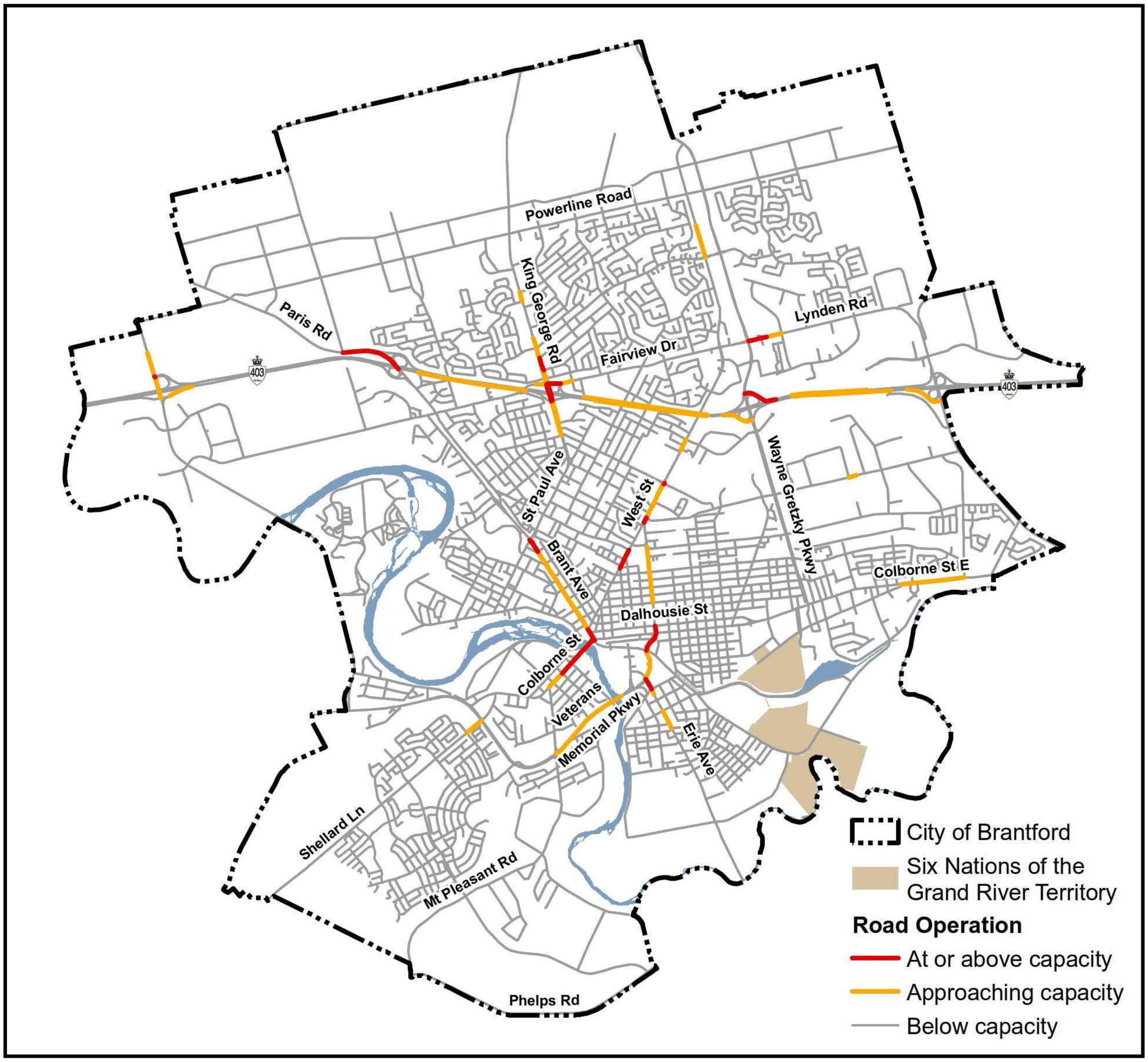


Table 4-5: 2041 Recommended: Screenline Assessment

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	10	11,100	6,628	0.60	6,199	0.56
1	Grand River South	WB	10	11,100	4,235	0.38	7,408	0.67
2	Grand River North	EB	4	5,200	2,770	0.53	4,114	0.79
2	Grand River North	WB	5	6,000	2,672	0.45	3,524	0.59
3	Highway 403	NB	14	11,800	6,709	0.57	8,565	0.73
3	Highway 403	SB	14	11,800	6,987	0.59	9,137	0.77
4	King George Road	EB	12	10,600	4,961	0.47	7,958	0.75
4	King George Road	WB	12	10,600	6,231	0.59	6,832	0.64
5	Wayne Gretzky Parkway (North)	EB	8	8,600	4,322	0.50	6,035	0.70
5	Wayne Gretzky Parkway (North)	WB	8	8,600	5,117	0.60	5,728	0.67
6	Wayne Gretzky Parkway (South)	EB	6	4,100	1,904	0.46	2,144	0.52
6	Wayne Gretzky Parkway (South)	WB	6	4,100	1,515	0.37	2,765	0.67
7	Memorial Drive	EB	8	5,900	1,635	0.28	3,004	0.51
7	Memorial Drive	WB	8	5,900	2,290	0.39	2,460	0.42
8	West Street	EB	6	4,300	1,875	0.44	2,786	0.65
8	West Street	WB	6	4,300	2,391	0.56	2,913	0.68
9	CNR Corridor	NB	11	7,900	4,109	0.52	4,812	0.61
9	CNR Corridor	SB	11	7,900	3,923	0.50	5,696	0.72
10	Garden Avenue	EB	8	8,000	4,562	0.57	5,349	0.67
10	Garden Avenue	WB	8	8,000	4,291	0.54	5,859	0.73
11	Powerline Road	NB	14	10,700	4,170	0.39	5,834	0.55
11	Powerline Road	SB	14	10,700	4,577	0.43	6,099	0.57
12	Murray Street	EB	7	4,400	1,968	0.45	1,664	0.38
12	Murray Street	WB	8	5,200	1,603	0.31	2,522	0.49
13	West External	EB	7	7,300	1,668	0.23	2,250	0.31
13	West External	WB	7	7,300	1,634	0.22	2,124	0.29
14	South-West External	NB	4	4,300	1,583	0.37	1,157	0.27
14	South-West External	SB	4	4,300	933	0.22	1,713	0.40
15	East External	EB	5	6,900	2,938	0.43	3,444	0.50
15	East External	WB	5	6,900	3,007	0.44	3,643	0.53
16	North-East External	NB	3	3,200	1,340	0.42	1,601	0.50
16	North-East External	SB	3	3,200	1,161	0.36	2,258	0.71
17	North-West External	NB	3	3,300	754	0.23	912	0.28
17	North-West External	SB	3	3,300	785	0.24	933	0.28

Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Notes: i) For more details on sreeenlines in general please see ***Chapter 2.0.Transportation Impacts of Growth***.

ii) Screenlines are illustrated in ***Figure 2-3*** .

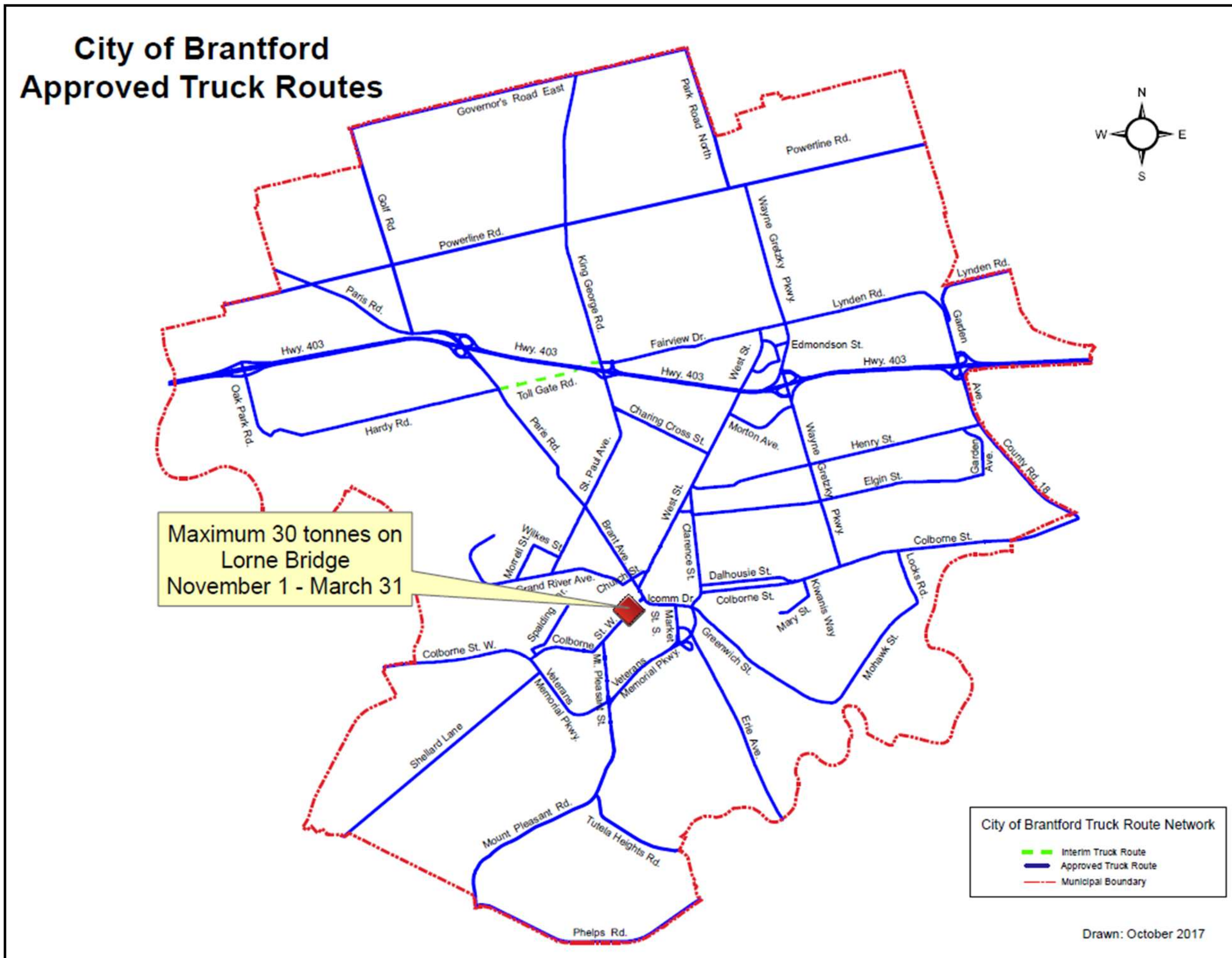
iii) Total (capacity) = the total roadway vehicle capacity of all lanes that cross a particular screenline in a particular direction.

iv) Volume = the total number of vehicles that cross a particular screenline in a particular direction during a particular peak hour.

4.3.16 Goods Movement

The transportation system is not only used for moving people but also for moving goods. It is important that access and mobility for trucks be accommodated in appropriate environments. This means restricting truck movements to roadways and places that are design for them, while still providing access to businesses that require trucking. ***Figure 4-61*** highlights the existing truck route designations. The existing truck routes identified in the City's Traffic By-Law are comprehensive.

Figure 4-61: Existing Truck Routes



4.4 Recommended Plan

4.4.1 Active Transportation

A key objective of the TMP is to work towards becoming a Bicycle Friendly Community by providing a clear, concise roadmap towards a more bicycle friendly future. Achieving this goal is dependent on providing full connectivity and the right environment to promote use and foster confidence in the system. This means addressing the needs of both recreational and utilitarian users. Full connectivity makes active transportation a feasible choice for any trip in the City. Providing the right space allows users of all skill to feel comfortable and choose routes that satisfy their safety and efficiency concerns by removing barriers to use.

Barriers to active transportation modes include highway crossings, traversing large urban intersections, travelling in close proximity to high volumes of fast moving vehicles, and the lack of user amenities (bike racks, lockers, shower facilities, rest areas).

The existing and proposed cycling and trails network is shown in ***Figure 4-62***. The implementation of this network will add 145 km of additional cycling and trails facilities on to the existing 51 km of on road facilities and 96 km of off road facilities. This network will provide a mix of on-road facilities (bike lanes and shared facilities) and off- road facilities (multi-use path and trails) that provide full connectivity for a full range of origins and destinations, and full range of user types/skills. ***Table 4-6*** summarizes the existing and proposed cycling and trails network by facility type.

As ***Table 4-6*** indicates, the majority of proposed Active Transportation Network changes are focused on on-road facilities. There are a few new multi-use paths / trails as a number of key roads are widened or extended. Overall, this strategy is taken because there is already a strong presence of multi-use paths / trails on non-roadway corridors and few additional corridors are available for exclusive use by Active Transportation use. A decided expansion of the Cycling and Trails Network along the road network is necessary to connect each community.

Sidewalks are incorporated into specific road design, where the cross- section elements have been defined for each roadway functional class to address the needs of all users. These design elements are part of the City's Linear Infrastructure Design Guidelines and have been updated to reflect the enhanced focus on active transportation and allow connection to the City Transit network.

Figure 4-62: Proposed 2041 Cycling and Trails Network

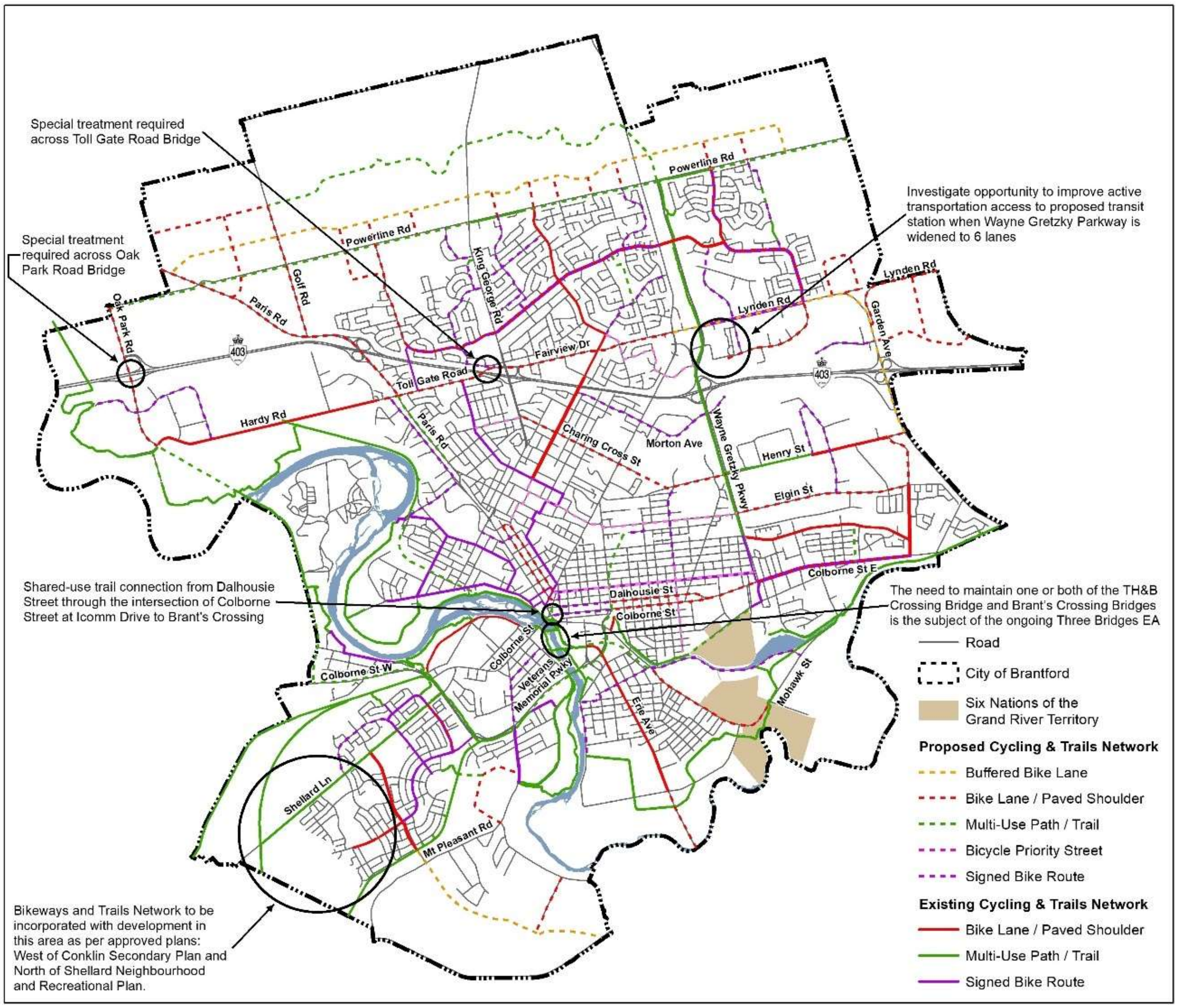


Table 4-6: Proposed 2041 Cycling and Trails Network Summary

Facility Type	Existing Length (centre line km)*	Proposed Length (centre line km)	Future Length (centre line km)
		On-Road	
Buffered Bike Lane	0.0	13.2	13.2
Bike Lane / Paved Shoulder	20.2	61.2	81.4
Bike Priority Street	0.0	10.0	10.0
Signed Bike Route	30.7	30.4	61.1
Sub Total	**50.9**	**114.8**	**165.7**
		Off-Road	
Multi-Use Path / Trail	95.5	30.2	125.7
Sub Total	**95.5**	**30.2**	**125.7**
TOTAL	**146.4**	**145.0**	**291.4**

* Existing lengths were calculated based on available information.

4.4.2 Transit

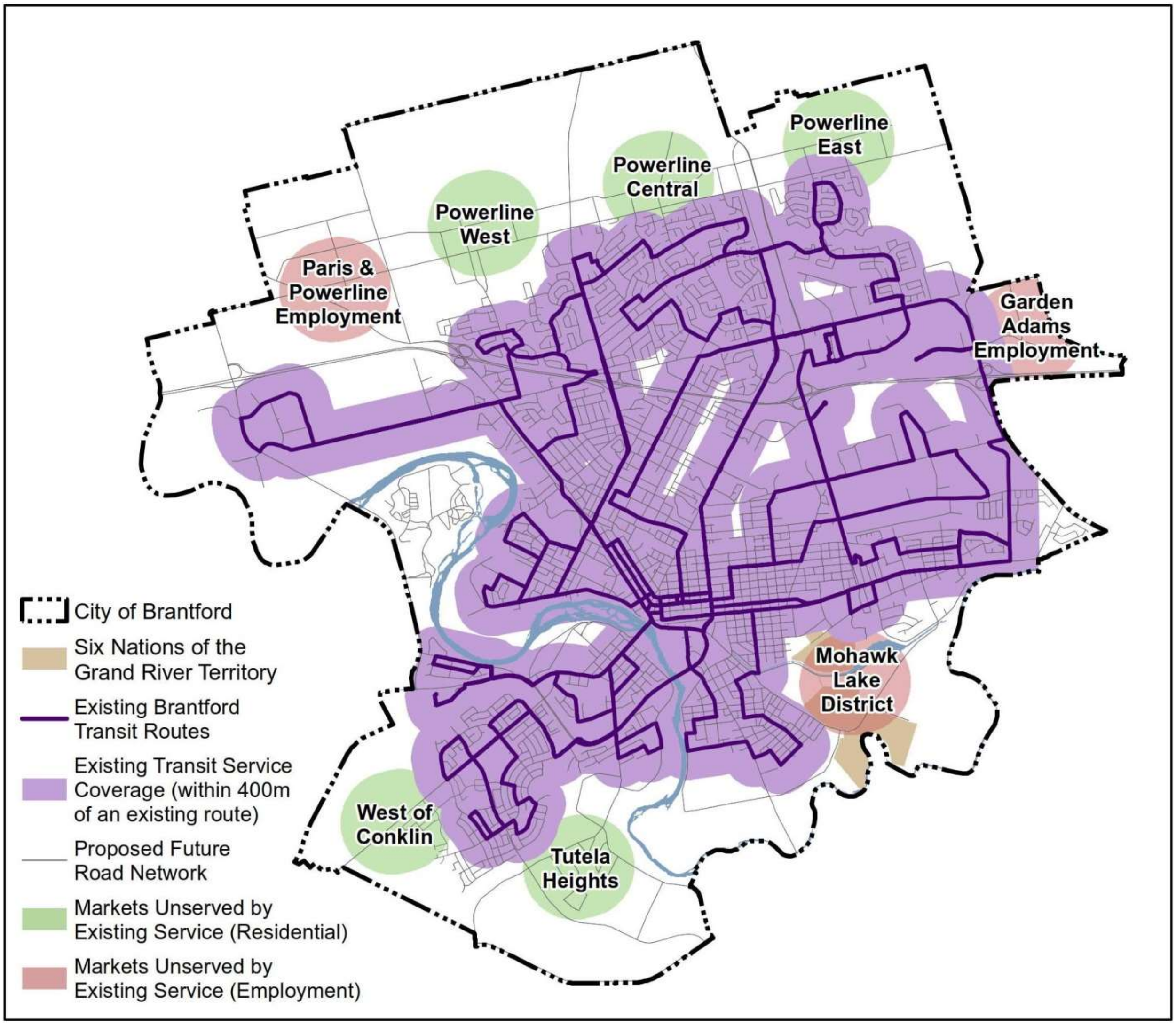
The scope of the Transportation Master Plan is to identify the role, need, and potential impact of the transit system in accommodating growth and moving people. The assessment has quantified the potential for ridership at the City wide and corridor levels.

The objectives with respect to the system coverage and expansion requirements for transit system are identified in ***Figure 4-63***.

The specific implementation plan for transit is provided in the next phase of the TMP (Implementation Plan). The implementation plan will identify the high-level service expansion and strategic service needs. However, with the expansion of transit service it is anticipated that the city fleet will be expanded to approximately 57 vehicles (40 conventional and 17 specialized), representing an increase of 25% in equipment.

The future transit service, routes and operational characteristics will be identified by future studies, i.e. a Transit Master Plan or Transit Operational Study that will provide estimates of the operational hours of services required to maintain the desired level of services throughout the network.

Figure 4-63: Proposed 2041 Transit Service Expansion and Enhancement



4.4.3 Road Network

From the transportation assessment, the roadway classifications and the infrastructure improvements for the 2041 horizon year have been identified as shown on ***Figure 4-64*** and ***Figure 4-65*** respectively.

The enhancements include infrastructure widening on:

- Wayne Gretzky Parkway between Henry Street and Lynden Road;
- Veterans Memorial Parkway between Mount Pleasant and Market Street South;
- Colborne Street West from County Road 7 to the existing 4-lane section;
- Paris Road from Golf Road to Oak Park Road;
- Oak Park Road from Hardy Road to Powerline Road; and
- Powerline Road from Oak Park Road to the City east limits.

New road additions include:

- Oak Park Road extension to Colborne Road West;
- Wayne Gretzky Parkway extension to connect with Park Road; and
- Charing Cross Street extension to Henry Street.

All of the projects identified will require a Schedule B or C MCEA to be completed, which would include significant public/stakeholder consultation, before they can be implemented.

TSM improvements to enhance the existing capacity (through urbanization, parking restrictions, and operational improvements, including roundabout implementation) are proposed for several corridors including:

- Golf Road;
- Paris Road;
- Brant Ave;
- Hardy Road;
- West Street;
- King George Road;
- Erie Avenue;
- Clarence Street/Clarence Street South; and
- County Road 18 (note that this is a County Road. The City will be required to work with the County in determining potential for improvements to the corridor, impacts, and costs).

TSM projects do not require Schedule B/C EA, but this TMP forms the basis for phase 1 and 2 of an EA for individual projects.

Figure 4-64: Roadway Classification

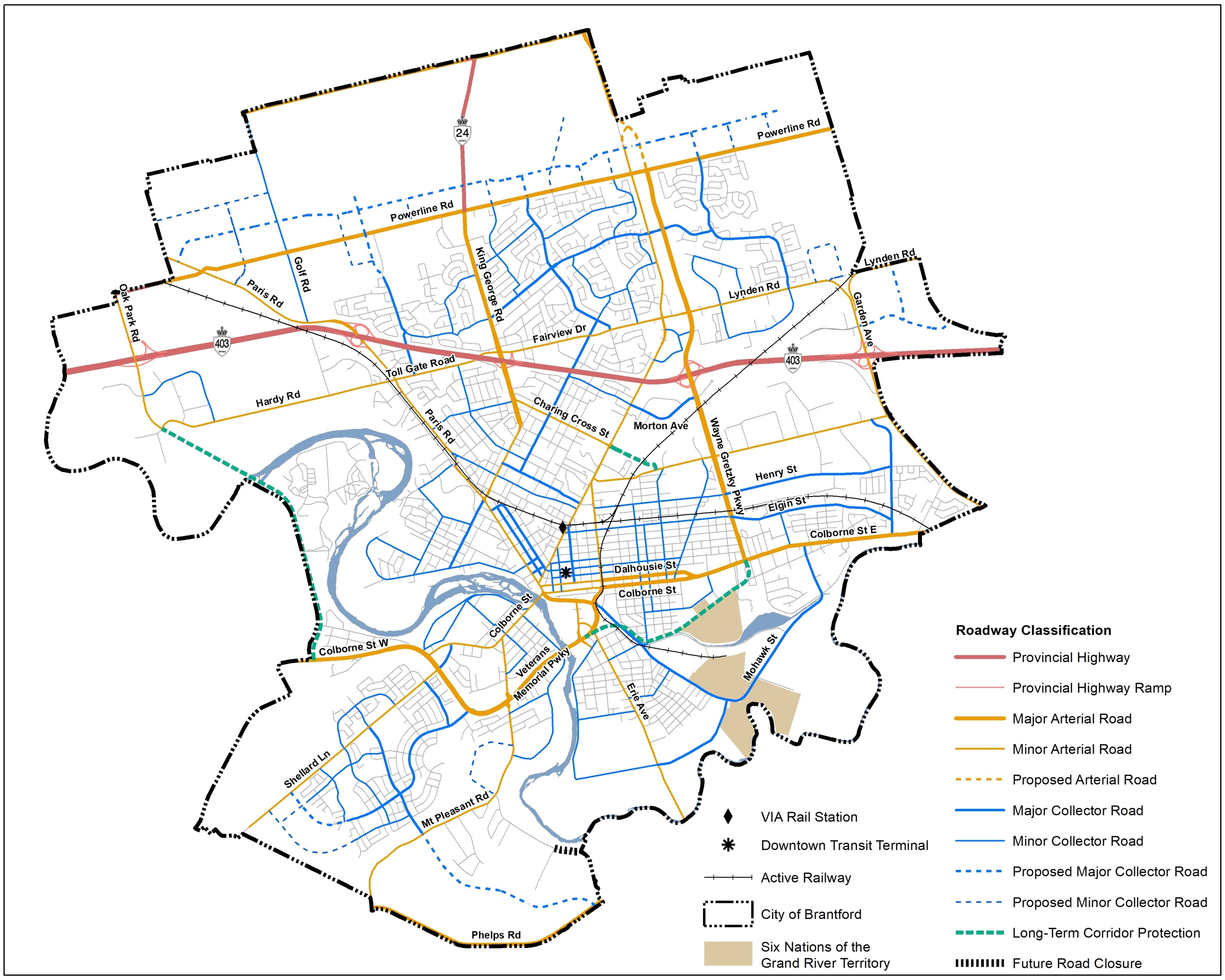
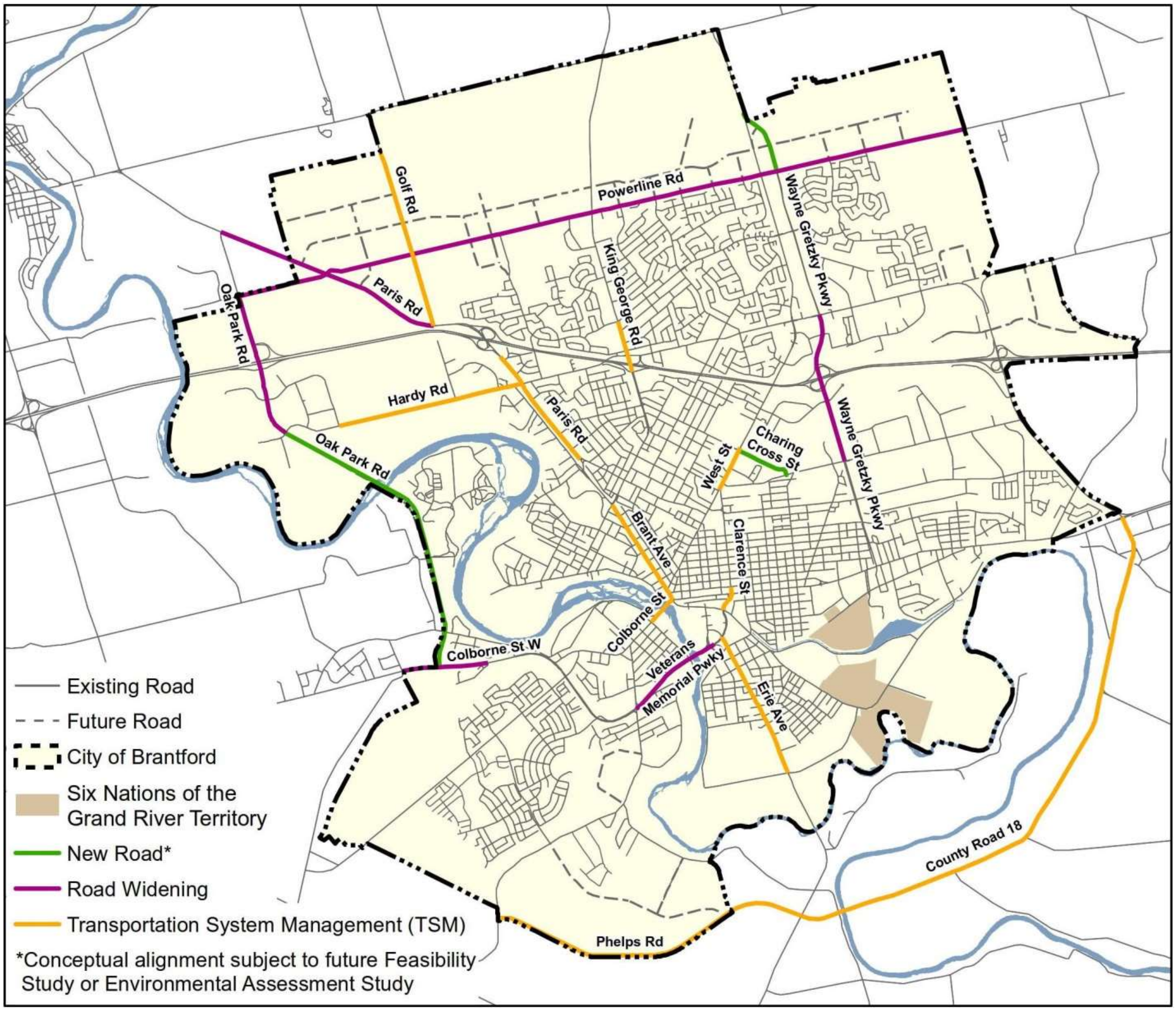


Figure 4-65: Proposed 2041 Road Network

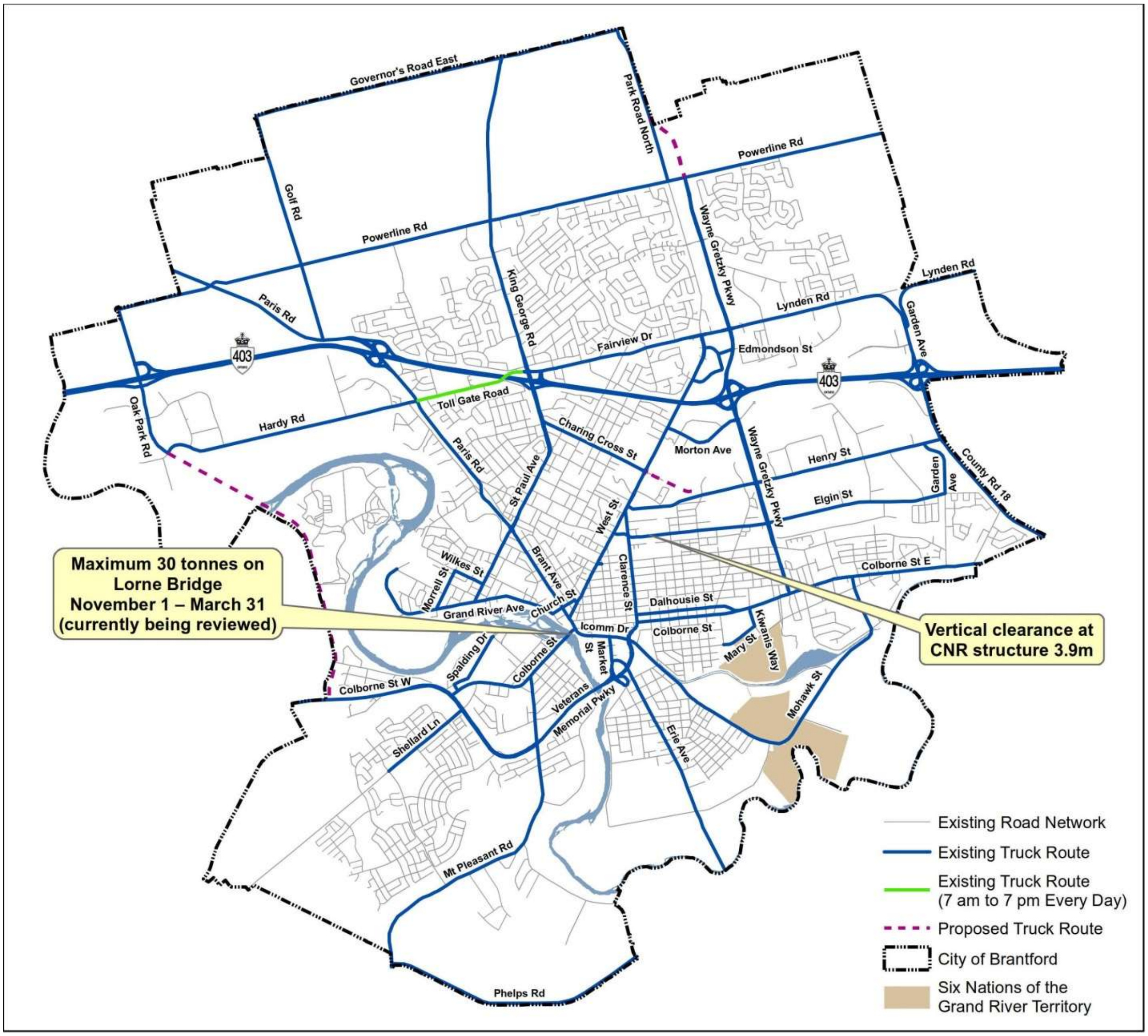


4.4.4 Goods Movement

Figure 4-66 highlights the existing truck route designations with modifications to reflect future potential changes. Specific changes include:

- Addition of the future Charing Cross Street Extension; and
- Additions of the future Oak Park Road Extension.

Figure 4-66: Proposed 2041 Truck Routes



5.0 Implementation Plan

5.1 Active Transportation

5.1.1 Strategy

The 2020 TMP Update includes an expansion of the City Cycling and Trails Network, building on the 2014 TMP plan, to include the extension of multi-use paths and trails into the Tutela Heights and North Expansion lands. In addition, enhancements have been made to conform to new initiatives and policies now in place (OTM Book 18 revisions since 2014).

The capital cost to provide these facilities is estimated at $31.7 Million to the year 2041. This includes ***Table 5-1*** summarizes the total length and estimated costs of the proposed facilities in the Cycling and Trails Network.

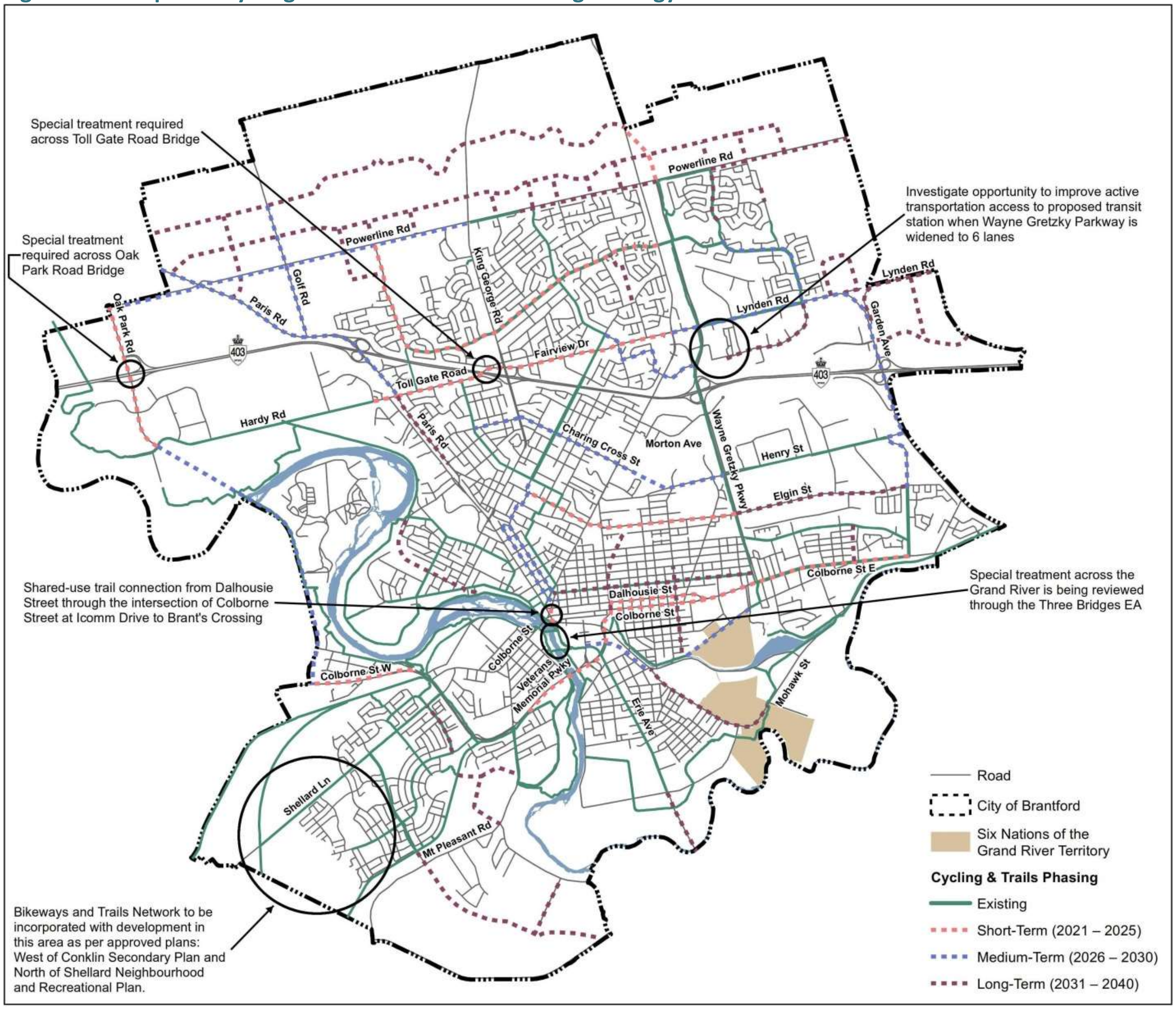
Table 5-1: Proposed 2041 Cycling and Trails Network Summary

Facility Type	Length (centre line km)	Cost ($000)*
On-Road		
Buffered Bike Lane	13.2	$4,244
Bike Lane / Paved Shoulder	61.2	$17,434
Bike Priority Street	10.0	$1,265
Signed Bike Route	30.4	$42
Sub Total	**114.8**	**$22,984**
Off-Road		
Multi-Use Path / Trail	30.2	$5,851
Sub Total	**30.2**	**$5,851**
Other		
Programs (Studies, Initiatives, Events)	-	$2,885
Sub Total	-	**$2,885**
TOTAL	**145.0**	**$31,720**

* All costs stated in 2020 dollars.

Figure 5-1 illustrates the recommended phasing and implementation plan for the Cycling and Trails Network. Several factors were critical in developing the phasing and implementation. Priority of the proposed routes were assessed based on: the timing of new roadways / roadway upgrades, the lack of safe and comfortable routes for cycling in surrounding area, its ability to connect isolated communities, its ability to attract a wider range of the potential cyclists, project complexity, estimated costs and timing of related road improvement projects.

Figure 5-1: Proposed Cycling and Trails Network Phasing Strategy



5.1.2	**Implementation**

5.1.2 Implementation

5.1.2.1 Short Term (2021-2026)

Routes in this phase represent those that complement the core network of existing / short-term routes. It may also include other critical links that are higher costs or require a more detailed analysis to implement. Examples are routes that require widening or road reconfiguration on arterial roads to accommodate on-street facilities. Projects related to a road improvement were phased according to the proposed road improvement project.

5.1.2.2 Medium Term (2026-2031)

Routes in this phase represent those that complement the core network of existing / short-term routes. It may also include other critical links that are higher costs or require a more detailed analysis to implement. Examples are routes that require widening or road reconfiguration on arterial roads to accommodate on-street facilities. Projects related to a road improvement were phased according to the proposed road improvement project.

5.1.2.3 Long Term (beyond 2031)

Routes in this phase represent remaining links that will enhance the Cycling and Trails Network. Some routes may represent a lower priority; however some routes are anticipated over the long-term due to other restrictions such as necessary coordination with other municipalities, project complexity, and estimated costs. Projects related to a road improvement were phased according to the proposed road improvement project.

5.1.2.4 Cost

The capital cost to provide the proposed Cycling and Trails Network is estimated at $31.7 Million to year 2041. ***Table 5-2*** summarizes the recommendations for the short, medium and long term to 2041.

Table 5-2: Cycling and Trails Recommendations by Time Frame

Facility Type	Length (centre line km)	Cost ($000)*
Short Term [2021 – 2025]		
Signed Bike Route	7.6	$10
Bike Priority Street	3.0	$380
Bike Lanes / Paved Shoulders	16.6	$1,640
Multi-Use Paths	4.7	$529
Programs (Studies, Initiatives, Events)	-	$820
Sub Total	**31.9**	**$3,379**
Mid Term [2026 – 2031]		
Signed Bike Route	7.6	$10
Bike Priority Street	3.1	$392
Bike Lanes / Paved Shoulders	22.4	$7,146
Multi-Use Paths	10.1	$845
Programs (Studies, Initiatives, Events)	-	$690
Sub Total	**43.2**	**$9,084**
Long Term [2032 – 2041]		
Signed Bike Route	15.2	$21
Bike Priority Street	3.9	$493
Bike Lanes / Paved Shoulders	35.4	$12,891
Multi-Use Paths	15.4	$4,476
Programs (Studies, Initiatives, Events)	-	$1,375
Sub Total	**69.9**	**$19,257**
TOTAL	**145.0**	**$31,720**

* All costs stated in 2020 dollars & Contingency of 30% for Engineering assumed (excludes Programs).

The proposed projects by time frame and estimated cost can be found in ***Appendix D.***

5.1.1 Monitoring

Implementation does not end with construction. Monitoring and assessment of the City's active transportation usage should continue on an ongoing basis and the network should be assessed every 5-10 year via a stand-alone Active Transportation Master Plan that will engage the participation of local cycling interest groups and committees.

Evaluating and documenting what is achieved through the use of performance measures will help assess the progress of Brantford's Active Transportation implementation Plan. The type of performance measures applied by municipalities can vary depending on desired outcomes and available data. However, in general performance measures can:

- Help to prioritize projects;
- Track project progress and gauge user interest;
- Demonstrate the value of pedestrian and bicycle projects to citizens and elected officials;
- Inform smarter investments through data-driven measures of success;
- Comply with funding requirements at varying levels of government; and
- Provide information to engage a broad set of stakeholders in project identification and prioritization.

Mode share data from the Statistics Canada Journey to Work Dataset and the Transportation Tomorrow Survey (TTS) can provide insight into Brantford's utilitarian usage while a bike and pedestrian count programme (either manual counts or automated counters) can provide data regarding recreational and/or commuter trips.

Identifying and applying a set of performance measures can help staff assess the level of impact that new facilities and routes have on active transportation usage. Data collected to quantify and measure performance targets to inform future priorities and justify capital investments that support future active transportation developments in Brantford.

5.2 Transit

5.2.1 Strategy

The preferred strategic direction for the 2020 TMP Update is to provide enhanced focus on transit by 2041. The TMP transit policies have been structured to provide an incremental approach to achieving these levels.

In the short to medium term, improvements to key performing transit routes will be provided through marketing, route changes and the addition of new routes as recommended in the 2016 Transit Service Plan *TRANSFormation 2021* study. The objective of these changes is to increase transit ridership through the improvement of service efficiency and comfort.

Between 2031 and 2041, the City will pursue the more aggressive "Transit Focus" approach in conjunction with continued population growth and growth in new areas of the city. The 'Transit Focus' will target improvements to key routes, increased service levels and frequencies and introduction of express routes between key residential and employment areas. It is envisioned that by 2041, this strategy will improve the transit mode share to 6% as a result of growth and increased use of transit.

Achieving an increase in ridership of this magnitude will require increased financial investment by the City, supported by strong transit-supportive policies related to the supply and cost of parking, Transportation Demand Management, land use planning and development, and transit priority measures on Brantford streets so that the conventional transit service is convenient, attractive to potential users, and competitive with the private automobile.

The following recommended policies to encourage increased transit use include a number of polices related to Transportation Demand Management, Parking, and Active Transportation. These transit-specific policies outline specific transit service improvements to achieve the ridership increases outlined in the preferred strategy.

5.2.2 Implementation

5.2.2.1 Short Term (2021-2026)

In the short term, the transit service improvement strategy should focus on the following recommended actions:

- Implement the recommendations of the 2016 Transit Service Plan, including adjustments to existing routes and schedules to improve schedule adherence and travel times;
- Increase the number of shelters at stops towards a coverage rate of 25% to increase the attractiveness and convenience of using transit;
- Make monthly passes more convenient to purchase and re-charge including on-line options;
- Prepare a marketing and communications plan and promotional materials to encourage and maintain transit ridership including a new transit route, schedule/information brochure;
- Investigate opportunities to implement transit priority on key corridors;
- Apply transit-supportive urban design guidelines to assist in making new developments easier to serve with transit;
- Work with County to extend and improve GO Transit service to key destinations (GTA, Cambridge/Kitchener/Waterloo);
- In conjunction with the County of Brant, explore the re-introduction of transit service to Paris;
- Enhance suburban transfer facilities. The facilities (i.e. bus circulation and shelters) at the major malls in the east and north ends of the City (Lynden Park Mall and Brantford Commons respectively) need to be improved to provide passenger amenities for transit users destined to these malls, as well as for transit users transferring between routes. Transit routes would link to these facilities with the objective of reducing travel times and to improve service coverage in future growth areas; and

- Initiate Transit Master Plan Study to assess next level strategies and implementation, and identify performance metrics and operational details if the transit system. The transit master plan would identify the key policies required to achieve an improved transit focus for travel in the City.

5.2.2.2 Medium Term (2026-2031)

In the medium term, the transit service improvement strategy should focus on the following recommended actions:

- Implement transit service in new development areas to build ridership early;
- Continued investment in conventional and specialized buses;
- Continued investment in additional transit shelters;
- Continue restructuring routes to shorten travel times; and
- Increase core and peak hour service frequencies on key routes.

5.2.2.3 Long Term (beyond 2031)

In the long term, the transit service improvement strategy should focus on the following recommended actions:

- Implement and expand transit service in new development areas;
- Continued investment in conventional and specialized buses;
- Continued investment in additional transit shelters;
- Continue restructuring routes to shorten travel times;
- Introduce transit priority measure;
- Introduce express routes linking key residential and employment areas; and
- Build new / upgrade existing downtown transit terminal.

5.2.2.4 Cost

The capital cost to provide this system is estimated at $32.3 Million to year 2041. ***Table 5-3*** summarizes the recommendations for the short, medium and long term to 2041.

Table 5-3: Transit Service Recommendations by Time Frame

Capital Item	Description	Cost ($000)*
Short Term [2021 – 2025]		
Fleet	1 new vehicle, 13 replacement vehicles	$15,400
Building	-	$ -
Transfer Points	Lynden Mall, Brantford Commons - Upgrades	$500
Route Infrastructure	Signage and Shelters Upgrade, ITS	$561
Studies	Transit TMP, Fleet Electrification Feasibility	$375
Specialized	Vehicle Replacement, Telecom Software	$1,570
	Sub Total	**$18,406**

Table 5-3: Transit Service Recommendations by Time Frame, Continued

Capital Item	Description	Cost ($000)*
Mid Term [2026 – 2031]		
Fleet	2 new vehicles, 10 replacement vehicles	$13,200
Building	Transit Center	$1,100
Transfer Points	-	$ -
Route Infrastructure	New Stops/ Shelters Expansion Routes/ITS	$651
Studies	Transit Master Plan Update	$100
Specialized	Vehicle Replacement	$3,750
	Sub Total	**$18,801**
Long Term [2032 – 2041]		
Fleet	5 new vehicles, 12 replacement vehicles	$18,700
Building	New/Upgrade Transit Terminal	$7,500
Transfer Points	-	$ -
Route Infrastructure	New Stops/ Shelters Expansion Routes/ITS	$1,620
Studies	-	$ -
Specialized	Vehicle Replacement, Software Upgrade	$5,800
	Sub Total	**$33,620**
	TOTAL	**$70,827**

* All costs stated in 2020 dollars.

The proposed projects by time frame and estimated cost can be found in ***Appendix D*.**

5.2.3 Monitoring

Monitoring and assessment of the City's transit services (conventional and specialized) should continue on a periodic (e.g., 5-year) interval using the TTS data, rider surveys, boarding counts, statistical data from the electronic fareboxes and schedule adherence data from the AVL (Automated Vehicle Location) system to assess specific route performance. Monitoring of the transit services involves three activities:

- On-going monitoring of the performance of each transit service against performance indicators such as total ridership, rides per capita and modal split, ridership per revenue-hour of service, rides per trip (specialized only), registrants (specialized only), average age of fleet, and revenue-hours per capita.
- Performance should be monitored and evaluated on an annual basis, with adjustments made as required to maximize the efficiency of the service.
- Completion of periodic (i.e., every 5 years) comprehensive transit service reviews of both the conventional and specialized transit services to define changing needs and demand, assess the performance of each service and preparation of multi-year service plans with projected operating and capital budget requirements.

5.3 Road Network

5.3.1 Strategy

For Road Infrastructure, estimates of interim year population and employment, 2026 and 2031, and the 2041 network performance assessment were used to generate a timeline for emerging constraints. The performance constraints were compared with the 2041 network recommendations to determine the likely need for infrastructure improvement for the interim years.

These network improvements have been combined with the TDM and TSM strategies to provide solutions that leverage the benefits of non-structural improvement to defer, as much as possible, the costs of required infrastructure.

5.3.2 Implementation

5.3.2.1 Travel Demand Management (TDM) Strategy

A TDM strategy is required for the City of Brantford with the objective of reducing single occupant vehicle travel and achieving the vehicle reduction targets identified in the transportation assessment. While based on the principles of this plan, the TDM strategy would be a separate exercise that could be done internally (i.e. with a TDM Coordinator) or by contracting it out to an external TDM expert if internal resources are not in place.

With the recent update to the City's Official Plan, the first priority for the overall TDM strategy would be to incorporate the TDM policies the City's planning documents. This stresses the importance of land use in helping manage transportation demand and meet single occupant vehicle reduction targets. A key component of the Official Plan is to identify policies that promote intensification, mixed use development, and pedestrian friendly design, which are supportive of the TDM strategy. The recommended TDM implementation Plan is provided in ***Table 5-4*.**

For all of the elements identified, the City must consult and engage: special interest groups, stakeholders, business community, accessibility agencies, community / senior centres, MTO, GO Transit, in the development of the program and plans. This includes projects initiated by others.

Table 5-4: TDM Recommended Implementation Plan

Proposed Action	1-5 years	6-10 years	11-20 years	Next Steps
Adopt a TDM Policy	x			Based on the Guiding Principles of this plan. Included in the Official Plan update.
Develop Trip Reduction Program for the Town Municipal Offices/Facilities	x	x	x	Internal Strategy developed by TDM Coordinator
Engage major employers and institutions to participate in trip reduction initiatives		x	x	Internal Strategy developed by TDM Coordinator
Encourage development of Activity Hubs	x	x	x	Include policies in Official Plan and Secondary Plans as appropriate
Include TDM in the development process	x	x	x	Include in Secondary Plans as well as approval of large development applications as appropriate

5.3.2.2 Transportation System Management (TSM) Strategy

A TSM Strategy should be developed for the City of Brantford. The objective of TSM is to maximize the use of the existing roadway infrastructure before expanding existing or constructing new facilities. Particular areas of concern in the longer term have been identified in the transportation assessment as: the existing bridge crossings of the Grand River; the Paris Road/ Brant Avenue corridor, and the King George Road Corridor. The recommended TSM implementation Plan is provided in ***Table 5-5*.**

Table 5-5: TSM Recommended Implementation Plan

Proposed Action	1-5 years	6-10 years	11-20 years	Next Steps
Prepare Access Management Guidelines	x			Initiate Separate Study. Include policies in Official Plan and Secondary Plans as appropriate.
Refine Right-of-Way Requirements to include Multi-Modal consideration for all roadway classifications	x			Per Complete Streets section of this TMP and ensure that objective are incorporated into City Design Guidelines Manual
Adopt Roundabout Implementation Strategy	x			Per Complete Streets section of this TMP, and City's Roundabout Installation Policy and Guideline toolbox.

With regard to the adoption of a roundabout strategy, the City has recently approved an installation Policy and developed guidelines for roundabout use and an analysis toolkit for their implementation. These elements include:

- Policy Direction (PW-022 Roundabout Installation Policy)
- Technical process checklist

The decision making process relies primarily on the technical elements: Initial screening criteria identified (which only confirms feasibility, not rationale for implementation); and Evaluation which identifies the criteria, weighting process, and scoring process for where a roundabout is preferred over traditional intersection control. The analysis toolkit still does not address the "role, desire, and overall rationale" for an implementation strategy.

The City's policy recognizes that not all intersections are going to suit roundabout implementation. There are typically four reasons for implementing roundabouts, which answer the question "What are we trying to achieve with roundabout implementation?":

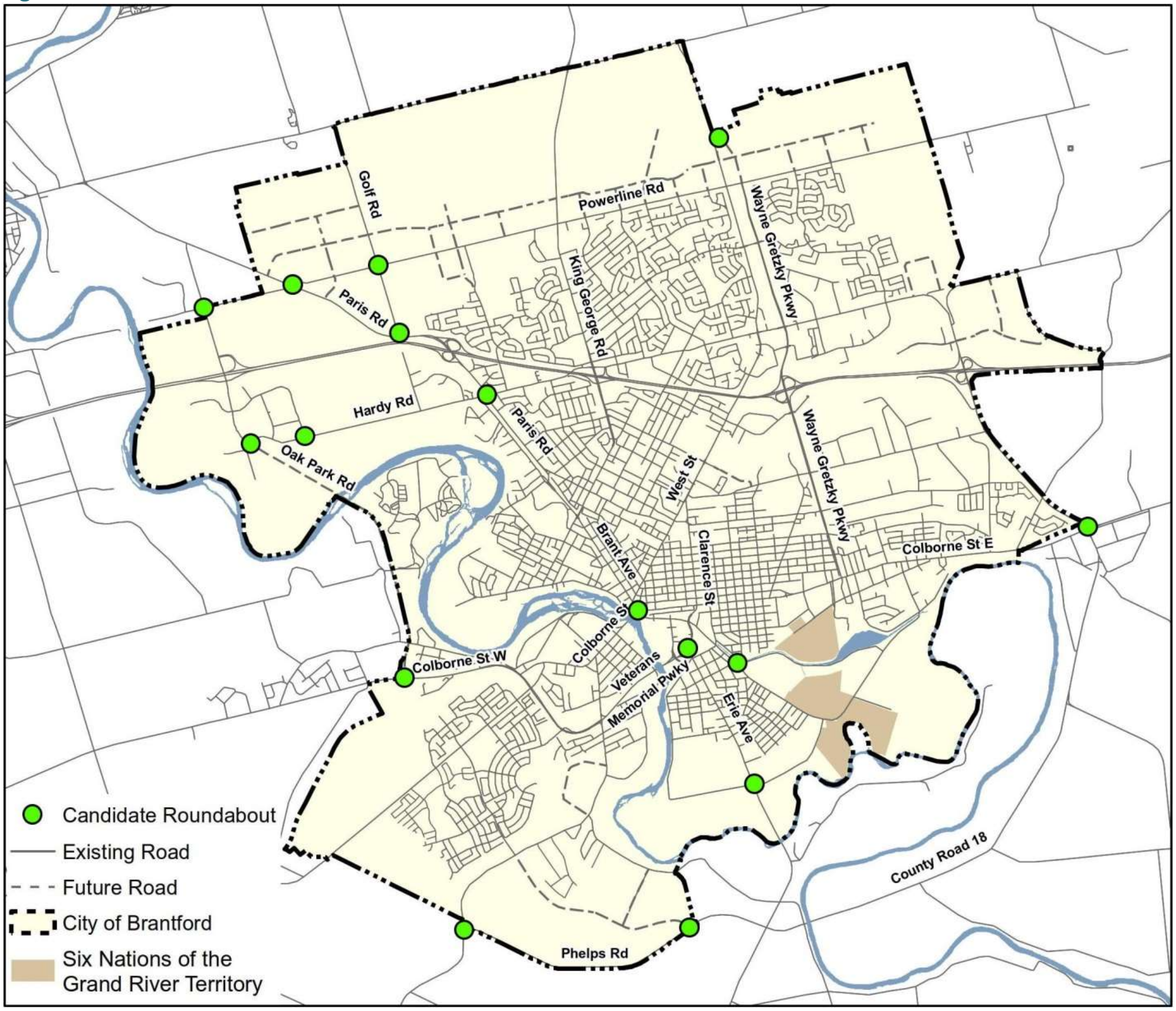
- Improve Operations – reduce delay for high volume turning movements
- Traffic Calming – reduce speed
- Improve Safety – reduce conflicts
- Gateway – visual cue re: changing environment

It is necessary to set goals, objectives, and direction for specific locations prior to undertaking technical analysis to justify / trade off against signalization.

With several corridors identified for consideration of TSM applications, it seems appropriate to target these corridors for potential roundabout implementation. In addition to having specific operational issues, several corridors transition from rural to suburban or suburban to urban environments making the good candidates for gateway treatments. Using the TSM findings as a guide, a list of candidate roundabout locations have been identified for this TMP, as shown in ***Figure 5-2***.

These are only meant to be candidate locations to be subject of future analysis using the City's roundabout guidelines. Through the development of a roundabout strategy, the City can expand the scope of this work to address local operational and safety issues. As well, any future Environmental Assessment or Traffic Impact Study will assess the need and feasibility of traffic control (including signalization versus roundabout implementation)

Figure 5-2: Candidate Roundabout Locations



5.3.2.3 **Short Term (2021-2026)**

In the short-term, the road infrastructure improvement strategy should focus on the following recommended projects:

- Veterans Memorial Parkway (MCEA Schedule C): Widening to 4 lanes from Mount Pleasant Street to Erie Avenue. To increase Grand River crossing capacity to serve ongoing planned growth in Southwest Brantford;
- Oak Park Road (MCEA Schedule C): Widening to 4 lanes from Powerline Road to Hwy 403 and Fen Ridge Court/Savannah Oaks Drive to Hardy Road. To serve growing business access needs in the northwest Brantford industrial area to/from Highway 403;
- Colborne Street West (MCEA Schedule C): Widening to 4 lanes from County Road 7 (Pleasant Ridge) to D'Aubigny Road. To serve trips travelling from the north and west into Downtown Brantford and for trips travelling between southwest Brantford and northwest Brantford / Brant County; and

- Wayne Gretzky Parkway (MCEA Schedule C): 4-lane extension from Powerline Road to Park Road North. To provide continuous and consistent arterial capacity between Highway 403 and Governors Road, serving both new development trips and longer distance trips from the congested King George corridor.

5.3.2.4 Medium Term (2026-2031)

In the medium-term, the road infrastructure improvement strategy should focus on the following recommended projects:

- Oak Park Road (MCEA Schedule C): 4-lane extension from Hardy Road to Colborne Street West. To address projected road network capacity deficiencies across the Grand River, and significantly relieve the Paris Road/Brant Avenue corridors to and from the central part of the city and the downtown. It will also connect the southwest development area with the northwest industrial area and Highway 403;
- Paris Road (MCEA Schedule C): Widening to 4 lanes from Oak Park Road to Golf Road. To address capacity needs for the northwest industrial are access to Highway 401 and for longer distance trips into Downtown Brantford;
- Powerline Road (MCEA Schedule C): Widening to 4 lanes (including urbanization) from Oak Park Road to King George Road. To address projected east-west road network capacity deficiencies along the south edge of the future north expansion area. It will connect the northwest industrial area to the north Brantford residential base;
- Charing Cross Street (MCEA Schedule C): 4-lane extension from West Street to Henry Street, with grade separation at CN Rail crossing. To address projected capacity deficiencies on West St. due to the jog between Charing Cross Street and Henry Street, and to provide a new continuous east-west arterial road in central Brantford between King George Rd. and Garden Avenue; and
- Golf Road TSM (MCEA Schedule B): Paris Road to Proposed Development Limit north of Powerline Road. Widen roadway bed and urbanize road to provide multi-modal environment consistent with urban arterial (including appropriate traffic control and auxiliary turn lanes and/or roundabouts).

5.3.2.5 Long Term (beyond 2031)

In the long-term, the road infrastructure improvement strategy should focus on the following recommended projects:

- Wayne Gretzky Parkway (MCEA Schedule C): Widening to 6 lanes from Lynden Road to Henry Street. To address long term city growth and associated capacity deficiencies on Wayne Gretzky Parkway, especially across the Highway 403 and CN Rail screenlines.;
- Powerline Road (MCEA Schedule C): Widening to 4 lanes from King George Road to East City Boundary. To address projected east-west road network capacity deficiencies along the south edge of the future north expansion area. It will connect the northwest industrial area to the north Brantford residential base;

- Conklin Road (MCEA Schedule C): 2-lane extension from Mt. Pleasant Road to Phelps Road. Addresses traffic generated by build out of the Shellard Lane and Tutela Heights development areas. Provides alternate access to the east and north via Phelps Road/County Road 18;
- New East/West Collector Road (north extension area) (MCEA Schedule B): New 2 lane collector road from Oak Park Road to King George Road. Addresses traffic generated by build out of the north expansion development area. Relieves traffic volumes on Powerline Road and provide collector function for all travel modes; and
- New East/West Collector Road (MCEA Schedule B): New 2 lane collector road from King George Road to East City Boundary. Addresses traffic generated by build out of the north expansion development area. Relieves traffic volumes on Powerline Road and provide collector function for all travel modes.

The result is that fourteen (14) main roadway network improvement projects are recommended for Brantford by 2041, as previously identified in ***Figure 4-65***. Most projects will require further public consultation, Environmental Assessment and Council approval prior to implementation.

5.3.2.6 Cost

The capital cost to provide this infrastructure (some 80 lane kilometres of network) is estimated at $293 Million to year 2041. ***Table 5-6*** summarizes the recommendations for the short, medium and long term to 2041.

Table 5-6: Road Infrastructure Recommendations by Time Frame

Project	Description	Cost ($000)***
Short Term [2021 – 2025]		
Veterans Memorial Parkway Widening	4 lanes – Mount Pleasant Street to Erie Avenue*	$40,500
Oak Park Road Widening	4 lanes – Powerline Road to Hwy 403 & Fen Ridge Court/Savannah Oaks Drive to Hardy Road	$6,400
Colborne Street West Widening	4 lanes – CR7 to D'Aubigny Road	$3,500
Wayne Gretzky Parkway Extension	4 lanes - Powerline Road to Park Road North	$4,100
	Sub-Total	**$54,500**
Mid Term [2026 – 2031]		
Oak Park Road Extension	4 Lanes – Hardy Road to Colborne Street **	$98,900
Paris Road Widening	4 lanes – Oak Park Road to Golf Road	$10,800
Powerline Road Widening	4 lanes – Oak Park Road to King George Road	$19,900
Charing Cross Extension	4 Lanes – West Street to Henry Street	$19,000
Golf Road TSM	Paris Road to Proposed Development Limit	$4,100
	Sub-Total	**$152,700**

Table 5-6: Road Infrastructure Recommendations by Time Frame, Continued

Project	Description	Cost ($000)***
Long Term [2032 – 2041]		
Wayne Gretzky Parkway Widening	6 Lane – Lynden Road to Henry Street	$29,100
Powerline Road Widening	4 lanes – King George Road to East City Boundary	$21,000
Conklin Road Extension	2 lanes - Mt. Pleasant Road to Phelps Road	$10,200
New East/West Road	2 lanes – Oak Park Road to King George Road	$15,300
New East/West Road	2 lanes – King George Road to East City Boundary	$16,400
	Sub-Total	**$92,000**
	TOTAL	**$299,200**

* Reference Costs Source: Veterans Memorial Parkway Widening and Extension, CIMA+, October 2018 - [Assume: Mt Pleasant to Bridge = 950 m (from feasibility study) and Bridge to existing 4-lane cross section west of Erie = 240 m]

** Reference Costs Source: Oak Park Road Extension Feasibility Study, Parsons, July 2019

*** All costs stated in 2020 dollars & Contingency of 20% for Construction and 30% for Engineering assumed unless stated specifically in reference reports (i.e. feasibility reports).

The proposed projects by time frame and estimated cost can be found in ***Appendix D.***

5.3.3 Monitoring

The TMP is intended to be reviewed every five years and updated if necessary. It also addresses only the Phases 1 and 2 requirements of the Municipal Class EA planning process for specific road extension, widening and intersection improvements, providing an assessment of the problem or opportunity and assessment of alternative planning solutions. It is not intended to address planning and design details that will be further addressed in Phases 3 and 4 of the complete process.

Many of the TMP policy recommendations are being incorporated into the new Official Plan (e.g. requirements for expansion, functional classification, design elements for category and functionality of road), and will be implemented through processing of land use applications under the Planning Act. The City may also choose to implement the recommended projects in a different order or phasing that has been suggested in the TMP Update to accommodate Council priorities, the need to coordinate with other infrastructure works (i.e. sewer work), planned developments in the area, or other considerations beyond the scope of this project to consider.

The TMP should also be monitored by maintaining the traffic demand forecasting model, including continued participation in the Transportation Tomorrow Survey. TMP monitoring may contain recommendations on updated traffic calming, parking management and truck route management. It is recommended that the TMP be monitored on an annual basis, taking into consideration new traffic counts, trends, private sector initiatives, performance targets, provincial initiatives and city growth.

APPENDIX A

Public Consultation

City Hall
100 Wellington Square
P.O. Box 818
Brantford ON N3T 5R7

October 19, 2017

[redacted]

RE: Notice of Study Commencement:
City of Brantford Master Servicing Plan Update and Transportation Master Plan Update

Dear [redacted]

The City of Brantford is undertaking three studies to guide the City's future development to the year 2041. This work will update the City's Master Servicing Plan, Transportation Master Plan and Official Plan, and account for the Boundary Expansion Lands that were transferred from Brant County to the City on January 1, 2017.

Water, Wastewater and Stormwater Master Servicing Plan Update
The City of Brantford has retained GM BluePlan Engineering Limited to complete a Master Servicing Plan Update. The objective of the study is to develop a comprehensive plan addressing all facets of the management, expansion and funding of the water, wastewater and stormwater system for the entire City. It will build on the Master Servicing Plan completed in 2014, to include the Boundary Expansion Lands, and to integrate with the latest Provincial Growth Plan and related City of Brantford Official Plan Review process.

Transportation Master Plan Update
Dillon Consulting Limited has been retained by the City of Brantford to complete an update of the 2014 Transportation Master Plan. The updated Plan will reconfirm the City's investments in transportation infrastructure in the coming years in consideration of the updated growth areas to 2041 and continued focus on sustainable transportation solutions. The goal of this Plan is to make sure that the transportation system can accommodate growth and meet the needs of pedestrians, cyclists, transit users, goods movement and automobiles.

The Water, Wastewater and Stormwater Master Servicing Plan Update and the Transportation Master Plan Update are being completed as separate Class EA studies in accordance with the requirements of the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for master planning (MEA, June 2000, as amended in 2007 and 2011). The studies are being undertaken based on Phases 1 and 2 of the Class EA process for Master Plans.

As part of the EA consultation program you are currently included in the Study Contact List. If you wish to be removed from the List or would like to suggest an alternative representative please contact the undersigned. Should we not hear from you, your details will remain on the Study Contact List and you will be notified of all future consultation opportunities during the undertaking of the Class EA studies.

Attached is the Notice of Study Commencement and Public Information Centre to be held on Thursday, November 16, 2017, 6:00 pm, at North Park Collegiate and Vocational School. As part of an integrated planning process, this meeting will introduce the Master Servicing Plan Update and Transportation Master Plan Update studies, and also address the Official Plan Review as outlined in the Notice.

Should you have any comments or questions, please contact the undersigned regarding the respective studies.

Yours truly,

Master Servicing Plan Update
www.brantford.ca/MasterServicingPlan

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Transportation Master Plan Update
www.brantford.ca/TransportationMasterPlan

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Consultant Project Manager
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Attach.

NOTICE OF STUDY COMMENCEMENT: TRANSPORTATION MASTER PLAN UPDATE

The City of Brantford has commenced work on an update of the 2014 Transportation Master Plan. The updated Plan will reconfirm the Town's investments in transportation infrastructure in the coming years in consideration of update growth projections for a longer time horizon and continued focus on sustainable transportation solutions. The goal of this Plan is to make sure that the transportation system can accommodate growth and meet the needs of automobiles, transit users, cyclists, and pedestrians in the short and long term.

The initial phases of the Transportation Master Plan will run concurrently with, and build on, the ongoing Official Plan Update and Municipal Comprehensive Review undertakings. The Transportation Master Plan Update is being conducted in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment which is an approved process under the Environmental Assessment Act.

WE NEED YOUR HELP!

What are the important transportation issues facing this community? How well are cyclists, pedestrians, and vehicles sharing the road? What role should transit have in the future of the community? What do you want the transportation network to be like in 20 years? What role does technology play in the travel behaviour of your community?

We want to hear your thoughts on these issues! More information will be available in early 2018, when we will be hosting a number of public open house events to gather your feedback. Check the City of Brantford website at www.brantford.ca in the coming months to find out how you can participate.

CONTACT US

For more information or to provide your comments, please contact:

Ting Ku, P. Eng.
Project Manager,
Manager of Transportation and Parking Services
City of Brantford, Engineering Services
Phone: 519-759-4150 x 5691
Email: tku@brantford.ca

Paul Bumstead, B.E.S.
Partner,
Consultant Project Manager
Dillon Consulting Limited
Phone: 416-229-4647 x2311
Email: pbumstead@dillon.ca

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

CITY OF BRANTFORD
OFFICIAL PLAN

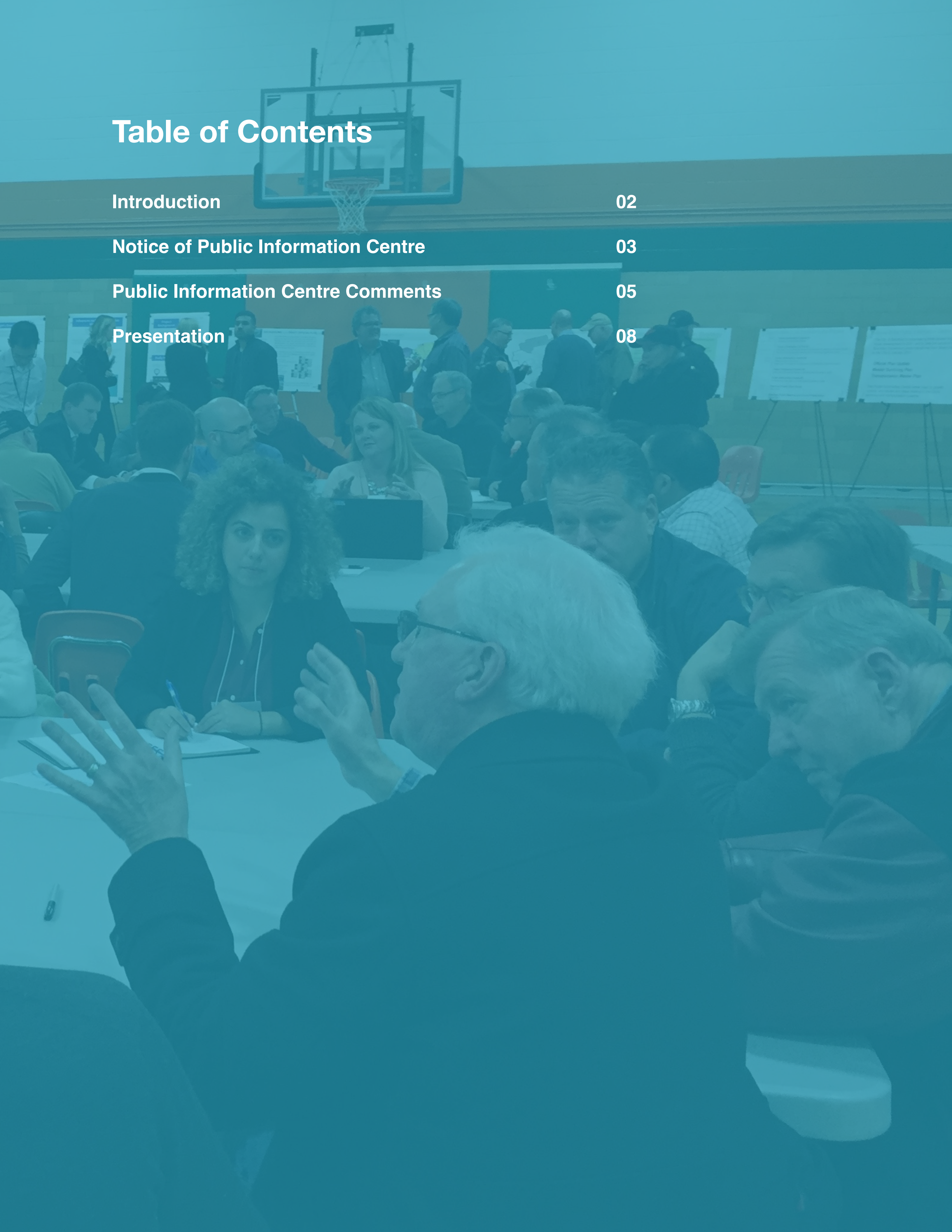
ENVISIONING OUR CITY: 2041

WHAT WE HEARD

Public Information Centre #2

November 16, 2017

The Planning Partnership



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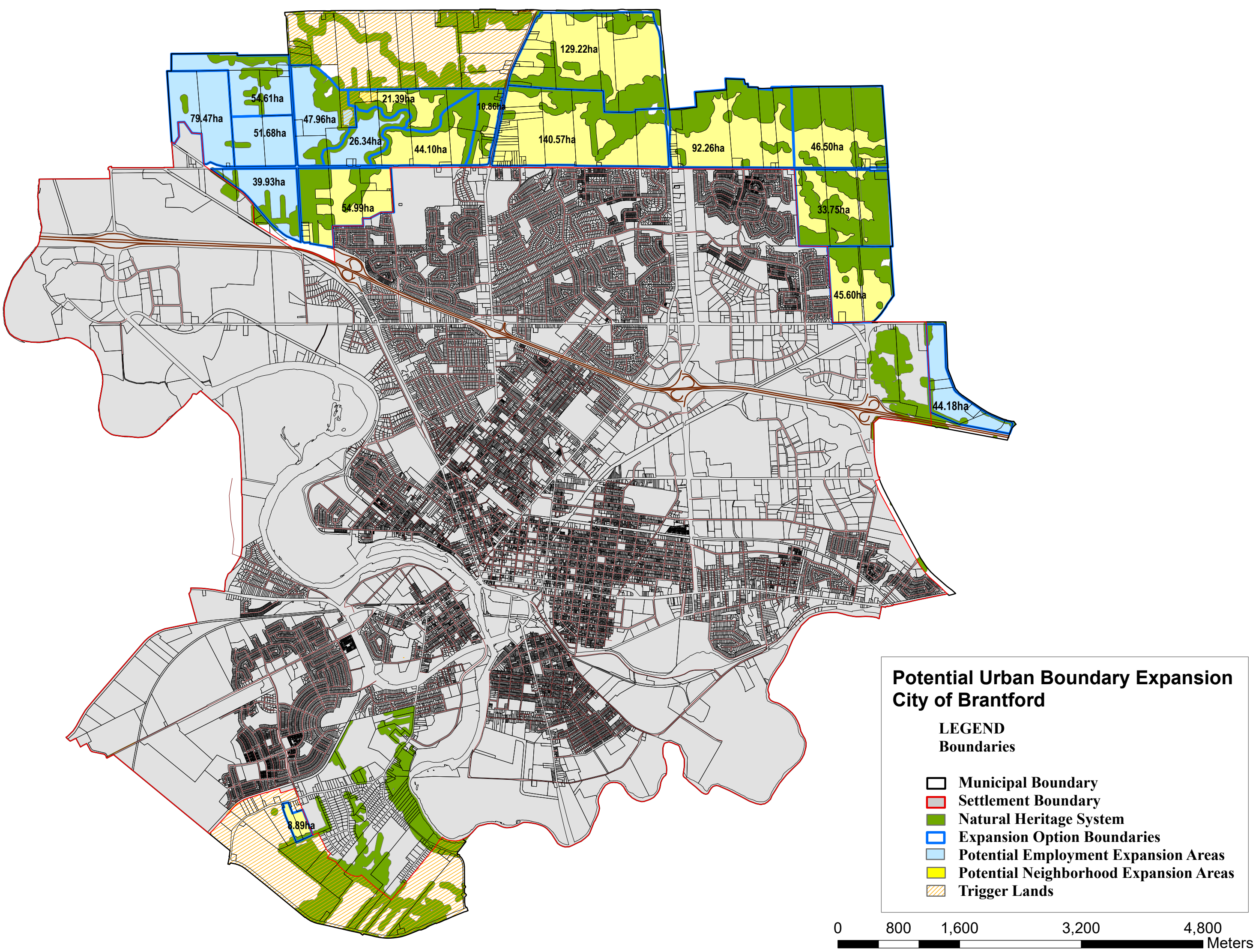
Study Area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Potential Urban Boundary Expansion
City of Brantford
LEGEND
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Municipal Boundary
Settlement Boundary
Natural Heritage System
Expansion Option Boundaries
Potential Employment Expansion Areas
Potential Neighborhood Expansion Areas
Trigger Lands
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4,800
Meters

Introduction

The City of Brantford is undertaking three studies to guide future development to 2041 and to take into account the Boundary Expansion Lands transferred from Brant County to the City in January 2017:

1. Official Plan Review
2. Master Servicing Plan Update
3. Transportation Master Plan Update

The second Public Information Centre took place on Thursday, November 16, 2017 from 6:00-8:30 p.m. at the North Park Collegiate & Vocational School. **Approximately 80 people attended.**

The purpose of Public Information Centre #2 was to provide information about the Official Plan Review, Master Servicing Plan, and Transportation Master Plan. Input and feedback was received from the public on the growth options under consideration through the Municipal Comprehensive Review, and issues and ideas relating to the City's servicing and transportation systems.

After an informative presentation, workshop participants were asked to join one of five Discussion Groups (and to move among them), each with a different focus:

1. Official Plan
2. Housing, Intensification & Growth Options
3. Employment
4. Transportation Master Plan Update
5. Master Servicing Plan Update

Input was recorded at each Discussion Group and is listed in this report.

Notice of Public Information Centre

CITY OF BRANTFORD

OFFICIAL PLAN

MASTER SERVICING PLAN

TRANSPORTATION MASTER PLAN

ENVISIONING OUR CITY: 2041

Notice of Study Commencement and Public Information Centre

Official Plan Review
Water, Wastewater and Stormwater Master Servicing Plan Update
Transportation Master Plan Update

Thursday November 16, 2017
6:00 – 8:30 pm (presentation at 6:30 pm)
North Park Collegiate & Vocational School, 280 North Park Street (at Fairview Drive)

The City of Brantford is undertaking three studies to guide the City's future development to the year 2041. This work will update the City's Official Plan, Master Servicing Plan, and Transportation Master Plan, and account for the Boundary Expansion Lands that were transferred from Brant County to the City on January 1 2017.

Official Plan Review

The Draft Official Plan prepared in 2016 will be revised to incorporate the Boundary Expansion Lands and to ensure the new Official Plan conforms to the Province of Ontario's 2017 Growth Plan for the Greater Golden Horseshoe. The process includes a Municipal Comprehensive Review to determine how much of the Boundary Expansion Lands are to be included within the City's urban settlement area. A Master Plan will establish land uses, environmental management and design guidance for those lands, as well as the infrastructure requirements through an integrated Environmental Assessment process.

Master Servicing Plan Update (MSP)

The objective of the MSP study is to develop a comprehensive plan that will incorporate all facets of the management, expansion and funding of the water, wastewater, and stormwater system for the entire city, including servicing of the Boundary Expansion Lands, to the year 2041 and beyond.

Transportation Master Plan Update (TMP)

The TMP study will provide a balanced strategy for the servicing and operation of important transportation infrastructure within the entire City, including the Boundary Expansion Lands, for the next 25 years. The goal of this Plan is to ensure that the transportation system can accommodate growth and meet the needs of pedestrians, cyclists, transit users, goods movement and automobiles.

The Transportation Master Plan and Water, Wastewater, and Stormwater Master Servicing Plan Updates are being completed as separate Class EA studies in accordance with the requirements of the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for master planning (MEA, June 2000, as amended in 2007 and 2011). The studies are being undertaken based on Phases 1 and 2 of the Class EA processes for Master Plans.

We Want to Hear from You!
What kind of City will Brantford be in 25 years? The decisions we make as a community today will shape our City's future tomorrow.

A series of meetings (Public Information Centres) will be held to provide information about the three studies, gather input and receive feedback from the public. The next meeting will be held on **Thursday November 16, 2017, 6:00 pm, at North Park Collegiate and Vocational School.**
As part of the integrated planning process, this meeting will address the Official Plan Review, Master Servicing Plan Update, and Transportation Master Plan Update studies.

We will be asking for your input to discussions about the City's growth options under consideration through the Municipal Comprehensive Review. We will introduce the Master Servicing Plan Update and Transportation Master Plan Update studies, and seek input from the public on issues and ideas relating to the city's existing water, wastewater, stormwater, and transportation systems.

What are the important transportation issues facing the community? How well are cyclists, pedestrians, and vehicles sharing the road? What role should transit have in the future of the community? What role does technology play in the travel behaviour of your community?
We want to hear your thoughts on these issues!

This notice is also available on the City website where future project updates will also be posted. If you wish to submit comments or would like to be added to the project mailing list, please contact:

<table>
<tr>
<td>Master Servicing Plan Update
www.brantford.ca/govt/projects/MasterServicingPlan

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<td>Transportation Master Plan Update
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<td>Official Plan Review
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CONVERSATION

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</tr>
</table>

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Public Information Centre Comments

November 16, 2017

1 Official Plan

Need the community to define and achieve the Vision

Intensification of "central areas", promoting transit, walking, cycling

North area: more like it is today, with cars

Pedestrian corridors with dedicated and green street design

Federal money is available for active transportation (does the City know about this?)

There is currently no active transportation specialist at the City

"Share the Road" cycling plan. Encourage cyclists to become stewards (Brant Cycle Club)

Different demographics have different behaviours (fewer millennials are buying cars)

Simplest technology, signal control system – progression is required to achieve this (Colborne Street and Dalhousie Street)

Electric vehicles are coming and people are okay about it, little reaction to autonomous vehicles

What will Brantford be in 2041?

2 Housing, Intensification & Growth Options

Apply development charge on land and allow developers to build to max

Plans should speak to greater mixed use development

High rise development concerns

- Over height of trees is too high – except when high rise has a podium/ pedestal and high rise is set back (e.g. development at Burlington Go Station)
- This provides better human scale/relation to pedestrians at the street level

How do you force the market? Is there a market for apartments?

How can we control the size of homes?

- Size of new large single dwelling development not good long term

50 persons and jobs/ha is hard to achieve now

Transportation is a problem – transit currently doesn't exist because it doesn't need to exist

Two different growth areas in the south-west and the north

Veterans Memorial Parkway needs to be completed

How to reconcile the targets with the low rise character of the existing neighbourhoods

- Can't look at Tutela Heights the same way as newer urban areas
- Maintain Tutela Heights village character

Lack of land supply

- Apartments being built on small infill sites are mostly assisted living/affordable housing
- Very few infill pockets left to develop – most of available stock is constrained and needs environmental remediation

If we look at the development, we see that the amount of infill housing remained constant but percentage of infill housing has gone up because of a lack of greenfield supply

Need to get the intensification number correct because we are going to be at it for a long time

- Can't apply annual percentage targets, need to look at past number of years
- Need to invest in infrastructure but don't overspend in the built-up area (BUA) when units may not come

Townhouses may be a challenge on intensification corridors – configuration of the lots

Provincial density targets are not realistic for Brantford

- Brantford residents don't envision a city like Mississauga in terms of density and housing form

Make sure zoning and incentives are available to make the corridors work

People move here for single detached homes

The numbers now are twisted – the intensification is occurring because there is no longer any greenfield land supply

The target has to be decided by input from the people

Numbers should consider smaller houses on smaller properties

If apartments were more affordable and more attractive they might be more successful

Low rise apartments may be appropriate

Need walkable communities

Can't do underground parking and make it work financially

People move to the city for singles and standard towns

3 Employment

How have the future Employment (ELE) lands been identified? There are two locations in the boundary lands

Expansion of car dealership onto industrial lands: Volkswagen dealership site on Lynden Park Road wants to expand to adjacent lands (employment area versus employment lands)

Concept of Agriculture Preserve lands to secure long-term lands for agriculture uses (also rural craft enterprises). Used to be a 'green belt' around the city

Will we be looking at "Prime Employment" Lands?

Would like to see higher density (80 p+j/ha) and more intensification (60%). Be denser faster

4 Transportation

Rural areas used to have public transit to downtown/urban area, but don't have it now. It is needed and wanted

Need the transportation system solutions to be cognizant of Regional needs

Brantford Southern Access Road (25 year plan) is still not implemented, plans need to be implemented

There is poor network performance now. Consider how to address future issues

Traffic on West Brant Avenue and Colborne Street. Consider access to hospital

Nobody is using the bike routes

Have Grand River crossing at Oak Street and St. Paul Avenue

Show the Brantford Southern Access Road extending east to the Glebe Lands, into the southern terminus of Wayne Gretzky Parkway

Extend Conklin Road

Consider the form of development, role and function of the street and ability to achieve intensification

Does walking and cycling fit with the idea of the 'suburban dream'? Which is why people move to Brantford

City structure is not conducive to street oriented development

Some benefit to the bulk of the growth occurring to the north

People drive because they commute to work in Toronto, Hamilton and Cambridge

Transportation Master Plan must look at trends and future impacts of distribution

5 Servicing

Will water and wastewater services be extended to the expansion lands? When will that be?

Will the City ensure that new infrastructure will have enough capacity to support later expansion of the growth boundary within the new City limits?

Servicing in the north must be challenging due to all the natural features and creeks

Will the City integrate existing septic serviced properties into the City's wastewater system?

When will the City integrate the existing Tuttela Heights water system into the City system? Are additional upgrades needed to support the integration or growth? How will that impact the existing County water system?

When can we start extending water and wastewater services to adjacent lands? What process is needed?

How will the new area effect the existing system? Will we need all new pipes, pumps, and reservoirs?

Timing for extending trunk water and wastewater services to the boundary lands? Which areas will get it first?

How will the City protect the existing creeks in the expansion lands?

Participants at Public Information Centre #2

Presentation

CITY OF BRANTFORD

ENVISIONING OUR CITY: 2041

PUBLIC INFORMATION CENTRE #2

November 16, 2017

Purpose of the Public Information Centre

The City of Brantford is undertaking three studies to guide future development to 2041 and to take into account the Boundary Expansion Lands transferred from Brant County to the City in January 2017:

Official Plan Update

Master Servicing Plan

Transportation Master Plan

This Public Information Centre seeks input to growth options, and issues and ideas relating to the City's servicing and transportation systems.

2

Consultants

SGL Planning & Design Inc.
Urban Boundary Expansion, Secondary Plan

The Planning Partnership
Official Plan, Consultation

Cushman & Wakefield
Real Estate

AgPlan
Agricultural Consultants

GM BluePlan Engineering Ltd.
Municipal Servicing

Plan B Natural Heritage
Landscape Ecology and Natural Heritage Planning

ASI
Heritage Culture, Archaeology, Indigenous Engagement

Ecosystem Recovery Inc.
Natural Resources Engineering, Stormwater Management

Dillon
Transportation

3

Opportunities to be Involved in the Process

2017

September 11 — **Public Information Centre #1**
Update on project and process

November 16 — **Public Information Centre #2**
Municipal Comprehensive Review Employment Conversions &Growth Options
Kick off of Environmental Assessment for Boundary Expansion Lands

2018

Spring — **Public Information Centre #3**
Preferred Urban Boundary
Vision and Principles for development in the Boundary Expansion Lands

Early Summer — **Public Information Centre #4**
Options for Community design in the Boundary Expansion Lands

Fall — **Public Information Centre #5**
Preferred land use plan for the Boundary Expansion Lands

2019

Winter — **Statutory Public Open House**
Official Plan

Spring — **Statutory Public Meeting and Council Presentation**
Official Plan

4

Indigenous Consultation Strategy

- The history of Brantford is tied to the history of the First Nations people in Brant County
- Brantford is in the traditional and treaty territory of Six Nations of the Grand River First Nation and the Mississaugas of the New Credit First Nation
- According to 2011 Census data, off-reserve Indigenous peoples constitute the fastest growing segment of Canadian society, with most living in urban centres.

Meetings are being scheduled with:

- Six Nations of the Grand River First Nation
- Haudenosaunee Confederacy Chiefs' Council
- Mississaugas of the New Credit First Nation

There is an interest in the project and its impact on their treaty rights.

5

Presentation

New Official Plan

Municipal Comprehensive Review

Boundary Expansion Lands

Master Servicing Plan

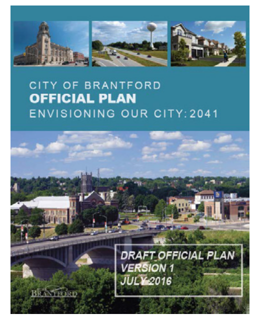
Transportation Master Plan

6

New Official Plan

The City of Brantford has been involved in an Official Plan Review process since 2013.

- Between 2013 and 2016, much work has been accomplished, including the hosting of visioning sessions, the preparation of technical background papers, and the creation of a new Draft Official Plan.



The process was put on hold in 2016:

- The Province announced changes to the Provincial Growth Plan which affect the City's Official Plan.
- The municipal boundary between Brant County and the City of Brantford was adjusted to secure lands in the City for future growth. These lands are known as the **Boundary Expansion Lands**.

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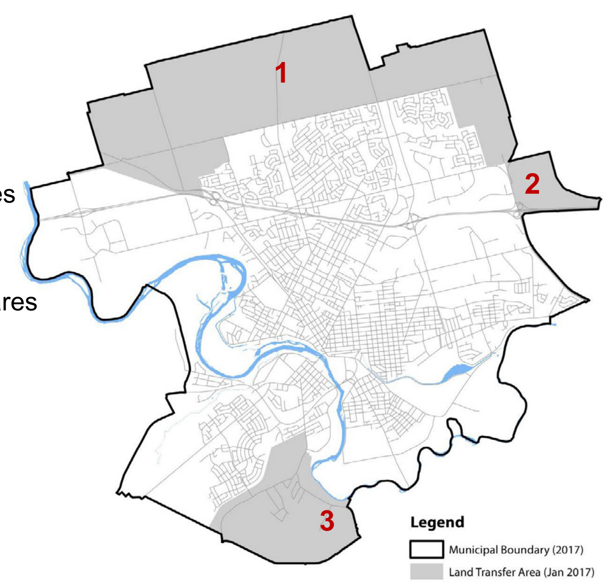
New Official Plan

Boundary Expansion Lands – 2,700 hectares

1. **North Area =** 1,966 hectares
2. **East Area =** 174 hectares
3. **Tutela Heights =** 580 hectares



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New Official Plan

Vision Statement – Draft Official Plan 2016

*Brantford has grown to become a **unique urban community** that has retained connections to its small town origins. It is defined by the **Grand River**, which is cherished for its natural features, historic legacy, and recreational amenities.*

*The people of Brantford are healthy and prosperous. They live in **complete communities** that are inclusive, accessible, compact, and well connected for all modes of travel. Residents have access to a **range of community services and recreational amenities** to support their well-being. The **local economy** thrives because it is diverse and adaptable to changing trends, just as it has been over the course of Brantford's history.*

*The entire community comes together in the **Downtown,** which is recognized as the heart of the community with a mix of activities, and the **highest quality public realm to present a distinct image** of the City. As Brantford grows, the success of existing communities is strengthened, and the features that make the City unique remain as valued assets for future generations to enjoy.*

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New Official Plan

Ten Guiding Principles– Draft Official Plan 2016

1. Protect the Grand River
2. Provide access to recreation and leisure amenities
3. Focus new development in the Downtown, intensification corridors and defined greenfield areas
4. Create a vibrant City Centre in Downtown Brantford
5. Achieve healthy communities
6. Protect the City's cultural heritage
7. Create a flexible approach to local economic development
8. Integrate transit planning with land use planning and create a local transit network
9. Enhance options to walk and cycle
10. Demonstrate environmental leadership

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New Official Plan

Key Sections of the Official Plan

- Growth Management
- Sense of Place
- Healthy Neighbourhoods & Communities
- Land Use Designations
- Housing, Economy & Creative Culture
- Public Health & Safety
- Integrated Transportation System
- Servicing
- Implementation
- Interpretation & Definitions

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Presentation

New Official Plan

Municipal Comprehensive Review

Boundary Expansion Lands

Master Servicing Plan

Transportation Master Plan

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New Official Plan

Municipal Comprehensive Review

Employment Conversion

- **Re-examine** existing employment sites in the City to determine whether any of these sites warrant conversion from employment to non-employment uses.
- The Growth Plan requires any conversion of employment land to be considered on **a City-wide comprehensive basis** rather than on a site-by-site basis as requests are made.
- The review of potential employment conversions through a Municipal Comprehensive Review ensures that the City is not compromising its ability to provide a **sufficient amount of land for employment to accommodate growth.**

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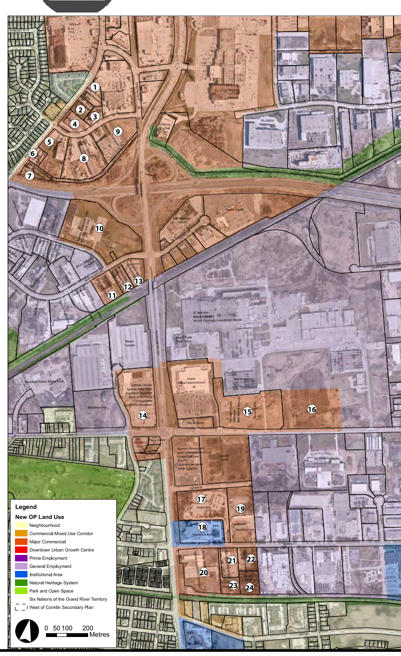
New Official Plan

Municipal Comprehensive Review



Employment Conversion Sites

Current analysis confirms the analysis done in 2015

Focus on Wayne Gretzky Parkway as a mixed use intensification corridor

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New Official Plan

Municipal Comprehensive Review

For Boundary Expansion Lands need to determine:

1. how much to include within the City's urban boundary through **Municipal Comprehensive Review**
2. the land uses through a **master plan**
3. required transportation and servicing infrastructure

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New Official Plan

Municipal Comprehensive Review

Targets for employment and population growth

	2016	2016 Expansion Lands	2041	Total 2016-2041 Growth
Population	100,300	1,080	163,000	61,620
Employment	46,913	-	79,000	32,087

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New Official Plan

Municipal Comprehensive Review

Projections and recommendations are preliminary until the Province releases a standard Growth Management/Land Needs Assessment Methodology later this year or early 2018.

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New Official Plan

Municipal Comprehensive Review

Employment

Three Categories of Employment:

1. Employment Lands Employment (ELE)
2. Population-Related Employment (PRE)
3. Major Office Employment (MOE)

- Proportion expected to remain constant
- But Major Office Employment to take slightly larger share at the expense of Population-Related Employment

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New Official Plan

Municipal Comprehensive Review

Employment

2041 Employment Growth Forecast		
Employment Category	**2016-2041**	**% Share**
ELE	15,926	53%
PRE	11,602	39%
MOE	2,252	8%
Total	**29,779**	**100%**

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New Official Plan

Municipal Comprehensive Review

Employment

Location of Employment Growth

Employment Lands Employment:
100% to Employment Lands

Population-Related Employment:
- 10% to Employment Lands
- 30% to existing Built-up Area
- 60% to the Location of Population Growth

Major Office Employment:
100% to Downtown & Intensification Corridors

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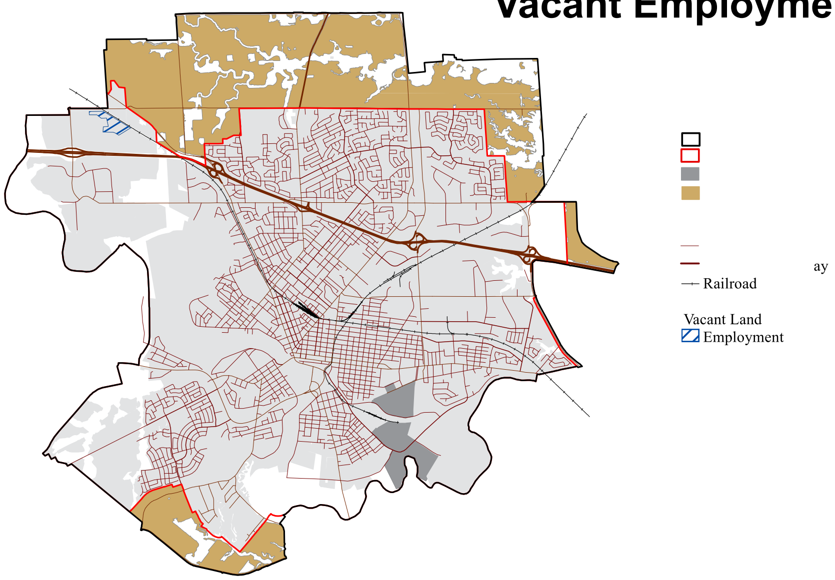
New Official Plan

Municipal Comprehensive Review

Vacant Employment Lands



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New Official Plan

Municipal Comprehensive Review

Employment

Current Vacant Employment Land	
Location	**Gross Hectares**
Northwest Industrial Area	288.3
Braneida Industrial Area (South of 403)	58.2
Braneida Industrial Area (North of 403)	23.9
Hopewell Lands	43.6
Total	**414**
Longterm Vacancy	**21**
Vacant Land to be Occupied by 2041	**393**

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New Official Plan

Municipal Comprehensive Review

Employment

Employment density determined by reviewing current job density and nature of future employment

23 jobs/gross hectare Employment lands Employment **= 690 ha**

64 jobs/gross hectare Population related Employment **= 18 ha**

Subtract vacant land of **393 ha**

Urban Boundary Expansion for Employment Lands
= approximately 300 ha

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New Official Plan

Municipal Comprehensive Review

Residential intensification potential – 4 steps

1. Assessed supply capacity.
2. Analyzed past and current market dynamics to compare to the available supply by housing type.
3. Prepared four different intensification scenarios based on the supply and market dynamics and recognizing the targets set out in the Growth Plan (2017).
4. Will recommend intensification target for Brantford.

- Based on the intensification target, will determine DGA growth and appropriate density target.

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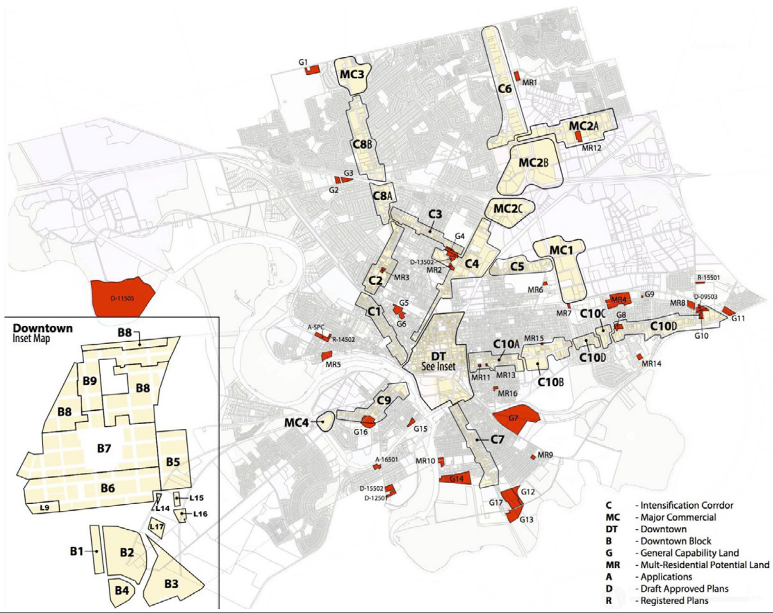
New Official Plan

Municipal Comprehensive Review

Intensification



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New Official Plan

Municipal Comprehensive Review

Intensification

Intensification Opportunities and Capacity Assessment

- Downtown Urban Growth Centre
- Major Commercial Centres
- Intensification Corridors
- Existing Neighbourhoods
- Second Units

Dwellings by Type and Density

	Singles + Semis		Townhouses		Apartments		Second Units		Total Units	
	Low	High	Low	High	Low	High	Low	High	Low	High
Downtown	-	-	-	-	614	1,972	-	-	614	1972
Major Commercial	-	-	-	-	1,723	6,451	-	-	1723	6,451
Intensification Corridor	-	-	165	383	1,455	3,415	-	-	1,620	3,798
Existing Neighbourhood	651	651	329	329	-	737	1,294	2,588	2,274	4,305
TOTAL	**651**	**651**	**494**	**712**	**3,793**	**12,561**	**1,294**	**2,601**	**6,232**	**16,525**

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New Official Plan

Municipal Comprehensive Review

Intensification

Residential Intensification Demand - Baseline

- Based on historical index but pushes index in recognition of changing boundary policy

	Singles & Semi	Townhouses	Apartments	Total Units
Units in BUA	651	712	5,482	**6,845**
Units in DGA	13,055	7,512	0	**20,567**
Total Units	**13,706**	**8,224**	**5,482**	**27,412**
% of Total Units	**50%**	**30%**	**20%**	**100%**

- Achieves only 25% intensification

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New Official Plan

Municipal Comprehensive Review

Intensification

Past Intensification Rates

- **2007 – 2016 = 44%**

Singles & Semi	Townhouses	Apartments	Total Units
24%	**26%**	**50%**	**100%**

- Growth Plan requires intensification to meet 40% by 2015 and thereafter
- Based on building permits to date in 2017
  - **2015 – 2017 Intensification = 47%**

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New Official Plan

Municipal Comprehensive Review

Intensification

Previous Provincial Policy

- 40% intensification

New Provincial Policy

- 50% intensification before 2031
  60% intensification 2031-2041

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New Official Plan

Municipal Comprehensive Review

Intensification

- Growth Plan allows Brantford to ask for alternative targets.
- Exploring alternative targets:

Alternative 1:

- 40% to 2021
- 45% 2021 – 2031
- 50% 2031 – 2041

Alternative 2:

- 45% to 2021
- 50% 2021 – 2031
- 55% 2031 – 2041

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New Official Plan

Municipal Comprehensive Review

Intensification

To determine appropriate target need to consider:

- How many apartments appropriate in Brantford?
  - Currently only 8,000 apartment units in the city
  - No higher order transit like inner GTA
- How many townhouses could be accommodated in Intensification Corridors?
- What is the appropriate housing mix for Brantford?

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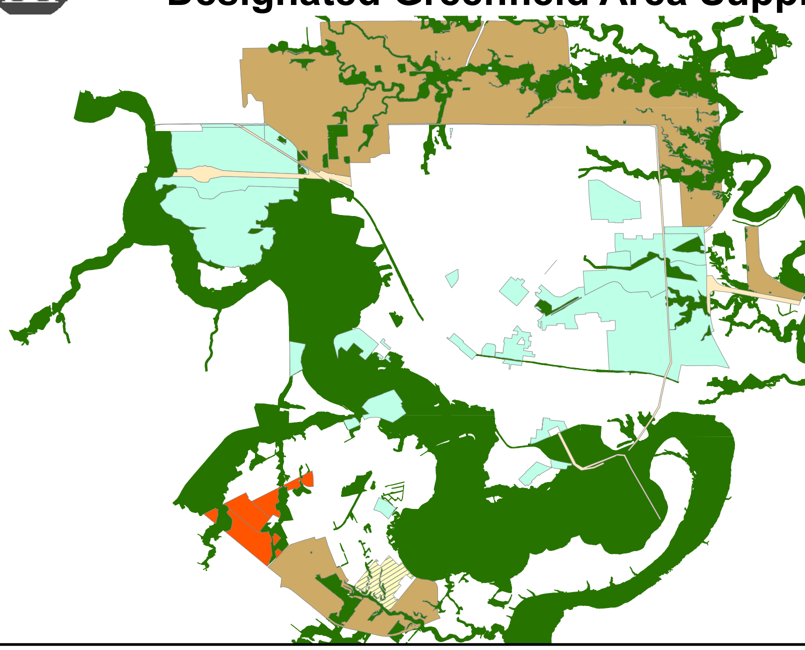
New Official Plan

Municipal Comprehensive Review

Designated Greenfield Area Supply

EGEND



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New Official Plan

Municipal Comprehensive Review

Designated Greenfield Area Supply

Existing supply includes:

- Vacant lots in registered plans
- Draft plans of subdivision
- Applications
- Vacant land without application

Singles & Semi	Townhouses	Apartments	Total Units
4,005	2,690	644	7,339
54%	37%	9%	100%

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New Official Plan

Municipal Comprehensive Review

Designated Greenfield Area Demand

Subtracting Supply from Residential Demand of 17,700 units

- Requires an Urban Boundary Expansion to accommodate:
  - **9,750 units**
  - **26,000 people**

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New Official Plan

Municipal Comprehensive Review

Designated Greenfield Area Supply

Convert to land needs:

apply urban density by housing type ie. units per hectare

+

commercial land needs approximately **20 ha**

+

Population Related Employment needs approximately **34 ha**

- Requires an urban boundary expansion of **approximately 500 ha** for residential, commercial and institutional uses
- Results in density of **55 persons and jobs/hectare**

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Presentation

New Official Plan

Municipal Comprehensive Review

Boundary Expansion Lands

Master Servicing Plan

Transportation Master Plan

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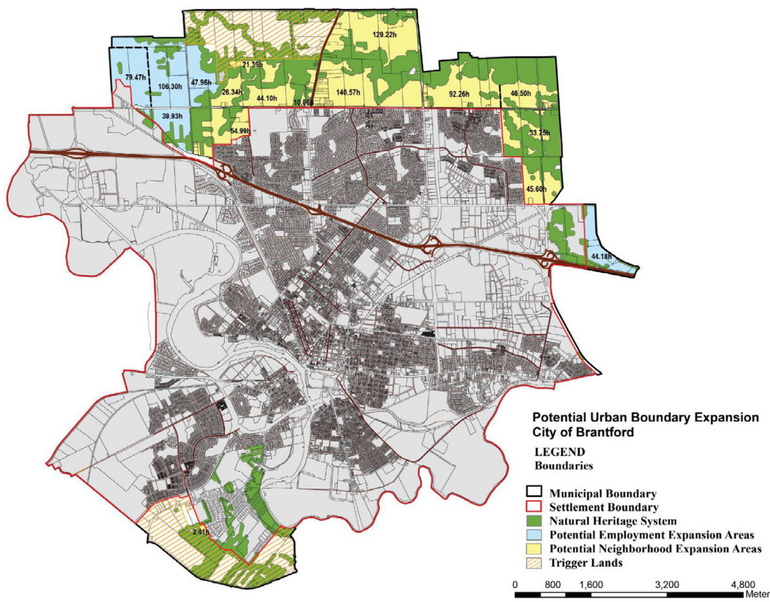
New Official Plan
Boundary Expansion Lands

Potential Expansion Options



New Official Plan
Boundary Expansion Lands

Boundary Expansion Land Area

Total = 2,700 ha

Natural Heritage System (NHS) = 980 ha

In 2017 Urban Boundary = 270 ha

Lands Available for Urban Expansion:

Trigger Lands = 360 ha

Developable Lands = 1,090 ha

Potential Urban Boundary Expansion:

Employment Land Needs = 300 ha

Neighbourhood Land Needs = 500 ha

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New Official Plan
Boundary Expansion Lands

Growth options will be evaluated through high-level reviews of:

- Agriculture;
- Transportation;
- Water and wastewater servicing;
- Water resource system;
- Key hydrologic area and natural heritage system; and
- Archaeological resources

Based on the results of the evaluation, preferred locations for growth will be selected.

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New Official Plan
Municipal Comprehensive Review
Boundary Expansion Lands

Next Steps

- Finalize Growth Management Report once Provincial methodology is released
- Multi-disciplinary high-level evaluation of growth options
- Selection of preferred growth option
- Prepare report summarizing Options and Evaluation
- Presentation to Council
- PIC #3 (preferred growth option and master plan visioning)
- Prepare revised Official Plan based on the new Growth Plan, bring expansion lands into the urban boundary
- Update servicing and transportation policies and mapping based on updated Transportation and Master Servicing studies

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Presentation

New Official Plan

Municipal Comprehensive Review

Expansion Lands

Master Servicing Plan

Transportation Master Plan

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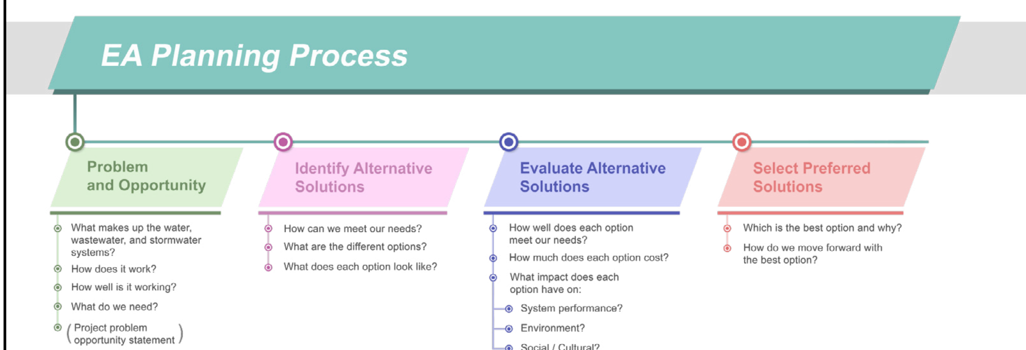
Master Servicing Plan

Municipal Class Environmental Assessment Process

The Water, Wastewater, and Stormwater Master Servicing Plan Update and Transportation Master Plan involve the completion of Phases 1 and 2 of the MEA Municipal Class EA process.



The study follows the Master Plan process as outlined in Section A.2.7 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Oct 2000, as amended in 2007, 2011 and 2015).

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Master Servicing Plan

Drivers of the Update

2014 Water, Wastewater, and Stormwater Master Plan (MSP) looks at planned growth to 2031 within the City's previ ous boundary.

The update is needed to integrate:

- City-wide servicing issues with review of the boundary adjustment lands
- Planning for growth to 2041 and new density and intensification targets

Will develop a long-term servicing strategy and capital forecast to:

- ensure the maintenance of services for existing residents and business
- support future growth of the community

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Master Servicing Plan

Vision Statement

Supporting a Strong and Growing Brantford

Establish a preferred servicing plan for the City's water, wastewater, and stormwater systems that:

- Meets **current needs**
- **Supports growth and expansion** of the City's urban boundary
- Maintains or improves **service levels**
- Considers **priority areas** of climate change, infrastructure optimization and renewal, and system resiliency

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Master Servicing Plan

Servicing of Boundary Expansion Lands

For settlement areas that receive their water from rivers or groundwater and discharge treated sewage to rivers, the completion of **Phases 1 and 2 of a Class Environmental Assessment** (EA) is required to determine:

- **capacity** requirements of the existing water and wastewater treatment facilities
- required **upgrades** to those facilities to accommodate forecast growth.

The Master Servicing Plan will review treatment needs for growth to 2041, including Boundary Expansion Lands, and will provide upgrade recommendations.

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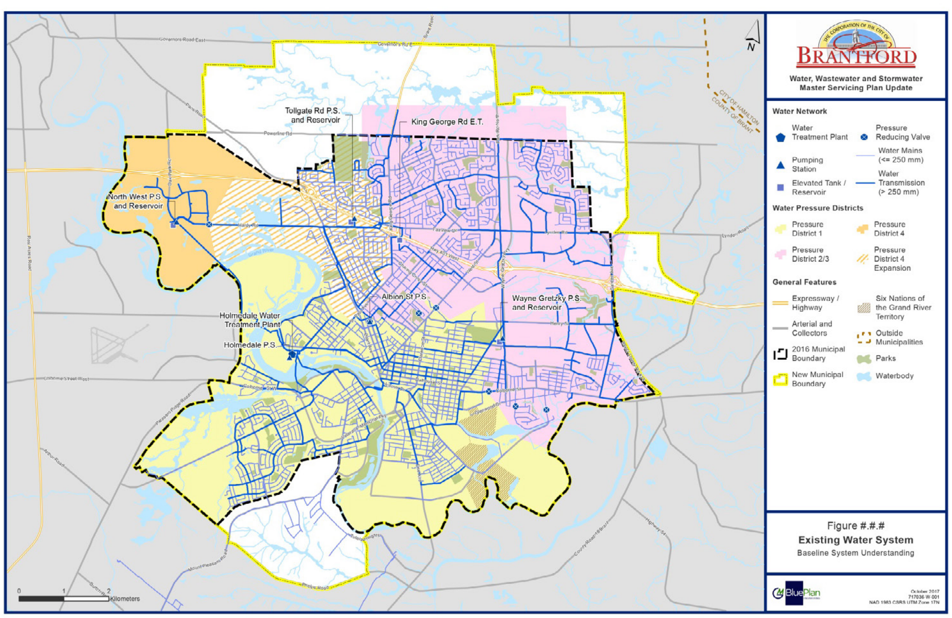
Master Servicing Plan

Existing Water System



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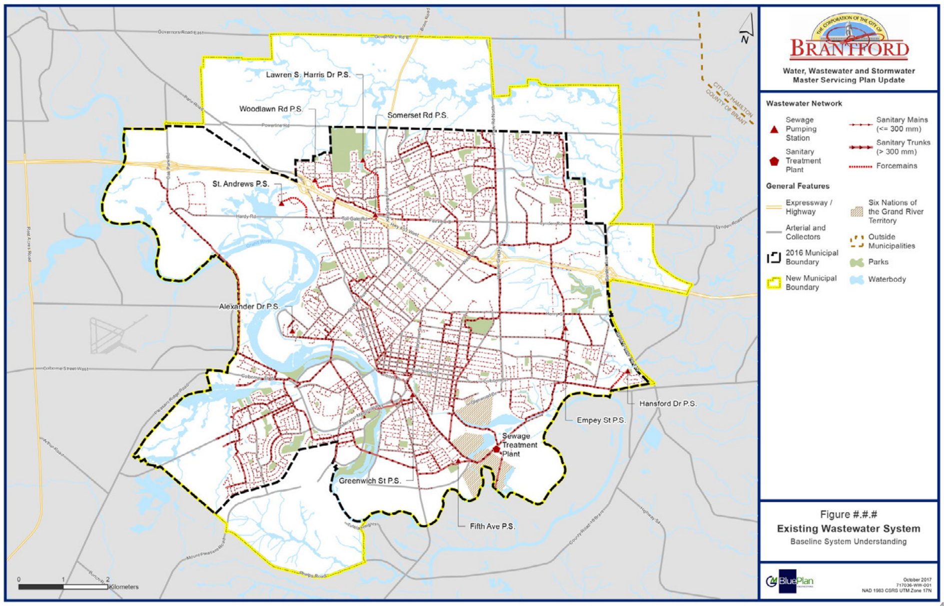
Master Servicing Plan

Existing Wastewater System



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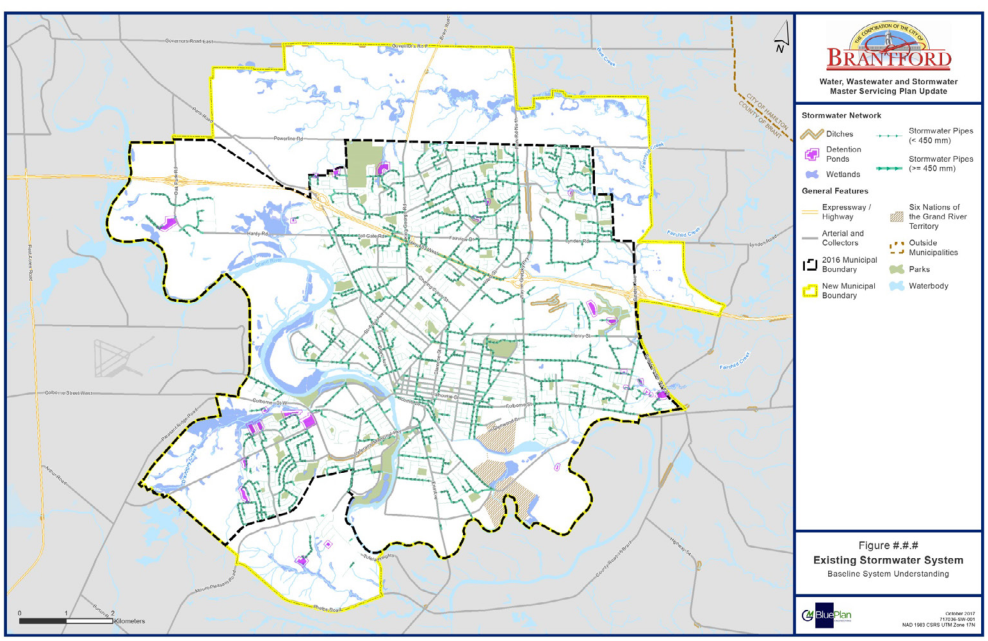
Master Servicing Plan

Existing Stormwater System



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Master Servicing Plan

Key Servicing Issues and Considerations

Water System

- Treatment Plant Capacity
- New Water Storage
- Water Needs in Northwest
- Extending Service to North and Tutela Heights
- Facility Optimization
- Local Pressure and Flow Capacity Upgrades

Wastewater System

- Treatment Plant Capacity
- Conveying Flows from North and Tutela Heights
- Existing Pump Station Capacity
- Wet Weather Flow
- River Siphons
- Wastewater Quality

Stormwater System

- Level of Service – Pipe vs. Overland Flow
- Stormwater Management Options
- Stream and Creek Erosion
- Grand River Interaction
- Retrofits within Existing Build Areas

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Presentation

New Official Plan

Municipal Comprehensive Review

Boundary Expansion Lands

Master Servicing Plan

Transportation Master Plan

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Transportation Master Plan

Urban Boundary Expansion Lands

As part of determining where the urban boundary should be expanded, the Transportation Master Plan will determine:

- high level transportation principles
- transportation network options
- transportation demand

As a component of the Master for Urban Boundary Expansion Lands, the Transportation Master Plan will include:

- detailed transportation network options
- an Active Transportation Plan, Transit Plan, Road Classifications Plan
- infrastructure staging and a phasing plan

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Transportation Master Plan

Urban Boundary Expansion Lands

Guiding Principles for Transportation Assessment

Healthy Communities – *support a healthy and active lifestyle*

- Promote cycling and walking and support transit services in residential neighbourhoods and employment areas
- Provide a transportation system that addresses user safety and security
- Support a compact urban form with land use intensification and transit

Sustainability – *balance economic, social and environmental goals*

- Protect the environment by minimizing impacts on air, water, land and natural resources
- Provide a transportation system that gives access to sustainable transportation options
- Identify a monitoring system to measure and manage the successful implementation of a sustainable transportation system

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Transportation Master Plan

Urban Boundary Expansion Lands
Guiding Principles for Transportation Assessment

Balanced Needs – *provide choice for the travel needs of residents*

- Provide high-quality services for transit, cycling/walking, road users and goods movement
- Offer a safe, convenient, accessible, affordable and efficient system to meet the daily needs of all residents
- Offer a choice of integrated travel modes, emphasizing cycling, walking, public transit and carpooling

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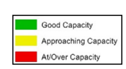
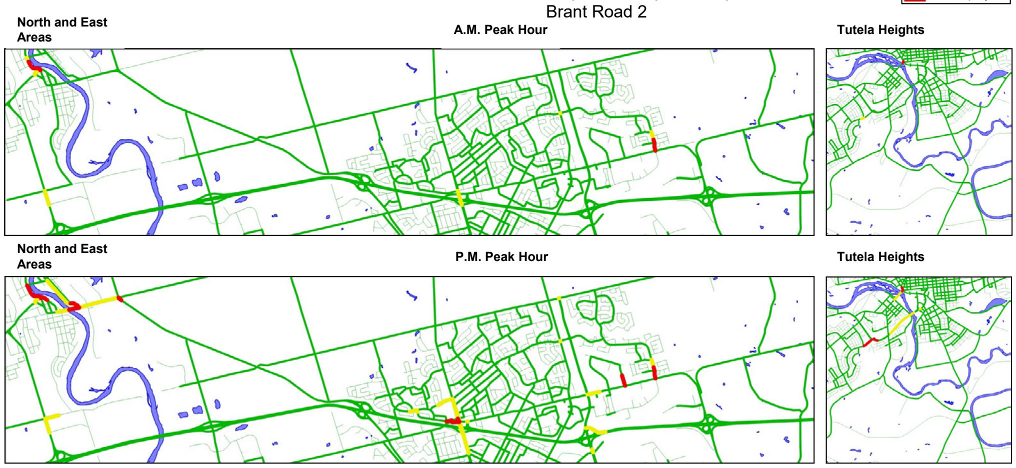
Transportation Master Plan

Existing Conditions

- Networks serving expansion areas providing acceptable levels of service
- Key corridors experiencing periods of congestion:

Downtown River Crossings
King George Rd / St. Paul Ave
Wayne Gretzky Parkway
Brant Road 2





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Transportation Master Plan

Urban Boundary Expansion Lands

Problems, Opportunities, and Constraints

The current road system and scheduled improvements will not be able to accommodate growth planned beyond 2041

Without action, commuters will experience:

- Increased congestion
- Longer travel times and delays
- Safety concerns
- Impact on quality of life
- Deterioration of air quality

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Transportation Master Plan

Urban Boundary Expansion Lands

Problems, Opportunities, and Constraints

Opportunities

- Support land use planning objectives
- Provide transportation choice (transit, active modes, travel demand management)
- Provide improved inter and intra regional connections
- Increase travel reliability for commuters and goods movement
- Optimize existing transportation infrastructure

Constraints

- Minimize impacts to the natural, social, economic and cultural environments
- Understand funding options and alternatives to deliver a sustainable transportation system
- Define a sustainable transportation system that aligns with Provincial Policy and Metrolinx RTP

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Transportation Master Plan

City-wide Transportation Master Plan

- In 2014, the City of Brantford completed a Transportation Master Plan Update identifying transportation improvements for a long-range planning horizon (20 years)
- The TMP recommended new or expanded infrastructure and service to address increasing congestion levels within the City
- An update is required to assess impacts of new policy positions related to land use and transit, to assess a longer planning horizon and to assess the boundary expansion lands

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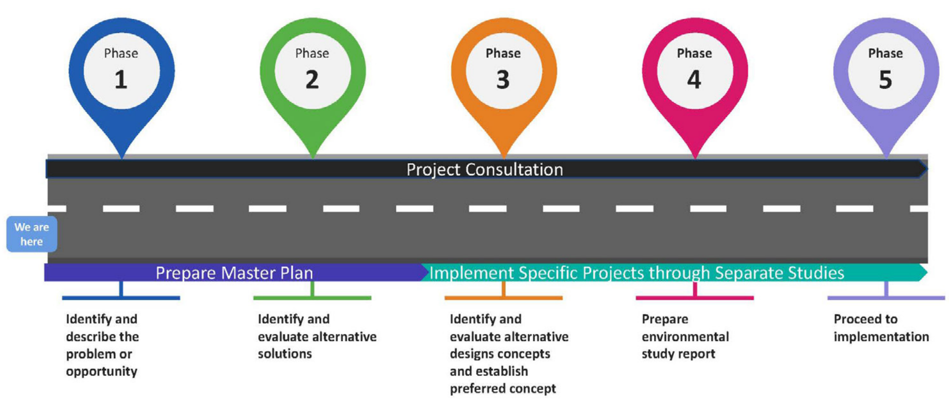
Transportation Master Plan

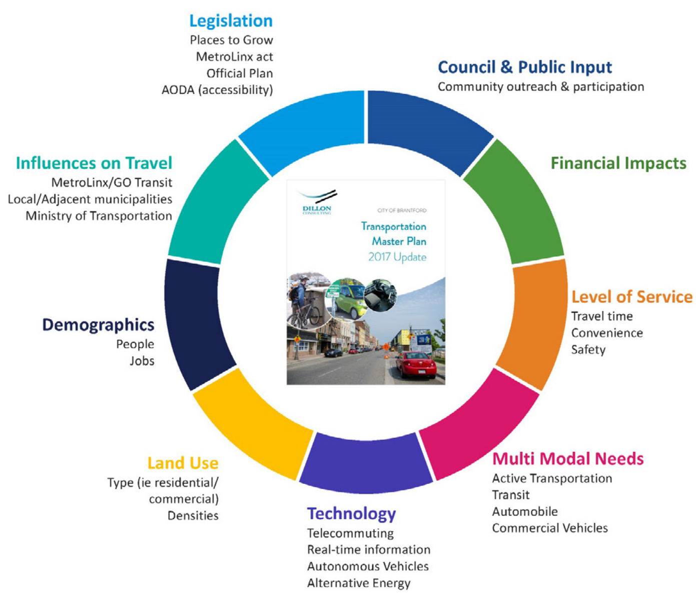
City-wide Transportation Master Plan

The Transportation Master Plan will follow the Municipal Class Environmental Assessment Process for Master Plans for Phases 1 and 2.



Transportation Master Plan

City-wide Transportation Master Plan
Influences



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Transportation Master Plan

City-wide Transportation Master Plan
Vision

- **Safe**
- **Convenient**
- **Environmentally Sound**
- **Multi-modal**
- **Efficient**
- **Accessible**
- **Affordable**
- **Energy efficient**

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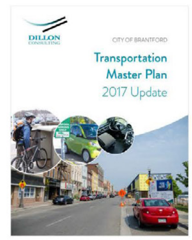
Transportation Master Plan

City-wide Transportation Master Plan
Next Steps



Tonight's discussion groups

please join a table of your interest and move to other tables of interest to you

1. Official Plan
2. Housing, intensification and growth options
3. Employment
4. Transportation Master Plan Update
5. Master Servicing Plan Update

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For more information

Master Servicing Plan

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Transportation Master Plan

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Official Plan Update

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JOIN THE CONVERSATION

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CITY OF BRANTFORD
OFFICIAL PLAN

ENVISIONING OUR CITY: 2041

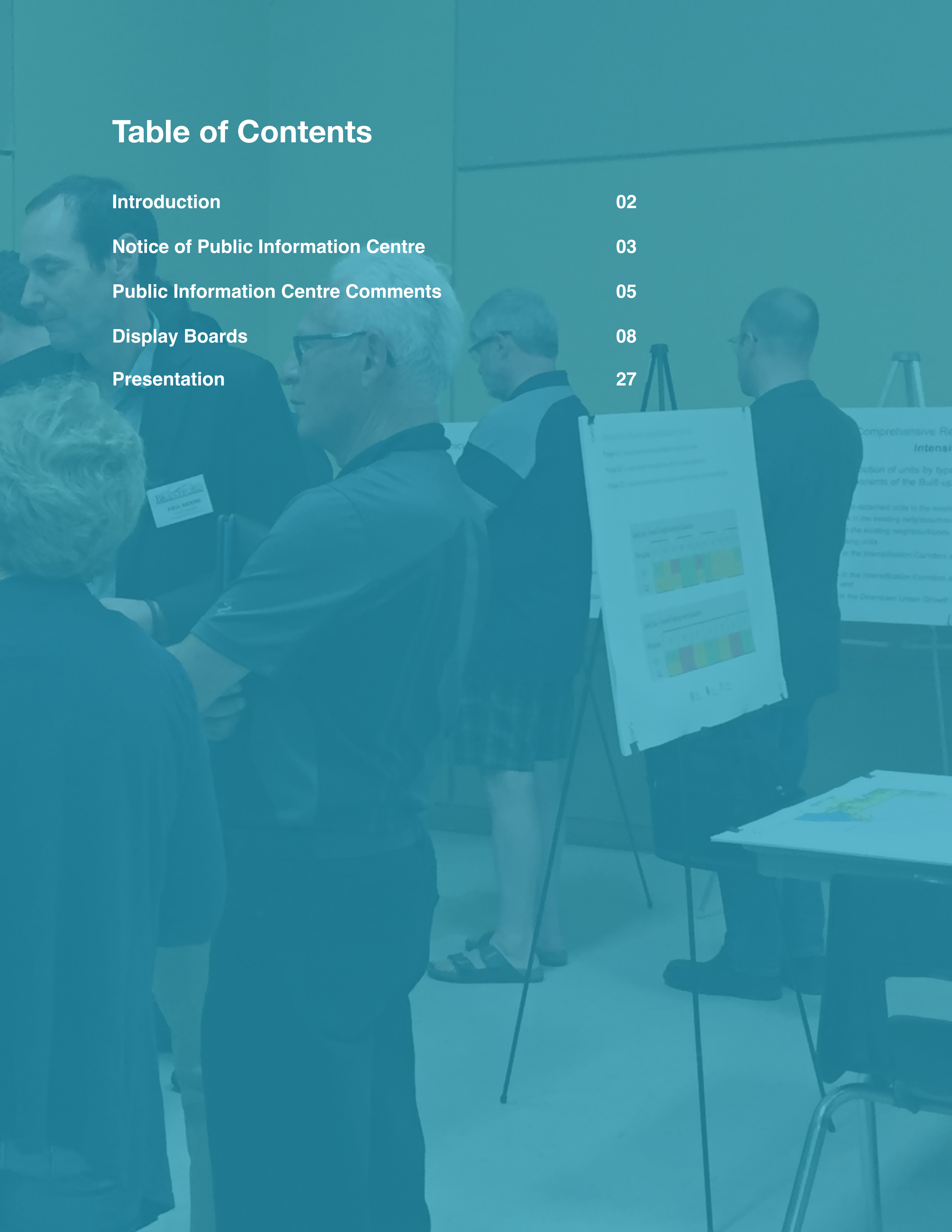
WHAT WE HEARD

Public Information Centre #3

May 17, 2018

The Planning Partnership


Expansion Lands
Boundary Expa
Evaluation Matrix Summary
eological
N11
11
E7
7



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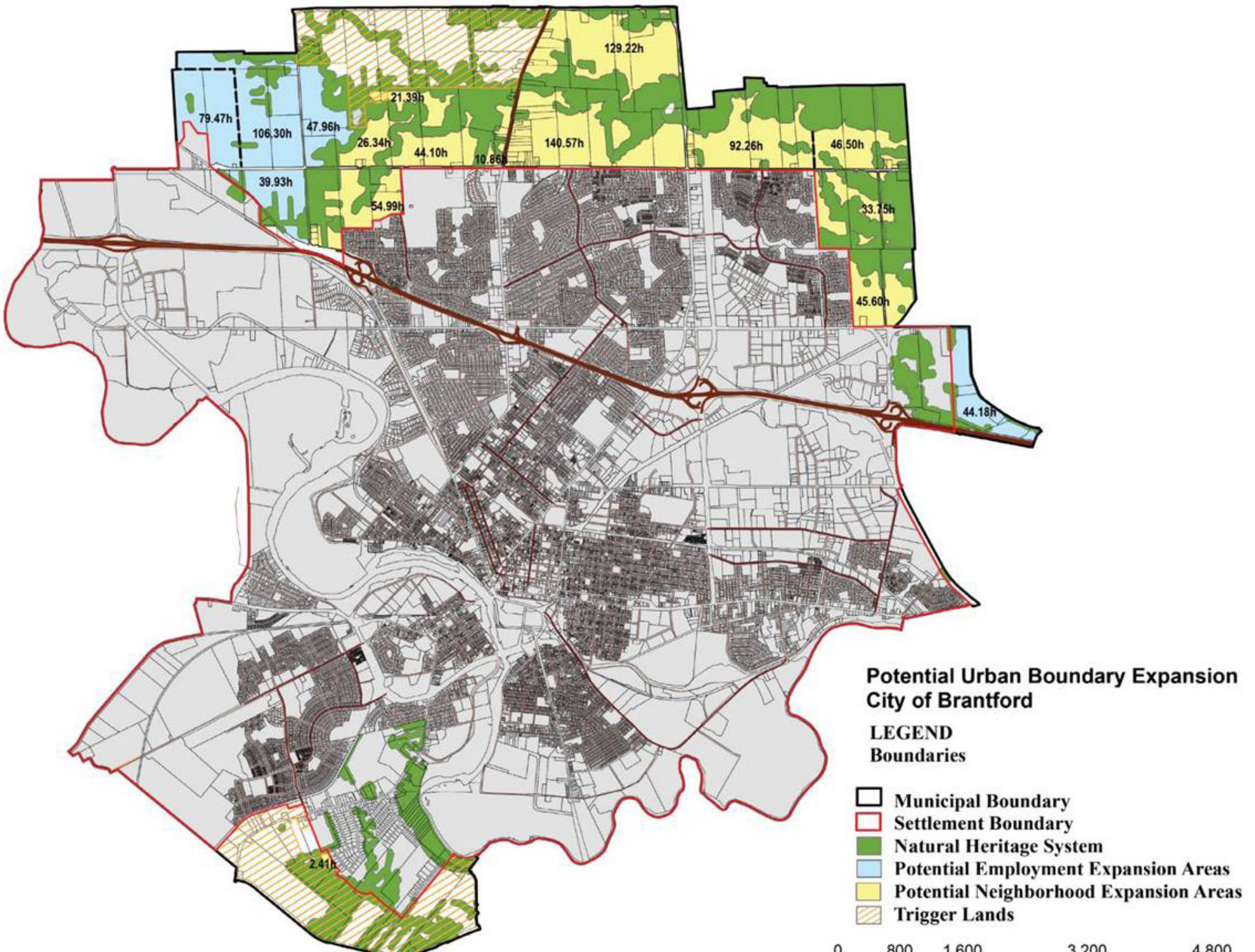
Study Area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Potential Urban Boundary Expansion
City of Brantford
LEGEND
Boundaries
Municipal Boundary
Settlement Boundary
Natural Heritage System
Potential Employment Expansion Areas
Potential Neighborhood Expansion Areas
Trigger Lands
0
800
1,600
3,200
4,800
Meters

Introduction

The City of Brantford is undertaking three studies to guide future development to 2041 and to take into account the Boundary Expansion Lands transferred from Brant County to the City in January 2017:

1. Official Plan Review
2. Master Servicing Plan Update
3. Transportation Master Plan Update

The third Public Information Centre took place on Thursday, May 17 from 6:00-8:30 p.m. at the Brantford & District Civic Centre.

Approximately 80 people attended.

The purpose of Public Information Centre #3 was to present:

- The results of the draft Land Needs Assessment which will determine the amount of land to be added to the City's urban settlement area;
- The potential location of the future urban lands in the Boundary Expansion Lands, also referred to as Boundary Adjustment Lands, based on the draft land needs;
- Proposed alternative targets for intensification in the City's Built-up Area;
- Proposed alternative density target in the City's Designated Greenfield Area; and,
- Updates on the Master Servicing Plan and the Transportation Master Plan.

After a presentation, attendees were invited to speak with a member of the consulting team in an open house format on the following topics:

1. Land Use Planning
2. Transportation Master Plan Update
3. Master Servicing Plan Update
4. Natural Features
5. Agriculture
6. Archaeology

Input was recorded and is summarized in this report.

Notice of Public Information Centre

CITY OF BRANTFORD

OFFICIAL PLAN
MASTER SERVICING PLAN
TRANSPORTATION MASTER PLAN

ENVISIONING OUR CITY: 2041

Notice of Public Information Centre

Official Plan Review
Water, Wastewater and Stormwater Master Servicing Plan Update
Transportation Master Plan Update

Thursday May 17th, 2018
6:00 – 8:30 pm (presentation at 6:30 pm)
Brantford & District Civic Centre - Auditorium, 69 Market Street South

The City of Brantford is undertaking three studies to guide the City's future development to the year 2041. This work will update the City's Official Plan, Master Servicing Plan, and Transportation Master Plan, and account for the Boundary Expansion Lands that were transferred from Brant County to the City on January 1, 2017.

We Want to Hear from You!

What kind of City will Brantford be in 25 years? The decisions we make as a community today will shape our City's future tomorrow. As part of the integrated planning process, a series of meetings (Public Information Centres) will be held to provide information about the three studies, gather input, and receive feedback from the public. The next meeting will be held on **Thursday May 17, 2018, 6:00 pm, at the Brantford & District Civic Centre – Auditorium.**

We will present the results of the Land Needs Assessment, which has determined the amount of land to be added to the City's urban settlement area, and the preferred location of those future urban lands in the Boundary Expansion Lands. We will also present proposed alternative targets for intensification in the City's Built-up Area and for density in the City's Designated Greenfield Area. Lastly, we will provide updates on the progress of Master Servicing Plan Update and Transportation Master Plan Update studies, and seek input from the public on issues and ideas relating to the City's existing Water, Wastewater, Stormwater, and Transportation Systems.

Background

Official Plan Review

The Draft Official Plan prepared in 2016 will be revised to incorporate the Boundary Expansion Lands and to ensure the new Official Plan conforms to the Province of Ontario's 2017 Growth Plan for the Greater Golden Horseshoe. The process includes a Municipal Comprehensive Review to determine where and how the City will grow and how much of the Boundary Expansion Lands are to be included within the City's urban settlement area. A Master Plan will establish land uses, environmental management and design guidance for those lands, as well as the infrastructure requirements through an integrated Environmental Assessment process.

Master Servicing Plan Update (MSP)

The objective of the MSP study is to develop a comprehensive plan that will incorporate all facets of the management, expansion and funding of the water, wastewater, and stormwater system for the entire City, including servicing of the Boundary Expansion Lands, to the year 2041 and beyond.

Transportation Master Plan Update (TMP)

The TMP study will provide a balanced strategy for the servicing and operation of important transportation infrastructure within the entire City, including the Boundary Expansion Lands, for the next 25 years. The goal of this Plan is to ensure that the transportation system can accommodate growth and meet the needs of pedestrians, cyclists, transit users, goods movement and automobiles.

The Transportation Master Plan and Water, Wastewater, and Stormwater Master Servicing Plan Updates are being completed as separate Class EA studies in accordance with the requirements of the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for master planning (MEA, June 2000, as amended in 2007 and 2011). The studies are being undertaken based on Phases 1 and 2 of the Class EA processes for Master Plans.

For More Information

This notice is also available on the City website where future project updates will also be posted. If you wish to submit comments, or would like to be added to the project mailing list, please contact:

Master Servicing Plan Update www.brantford.ca/govt/projects/MasterServicingPlan **Julien Bell, P.Eng.** Consultant Project Manager – GM BluePlan 330 Trillium Drive, Unit D Kitchener, ON N2E 3J2 Phone: 416-703-0667 Email: julien.bell@gmblueplan.ca **Tara Gudgeon, HBSc** Project Manager, Manager of Continuous Improvement 100 Wellington Square Brantford, ON N3T 2M2 Phone: 519-759-4150 x 5640 Email: tgudgeon@brantford.ca	**Transportation Master Plan Update** www.brantford.ca/govt/projects/TransportationMasterPlan **Paul Bumstead, B.E.S.** Consultant Project Manager – Dillon Consulting Limited 235 Yorkland Boulevard, Suite 800 Toronto ON M2J 4Y8 Phone: 416.229.4646 x 2311 Email: pbumstead@dillon.ca **Evie Przybyla, MCIP, RPP** Senior Transportation Project Manager 100 Wellington Square Brantford, ON N3T 2M2 Phone: 519-759-4150 x 5379 Email: yprzybyla@brantford.ca
Official Plan Review www.brantford.ca/officialplan **Alan Waterfield, MCIP, RPP** Senior Policy Planner 100 Wellington Square Brantford, ON N3T 2M2 Phone: 519-759-4150 x 5163 Email: awaterfield@brantford.ca	JOIN THE CONVERSATION facebook.com/CityofBrantford @CityofBrantford

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Public Information Centre Comments

May 17, 2018

The following is a summary of the comments made during the table group discussions as recorded by the team member representing the topic.

Questions raised will be addressed in finalizing the Part 2 MCR Report and other components of the Official Plan Review.

1 Land Use Planning

Why is Tutela Heights not on the options? Will it be serviced?

What do you mean when you say higher densities?

The Hopewell Development area should be included in the options

How can the current intensification targets be so high when historical trends are so low? Can we actually achieve the density targets?

Will we take the 'field of dreams' approach of 'build it and they will come' or develop when there is demand? It's best to have a mixture

2 Transportation Master Plan Update

Cycling

There are lots of north/south bike routes, need more east/west routes

Need an east/west bike route in the north end

Like North Park Street

The transportation hierarchy should be pedestrians, active transportation and then transit

Sharrows are not effective. Need to have separate bike lanes. Green corridors would be even better

Need to have secure bike parking (lockers, bike cage/room with secure entry)

What percentage of the capital budget will be designated to active modes of transportation?

Active transportation needs to be encouraged to help fight climate change

Transit

Need transit in Tutela Heights

Connect transit to Six Nations Reserve

Downtown Transit Station

Coordinate with VIA Rail

Connect inter-city transit and create a hub

Encourage transit connections (BIA shuttle between the VIA/GO hub and downtown)

Intensification

Like intensification projects

Implementation timelines need to be accelerated

Columbia Street in Waterloo is a good example for intensification

Other

Like that the Transportation Master Plan is building on land use

Make sure to coordinate with the Master Servicing Plan

There should be a connection between the Official Plan work and the Transportation Master Plan

Traffic signal at Mount Pleasant and Conklin Roads

Consider timing for improvements

Do not support the two way conversion. Need to meet with EMS regarding requirements. Keep one way, reduce to one lane and add bike lanes and wider sidewalks

Scatter the intersection

Country Road 18 should be seen as a ring road. Avoid a single point of failure (flooding).

Wayne Gretzky Parkway needs alignment north of Powerline Road

Support the extension of Conklin Road

3 Master Servicing Plan Update

Where is the sustainable development? Why not focus efforts on repairing infrastructure in the city?

Sustaining infrastructure and allowing growth is not possible simultaneously

What is the timing for the north-east wastewater capacity solutions?

Create wetlands as part of the storm water management plan and to recharge groundwater

A pipeline from the Great Lakes is unfavourable

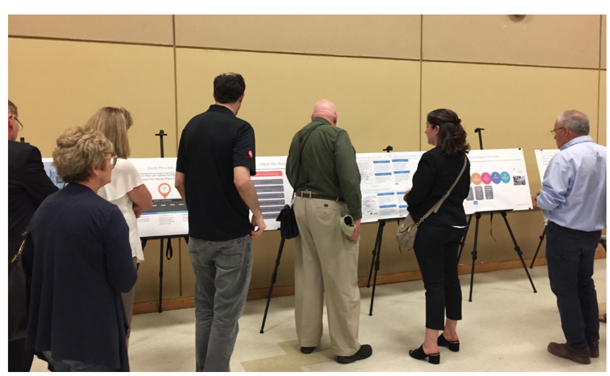
Storm water management to control runoff (climate change)

Have questions regarding infrastructure capacity and upgrades needed for the expansion areas

How is new infrastructure going to be paid for when it's already a struggle to update the infrastructure that is at capacity?

Employment land (E1-6) is located on top of an aquifer with high permeability. What is going to protect them? What if the government decides to designate them as a protected area? Where will the employment lands go? Where would residential lands go? Can we swap the residential for employment lands if it becomes a protected aquifer?

How and when will Tutela Heights be serviced (sanitary system)?



Participants at Public Information Centre #3

4 Natural Features

What is the forest cover now? What is the target and timeline?

Do you recognize the value of wetlands and the value of wetland creation and restoration?

What is the current wetland area and the target for the future?

What options are available for woodland/wetland creation?

How will climate change be addressed in policies?

How will the carbon footprint be addressed?

Consider the impact of urban growth on flooding. How will property and the environment be protected?

Do Source Water Protection Areas exist within the study area?

Natural Heritage Features are not accurately mapped in N9

What are the implications of creek blocks on developable land?

Natural heritage features have changed in N6 and N5

Access for farm equipment to cross Jones Creek

5 Agriculture

Detailed maps of the options are required

Leave out detailed minimum distance separation (MDS) until numbers are approved by the Province and the actual area slated for development is known

Barn information is already out of date (a barn and house are removed and other barn locations are imprecise)

Capability maps do not always match ‘on the ground’ experience

6 Archaeology

Is there an Archaeological Master Plan in place for the expansion lands, and if not, what is the City doing to protect the archaeological resources and artifacts in these lands?

Will the City require archaeological assessments on these lands prior to any development?

How did the consultant determine where the archaeological sites and areas of archaeological potential are in the mapping? Did this include any field studies?

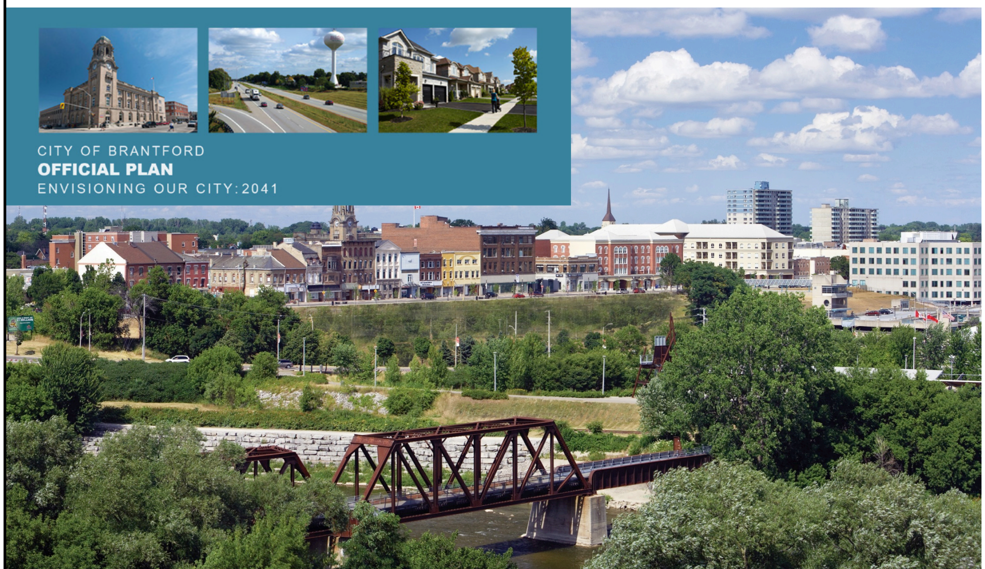
Why would a landowner share information on archaeology if this might make their property less desirable from an expansion point of view?

Can you clarify the methodology for determining or evaluating the specific evaluation score for each area?

Why did certain areas receive such high scores while adjacent parcels did not?

Participants at Public Information Centre #3

Display Boards



CITY OF BRANTFORD

ENVISIONING OUR CITY: 2041

PUBLIC INFORMATION CENTRE

Study Process

The City of Brantford is undertaking three studies to guide future development to 2041 and to take into account the Boundary Expansion Lands transferred from Brant County to the City in January 2017:

Official Plan Review

Master Servicing Plan Update

Transportation Master Plan Update

Purpose of this PIC

1) Outline key outputs from Municipal Comprehensive Review:
   - Alternative Intensification Target
   - Alternative Greenfield Density Target
   - Amount of Employment Land Needs
   - Amount of Community Land Needs
   - Where new growth should be located
2) Municipal Servicing Plan Update
3) Transportation Master Plan update
4) Next steps

3

Municipal Comprehensive Review

Land Needs

Targets for employment and population growth

	Brantford 2016	2016 Expansion Lands	2041	Total 2016-2041 Growth
Population	100,525	1,185	163,000	61,290
Employment	44,375	515	79,000	34,110

Municipal Comprehensive Review

Employment Land Needs

Employment density determined by reviewing current job density and nature of future employment

24 jobs/gross hectare Employment Lands Employment **= 732 ha**

64 jobs/gross hectare Population Related Employment **= 20 ha**

Subtract vacant land of **– *414 ha***

Urban Boundary Expansion for Employment Lands = 338 ha

Municipal Comprehensive Review

Intensification Strategy

- The Growth Plan has set an intensification target of 60%
- Requires 16,000 units over 25 years
- Substantial shift in the housing market required
  Recommend to continue shift towards medium and higher density housing
- Slowly increase intensification target:

40% to 2021
45% 2021 to 2031 = 12,500 units
50% 2031 to 2041

Municipal Comprehensive Review

Intensification Strategy

- A reasonable distribution of units by type to the various geographical components of the Built-up Area would entail:
  - 650 single and semi-detached units in the existing neighbourhoods;
  - 1,250 second units in the existing neighbourhoods;
  - 800 townhouses in the existing neighbourhoods;
  - 1,000 student housing units;
  - 3,500 townhouse in the Intensification Corridors and major mixed use commercial sites;
  - 1,500 apartments in the Intensification Corridors and major mixed use commercial sites; and
  - 3,800 apartments in the Downtown Urban Growth Centre.

Municipal Comprehensive Review

DGA Targets

Growth Plan set a DGA density target of 80%

Recommended graduated DGA density targets:

- 2016 to 2021 – 50 persons and jobs/hectare
  - Based on existing registered and draft application plan
- 2021 to 2031 – 57 persons and jobs/hectare
- After 2031 – 60 persons and jobs/hectare
  - Achieve mix of 55% Singles/Semis / 40% Townhouse / 5% Apartment

Municipal Comprehensive Review

Community Area Land Needs

- Based on the 3 graduated densities:

DGA LAND REQUIREMENTS BY PLANNING PERIOD

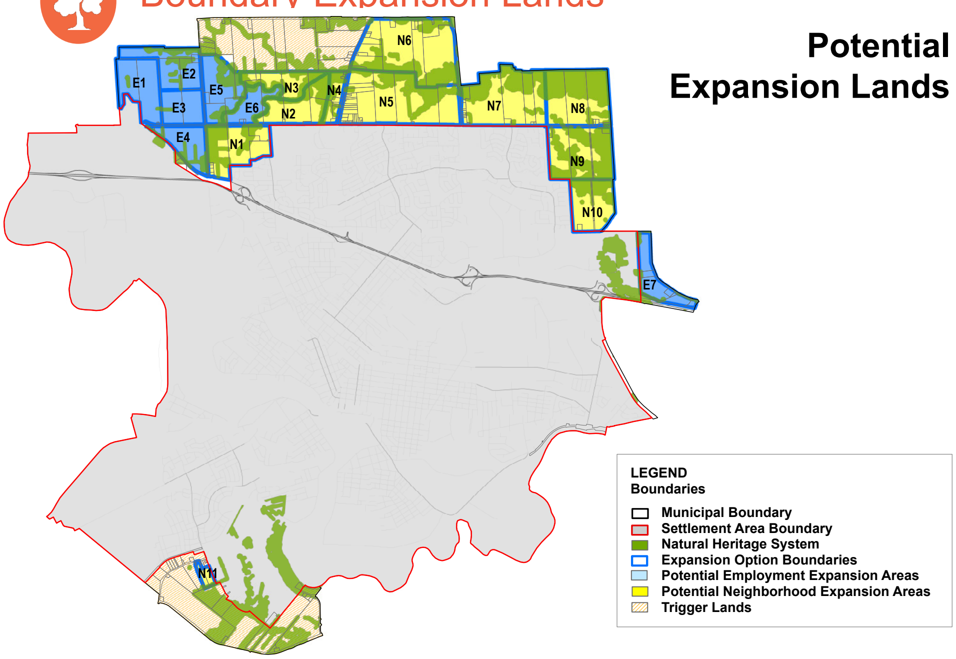
Time period	% DGA Growth	Units	Pop & Jobs	Density	Area (ha)
2016-2021	8%	1,125	4,100	50	82
2021-2031	55%	7,930	28,186	57	495
2031-2041	37%	5,315	18,962	60	316
Total	**100%**	**14,370**	**51,248**	**-**	**893**

Subtract existing vacant land supply in DGA *– 430 ha*

Land deficit **= 462 ha**

Boundary Expansion Lands

Potential Expansion Lands



Boundary Expansion Lands

Boundary Expansion Lands

Neighbourhood Evaluation Matrix Summary

Principles	Neighbourhood Options										
	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
Agriculture											
A1	10	3	6	2	9	6	11	6	3	3	1
A2	10	7	11	6	1	2	4	9	7	5	2
A3	1	1	1	1	1	1	11	1	1	1	1
Archaeology											
B1	1	2	7	8	5	2	2	6	8	10	11
Transportation											
C1	3	1	10	3	3	3	3	3	10	1	9
C2	1	1	10	10	1	7	1	1	9	1	7
C3	1	1	10	8	1	9	1	1	10	1	1
C4	1	1	10	1	1	9	1	1	10	1	1
Environment											
D1	1	4	7	4	4	4	7	7	7	1	1
D2	1	3	6	3	6	6	6	6	6	3	1
D3	6	3	6	6	3	6	6	6	6	3	1
D4	1	6	2	6	2	2	6	6	6	2	6
Water & Wastewater											
E1 W	1	1	9	1	1	7	1	6	11	9	7
E1 WW	2	4	10	4	4	9	1	4	10	2	4
E2 W	8	3	11	1	3	8	1	3	8	3	3
E2 WW	1	4	4	4	4	10	2	4	4	2	11
E3 W	3	3	11	7	3	9	1	7	9	3	1
E3 WW	6	7	11	9	7	10	1	1	1	1	1
E4 W	1	1	10	6	6	6	1	6	11	1	1
E4 WW	1	5	11	5	5	8	2	2	8	2	10
Stormwater											
F1	11	6	6	1	5	1	6	6	1	1	6
F2	3	3	10	7	11	7	3	3	7	2	1
F3	3	2	6	6	11	6	3	6	6	3	1
F4	1	1	10	1	1	10	1	1	7	7	7
F5	5	4	6	3	11	7	10	8	9	1	2
Land Use											
G1	1	6	11	1	1	10	1	8	8	6	1
G2	6	4	6	1	1	4	1	6	6	6	6

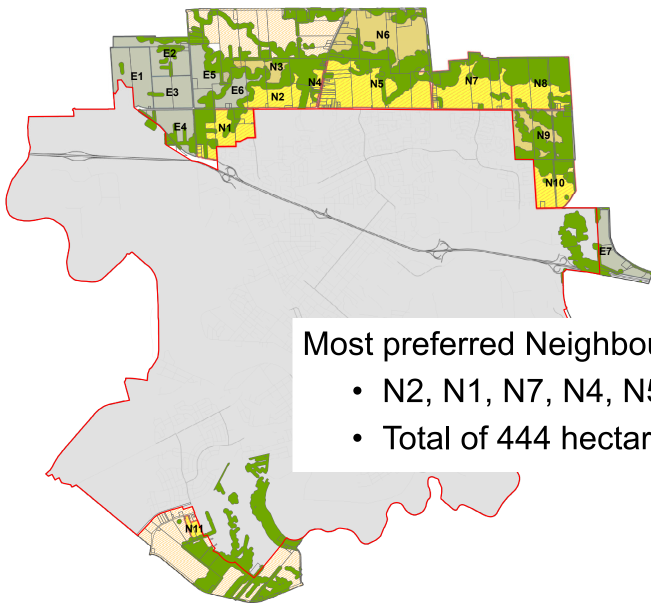
Boundary Expansion Lands

Boundary Expansion Lands

Employment Evaluation Matrix Summary

Principles	Employment Options						
	E1	E2	E3	E4	E5	E6	E7
Agriculture							
A1	6	4	6	3	2	1	4
A2	7	4	5	5	1	2	2
A3	1	1	1	1	1	1	1
Archaeology							
B1	2	4	3	1	5	6	7
Transportation							
C1	4	6	1	1	4	6	1
C2	7	1	1	1	1	1	6
C3	7	1	1	1	1	1	1
C4	6	7	1	1	1	1	1
Environment							
D1	1	7	1	3	5	5	3
D2	1	7	1	1	5	5	4
D3	1	7	1	5	5	1	1
D4	1	6	3	1	6	5	3
Water & Wastewater							
E1 W	2	5	5	5	2	2	1
E1 WW	1	1	1	1	6	6	1
E2 W	1	1	1	1	5	5	5
E2 WW	1	1	1	1	1	1	1
E3 W	2	4	3	4	7	4	1
E3 WW	2	4	4	2	4	4	1
E4 W	4	4	4	4	1	1	1
E4 WW	1	1	1	1	6	6	1
Stormwater							
F1	4	6	2	7	3	4	1
F2	1	6	1	1	7	1	5
F3	7	4	4	2	2	1	4
F4	7	5	6	4	2	1	3
F5	7	5	3	6	2	4	1
Land Use							
G1	1	6	4	1	4	6	1
G3	3	6	4	1	4	6	1

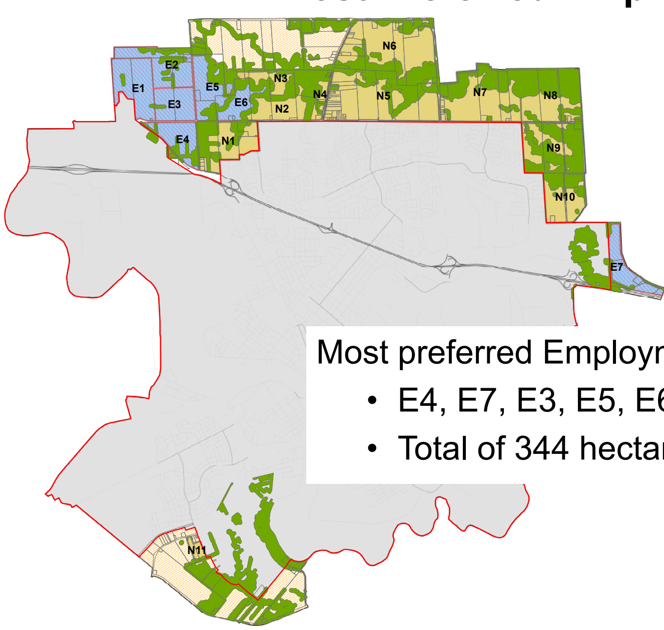
Boundary Expansion Lands
Most Preferred Neighbourhood Options



Most preferred Neighbourhood Options

- N2, N1, N7, N4, N5, N10, N11 and N8
- Total of 444 hectares

Boundary Expansion Lands
Most Preferred Employment Options



Most preferred Employment Options

- E4, E7, E3, E5, E6, E1, and E2
- Total of 344 hectares

Settlement Area Boundary Expansion Evaluation – Agriculture

Principle A1: To identify the better versus the poorer agricultural areas within each Option and to retain those better areas in agriculture as long as possible.

Principle A2: To identify the better versus the poorer agricultural areas adjacent or near to the Options and to minimize impacts of non-agricultural uses proposed in the expansion area on the better agricultural areas identified.

Principle A3: To avoid impacts on the agri-food network or if not possible, to minimize and mitigate impacts.

Agriculture - Neighbourhood Evaluation Summary

Principle	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
A1	10	3	6	2	9	6	11	6	3	3	1
A2	10	7	11	6	1	2	4	9	7	5	2
A3	1	1	1	1	1	1	11	1	1	1	1

Agriculture - Employment Evaluation Summary

Principle	E1	E2	E3	E4	E5	E6	E7
A1	6	4	6	3	2	1	4
A2	7	4	5	5	1	2	2
A3	1	1	1	1	1	1	1

Most Preferred Least Preferred Medium Preferred

Settlement Area Boundary Expansion Evaluation – Archaeology

Principle B1: To protect and avoid archaeological resources and areas of potential for the presence of archaeological resources, and where avoidance is not possible, to assess and mitigate the archaeological resources.

Archaeology - Overall Neighbourhood Evaluation

Principles	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
B1	1	2	7	8	5	2	2	6	8	10	11

Archaeology - Overall Employment Evaluation

Principles	E1	E2	E3	E4	E5	E6	E7
B1	2	4	3	1	5	6	7

Most Preferred Least Preferred Medium Preferred

Settlement Area Boundary Expansion Evaluation – Transportation

Principle C1: To ensure appropriate access and connectivity to new urban areas.

Principle C2: To ensure appropriate transportation capacity is maintained.

Principle C3: To balance transportation needs and provide choice for the travel needs of residents.

Principle C4: To ensure transportation network continuity between existing and new areas.

Transportation - Overall Neighbourhood Evaluation

Principle	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
C1	3	1	10	3	3	3	3	3	10	1	9
C2	1	1	10	10	1	7	1	1	9	1	7
C3	1	1	10	8	1	9	1	1	10	1	1
C4	1	1	10	1	1	9	1	1	10	1	1

Transportation - Overall Employment Evaluation

Principle	E1	E2	E3	E4	E5	E6	E7
C1	4	6	1	1	4	6	1
C2	7	1	1	1	1	1	6
C3	7	1	1	1	1	1	1
C4	6	7	1	1	1	1	1

Most Preferred · Least Preferred · Medium Preferred

Settlement Area Boundary Expansion Evaluation – Environment

Principle D1: To protect, enhance and restore the Natural Heritage System (NHS) for the long-term along with existing linkage connections between the NHS and NHS features within the County of Brant and the existing urban area.

Principle D2: To protect and enhance surface water quality/quantity including fish habitat.

Principle D3: To protect and enhance the groundwater regime.

Principle D4: To protect significant wildlife habitat features and functions including the habitat of species-at-risk.

Principle D5: To protect stream channel and valleyland integrity, particularly in erosion prone systems.

Environment - Overall Neighbourhood Evaluation

Principle	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
D1	1	4	7	4	4	4	7	7	7	1	1
D2	1	3	6	3	6	6	6	6	6	3	1
D3	6	3	6	6	3	6	6	6	6	3	1
D4	1	6	2	6	2	2	6	6	6	2	6

Environment - Overall Employment Evaluation

Principle	E1	E2	E3	E4	E5	E6	E7
D1	1	7	1	3	5	5	3
D2	1	7	1	1	5	5	4
D3	1	7	1	5	5	1	1
D4	1	6	3	1	6	5	3

Most Preferred · Least Preferred · Medium Preferred

Settlement Area Boundary Expansion Evaluation – Water System

Principle E1: To efficiently use existing and planned infrastructure and to minimize the complexity of extending the existing water and wastewater system to the expansion areas.

Principle E2: To align future infrastructure with the Master Servicing Plan.

Principle E3: To phase water and wastewater infrastructure logically and consecutively.

Principle E4: To ensure the infrastructure is financially viable over the full life-cycle and the preferred serving solution considers the best life-cycle Options when considering overall operational efficiency, operational resiliency to climate change and/or major component failure, operational and maintenance cost, existing renewal needs of the system, post period servicing, and greenhouse gas emissions.

Water Servicing - Overall Neighbourhood Evaluation

Principles	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
E1 W	1	1	9	1	1	7	1	6	11	9	7
E2 W	8	3	11	1	3	8	1	3	8	3	3
E3 W	3	3	11	7	3	9	1	7	9	3	1
E4 W	1	1	10	6	6	6	1	6	11	1	1

Water Servicing - Overall Employment Evaluation

Principles	E1	E2	E3	E4	E5	E6	E7
E1 W	2	5	5	5	2	2	1
E2 W	1	1	1	1	5	5	5
E3 W	2	4	3	4	7	4	1
E4 W	4	4	4	4	1	1	1

Most Preferred · Least Preferred · Medium Preferred

Settlement Area Boundary Expansion Evaluation – Wastewater System

Principle E1: To efficiently use existing and planned infrastructure and to minimize the complexity of extending the existing water and wastewater system to the expansion areas.

Principle E2: To align future infrastructure with the Master Servicing Plan.

Principle E3: To phase water and wastewater infrastructure logically and consecutively.

Principle E4: To ensure the infrastructure is financially viable over the full life-cycle and the preferred serving solution considers the best life-cycle Options when considering overall operational efficiency, operational resiliency to climate change and/or major component failure, operational and maintenance cost, existing renewal needs of the system, post period servicing, and greenhouse gas emissions.

Wastewater Servicing - Overall Neighbourhood Evaluation

Principles	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
E1 WW	2	4	10	4	4	9	1	4	10	2	4
E2 WW	1	4	4	4	4	10	2	4	4	2	11
E3 WW	6	7	11	9	7	10	1	1	1	1	1
E4 WW	1	5	11	5	5	8	2	2	8	2	10

Wastewater Servicing - Overall Employment Evaluation

Principles	E1	E2	E3	E4	E5	E6	E7
E1 WW	1	1	1	1	6	6	1
E2 WW	1	1	1	1	1	1	1
E3 WW	2	4	4	2	4	4	1
E4 WW	1	1	1	1	6	6	1

Most Preferred · Least Preferred · Medium Preferred

Settlement Area Boundary Expansion Evaluation – Stormwater

Principle F1: To avoid key hydrologic areas where possible when determining the most appropriate location for settlement area boundary expansion. Key hydrologic areas are defined as significant groundwater recharge areas (SGRAs), highly vulnerable aquifers (HVAs), and significant surface water contribution areas that are necessary for the ecological and hydrologic integrity of a watershed.

Principle F2: To minimize the impact on the water resource system by minimizing the relative complexity needed to complete local stormwater servicing.

Principle F3: To minimize the impact on the water resource system by evaluating the existing downstream system capacity.

Principle F4: To phase stormwater management infrastructure logically and consecutively.

Principle F5: To ensure that the stormwater infrastructure is financially viability by minimizing the total project life-cycle cost to service the expansion areas.

Stormwater - Overall Neighbourhood Evaluation

Principles	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
F1	11	6	6	1	5	1	6	6	1	1	6
F2	3	3	10	7	11	7	3	3	7	2	1
F3	3	2	6	6	11	6	3	6	6	3	1
F4	1	1	10	1	1	10	1	1	7	7	7
F5	5	4	6	3	11	7	10	8	9	1	2

Stormwater - Overall Employment Evaluation

Principles	E1	E2	E3	E4	E5	E6	E7
F1	4	6	2	7	3	4	1
F2	1	6	1	1	7	1	5
F3	7	4	4	2	2	1	4
F4	7	5	6	4	2	1	3
F5	7	5	3	6	2	4	1

Most Preferred   Least Preferred   Medium Preferred

Settlement Area Boundary Expansion Evaluation – Land Use

Principle G1: To ensure development occurs adjacent to existing built areas.

Principle G2: To create compact new urban areas with a mix of uses and densities.

Principle G3: To direct employment areas to locations in proximity to major goods movement facilities.

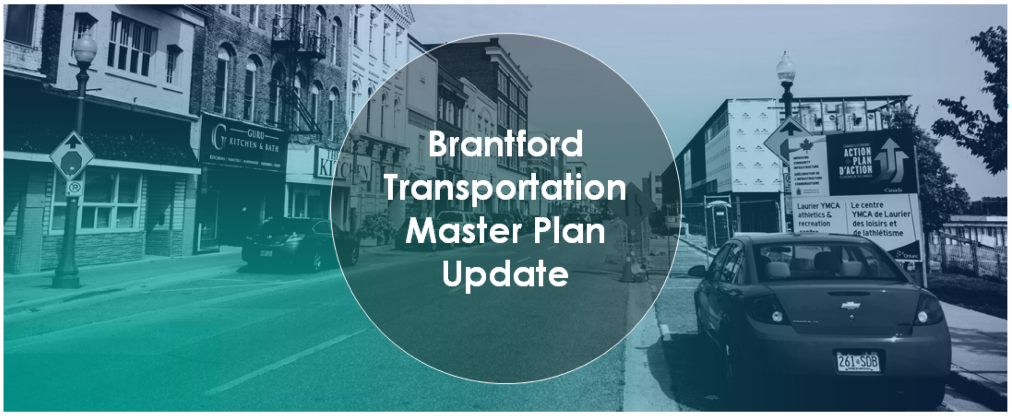
Land Use - Overall Neighbourhood Evaluation

Principles	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
G1	1	6	11	1	1	10	1	8	8	6	1
G2	6	4	6	1	1	4	1	6	6	6	6

Land Use - Overall Employment Evaluation

Principles	E1	E2	E3	E4	E5	E6	E7
G1	1	6	4	1	4	6	1
G3	3	6	4	1	4	6	1

Most Preferred   Least Preferred   Medium Preferred



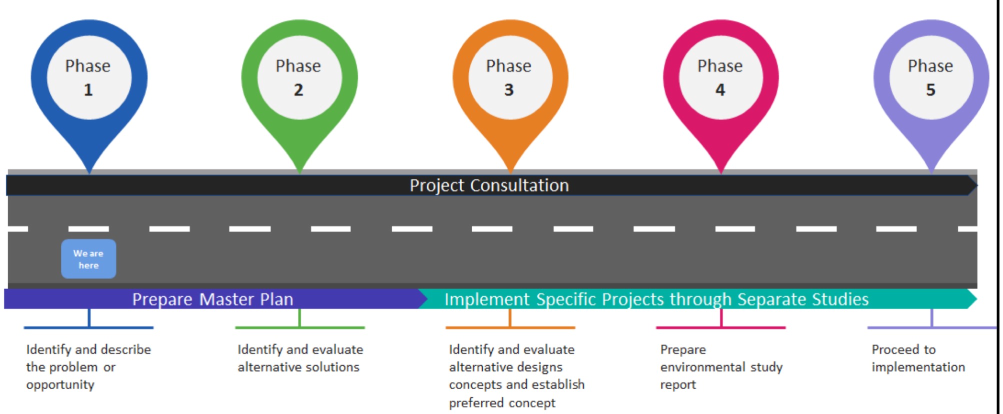
TMP Foundations and Strategies PIC #3

May 17, 2018

BRANTFORD

Study Process

The Transportation Master Plan will follow the Municipal Class Environmental Assessment Process for Master Plans for Phases 1 and 2.



BRANTFORD

Brantford Transportation Master Plan Update

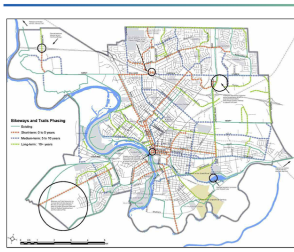
What We Heard at Study Initiation

Problems and Challenges	Opportunities and Priorities
Congestion	Public Transit
Connections / Accessibility (Transit)	Active Transportation
Safe Environment	Street Design
Pedestrian Linkages	Complete Community
Regional Integration	Implementable Strategy
Form of Development	Connect Infrastructure

BRANTFORD

Brantford Transportation Master Plan Update

Active Transportation Opportunities



Opportunity

Promote increased use of alternative modes by providing an integrated pedestrian and bicycle network that enhances user experience through increased safety and efficiency.

Objective

Realize increase in active modes for utilitarian purposes (work and school) which supports character of a complete community.

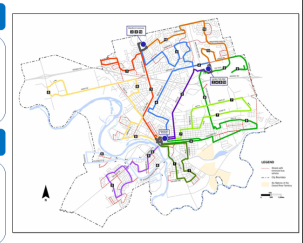
Regional and Local Transit Service Opportunities

Opportunity

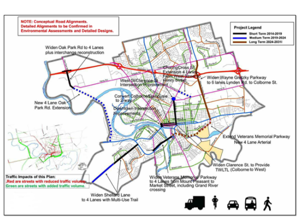
Provide mobility choice for wider range of users and destinations through more access, better connections, increased frequency, and enhanced experience.

Objective

Increase transit service coverage to compete with single auto mode, to increase number of non-auto trips and encourage transit oriented development.



Inter and Intra Regional Corridor Opportunities



Opportunity

Provide a balanced road system that is accessible for local, intra-municipal and inter-regional travel while enhancing user travel experience

Objective

Maximize efficiency of existing roadway infrastructure and identify new transportation corridors to address gaps in service

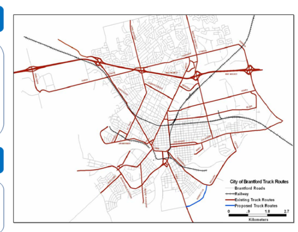
Commercial Vehicle Traffic

Opportunity

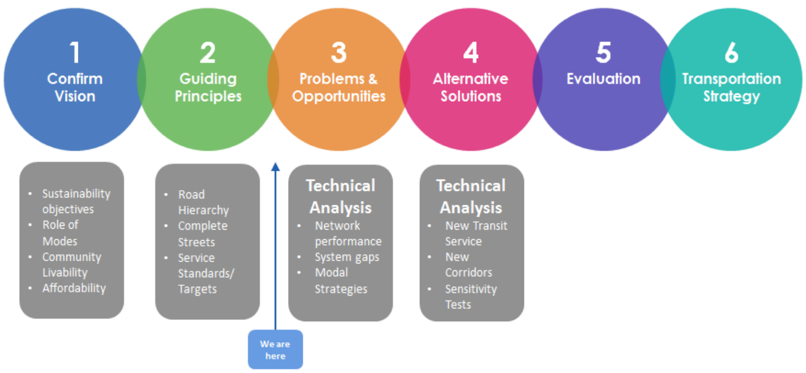
Identify network alternatives that encourage efficient movement of goods through and around the city that protect and enhance the community experience for other users.

Objective

Maintain access to industry and support economic prosperity of the City.



Next Steps in the Study



BRANTFORD

Brantford Transportation Master Plan Update

Municipal Class EA Process

The Water, Wastewater, and Stormwater Master Servicing Plan Update and Transportation Master Plan involve the completion of Phases 1 and 2 of the MEA Municipal Class EA process.

The study follows the Master Plan process as outlined in Section A.2.7 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Oct 2000, as amended in 2007, 2011 and 2015).

Master Servicing Plan Vision Statement

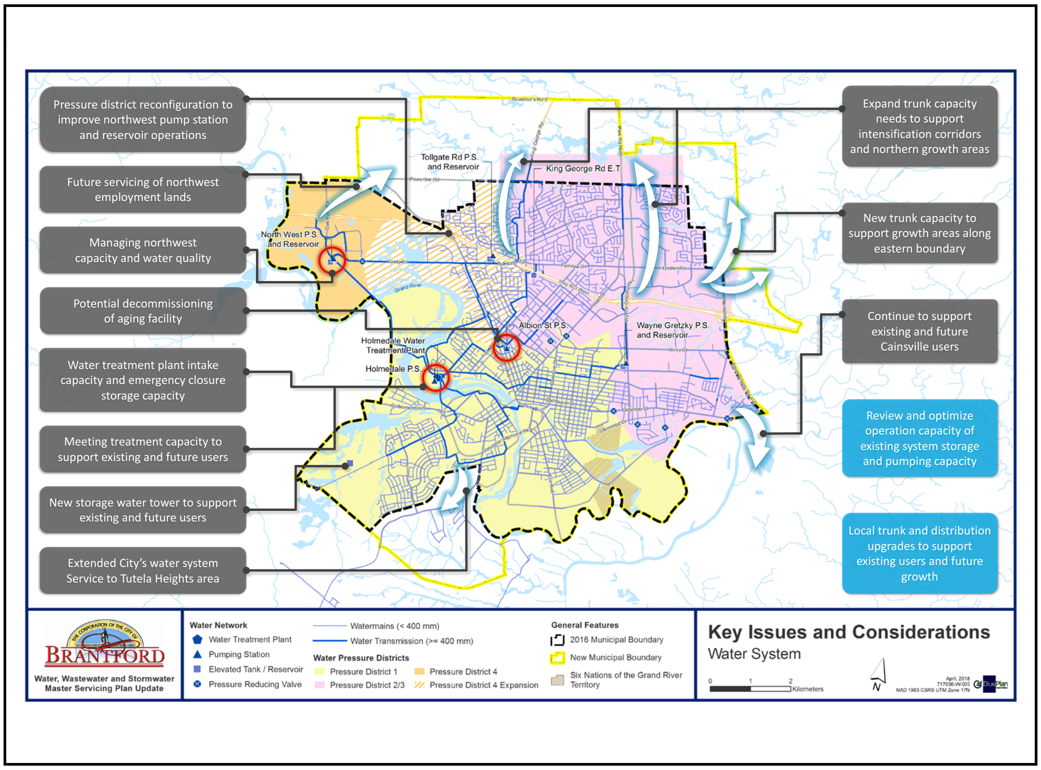
Supporting a Strong and Growing Brantford

To establish a preferred servicing plan for the City's water, wastewater, and stormwater systems that:

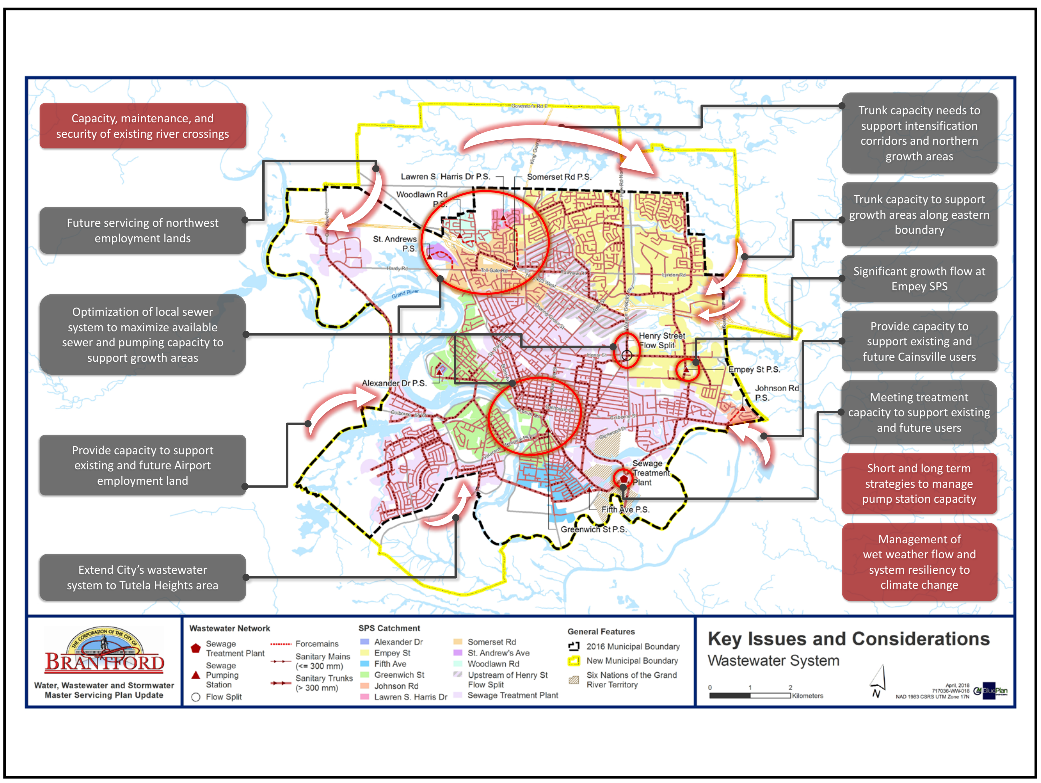
- Meets current needs
- Supports growth and expansion of the City's urban boundary
- Maintains or improves service levels
- Considers priority areas of climate change, infrastructure optimization and renewal, and system resiliency

What is Driving the Master Servicing Plan Update

- In 2014, the City completed the Water, wastewater, and stormwater master plan (MSP) that looked at planned growth to 2031, within the City's previous boundary.
- The MSP update is needed to integrate:
  - City-wide servicing issues with review of the boundary adjustment lands
  - Planning for growth to 2041 and new density and intensification targets
- The MSP will develop a long-term servicing strategy and capital forecast to ensure the maintenance of services for existing residents and business as well as support future growth of the community



Pressure district reconfiguration to improve northwest pump station and reservoir operations
Future servicing of northwest employment lands
Managing northwest capacity and water quality
Potential decommissioning of aging facility
Water treatment plant intake capacity and emergency closure storage capacity
Meeting treatment capacity to support existing and future users
New storage water tower to support existing and future users
Extended City's water system Service to Tutela Heights area
Expand trunk capacity needs to support intensification corridors and northern growth areas
New trunk capacity to support growth areas along eastern boundary
Continue to support existing and future Cainsville users
Review and optimize operation capacity of existing system storage and pumping capacity
Local trunk and distribution upgrades to support existing users and future growth
Tollgate Rd P.S. and Reservoir
King George Rd E.T.
North West P.S. and Reservoir
Albion St P.S.
Wayne Gretzky P.S. and Reservoir
Holmedale Water Treatment Plant
Holmedale P.S.
BRANTFORD
Water, Wastewater and Stormwater Master Servicing Plan Update
Water Network
Water Treatment Plant
Pumping Station
Elevated Tank / Reservoir
Pressure Reducing Valve
Watermains (< 400 mm)
Water Transmission (>= 400 mm)
Water Pressure Districts
Pressure District 1
Pressure District 2/3
Pressure District 4
Pressure District 4 Expansion
General Features
2016 Municipal Boundary
New Municipal Boundary
Six Nations of the Grand River Territory
Key Issues and Considerations
Water System
0 1 2 Kilometers
N
April, 2018
717036-W-005
NAD 1983 CSRS UTM Zone 17N



Capacity, maintenance, and security of existing river crossings
Future servicing of northwest employment lands
Optimization of local sewer system to maximize available sewer and pumping capacity to support growth areas
Provide capacity to support existing and future Airport employment land
Extend City's wastewater system to Tutela Heights area
Trunk capacity needs to support intensification corridors and northern growth areas
Trunk capacity to support growth areas along eastern boundary
Significant growth flow at Empey SPS
Provide capacity to support existing and future Cainsville users
Meeting treatment capacity to support existing and future users
Short and long term strategies to manage pump station capacity
Management of wet weather flow and system resiliency to climate change
Lawren S. Harris Dr P.S.
Somerset Rd P.S.
Woodlawn Rd P.S.
St. Andrews P.S.
Henry Street Flow Split
Empey St P.S.
Johnson Rd P.S.
Alexander Dr P.S.
Sewage Treatment Plant
Fifth Ave P.S.
Greenwich St P.S.
BRANTFORD
Water, Wastewater and Stormwater Master Servicing Plan Update
Wastewater Network
Sewage Treatment Plant
Sewage Pumping Station
Flow Split
Forcemains
Sanitary Mains (<= 300 mm)
Sanitary Trunks (> 300 mm)
SPS Catchment
Alexander Dr
Empey St
Fifth Ave
Greenwich St
Johnson Rd
Lawren S. Harris Dr
Somerset Rd
St. Andrew's Ave
Woodlawn Rd
Upstream of Henry St Flow Split
Sewage Treatment Plant
General Features
2016 Municipal Boundary
New Municipal Boundary
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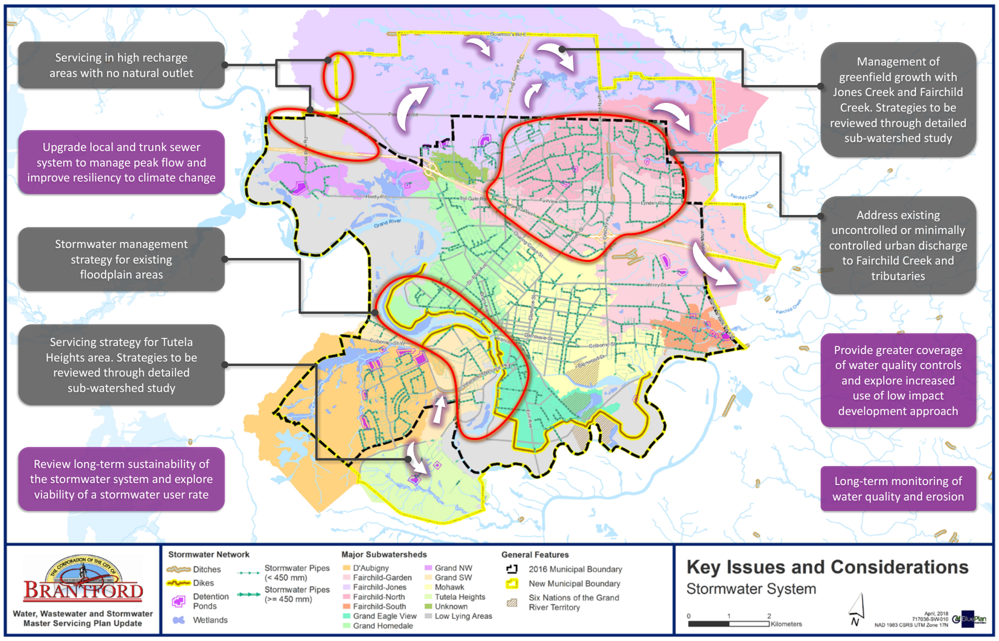
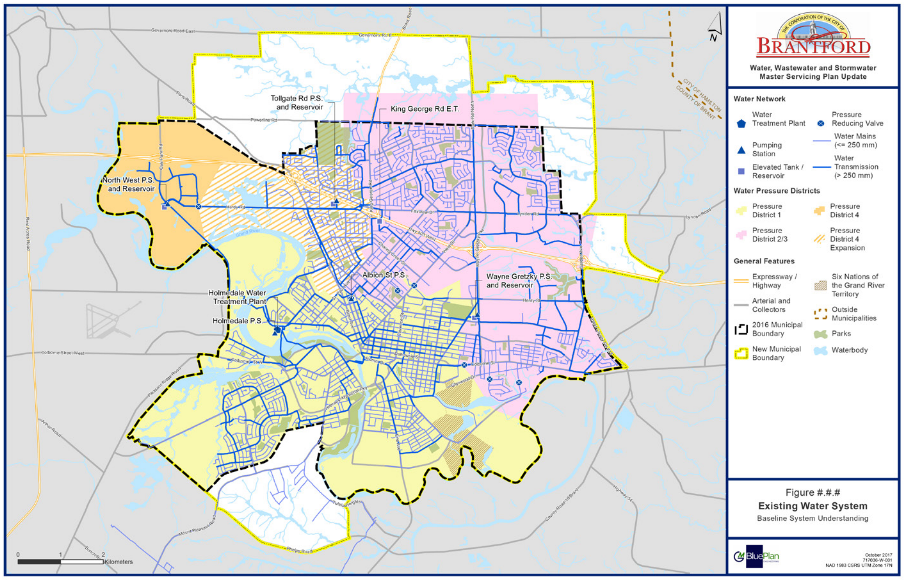
April, 2018
717036-WW-018
NAD 1983 CSRS UTM Zone 17N



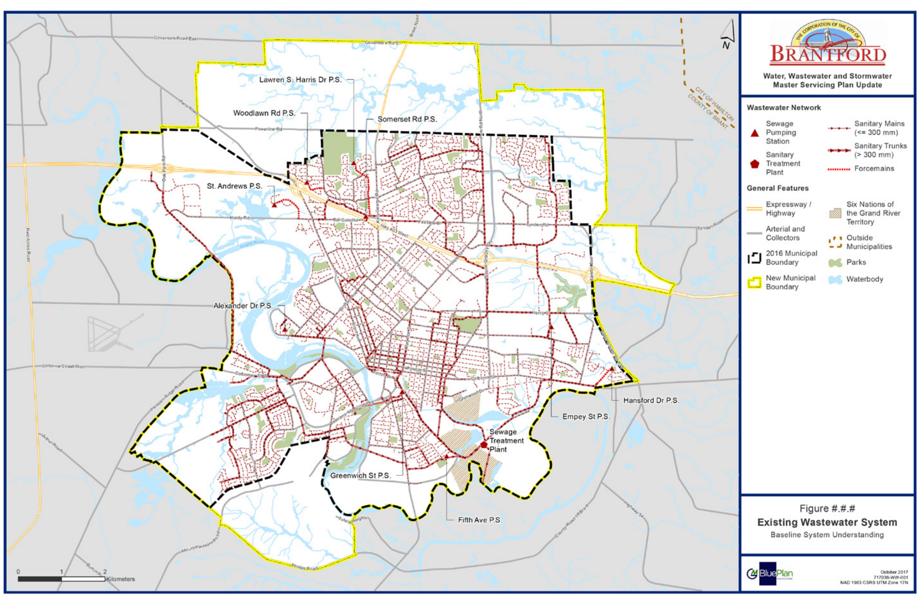
Key Servicing Issues and Considerations

Water System	Wastewater System	Stormwater System
• Treatment Plant Capacity • New Water Storage • Water Needs in Northwest • Extending Service to North and Tutela Heights • Facility Optimization • Local Pressure and Flow Capacity Upgrades	• Treatment Plant Capacity • Conveying Flows from North and Tutela Heights • Existing Pump Station Capacity • Wet Weather Flow • River Siphons • Wastewater Quality	• Level of Service – Pipe vs. Overland Flow • Stormwater Management Options • Stream and Creek Erosion • Grand River Interaction • Retrofits within Existing Build Areas

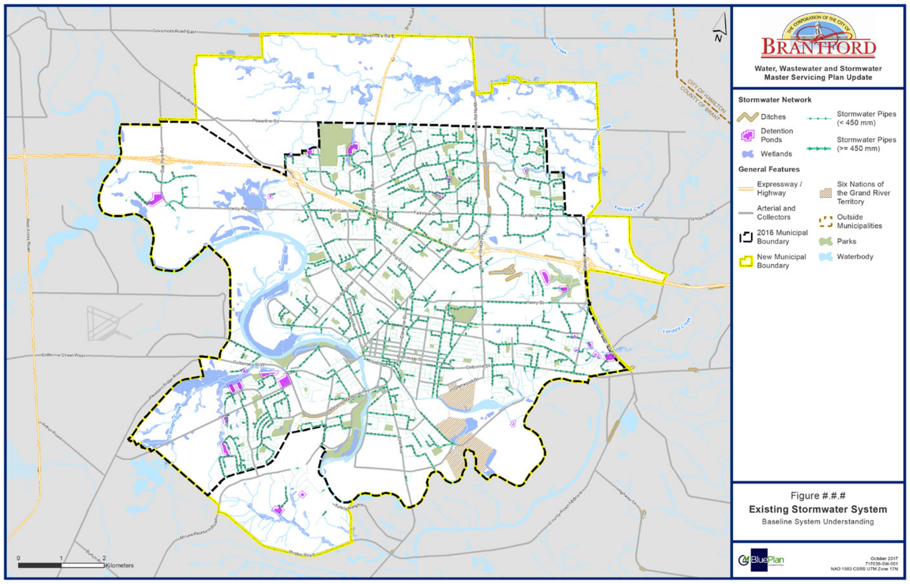
Existing Water System



Existing Wastewater System



Existing Stormwater System



Presentation

CITY OF BRANTFORD

ENVISIONING OUR CITY: 2041

PUBLIC INFORMATION CENTRE #3

May 17, 2018

Study Process

The City of Brantford is undertaking three studies to guide future development to 2041 and to take into account the Boundary Expansion Lands transferred from Brant County to the City in January 2017:

Official Plan Review

Master Servicing Plan Update

Transportation Master Plan Update

2

Purpose of this PIC

1) Outline key outputs from Municipal Comprehensive Review:
   - Alternative Intensification Target
   - Alternative Greenfield Density Target
   - Amount of Employment Land Needs
   - Amount of Community Land Needs
   - Where new growth should be located
2) Municipal Servicing Plan Update
3) Transportation Master Plan update
4) Next steps

3

Consultants

SGL Planning & Design Inc.
Urban Boundary Expansion, Secondary Plan

The Planning Partnership
Official Plan, Consultation

Cushman & Wakefield
Real Estate

AgPlan
Agricultural Consultants

GM BluePlan Engineering Ltd.
Municipal Servicing

Plan B Natural Heritage
Landscape Ecology and Natural Heritage Planning

ASI
Heritage Culture, Archaeology, Indigenous Engagement

Ecosystem Recovery Inc.
Natural Resources Engineering, Stormwater Management

Dillon
Transportation

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Opportunities to be Involved in the Process

2017

September 11	**Public Information Centre #1** Update on project and process
November 16	**Public Information Centre #2** Municipal Comprehensive Review, Employment Conversions & Growth Options Kick off of Environmental Assessment for Boundary Expansion Lands
2018	
May 17	**Public Information Centre #3** Municipal Comprehensive Review, Land Needs Assessment, Preferred Urban Boundary
June	**Public Information Centre #4** Vision and Principles for Development in the Boundary Expansion Lands
Fall	**Public Information Centre #5** Options for Community Design in the Boundary Expansion Lands
2019 Winter	**Public Information Centre #6** Preferred Land Use Plan for the Boundary Expansion Lands
Spring	**Statutory Public Open House** Draft Official Plan
Fall	**Statutory Public Meeting and Council Presentation** Official Plan

5

Indigenous Consultation Strategy

- The history of Brantford is tied to the history of the First Nations people in Brant County
- Brantford is in the traditional and treaty territory of Six Nations of the Grand River First Nation and the Mississaugas of the New Credit First Nation

Meetings have occurred with:

- Six Nations of the Grand River First Nation
- Mississaugas of the New Credit First Nation

City staff will be attending First Nations community awareness events:

- Six Nations of the Grand River – May 18
- Mississaugas of the New Credit First Nation – June 15

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Presentation

Municipal Comprehensive Review

- Employment Land Needs to Accommodate 2041 forecast
- Urban Growth Centre
- Intensification Strategy + Alternative Target
- Designated Greenfield Area Supply + Alternative Target
- Community Land Needs to Accommodate 2041 forecast

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Municipal Comprehensive Review

Land Needs

Targets for employment and population growth

	Brantford 2016	2016 Expansion Lands	2041	Total 2016-2041 Growth
Population	100,525	1,185	163,000	61,290
Employment	44,375	515	79,000	34,110

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Municipal Comprehensive Review

Employment Land Needs

- Three categorizes of employment:
  1. Employment Lands Employment (ELE)
     - Focused on employment areas
  2. Population-Related Employment (PRE)
     - In existing and new neighbourhoods
     - Small portion to employment areas
  3. Major Office Employment (MOE)
     - Focused on the Downtown

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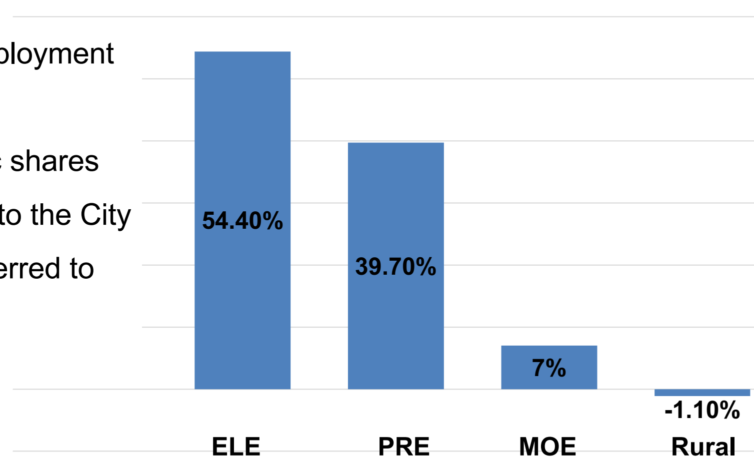
Municipal Comprehensive Review

Employment

- Home based employment not included
- Similar to historic shares
- But MOE is new to the City
- Rural jobs transferred to PRE

Employment Growth Forecast - % Share



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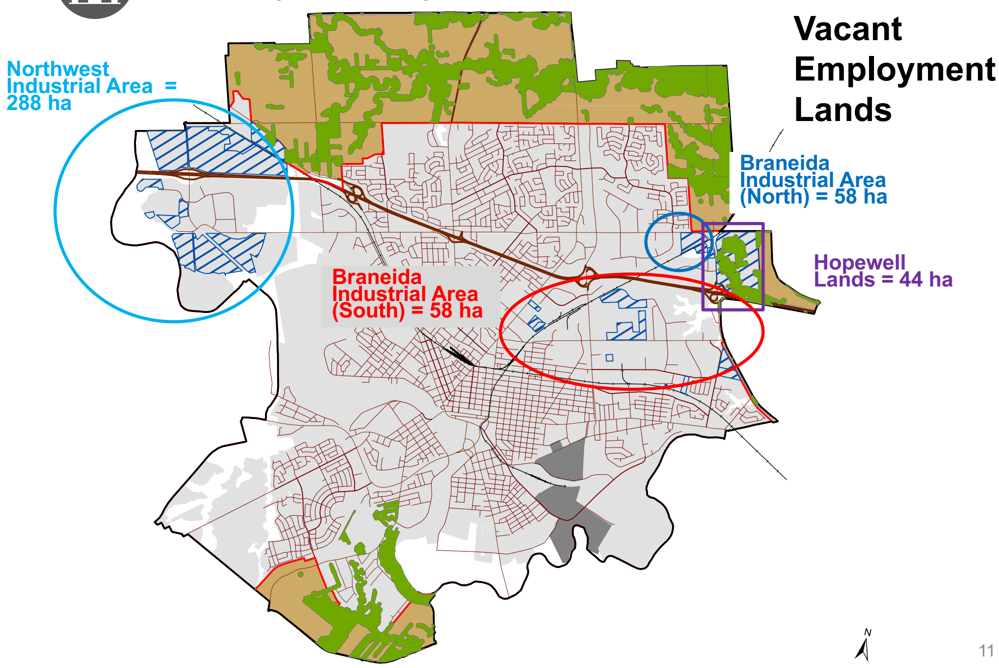
Municipal Comprehensive Review

Vacant Employment Lands



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Municipal Comprehensive Review

Employment Land Needs

Employment density determined by reviewing current job density and nature of future employment

24 jobs/gross hectare Employment Lands Employment **= 732 ha**

64 jobs/gross hectare Population Related Employment **= 20 ha**

Subtract vacant land of – ***414 ha***

Urban Boundary Expansion for Employment Lands = 338 ha

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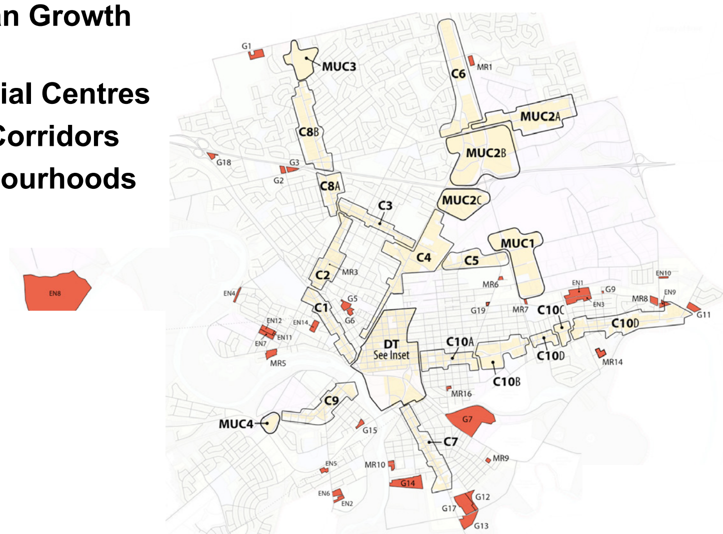
Municipal Comprehensive Review

Intensification Strategy

- **Downtown Urban Growth Centre**
- **Major Commercial Centres**
- **Intensification Corridors**
- **Existing Neighbourhoods**
- **Second Units**



Municipal Comprehensive Review

Intensification Strategy

- Considers three scenarios within the Built-up Area
- Range from:
  - low of 4,517 to high of 15,616

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Municipal Comprehensive Review

Intensification Strategy

Built Up Area:

- Since 2007: 4,158 units built, of which 1,922 (46%) in the BUA
- Of 1,922 units in the BUA:
  - Single and semi detached dwellings (30%)
  - Townhouse dwellings (22%)
  - Apartment units (49%)
- Apartment construction has been limited
  - Only 2 new buildings constructed with more than 100 units
  - Most new buildings contain less than 50 units

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Municipal Comprehensive Review

Urban Growth Centre Intensification Strategy

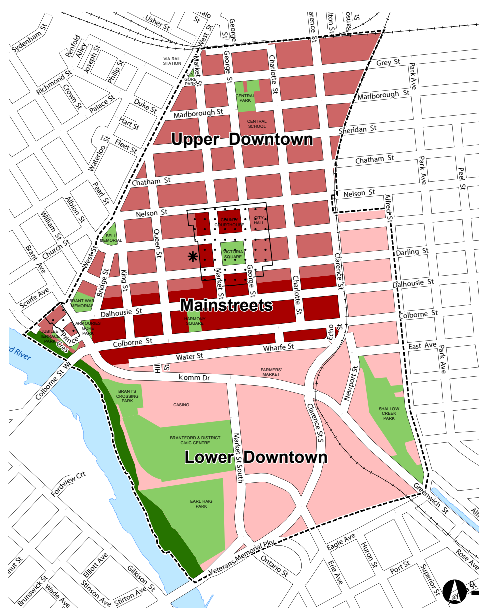
Size = 130 ha

Population = 2,644 people

Employment = 4,565 jobs

Density = 55 persons + jobs per hectare

- But only 232 units developed over the last 10 years
- Need an additional 12,291 persons and jobs/ha to achieve target by 2031



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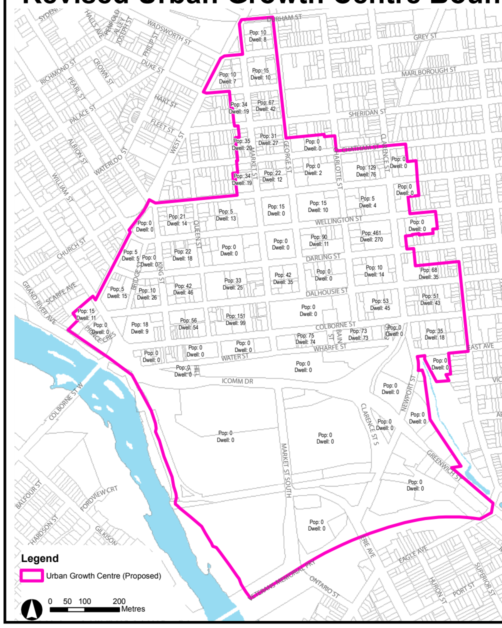
Municipal Comprehensive Review

Intensification Strategy

Revised Urban Growth Centre Boundary



Size **= 104 ha**

Population **= 1,779 people**

Employment = 4,300 jobs

Density **= 58 persons + jobs per hectare**

- Need additional 9,539 persons and jobs/ha to achieve target by 2031

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Municipal Comprehensive Review

Intensification Strategy

- The Growth Plan has set an intensification target of 60%
- Requires 16,000 units over 25 years
- Substantial shift in the housing market required
- Recommend to continue shift towards medium and higher density housing
- Slowly increase intensification target:

40% to 2021

45% 2021 to 2031 **= 12,500 units**

50% 2031 to 2041

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Municipal Comprehensive Review

Intensification Strategy

- A reasonable distribution of units by type to the various geographical components of the Built-up Area would entail:
  - 650 single and semi-detached units in the existing neighbourhoods;
  - 1,250 second units in the existing neighbourhoods;
  - 800 townhouses in the existing neighbourhoods;
  - 1,000 student housing units;
  - 3,500 townhouse in the Intensification Corridors and major mixed use commercial sites;
  - 1,500 apartments in the Intensification Corridors and major mixed use commercial sites; and
  - 3,800 apartments in the Downtown Urban Growth Centre.

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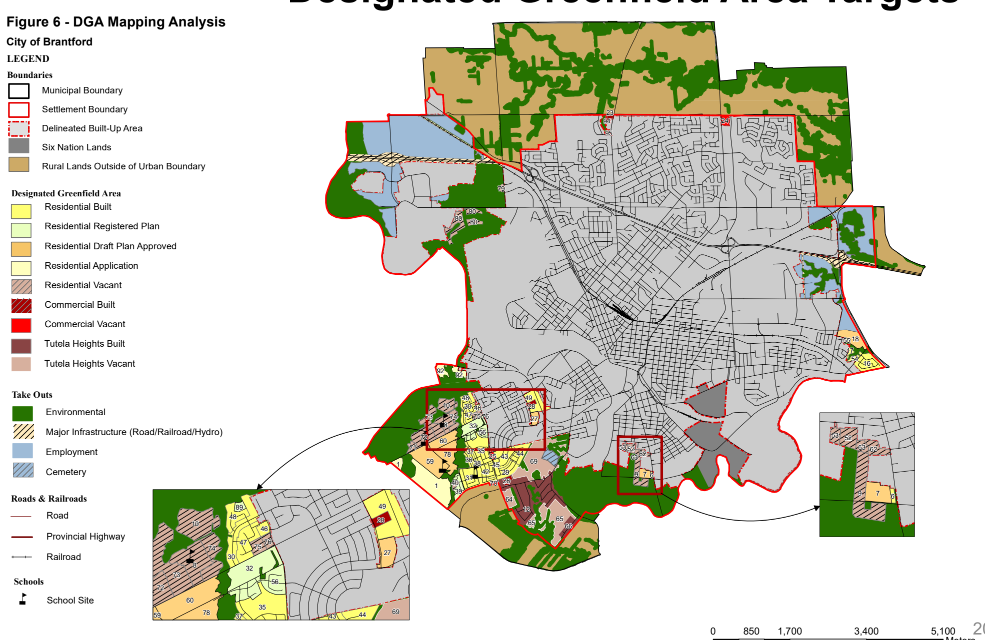
Municipal Comprehensive Review

Designated Greenfield Area Targets



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Municipal Comprehensive Review

Intensification DGA Targets

- Existing DGA Density is only 40 persons and jobs per ha
- Current Approvals and Designations result in density of 45 persons and jobs/hectares
  - Based on mix of 73% Single/Semi / 25% Townhouse / 2% Apartment
- Increasing density on low density and requiring broader unit mix:
  - Increases density to 54 persons and jobs/hectare
    - Based on mix of 64% Single/Semi / 35% Townhouse / 1% Apartment
  - Increases supply by nearly 800 units
  - Total supply 7,815 units in current Settlement Boundary
  - BUT significant infrastructure constraints

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Municipal Comprehensive Review

DGA Targets

Growth Plan set a DGA density target of 80%

Recommended graduated DGA density targets:

- 2016 to 2021 – 50 persons and jobs/hectare
  - Based on existing registered and draft application plan
- 2021 to 2031 – 57 persons and jobs/hectare
- After 2031 – 60 persons and jobs/hectare
  - Achieve mix of 55% Singles/Semis / 40% Townhouse / 5% Apartment

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Municipal Comprehensive Review

Community Area Land Needs

- Based on the 3 graduated densities:

DGA LAND REQUIREMENTS BY PLANNING PERIOD					
Time period	% DGA Growth	Units	Pop & Jobs	Density	Area (ha)
2016-2021	8%	1,125	4,100	50	82
2021-2031	55%	7,930	28,186	57	495
2031-2041	37%	5,315	18,962	60	316
Total	**100%**	**14,370**	**51,248**	**-**	**893**

Subtract existing vacant land supply in DGA *– 430 ha*

Land deficit **= 462 ha**

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Presentation

Municipal Comprehensive Review – Boundary Expansion Lands

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Boundary Expansion Lands

Boundary Expansion

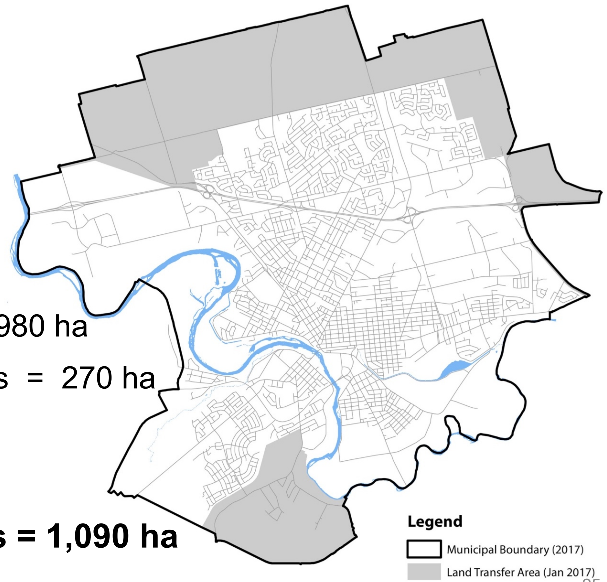
Total Area = 2,700 ha

Natural Heritage System = 980 ha

2017 Urban Boundary Lands = 270 ha

Trigger Lands = 360 ha

Total Developable Lands = 1,090 ha



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Boundary Expansion Lands

Boundary Expansion

- To accommodate 2041 population and employment forecasts, need:
  - 338 hectares Employment lands
  - 462 hectares Community/Neighbourhood lands

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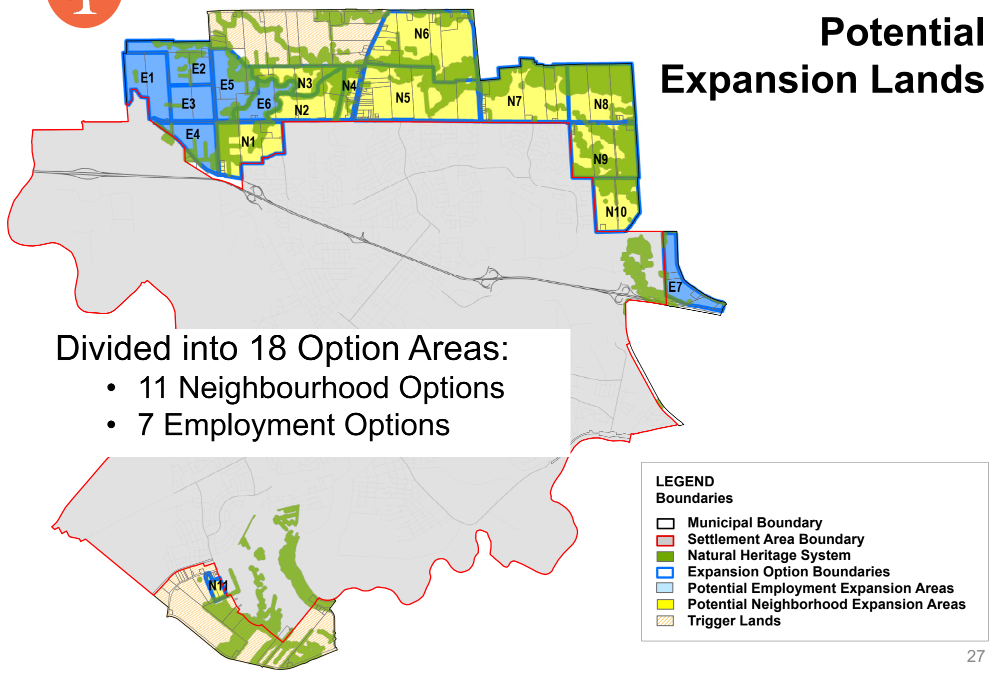
Boundary Expansion Lands

Potential Expansion Lands



Divided into 18 Option Areas:

- 11 Neighbourhood Options
- 7 Employment Options

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Boundary Expansion Lands

Boundary Expansion Lands

- Study team developed a series of Principles and criteria to evaluate the 18 Options
- Each Option was analyzed and ranked from Most Preferred to Least Preferred for each principle.

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Boundary Expansion Lands

Boundary Expansion Lands

Agriculture

- Principle 1: To identify the better versus the poorer agricultural areas within each Option and to retain those better areas in agriculture as long as possible.
- Principle 2: To identify the better versus the poorer agricultural areas adjacent or near to the Options and to minimize impacts of non-agricultural uses proposed in the expansion area on the better agricultural areas identified.
- Principle 3: To avoid impacts on the agri-food network or if not possible, to minimize and mitigate impacts.

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Boundary Expansion Lands

Boundary Expansion Lands

Archaeology

- Principle 1: To protect and avoid archaeological resources and areas of potential for the presence of archaeological resources, and where avoidance is not possible, to assess and mitigate the archaeological resources.

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Boundary Expansion Lands

Boundary Expansion Lands

Transportation

- Principle 1: To ensure appropriate access and connectivity to new urban areas.
- Principle 2: To ensure appropriate transportation capacity is maintained.
- Principle 3: To balance transportation needs and provide choice for the travel needs of residents.
- Principle 4: To ensure transportation network continuity between existing and new areas.

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Boundary Expansion Lands

Boundary Expansion Lands

Environment

- Principle 1: To protect, enhance and restore the Natural Heritage System (NHS) for the long-term along with existing linkage connections between the NHS and NHS features within the County of Brant and the existing urban area.
- Principle 2: To protect and enhance surface water quality/quantity including fish habitat.
- Principle 3: To protect and enhance the groundwater regime.
- Principle 4: To protect significant wildlife habitat features and functions including the habitat of species-at-risk.
- Principle 5: To protect stream channel and valleyland integrity, particularly in erosion prone systems.

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Boundary Expansion Lands

Boundary Expansion Lands

Water/Wastewater Servicing

- Principle 1: To efficiently use existing and planned infrastructure and to minimize the complexity of extending the existing water and wastewater system to the expansion areas.
- Principle 2: To align future infrastructure with the Master Servicing Plan.
- Principle 3: To phase water and wastewater infrastructure logically and consecutively.
- Principle 4: To ensure the infrastructure is financially viable over the full life-cycle and the preferred serving solution considers the best life-cycle Options

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Boundary Expansion Lands

Boundary Expansion Lands

Stormwater

- Principle 1: To avoid key hydrologic areas where possible when determining the most appropriate location for settlement area boundary expansion.
- Principle 2: To minimize the impact on the water resource system by minimizing the relative complexity needed to complete local stormwater servicing.
- Principle 3: To minimize the impact on the water resource system by evaluating the existing downstream system capacity.
- Principle 4: To phase stormwater management infrastructure logically and consecutively.
- Principle 5: To ensure that the stormwater infrastructure is financially viability by minimizing the total project life-cycle cost to service the expansion areas.

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Boundary Expansion Lands

Boundary Expansion Lands

Land Use

- Principle 1: To ensure development occurs adjacent to existing built areas.
- Principle 2: To create compact new urban areas with a mix of uses and densities.
- Principle 3: To direct employment areas to locations in proximity to major goods movement facilities.

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Boundary Expansion Lands

Boundary Expansion Lands

Neighbourhood Evaluation Matrix Summary

Principles	Neighbourhood Options										
	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
Agriculture											
A1	10	3	6	2	9	6	11	6	3	3	1
A2	10	7	11	6	1	2	4	9	7	5	2
A3	1	1	1	1	1	1	11	1	1	1	1
Archaeology											
B1	1	2	7	8	5	2	2	6	8	10	11
Transportation											
C1	3	1	10	3	3	3	3	3	10	1	9
C2	1	1	10	10	1	7	1	1	9	1	7
C3	1	1	10	8	1	9	1	1	10	1	1
C4	1	1	10	1	1	9	1	1	10	1	1
Environment											
D1	1	4	7	4	4	4	7	7	7	1	1
D2	1	3	6	3	6	6	6	6	6	3	1
D3	6	3	6	6	3	6	6	6	6	3	1
D4	1	6	2	6	2	2	6	6	6	2	6
Water & Wastewater											
E1 W	1	1	9	1	1	7	1	6	11	9	7
E1 WW	2	4	10	4	4	9	1	4	10	2	4
E2 W	8	3	11	1	3	8	1	3	8	3	3
E2 WW	1	4	4	4	4	10	2	4	4	2	11
E3 W	3	3	11	7	3	9	1	7	9	3	1
E3 WW	6	7	11	9	7	10	1	1	1	1	1
E4 W	1	1	10	6	6	6	1	6	11	1	1
E4 WW	1	5	11	5	5	8	2	2	8	2	10
Stormwater											
F1	11	6	6	1	5	1	6	6	1	1	6
F2	3	3	10	7	11	7	3	3	7	2	1
F3	3	2	6	6	11	6	3	6	6	3	1
F4	1	1	10	1	1	10	1	1	7	7	7
F5	5	4	6	3	11	7	10	8	9	1	2
Land Use											
G1	1	6	11	1	1	10	1	8	8	6	1
G2	6	4	6	1	1	4	1	6	6	6	6

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Boundary Expansion Lands

Boundary Expansion Lands

Employment Evaluation Matrix Summary

Principles	Employment Options						
	E1	E2	E3	E4	E5	E6	E7
Agriculture							
A1	6	4	6	3	2	1	4
A2	7	4	5	5	1	2	2
A3	1	1	1	1	1	1	1
Archaeology							
B1	2	4	3	1	5	6	7
Transportation							
C1	4	6	1	1	4	6	1
C2	7	1	1	1	1	1	6
C3	7	1	1	1	1	1	1
C4	6	7	1	1	1	1	1
Environment							
D1	1	7	1	3	5	5	3
D2	1	7	1	1	5	5	4
D3	1	7	1	5	5	1	1
D4	1	6	3	1	6	5	3
Water & Wastewater							
E1 W	2	5	5	5	2	2	1
E1 WW	1	1	1	1	6	6	1
E2 W	1	1	1	1	5	5	5
E2 WW	1	1	1	1	1	1	1
E3 W	2	4	3	4	7	4	1
E3 WW	2	4	4	2	4	4	1
E4 W	4	4	4	4	1	1	1
E4 WW	1	1	1	1	6	6	1
Stormwater							
F1	4	6	2	7	3	4	1
F2	1	6	1	1	7	1	5
F3	7	4	4	2	2	1	4
F4	7	5	6	4	2	1	3
F5	7	5	3	6	2	4	1
Land Use							
G1	1	6	4	1	4	6	1
G3	3	6	4	1	4	6	1

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Boundary Expansion Lands

Boundary Expansion Lands

- Identified specific constraints and trade-offs for each Option
- Identified potential for mitigation, management or phasing measures to address constraints for each Option

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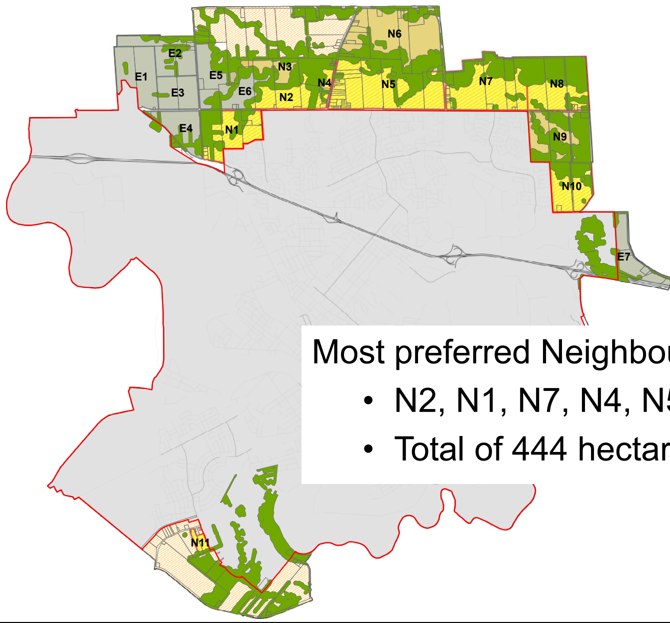
Boundary Expansion Lands

Most Preferred Neighbourhood Options



Most preferred Neighbourhood Options

- N2, N1, N7, N4, N5, N10, N11 and N8
- Total of 444 hectares

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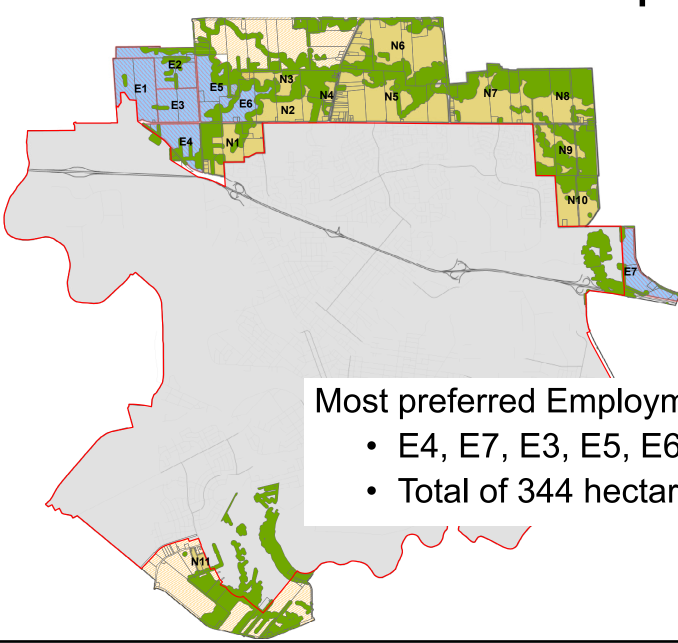
Boundary Expansion Lands

Most Preferred Employment Options



Most preferred Employment Options

- E4, E7, E3, E5, E6, E1, and E2
- Total of 344 hectares

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Boundary Expansion Lands

Next Steps

- Committee Meeting – June 5th
- Preparation of the preferred plan and master plan study for the settlement area boundary expansion lands
  - More detailed evaluation of constraints and developable potential
  - Detailed Land Uses
  - Detailed Transportation Network
  - Servicing Solutions
- PIC 4: Visioning Workshop – June 21st
- PIC 5: Land Use Options – September 2018

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Presentation

Municipal Comprehensive Review – Land Needs

Municipal Comprehensive Review – Boundary Expansion Lands

Master Servicing Plan - Update

Transportation Master Plan

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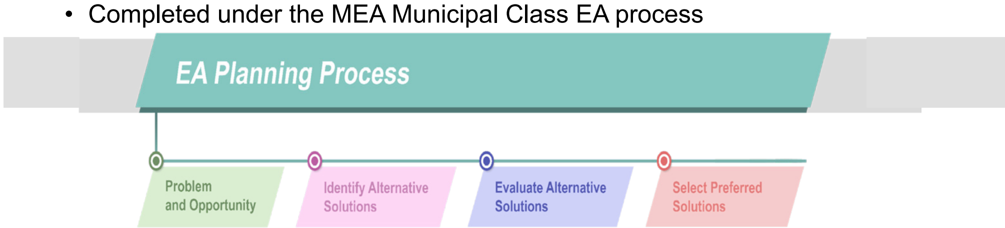
Master Servicing Plan

Master Servicing Plan Introduction

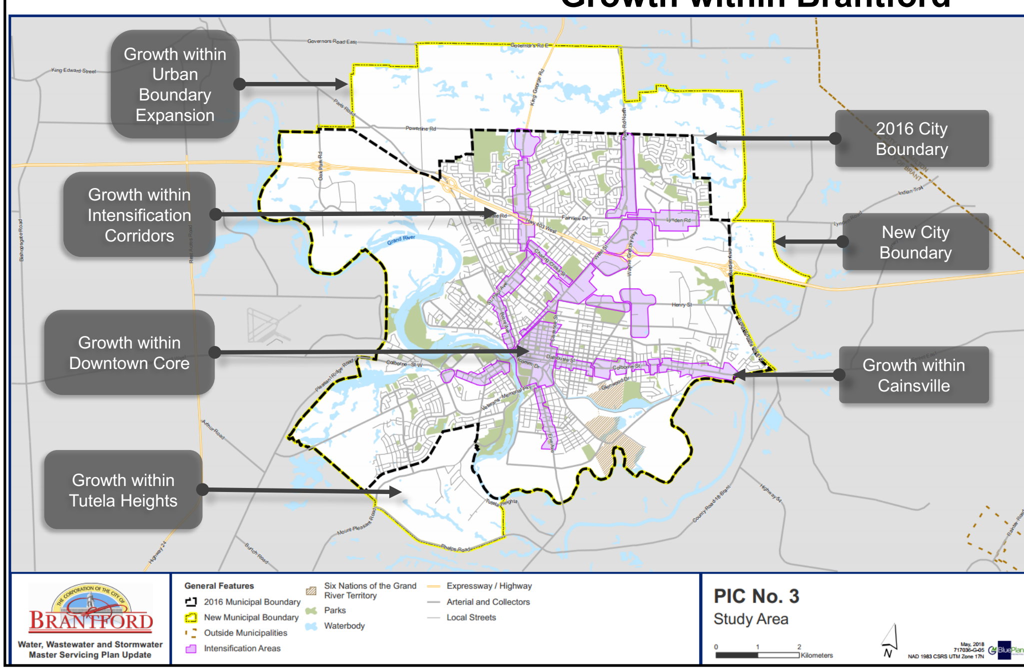
Water, Wastewater, and Stormwater Master Servicing Plan to Support a Strong and Growing Brantford

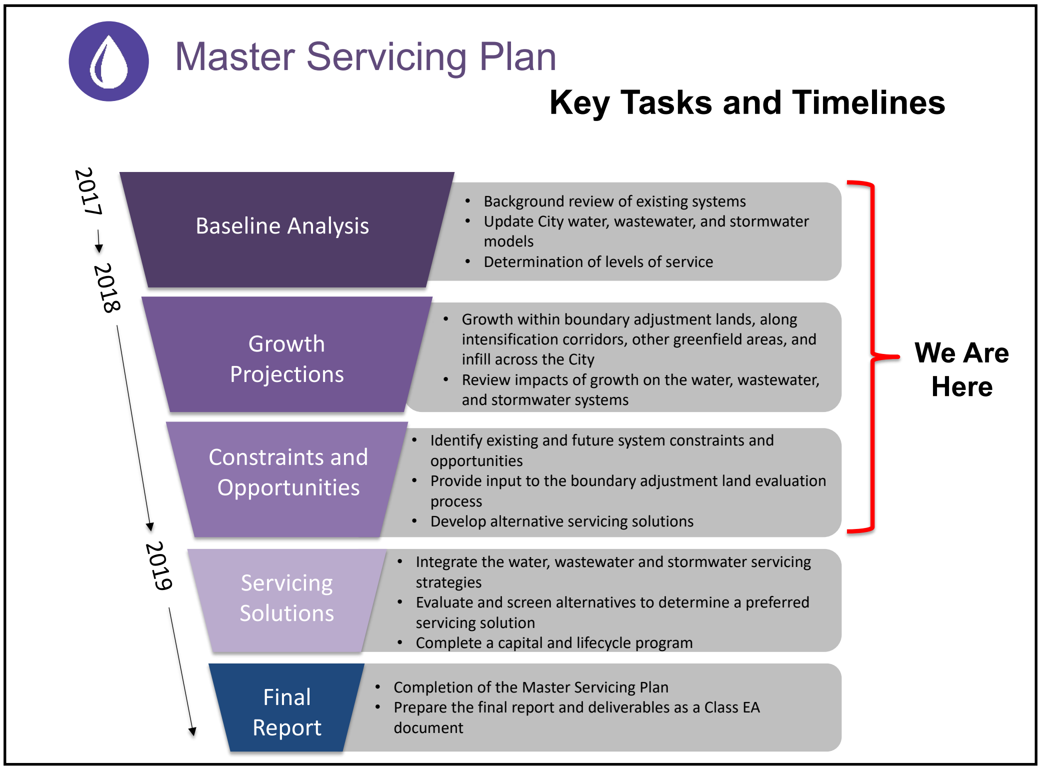
- In 2014, the City completed the Water, Wastewater, and Stormwater master servicing plan (MSP) that looked at planned growth to 2031, within the approved 2031 City boundary at that time.
- This MSP update is needed to integrate:
  - City-wide servicing issues with review of the boundary adjustment lands
  - Planning for growth to 2041 and new density and intensification targets
- This MSP will develop a long-term servicing strategy and capital forecast that will support future growth of the community as well as ensure level of service for existing residents and businesses
- Completed under the MEA Municipal Class EA process

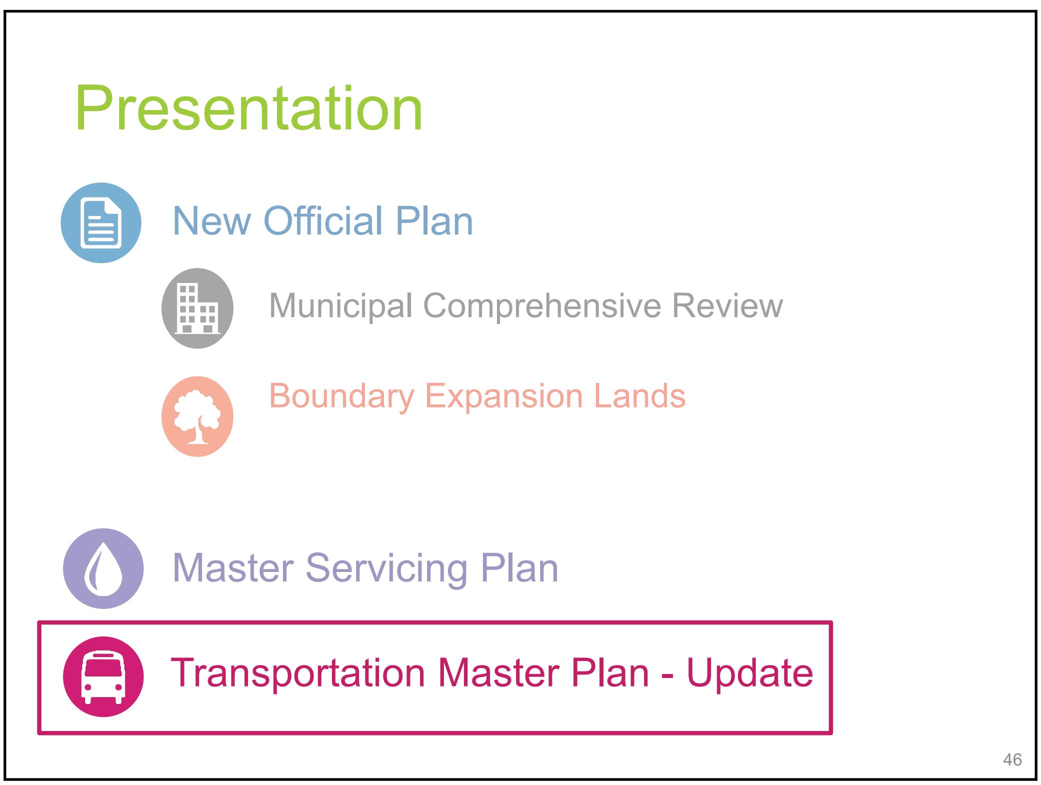


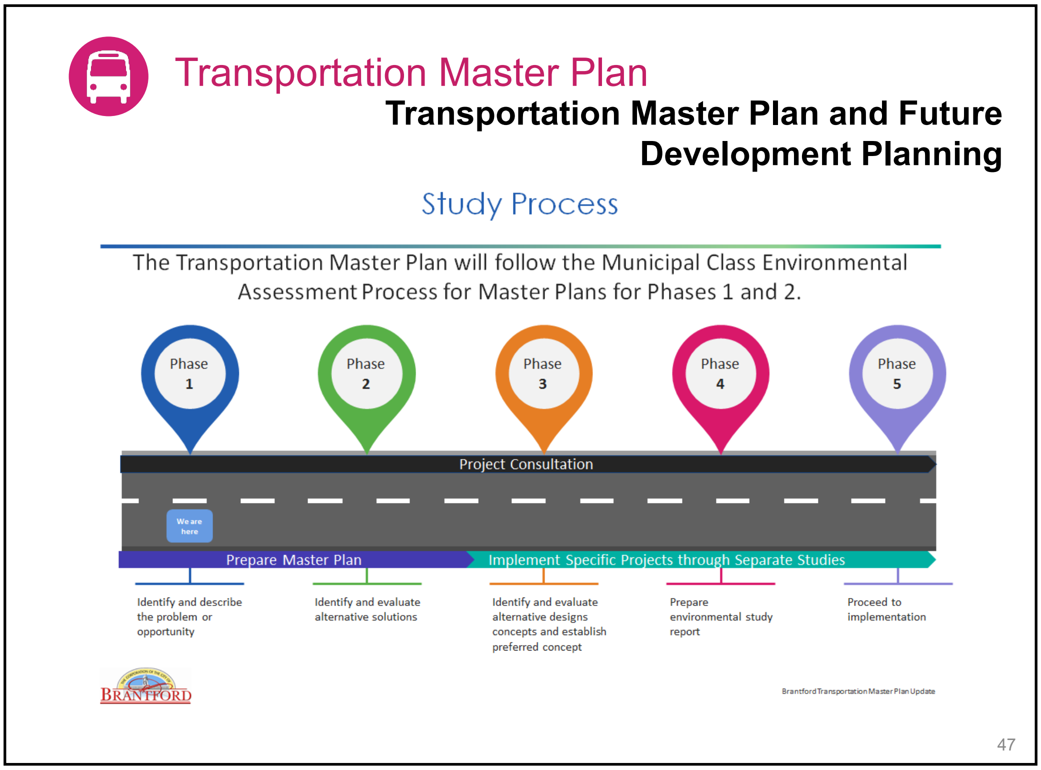
Master Servicing Plan

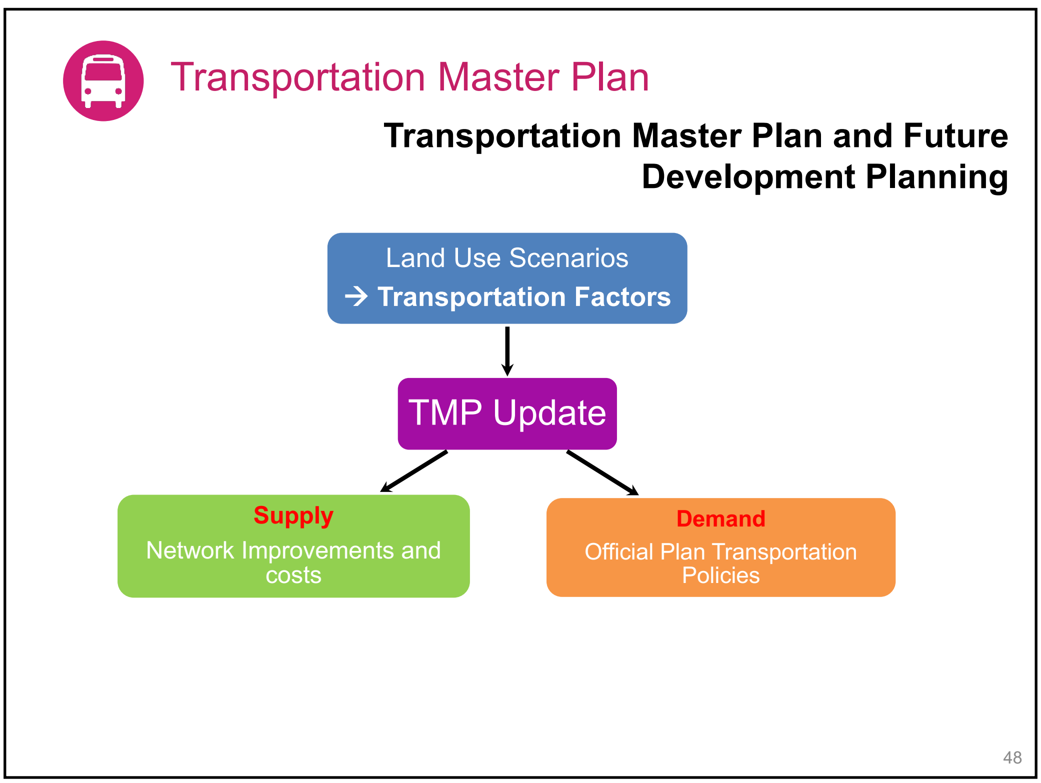
Growth within Brantford




Master Servicing Plan
Key Tasks and Timelines
2017
2018
2019
Baseline Analysis
• Background review of existing systems
• Update City water, wastewater, and stormwater models
• Determination of levels of service
Growth Projections
• Growth within boundary adjustment lands, along intensification corridors, other greenfield areas, and infill across the City
• Review impacts of growth on the water, wastewater, and stormwater systems
Constraints and Opportunities
• Identify existing and future system constraints and opportunities
• Provide input to the boundary adjustment land evaluation process
• Develop alternative servicing solutions
Servicing Solutions
• Integrate the water, wastewater and stormwater servicing strategies
• Evaluate and screen alternatives to determine a preferred servicing solution
• Complete a capital and lifecycle program
Final Report
• Completion of the Master Servicing Plan
• Prepare the final report and deliverables as a Class EA document
We Are Here

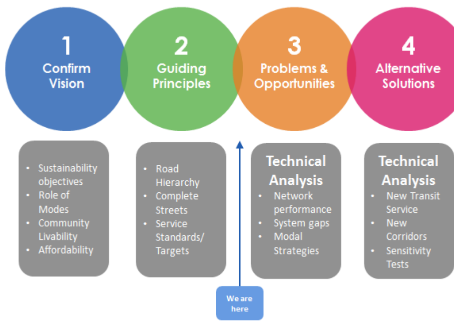

Presentation
New Official Plan
Municipal Comprehensive Review
Boundary Expansion Lands
Master Servicing Plan
Transportation Master Plan - Update
46


Transportation Master Plan
Transportation Master Plan and Future Development Planning
Study Process
The Transportation Master Plan will follow the Municipal Class Environmental Assessment Process for Master Plans for Phases 1 and 2.
Phase 1
Phase 2
Phase 3
Phase 4
Phase 5
Project Consultation
We are here
Prepare Master Plan
Implement Specific Projects through Separate Studies
Identify and describe the problem or opportunity
Identify and evaluate alternative solutions
Identify and evaluate alternative designs concepts and establish preferred concept
Prepare environmental study report
Proceed to implementation
BRANTFORD
Brantford Transportation Master Plan Update
47


Transportation Master Plan
Transportation Master Plan and Future Development Planning
Land Use Scenarios
→ Transportation Factors
TMP Update
Supply
Network Improvements and costs
Demand
Official Plan Transportation Policies
48

Transportation Master Plan

Next Steps in the Study



Brantford Transportation Master Plan Update

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For more information

Master Servicing Plan

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Official Plan Update

City of Brantford

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JOIN THE CONVERSATION

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City of Brantford
March 16 at 7:11am ·

Calling all cycling enthusiasts! The City of #Brantford is pleased to be working with the Share the Road Cycling Coalition to host an interactive Bicycle Friendly Communities World Cafe on Thursday, April 5th, 6:30 - 8:30 pm at the Civic Centre Auditorium 69-79 Market St. South. Register today at bit.ly/2tRR8ER #BicycleFriendlyBrantford

City of Brantford
Government Organization

Learn More

Like Comment

CITY OF BRANTFORD

MASTER SERVICING PLAN TRANSPORTATION MASTER PLAN

ENVISIONING OUR CITY: 2041

Notice of Public Information Centre

Water, Wastewater, and Stormwater Master Servicing Plan and Transportation Master Plan Updates

The City of Brantford is undertaking three studies to guide the City's future development through to 2041. The City's Official Plan, Master Servicing Plan, and Transportation Master Plan are being updated, and account for the Boundary Expansion Lands that were transferred from Brant County to the City on January 1, 2017.

Master Servicing Plan Update (MSP)

The objective of the MSP study is to develop a comprehensive plan that will incorporate all facets of the management, expansion, and funding of the water, wastewater, and stormwater systems for the entire city, including servicing of the Boundary Expansion Lands, to the year 2041 and beyond.

Transportation Master Plan Update (TMP)

The TMP study will provide a balanced strategy for the servicing and operation of important transportation infrastructure within the entire City, including the Boundary Expansion Lands, for the next 25 years. The goal of this TMP is to ensure that the transportation system can accommodate growth and meet the needs of pedestrians, cyclists, transit users, goods movement, and automobiles.

The Master Servicing Plan and Transportation Master Plan Updates are being completed as separate Class EA studies in accordance with the requirements of the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for master planning (MEA, June 2000, as amended in 2007 and 2011). The studies are being undertaken based on Phases 1 and 2 of the Class EA processes for Master Plans.

We Want to Hear From You

What should the City of Brantford look like in 2041? The decisions we make as a community today will shape our City's future tomorrow. At our last Public Information Centre (PIC) in October 2019, we presented how much growth we target to accommodate through intensification and development of remaining vacant land in the existing Settlement Area.

At our next PIC, we will present the opportunities and constraints associated with meeting this growth using existing transportation and servicing infrastructure. Where transportation and servicing constraints are identified, we will identify infrastructure/strategy improvement opportunities to meet these challenges in the future and answer any questions you may have.

Join us on

Monday, February 10, 2020
6:30 p.m. to 8:00 p.m.

Brantford and District Civic Centre Auditorium,
69 Market St. S., Brantford

A series of PICs will be held to provide information about the studies, gather input and receive feedback from the public. If you wish to submit comments or would like to be added to the project mailing list, please contact:

MASTER SERVICING PLAN
brantford.ca/MasterServicingPlan

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TRANSPORTATION MASTER PLAN
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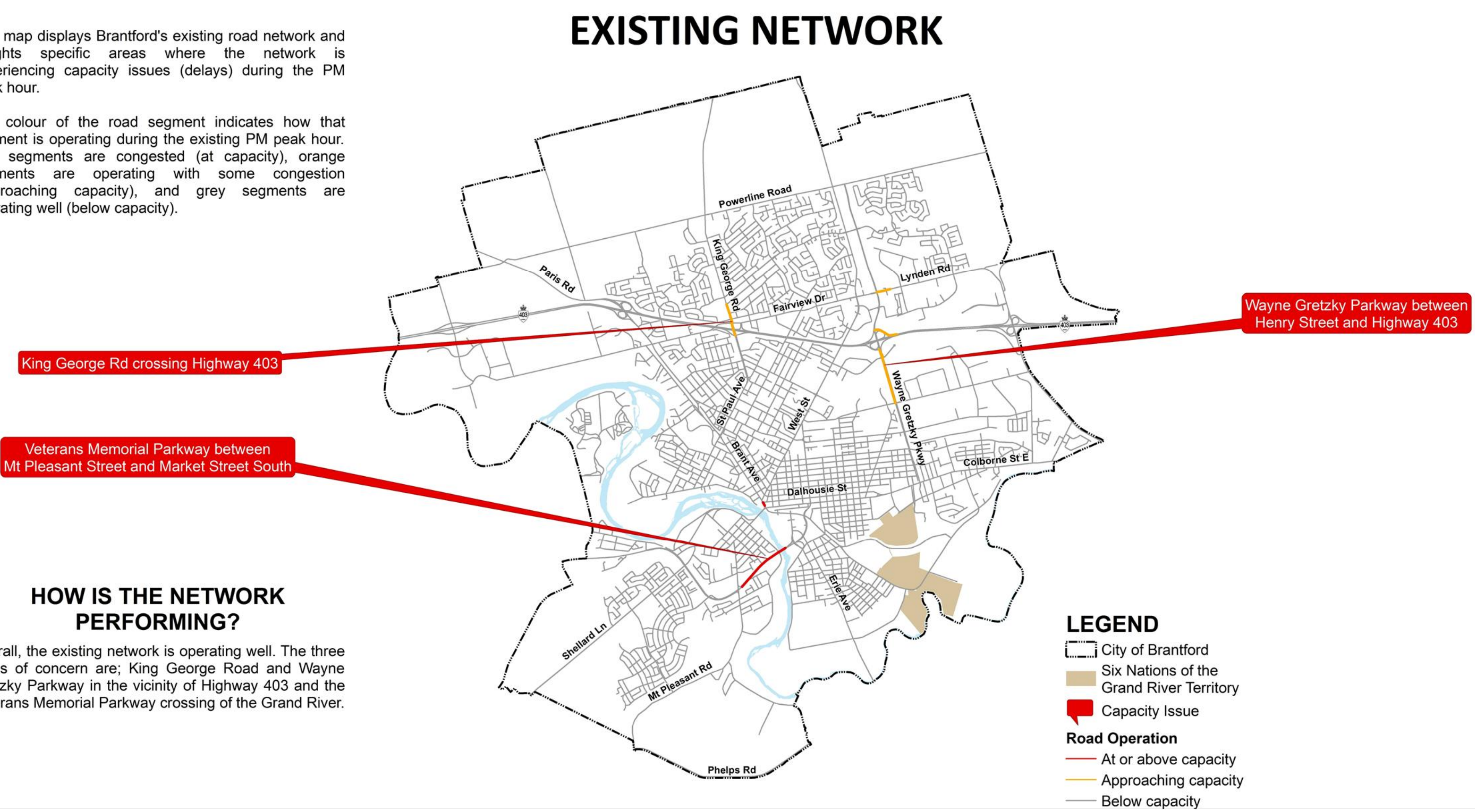
CITY OF BRANTFORD

Join the Conversation

2018 Network Performance

This map displays Brantford's existing road network and hi-lights specific areas where the network is experiencing capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment is operating during the existing PM peak hour. Red segments are congested (at capacity), orange segments are operating with some congestion (approaching capacity), and grey segments are operating well (below capacity).



HOW IS THE NETWORK PERFORMING?

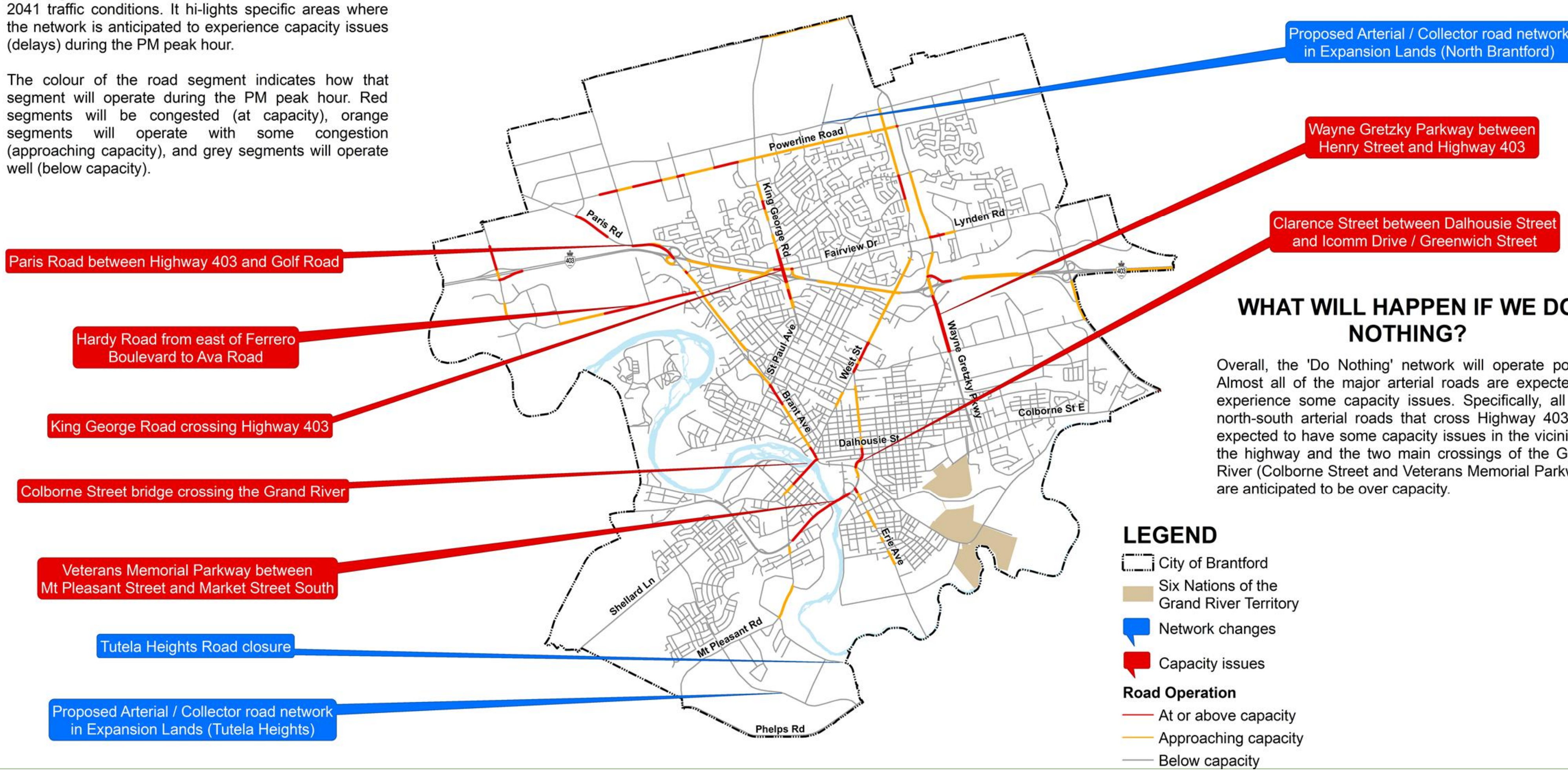
Overall, the existing network is operating well. The three areas of concern are; King George Road and Wayne Gretzky Parkway in the vicinity of Highway 403 and the Veterans Memorial Parkway crossing of the Grand River.

2041 Network Performance

DO NOTHING NETWORK

This map displays Brantford's existing road network, including short term committed improvements, under 2041 traffic conditions. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).



WHAT WILL HAPPEN IF WE DO NOTHING?

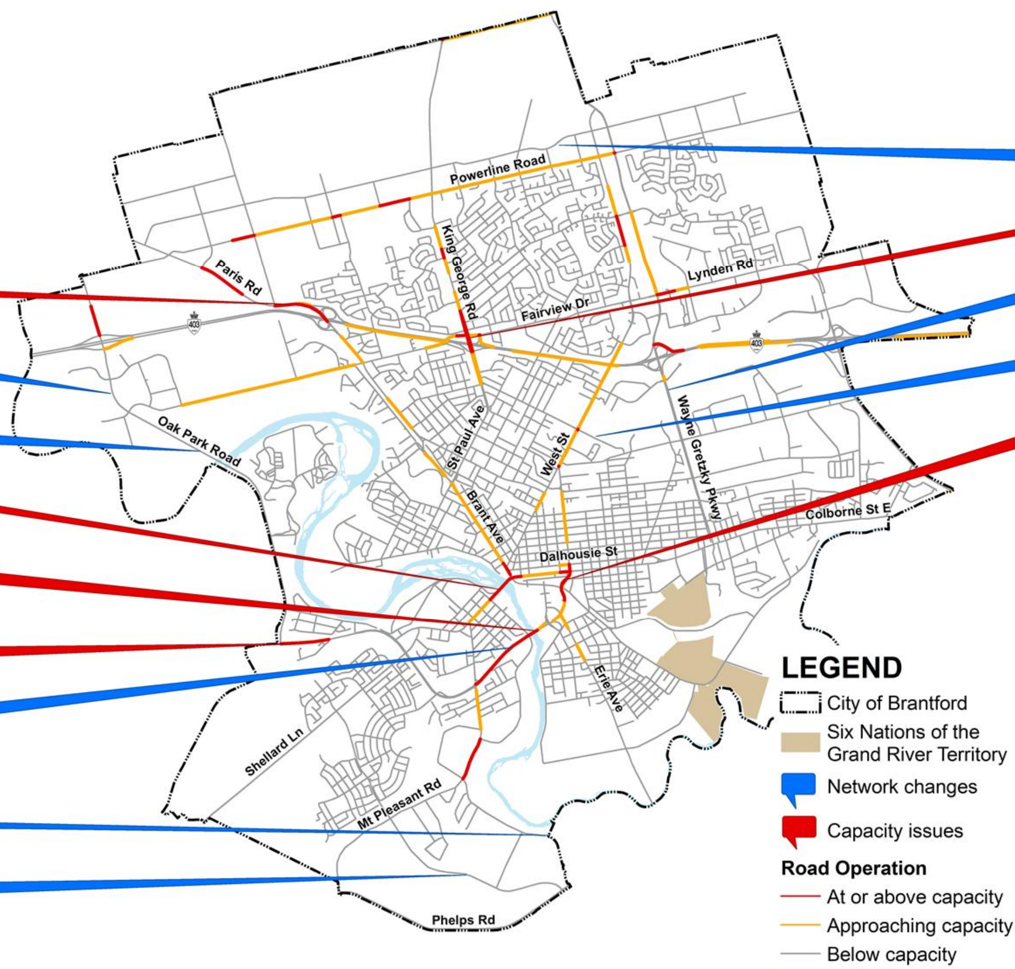
Overall, the 'Do Nothing' network will operate poorly. Almost all of the major arterial roads are expected to experience some capacity issues. Specifically, all five north-south arterial roads that cross Highway 403 are expected to have some capacity issues in the vicinity of the highway and the two main crossings of the Grand River (Colborne Street and Veterans Memorial Parkway) are anticipated to be over capacity.

2041 Network Performance

This map displays Brantford's 'INCREASED INFRASTRUCTURE' road network, including short term committed improvements, under 2041 traffic conditions. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).

INCREASED NETWORK INFRASTRUCTURE



WHAT INFRASTRUCTURE?

The 2014 Transportation Master Plan outlined a series of infrastructure projects that would be necessary to accommodate the anticipated population and employment growth to 2031. They include the addition of new roads and the widening of existing roads.

WHAT WILL HAPPEN IF WE INCREASE NETWORK INFRASTRUCTURE?

The 'INCREASED INFRASTRUCTURE' network will operate favorably. A few notable network improvements include a reduction in congestion along Hardy Road and Brant Avenue as a result of the Oak Park Road widening and extension and the elimination of congestion on Wayne Gretzky Parkway (Lynden Road to Colborne Street) as a result of a widening to 6 lanes. However, it should also be noted that the two main crossings of the Grand River (Colborne Street and Veterans Memorial Parkway) are still anticipated to be over capacity even with the widening of Veterans Memorial Parkway (Mount Pleasant to Erie Avenue) to 4 lanes. The additional capacity on Veterans Memorial Parkway attracts vehicles that were previously avoiding this river crossing (and using Erie Avenue) as a result of the congestion.

2041 Network Performance

This map displays Brantford's 'MANAGE TRAVEL DEMAND' road network, including short term committed improvements, under 2041 traffic conditions. Emphasis has been placed on reducing the number of vehicles using the network. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

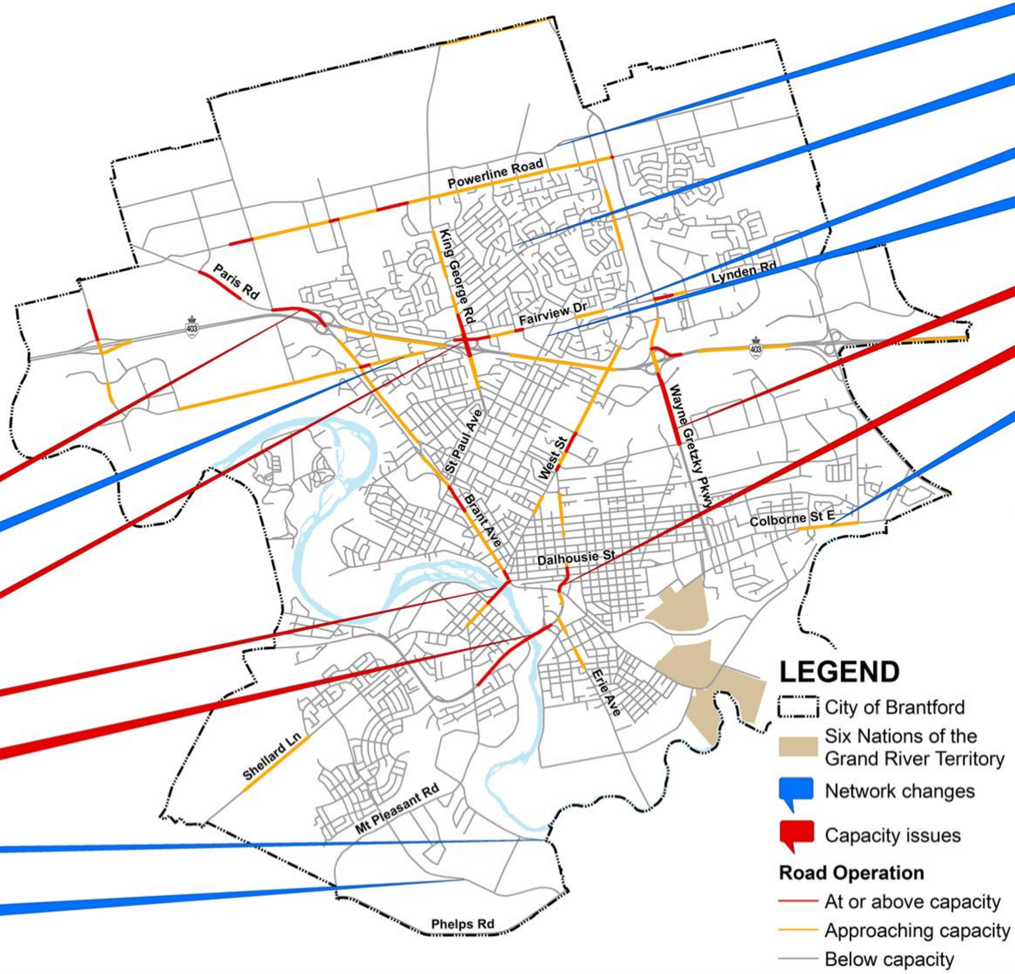
The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate

WHAT IS TDM?

TDM or Transportation Demand Management is the application of strategies and policies to reduce travel demand, or to redistribute this demand in space or time.

Specific to the 'MANAGE TRAVEL DEMAND' network, additional active transportation facilities will be created and transit service will be enhanced. This will increase in the percentage of walking, cycling, and transit trips, while decreasing the percentage of driving trips.

MANAGE TRAVEL DEMAND



Paris Road between Highway 403 and Golf Road

Tollgate Road Road Diet (Paris Road to King George Road)

King George Road crossing Highway 403

Colborne St bridge crossing the Grand River

Veterans Memorial Parkway between Mt Pleasant Street and Market Street South

Tutela Heights Road closure

Proposed Arterial / Collector road network in Expansion Lands (Tutela Heights)

Proposed Arterial / Collector road network in Expansion Lands (North Brantford)

Memorial Drive Road Diet (North Park Street to Powerline Road)

Fairview Road Road Diet (King George Road to West Street

North Park Street Road Diet (Waddington Street to Memorial Drive)

Wayne Gretzky Parkway between Henry Street and Highway 403

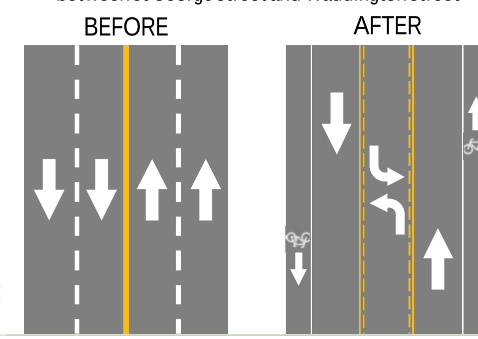
Clarence Street between Dalhousie Street and Icomm Drive / Greenwich Street

Colborne Street Road Diet (Wayne Gretzky Parkway to Garden Avenue)

WHAT IS A ROAD DIET?

A road diet is when one or more vehicle lanes are removed from a roadway and repurposed for a different use to introduce a systematic improvement. The improvements may take many forms, including reducing overall vehicle speeds to improve safety, introducing additional parking, and providing infrastructure for cyclists and/or pedestrians.

Brantford Example: North Park Street between St George Street and Waddington Street



Network Performance Measures

Scenario	2018 Existing	2041 "Do Nothing"	2041 Increased Network Infrastructure	2041 Manage Travel Demand
VKT (km)	143,900	258,500	260,200	243,700
VHT (hours)	2230	4790	4590	4360
Average Travel Time (minutes:seconds)	04:22	05:56	05:41	05:55
Percent of network at or approaching capacity	0.44%	6.08%	5.16%	5.15%

VEHICLE KILOMETRES TRAVELLED (VKT)
The total kilometers travelled by all vehicles in the network during the PM peak hour.

VEHICLE HOURS TRAVELLED (VHT)
The total time spent travelling by all vehicles in the network during the PM peak hour.

WHAT DOES THIS MEAN?

With population growth, there will be an increase in demand on the road network. This means an increase in VKT, VHT, average travel time, and the percent of the network that is at or approaching capacity. However, increasing network infrastructure and managing travel demand will help accommodate the additional demand.

IF WE…

INCREASE NETWORK INFRASTRUCTURE

- Insignificant change in VKT
- 4% decrease in VHT
- 15 sec decrease in average travel time
- 15% reduction of network at or approaching capacity

MANAGE TRAVEL DEMAND

- 6% decrease in VKT
- 9% decrease in VHT
- Insignificant change in average travel time
- 15% reduction of network at or approaching capacity

Increasing Network Infrastructure (increasing supply) and Managing Travel Demand (decreasing demand) are on the opposite ends of the spectrum when managing the performance of a transportation network. The ultimate solution will likely be a hybrid of the two scenarios.

CITY OF BRANTFORD

MASTER SERVICING PLAN TRANSPORTATION MASTER PLAN

ENVISIONING OUR CITY: 2041

Notice of Public Information Centre

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We Want to Hear from You!

What should the City of Brantford look like in 2041? The decisions we make as a community today will shape our City's future tomorrow. At our last Public Information Centre (PIC) in February 2020, we presented the opportunities and constraints associated with meeting the growth targeted in the City's Official Plan using existing transportation and servicing infrastructure. Where transportation and servicing constraints were identified, infrastructure/strategy improvement opportunities to meet these challenges in the future were presented.

At our next PIC, we will present the draft preferred short and long term strategy for a multi-modal transportation plan for the TMP and for a city wide master servicing plan for the MSP. It will also present high level cost comparisons and a draft implementation plan for the preferred solution and answer any questions you may have.

In response to the COVID-19 situation, this PIC will be held as a virtual PIC. All content and instructions on how to submit questions will be posted on the project webpages:
www.brantford.ca/MasterServicingPlan
www.brantford.ca/TransportationMasterPlan

PIC Boards and a video walkthrough of their content will be posted on **Tuesday, June 9, 2020 at 3:00 p.m.** This will be followed by a two week question submission period closing June 23, 2020. A question and answers video will be posted on **Tuesday, June 30, 2020 at 3:00 p.m.** This will be followed by a three week question submission period, closing July 21, 2020. A Frequently Asked Questions (FAQ) document being posted on **Tuesday, July 28, 2020 at 3:00 p.m.**

If you wish to submit comments or would like to be added to the project mailing list, please contact:

Master Servicing Plan	**Transportation Master Plan**
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Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

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CONVERSATION

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Virtual Public Information Center #4

June 9, 2020 & June 30, 2020

Welcome

Why Are We Here?

- The City is updating the 2014 Water, Wastewater and Stormwater Master Servicing Plan (MSP) and the 2014 Transportation Master Plan (TMP)
- These updates will develop long term servicing and transportation strategies to ensure the maintenance of services for existing residents and business as well as support future growth of the community
- This Virtual Public Information Centre is presenting the preferred future network recommendations for:
  - Public Transit Strategy
  - Active Transportation System (cycling and walking)
  - Roadway Network Infrastructure
  - Water Servicing
  - Wastewater Servicing
  - Stormwater Servicing

We Need Your Help!

- Review the content
- Ask questions
- Provide comments

Virtual Public Information Centre (PIC)

In response to the advice of public health officials to limit in-person gatherings due to COVID-19, this Virtual Public Information Centre (PIC) has been developed. Through this Virtual PIC, you will be able to learn more about the Master Servicing Plan and Transportation Master Plan projects and provide comments on the study findings.

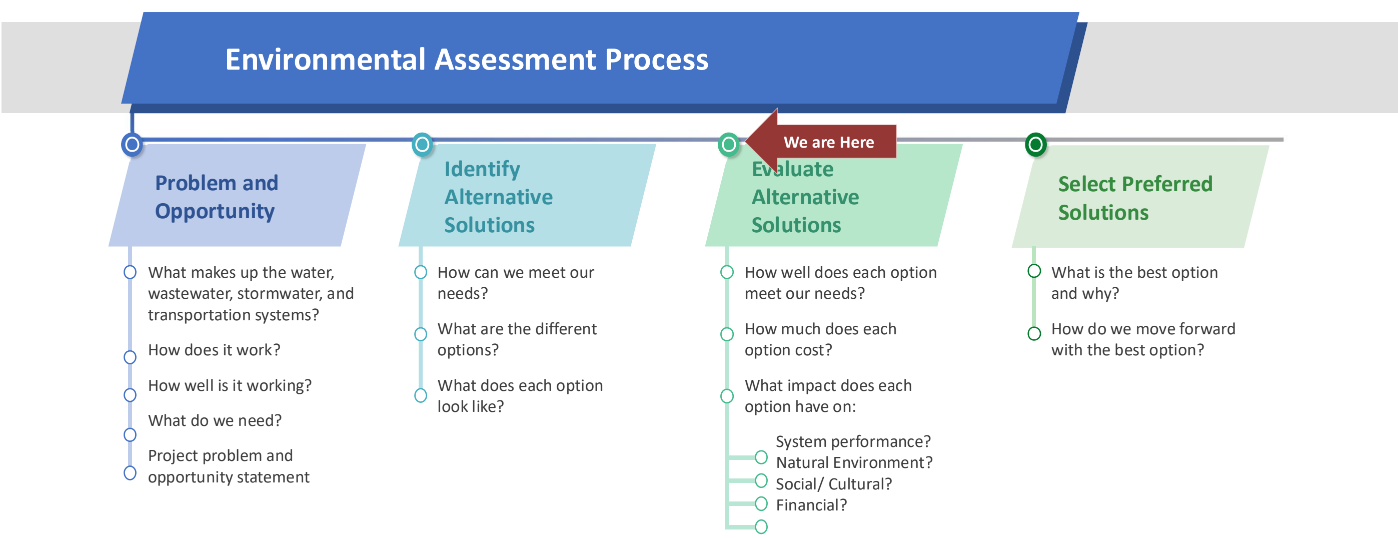
Virtual PIC Process

- **June 9 at 3:00 p.m.** PIC Boards and a video walkthrough of their content will be posted
- **June 9 – June 23** First question and comment submission period
- **June 30 at 3:00 p.m.** A question and answers video will be posted
- **June 30 – July 21** Second question and comments submission period
- **July 28 at 3:00 p.m.** A Frequently Asked Questions (FAQ) document will be posted

In accordance with the Municipal Freedom of Information and Privacy Protection Act, no personal information will be included with the responses presented on the project website and all comments will become part of the public record.

Municipal Class EA Process

The Water, Wastewater, and Stormwater Master Servicing Plan Update and Transportation Master Plan Update involve the completion of Phases 1 and 2 of the MEA Municipal Class Environmental Assessment (EA) process



The study follows the Master Plan process as outlined in Section A.2.7 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Oct 2000, as amended in 2007, 2011, and 2015).

Consultation Overview - TMP

Public Consultation Centre Purpose

To present preferred future transportation network recommendations for:

- Public Transit Strategy
- Active Transportation System (cycling and walking)
- Roadway Network Infrastructure

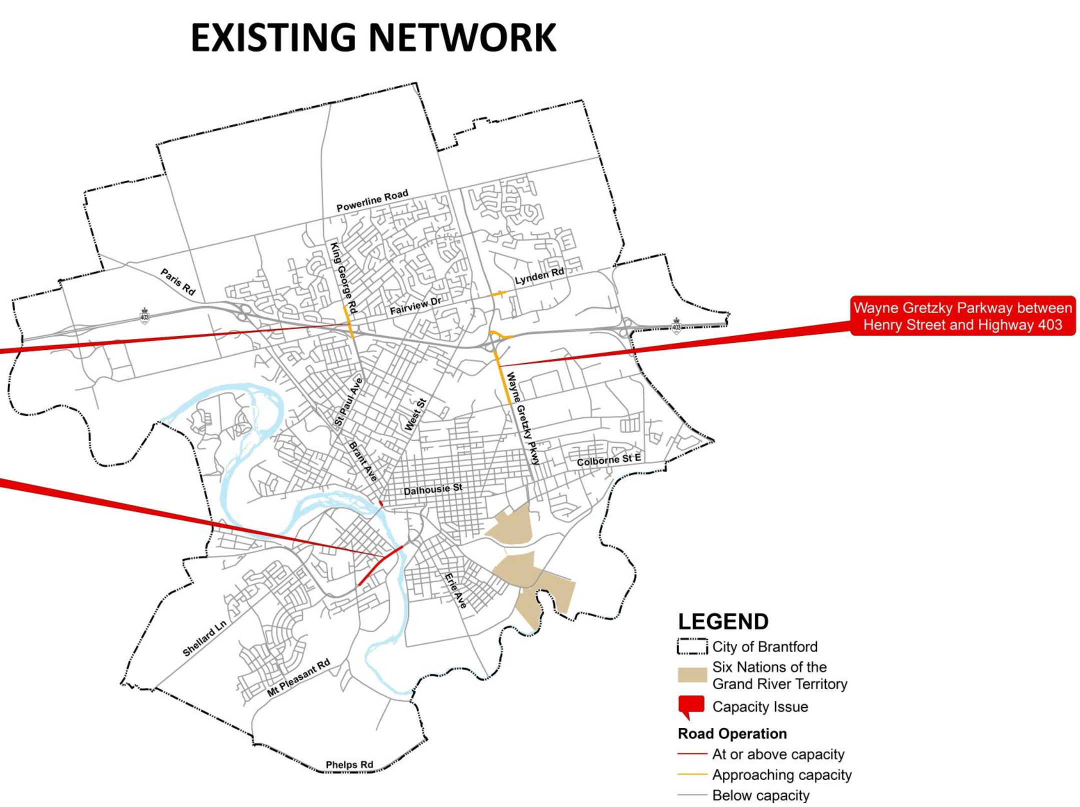
Consultation to Date

- Study Commencement - October 19th and 26th, 2017
- Public Meeting #1: Envisioning Our City: 2041 – November 16th, 2017
- Active Transportation Workshop - April 5th, 2018
- Public Meeting #2: Foundations and Strategies - May 17th, 2018
- Public Meeting #3: Constraints and Opportunities - February 10th, 2020

2018 Network Performance

This map displays Brantford's existing road network and hi-lights specific areas where the network is experiencing capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment is operating during the existing PM peak hour. Red segments are congested (at capacity), orange segments are operating with some congestion (approaching capacity), and grey segments are operating well (below capacity).

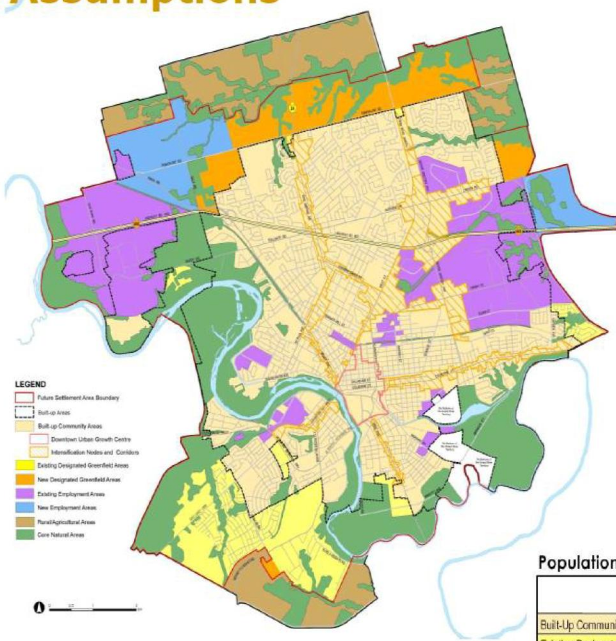


HOW IS THE NETWORK PERFORMING?

Overall, the existing network is operating well. The three areas of concern are; King George Road and Wayne Gretzky Parkway in the vicinity of Highway 403 and the Veterans Memorial Parkway crossing of the Grand River.

Growth Management Assumptions

Growth Management Assumptions



Growth management assumptions influence how the City can accommodate forecasted growth and provide a basis for the Urban Structure as well as the development of land use designations and policies.

The Growth Plan for the Greater Golden Horseshoe projects that Brantford's population will reach 163,000 residents, with 79,000 jobs in the City, by the year 2041. As indicated in the table below, it is anticipated that new growth of 61,300 residents and 34,110 jobs will be distributed throughout the City, in a combination of intensification within the Built-up Area and growth in the city's new and existing Designated Greenfield and Employment Areas.

- The City's Built-up Area (shown in the light peach tone on the map at left) will accommodate over 15,000 new residents through intensification.
- Over 23,000 new residents will be added to the existing Designated Greenfield Area (yellow on the map) as it continues to develop.
- Over 22,000 new residents will be accommodated in the boundary expansion lands in the new Designated Greenfield Area (orange on the map).
- 10,450 new jobs will be located in the existing Employment Areas (purple on the map), with 8,400 new jobs in new Employment Areas in the boundary expansion lands (blue on the map). The rest of the employment growth will be located in business, office and commercial developments located in the Downtown and other parts of the City.

Population and Employment Growth, 2016-2041

	Population			Employment		
	2016	2041	Growth	2016	2041	Growth
Built-Up Community Area	94,720	110,305	15,585	18,530	28,055	9,525
Existing Designated Greenfield Area	6,485	29,845	23,360	355	1,495	1,140
New Designated Greenfield Area	*	22,620	22,620	*	4,955	4,955
Existing Employment Area				25,575	36,025	10,450
New Employment Area				*	8,400	8,400
Rural Area	495	230	-265	430	70	-360
Total	**101,700**	**163,000**	**61,300**	**44,890**	**79,000**	**34,110**

Note: * Accounted for in the Rural Area in 2016. Most of the 2016 Rural Area population and employment will be absorbed into the New Designated Greenfield Area or New Employment Area.
Source: Envisioning Brantford - MCR Part 1 Report, SGL Planning & Design et. al., Chapters 6 and 10

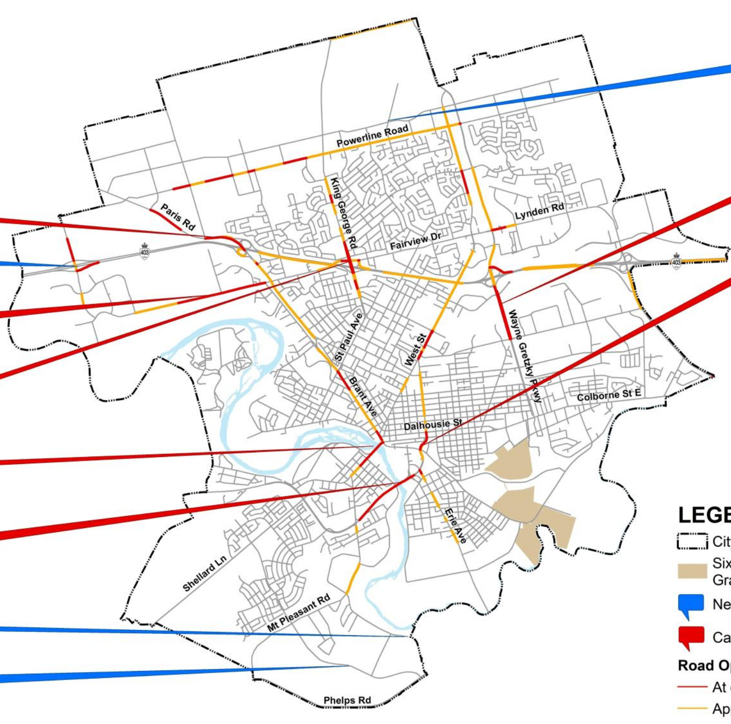
1

2041 Network Performance

DO MINIMAL NETWORK

This map displays Brantford's existing road network, including short term committed improvements, under 2041 traffic conditions. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).



Proposed Arterial / Collector road network in Expansion Lands (North Brantford)

Wayne Gretzky Parkway between Henry Street and Highway 403

Clarence Street between Dalhousie Street and Icomm Drive / Greenwich Street

Paris Road between Highway 403 and Golf Road

Oak Park Road & Highway 403 interchange upgrade

Hardy Road from east of Ferrero Boulevard to Ava Road

King George Road crossing Highway 403

Lorne Bridge crossing the Grand River

Veterans Memorial Parkway between Mt Pleasant Street and Market Street South

Tutela Heights Road closure

Proposed Arterial / Collector road network in Expansion Lands (Tutela Heights)

WHAT WILL HAPPEN IF WE DO MINIMAL?

Overall, the 'Do Minimal' network will operate poorly. Almost all of the major arterial roads are expected to experience some capacity issues. Specifically, all five north-south arterial roads that cross Highway 403 are expected to have some capacity issues in the vicinity of the highway and the two main crossings of the Grand River (Colborne Street and Veterans Memorial Parkway) are anticipated to be over capacity.

LEGEND

- City of Brantford
- Six Nations of the Grand River Territory
- Network changes
- Capacity issues

Road Operation

- At or above capacity
- Approaching capacity
- Below capacity

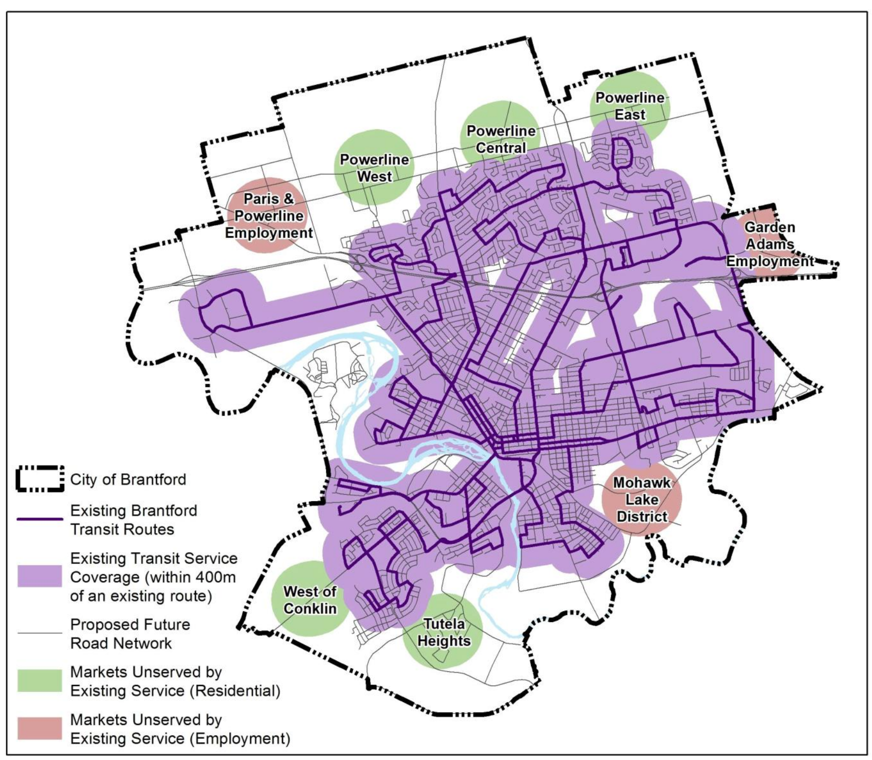
Alternative Strategies to Address Network Needs

- **Travel Demand Management (TDM)**
  - Modify travel behaviour – time of travel, land use characteristics
  - Reduce vehicle use – provide improved programs, services and facilities for other modes
  - Examples: increased transit, increased cycle, increased walk mode, ride share opportunities
- **Transportation System Management (TSM)**
  - Optimize infrastructure efficiency to improve performance and improve safety for all modes
  - Re-allocation of space within right of way
  - Use of technology
  - Examples: signal coordination, auxiliary turning lanes, turn restrictions
- **Increase the supply of transportation infrastructure**
  - Expand existing infrastructure, e.g. widen road
  - Add new infrastructure, e.g. new road, extend existing road

Transit Opportunities - Approach

- Assess existing transit system coverage
- Review existing mode splits to transit for traffic zones
- Set appropriate targets for land use type and density, and in consideration of available transit
- Apply targets to 2041 trip ends
- Adjust total travel demands for vehicles
- Assign transit trips to enhanced/expanded transit service coverage
- Outcome:
  - Overall system improvement in transit use results in reduction of vehicle trips
  - Corridor transit use increase
- Increase in transit use increase results in auto trip reduction.
- Capacity analysis reassessed using reduced auto demand scenario (TDM).

Existing Transit System Coverage and Future Market Opportunities



Transit Opportunities

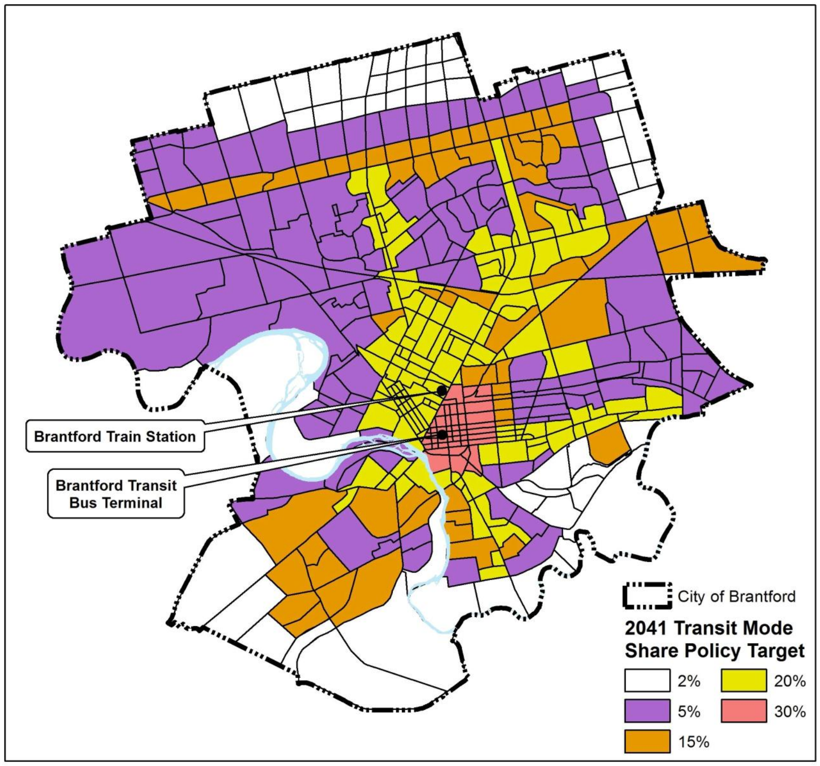
Transit Mode Share – City Wide
- 2016 – 2.7%
- 2041 Trend – 2.2%
- 2041 TDM Max – 5.9%

Achieving more than doubling of transit mode share requires extension of service into developing areas and increasing service frequency in key corridors.

Significant investment required to achieve target mode split.

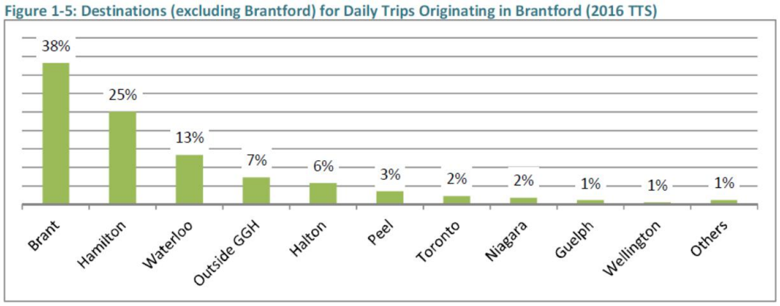
	Transit Trips by Route: PM Peak Period	2016	2041 "Do Min"	2041 "TDM Max"
Route 1	Eagle Place	228	357	1,090
Route 2	West Street/Brier Park	409	514	1,338
Route 4	Mall Link (4A)	372	485	1,345
Route 4	Mall Link (4C)	318	426	1,151
Route 5	West Brant/Oakhill	116	152	563
Route 6	West Brant/Shellard	215	433	1,782
Route 7	East Ward/Braneida	280	405	990
Route 8	Holmedale/Mayfair	239	451	1,855
Route 9	Echo Place	349	519	1,811
Route 100	Powerline	-	-	914
	TOTAL	2,526	3,743	12,838

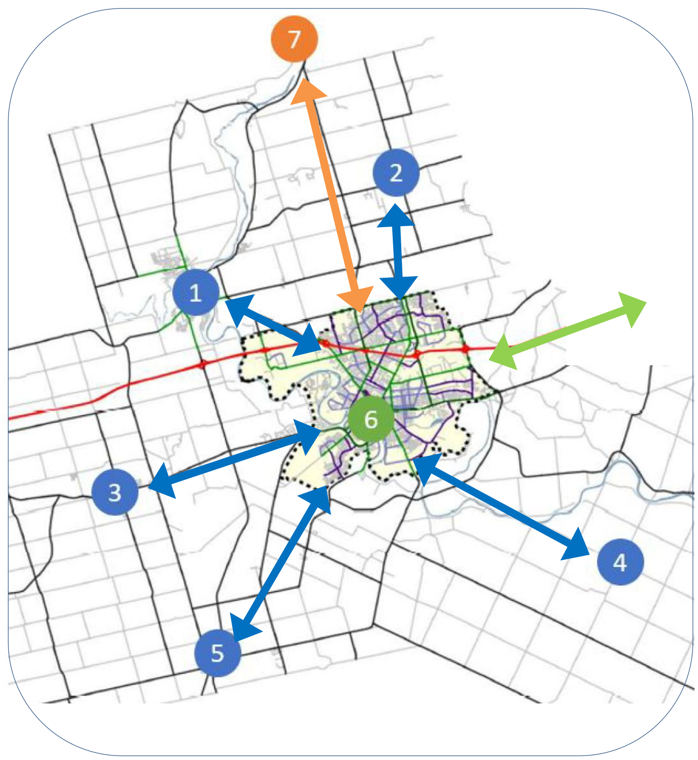
2041 Transit Mode Split – Zone Policy Targets



Transit Opportunities – Partnership Opportunities

Figure 1-5: Destinations (excluding Brantford) for Daily Trips Originating in Brantford (2016 TTS)





- Transit service market potential – 2041 pm peak period person trips from Brantford to Brant:
  1. Paris - 5,000 person trips (all modes)
  2. Saint George - 1,000 person trips (all modes)
  3. Burford/Airport - 250 person trips (all modes)
  4. Oshwekin area - 200 person trips (all modes)
  5. Scotland area - 650 person trips (all modes)
- Transit service market potential – 2041 pm peak period person trips from Brantford to GTA:
  6. Via Hwy 403 - 4,500 person trips (all modes)
- Transit service market potential – 2041 pm peak period person trips from Brantford to Cambridge/Kitchener/Waterloo
  7. Via Hwy 24 – 1,300 person trips (all modes)

2041 Network Performance

This map displays Brantford's 'MANAGE TRAVEL DEMAND' road network, including short term committed improvements, under 2041 traffic conditions. Emphasis has been placed on reducing the number of vehicles using the network. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

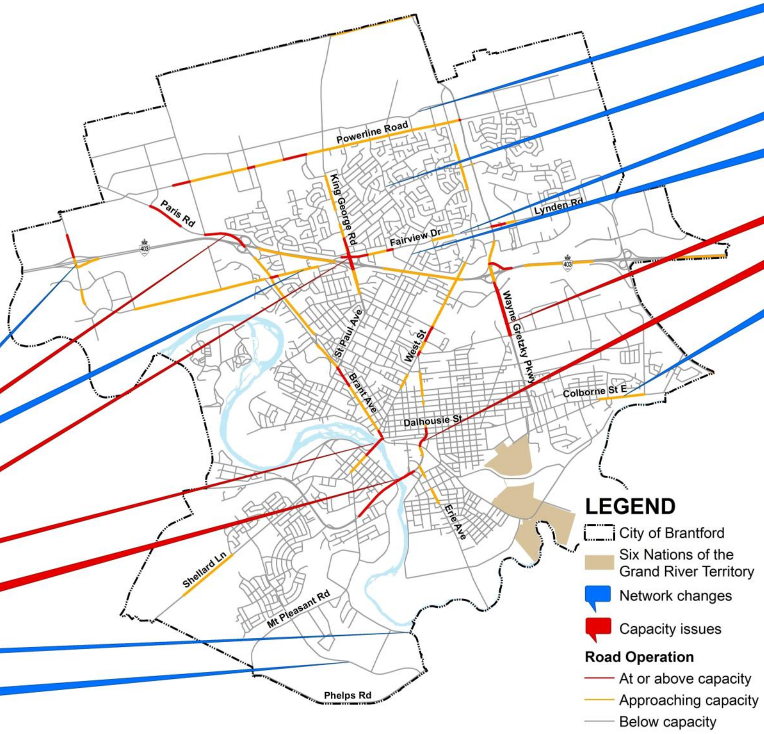
The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).

WHAT IS TDM?

TDM or Transportation Demand Management is the application of strategies and policies to reduce travel demand, or to redistribute this demand in space or time.

Specific to the 'MANAGE TRAVEL DEMAND' network, additional active transportation facilities will be created and transit service will be enhanced. This will increase in the percentage of walking, cycling, and transit trips, while decreasing the percentage of driving trips.

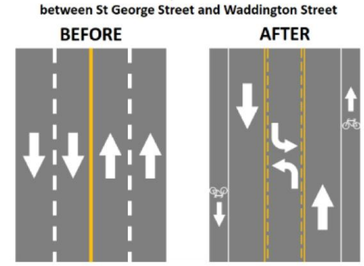
MANAGE TRAVEL DEMAND



WHAT IS A ROAD DIET?

A road diet is when one or more vehicle lanes are removed from a roadway and repurposed for a different use to introduce a systematic improvement. The improvements may take many forms, including reducing overall vehicle speeds to improve safety, introducing additional parking, and providing infrastructure for cyclists and/or pedestrians.

Brantford Example: North Park Street between St George Street and Waddington Street

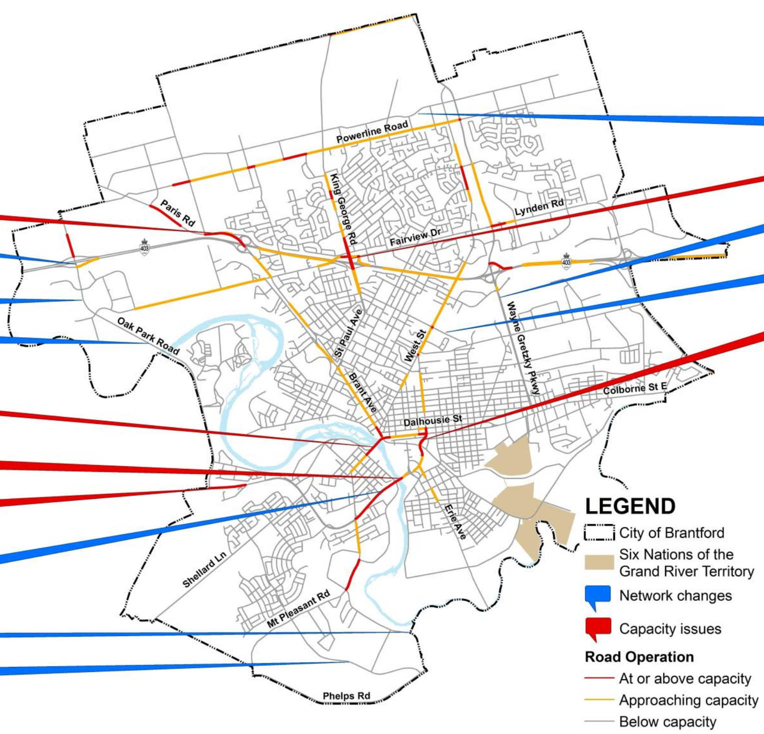


2041 Network Performance

This map displays Brantford's 'INCREASED INFRASTRUCTURE' road network, including short term committed improvements, under 2041 traffic conditions. It hi-lights specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).

INCREASED NETWORK INFRASTRUCTURE



WHAT INFRASTRUCTURE?

The 2014 Transportation Master Plan outlined a series of infrastructure projects that would be necessary to accommodate the anticipated population and employment growth to 2031. They include the addition of new roads and the widening of existing roads.

WHAT WILL HAPPEN IF WE INCREASE NETWORK INFRASTRUCTURE?

The 'INCREASED INFRASTRUCTURE' network will operate favorably. A few notable network improvements include a reduction in congestion along Hardy Road and Brant Avenue as a result of the Oak Park Road widening and extension and the elimination of congestion on Wayne Gretzky Parkway (Lynden Road to Colborne Street) as a result of a widening to 6 lanes. However, it should also be noted that the two main crossings of the Grand River (Colborne Street and Veterans Memorial Parkway) are still anticipated to be over capacity even with the widening of Veterans Memorial Parkway (Mount Pleasant to Erie Avenue) to 4 lanes. The additional capacity on Veterans Memorial Parkway attracts vehicles that were previously avoiding this river crossing (and using Erie Avenue) as a result of the congestion.

Constraints and Opportunities – Assessment Approach

Problem Identification

- Based on 2041 Do Minimal Alternative
- Identify system problems through application of strategic transportation model – demands on network
- Network Performance - Volume to Capacity assessment p.m. peak hour

Assessment

- Assess Travel Patterns - select link analysis to identify origins and destinations for all auto trips using specific links
- Identify impacts of alternative strategies on corridor/link performance
- Identify preferred alternative to address deficiency on link/in corridor
- Assess total system performance once preferred alternative identified for each corridor

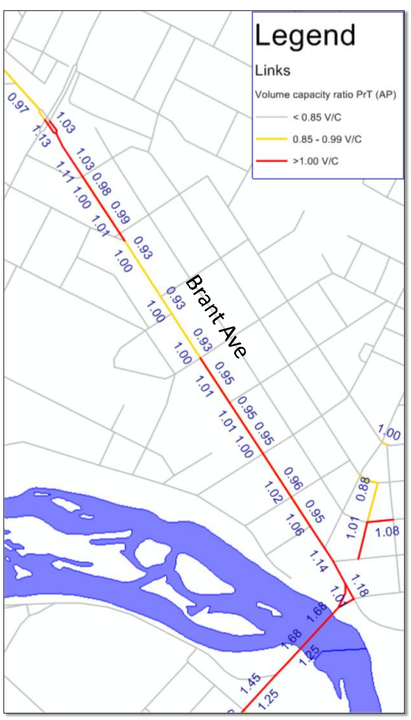
Evaluation

- High level screening of mitigation opportunities to address stated problem.
- Based on impacts on performance (benefits) and impacts of implementation (disadvantages), decision made as to appropriateness for long term plan.
- Example evaluation table:

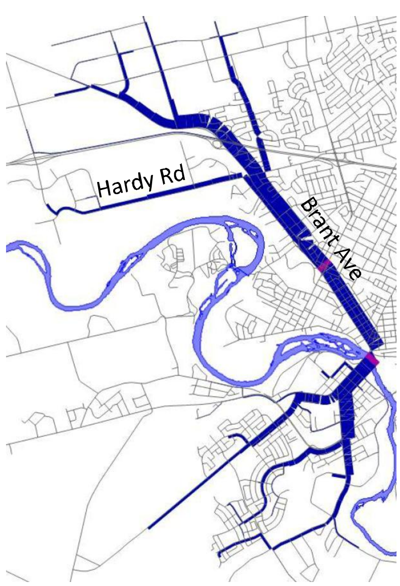
Travel Demand Management	✓
Transportation System Management	✓
Road Widening	✗
New Road	✓

✓ Carry Forward
✓ Not Preferred But Protect Long Term
✗ Not Carried Forward

Constraints and Opportunities – Inter-Regional



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Brant Avenue - St Paul Avenue to Colborne Street

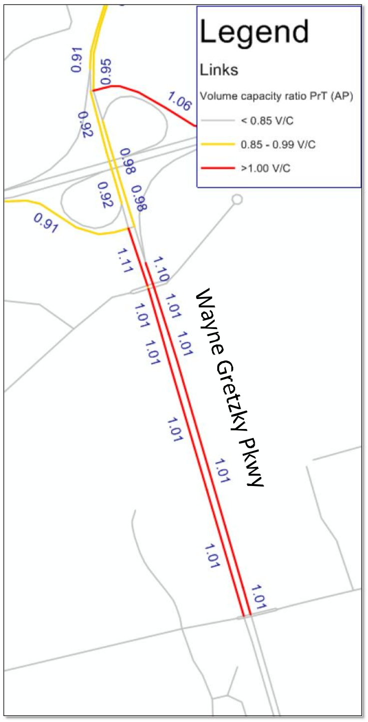
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

Assessment

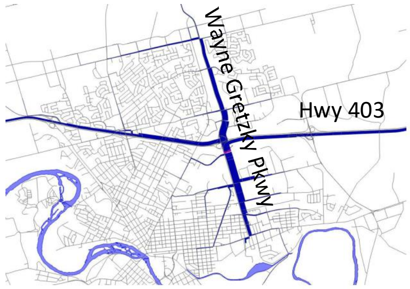
- Corridor Transit Mode Split
  - 2016 – 9%
  - 2041 w/ TDM – 26%
- Oak Park Road Extension potential to divert 300-500 peak hour vehicles

Constraints and Opportunities – Inter-Regional

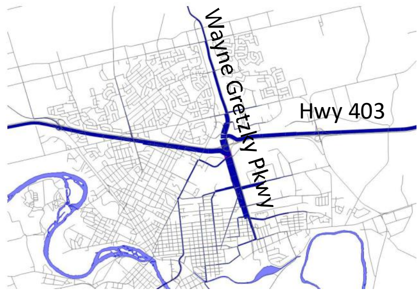


2041 Volume to Capacity – PM Peak Hour

Northbound



Southbound



Origin-Destination Flow – PM Peak Hour

Wayne Gretzky Parkway - Henry Street to Highway 403

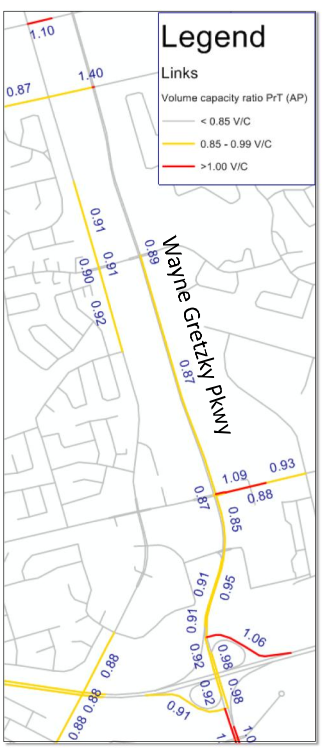
Alternatives

TDM	✓
TSM	✓
Road Widening	✓
New Road	✗

Assessment

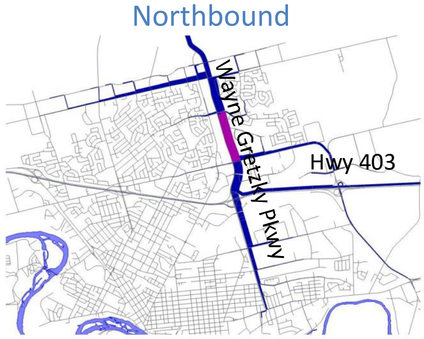
- Corridor Transit Mode Split
  - 2016 – 5%
  - 2041 w/ TDM – 14%
- Widen from 4-lanes to 6-lanes to accommodate growth volume, inter- and intra-regional

Constraints and Opportunities – Inter-Regional



2041 Volume to Capacity – PM Peak Hour

Northbound



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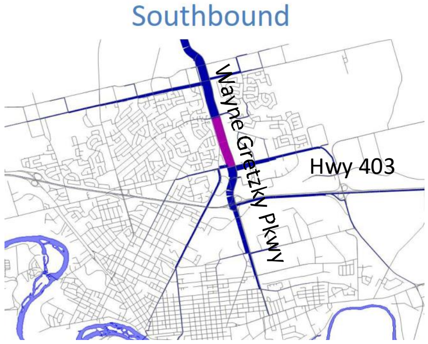


Origin-Destination Flow – PM Peak Hour

Wayne Gretzky Parkway - North of Highway 403

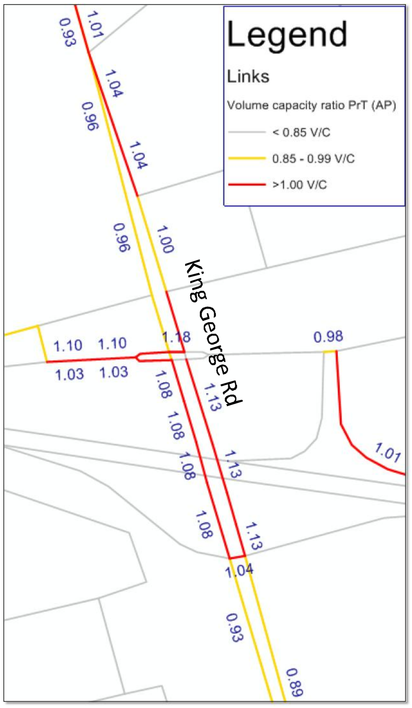
Alternatives

TDM	✓
TSM	✓
Road Widening	✓
New Road	✗

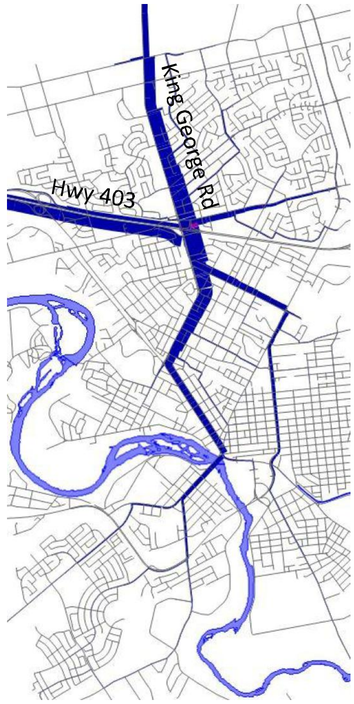
Assessment

- Corridor Transit Mode Split
  - 2016 – 0% (WGP north of Fairview / Lynden)
  - 2041 w/ TDM – 8%
- Provide an additional lane in each direction between Lynden Road and the E-NS ramp terminal and the N-W direct ramp

Constraints and Opportunities – Inter-Regional



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

King George Road - Crossing Highway 403

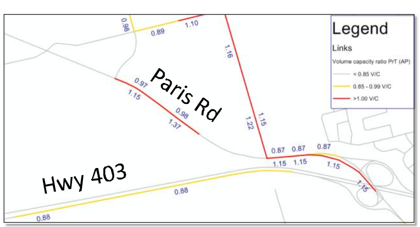
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

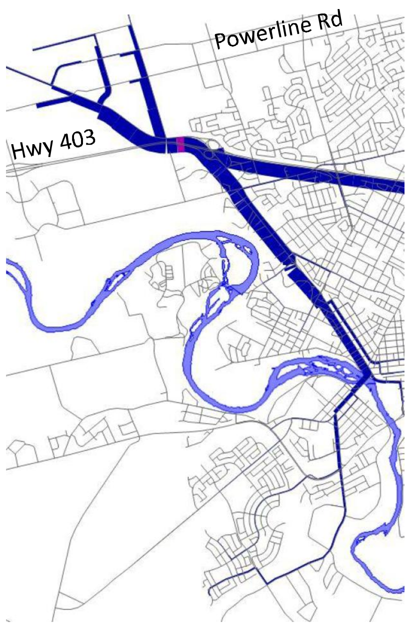
Assessment

- Corridor Transit Mode Split
  - 2016 – 5%
  - 2041 w/ TDM – 12%
- Access Management Plan
- 4-lane extension of WGP Parkway north of Powerline Road as alternative parallel capacity to King George corridor

Constraints and Opportunities – Inter-Regional



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Paris Road - Highway 403 to Powerline Road

Alternatives

TDM	✓
TSM	✓
Road Widening	✓
New Road	✓

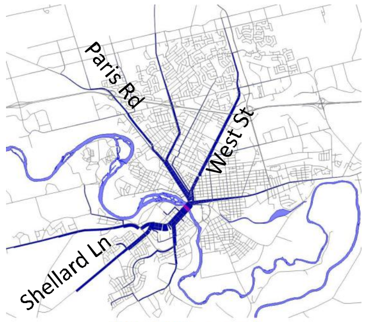
Assessment

- Corridor Transit Mode Split
  - 2016 – 0% (no transit route)
  - 2041 w/ TDM – 25%
- Widen to 4-lanes Golf Road to Oak Park Road to match with the current 4 lane configuration east of Golf Road
- Oak Park Road Extension potential to divert 250-300 peak hour vehicles

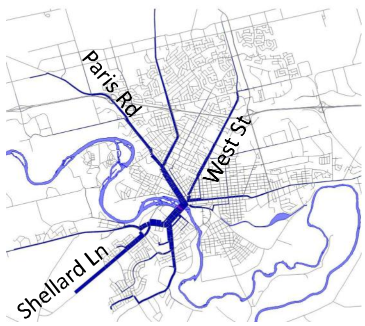
Constraints and Opportunities – Intra-Regional

2041 Volume to Capacity – PM Peak Hour

Eastbound



Westbound



Origin-Destination Flow – PM Peak Hour

Lorne Bridge - Grand River Crossing

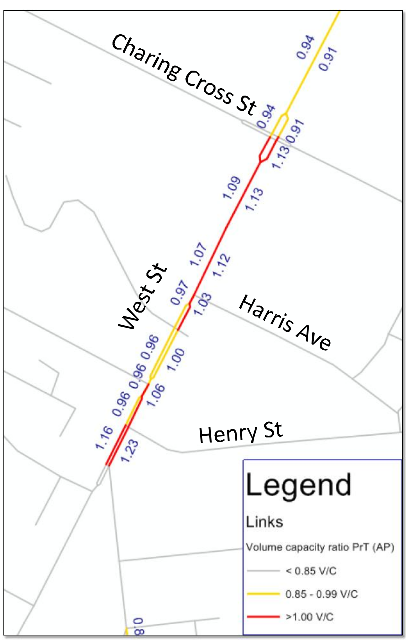
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

Assessment

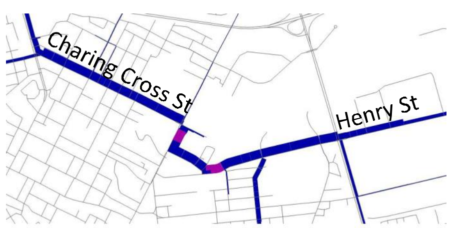
- Corridor Transit Mode Split
  - 2016 – 3%
  - 2041 w/ TDM – 16%
- Oak Park Road Extension potential to divert 300-500 peak hour vehicles

Constraints and Opportunities – Intra-Regional

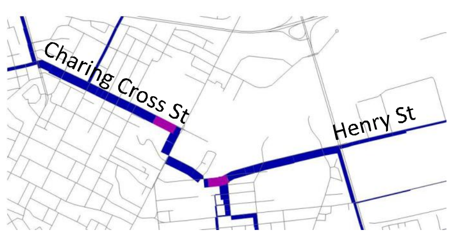


2041 Volume to Capacity – PM Peak Hour

Northbound



Southbound



Origin-Destination Flow – PM Peak Hour

West Street - Charing Cross Street to Henry Street

Alternatives

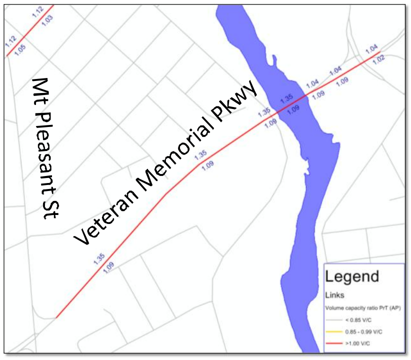
TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

Assessment

- Corridor Transit Mode Split
  - 2016 – 6%
  - 2041 w/ TDM – 14%
- East-West capacity issue using West Street as parallel transfer (i.e. Charing Cross Street to Henry Street).
- Extend Charing Cross Street to Henry Street

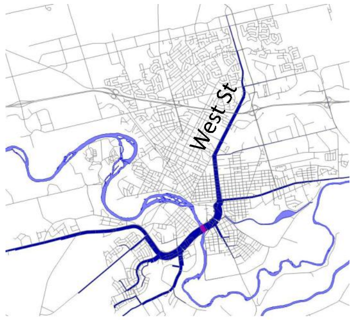
Constraints and Opportunities – Intra-Regional

Veterans Memorial Parkway - Mt. Pleasant Street to Market Street

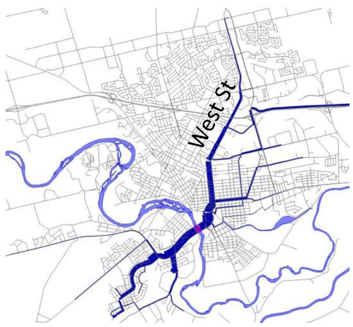


2041 Volume to Capacity – PM Peak Hour

Eastbound



Westbound



Origin-Destination Flow – PM Peak Hour

Alternatives

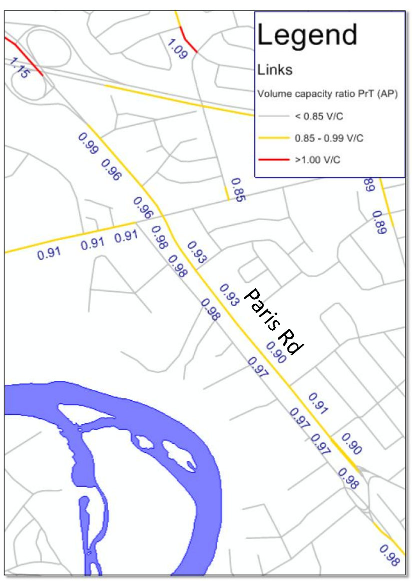
TDM	✓
TSM	✓
Road Widening	✓
New Road	✗

Assessment

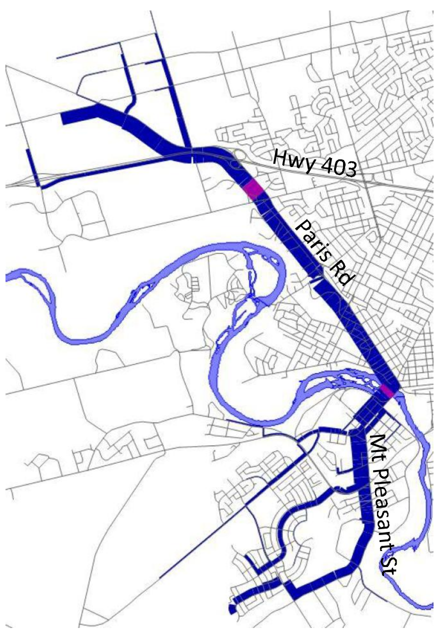
- Corridor Transit Mode Split
  - 2016 – 8%
  - 2041 w/ TDM – 23%
- Improve County Road 18 through TSM (signage, shoulder upgrades).
- Widen VMP to provide consistent 4-lane cross section (including bridge, through reallocation of space or widening of bridge deck)

Constraints and Opportunities – Intra-Regional

Paris Road - South of Highway 403



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

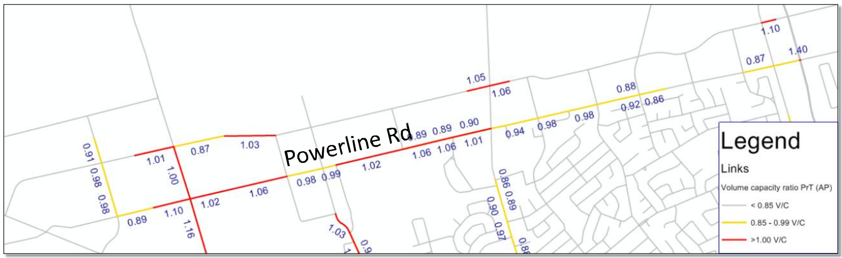
Alternatives

TDM	✓
TSM	✗
Road Widening	✗
New Road	✓

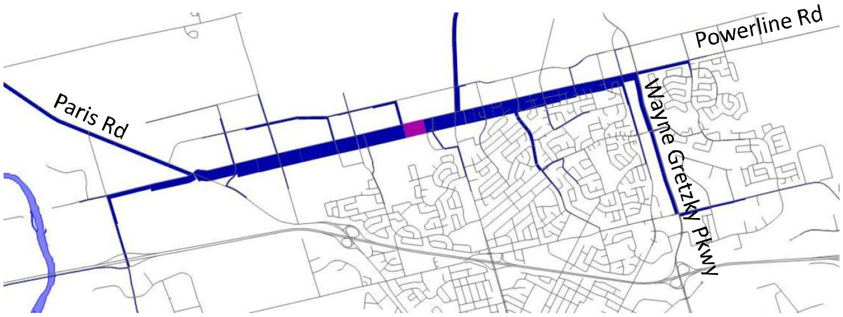
Assessment

- Corridor Transit Mode Split
  - 2016 – 12%
  - 2041 w/ TDM – 40%
- Oak Park Road Extension potential to divert 300-500 peak hour vehicles

Constraints and Opportunities – Intra-Regional



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Powerline Road - Paris Road to Wayne Gretzky Parkway

Alternatives

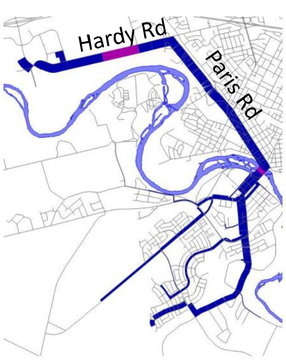
TDM	✓
TSM	✗
Road Widening	✓
New Road	✗

Assessment

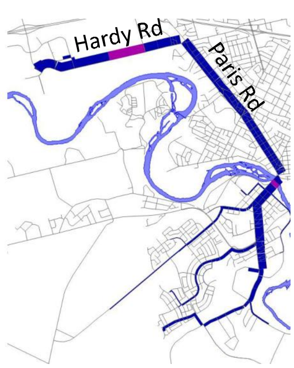
- Corridor Transit Mode Split
  - 2016 – 0%
  - 2041 w/ TDM – 25%
- Widen Powerline road to urban 4-lane cross section

Constraints and Opportunities – Intra-Regional

2041 Volume to Capacity – PM Peak Hour



Eastbound



Westbound

Origin-Destination Flow – PM Peak Hour

Hardy Road - Ferrero Boulevard to Paris Road

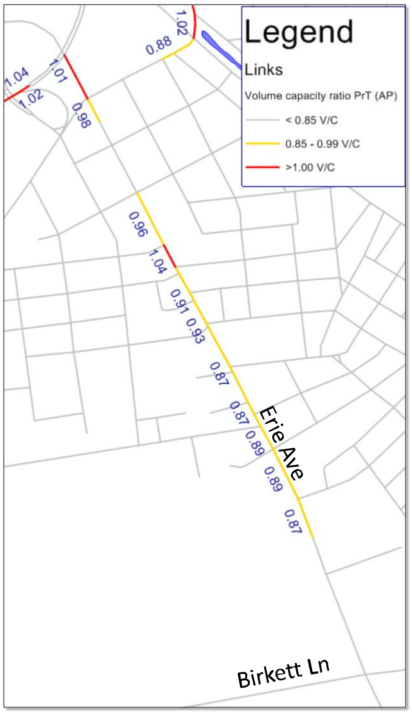
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

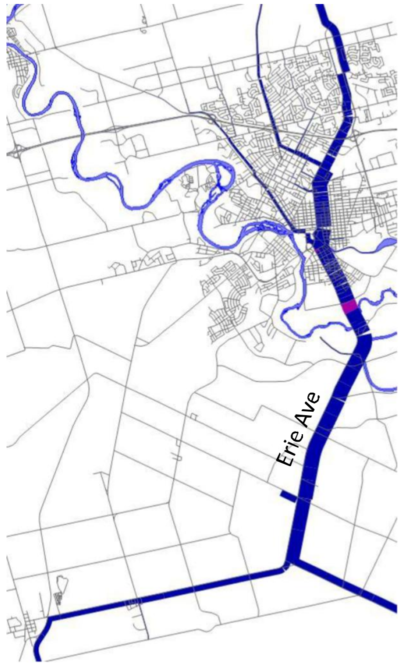
Assessment

- Corridor Transit Mode Split
  - 2016 – 18%
  - 2041 w/ TDM – 55%
- Oak Park Road Extension potential to divert 100 peak hour vehicles

Constraints and Opportunities – Intra-Regional



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Erie Avenue - Veterans Memorial Parkway to Birkett Lane

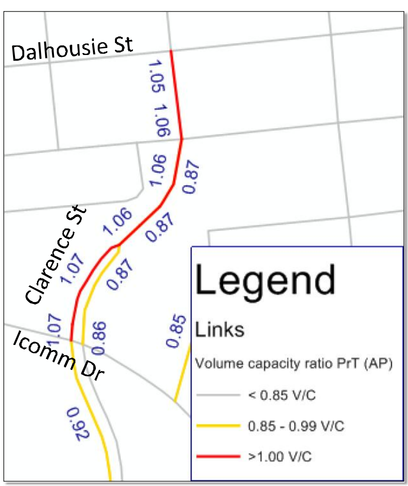
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✗

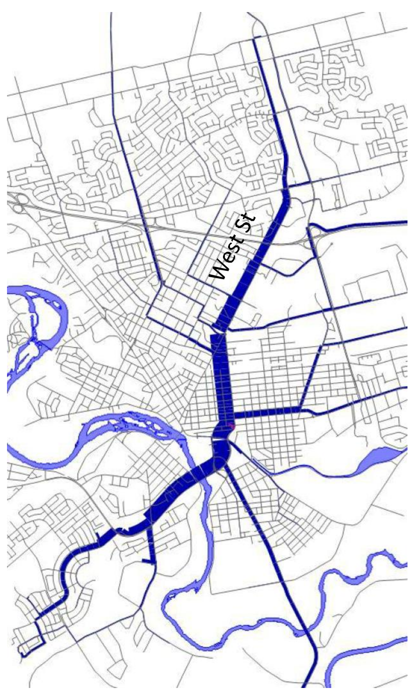
Assessment

- Corridor Transit Mode Split
  - 2016 – 24%
  - 2041 w/ TDM – 52%
- TSM measures (peak turning prohibitions, auxiliary lane provisions) at critical locations

Constraints and Opportunities - Local Systems



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Clarence Street – Dalhousie Street to Icomm Drive

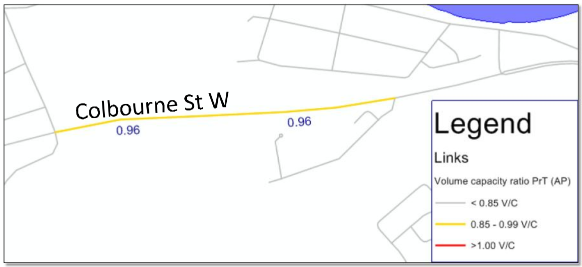
Alternatives

TDM	✓
TSM	✓
Road Widening	✗
New Road	✓

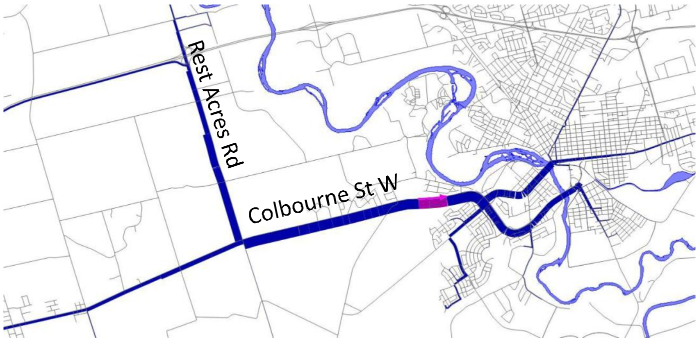
Assessment

- Corridor Transit Mode Split
  - 2016 – 7%
  - 2041 w/ TDM – 22%
- TSM measures (turning prohibitions, auxiliary lanes) at critical locations
- VMP Extension: opportunity to provide alternative route out of downtown via Murray Avenue or WGP

Constraints and Opportunities - Local Systems



2041 Volume to Capacity – PM Peak Hour



Origin-Destination Flow – PM Peak Hour

Colbourne Street West – CR-7 to D'Aubigny Road

Alternatives

TDM	✓
TSM	✓
Road Widening	✓
New Road	✗

Assessment

- Corridor Transit Mode Split
  - 2016 – 0%
  - 2041 w/ TDM – 13%
- Provide additional eastbound lane

Active Transportation Opportunities

Complete Streets - Walking

GOAL: Be a complete, pedestrian-friendly community with networks that integrate with transit, paths and trails, neighbourhood amenities, parks, open space, and schools.

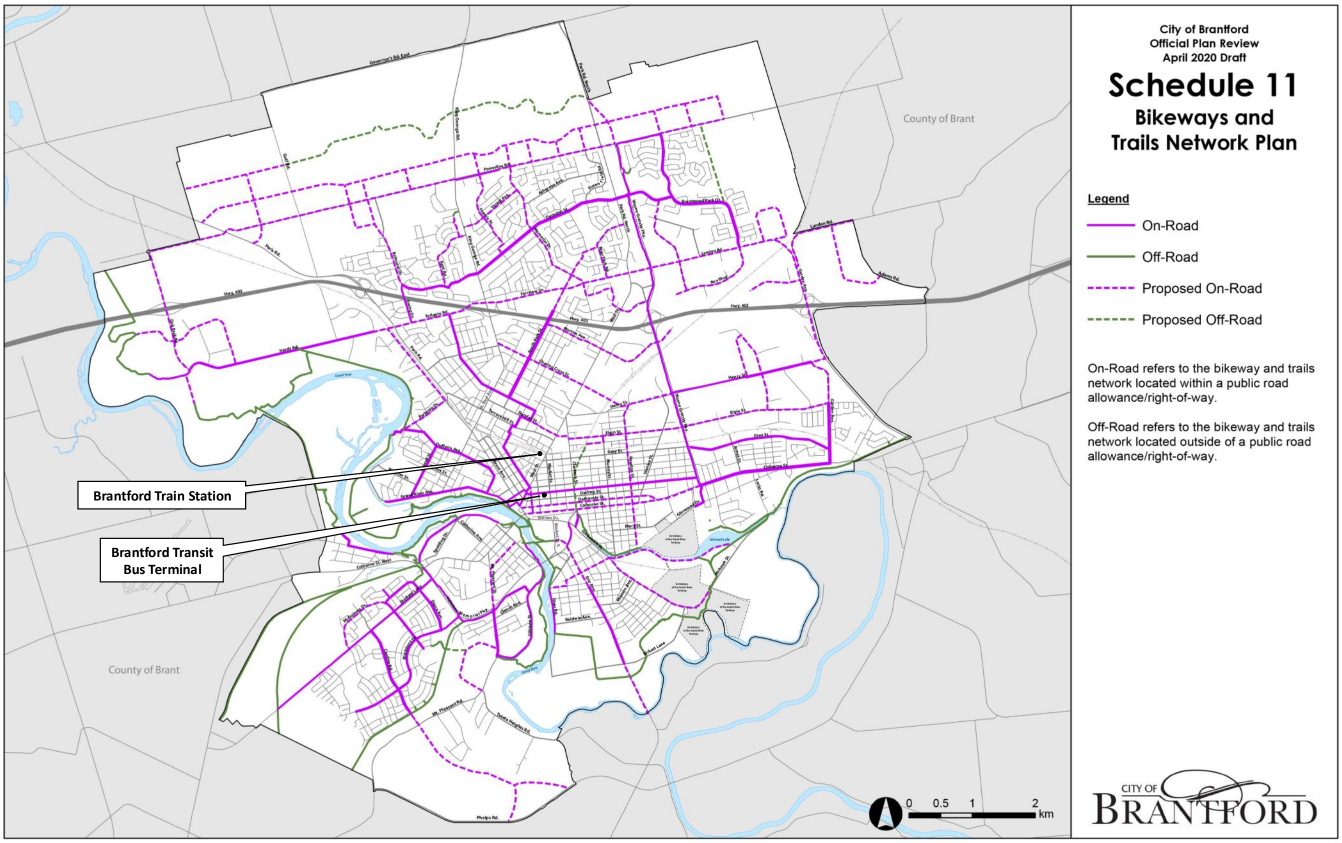
OBJECTIVES:
1. Facilities provide a high level of pedestrian connectivity.
2. Walking environment is safe for users.
3. Pedestrian accessibility, comfort, and mobility levels support walking as a preferred mode.

Complete Streets - Cycling

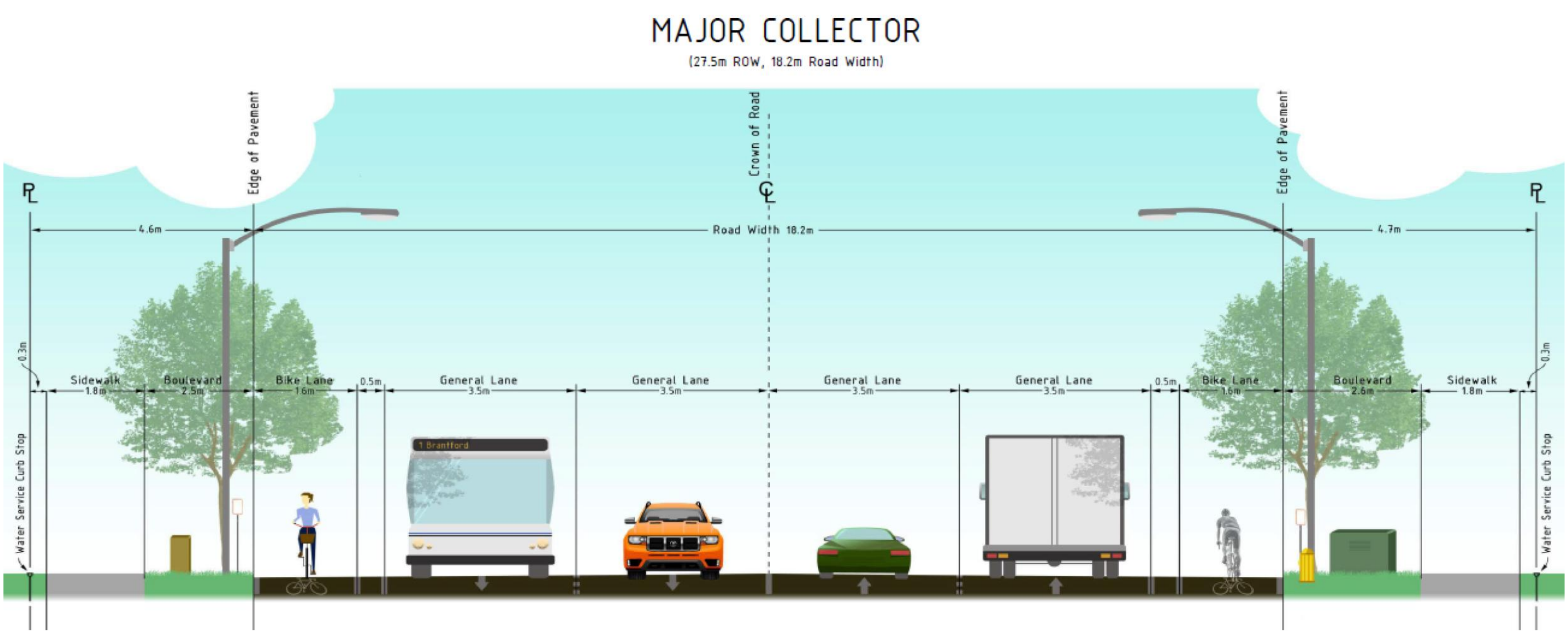
GOAL: Provide safe and convenient bicycle routes suitable for all user types: utilitarian (commuting), recreational (personal or family discretionary), and sport (advanced, high level recreational).

OBJECTIVES:
1. There is a continuous network of safe and direct bicycle routes.
2. There is an ability to navigate the bicycle network with ease.
3. End-of-trip facilities support cycling as a preferred mode of transportation.
4. The bicycling environment is safe.
5. Provide unique and specific design environments appropriate for the different types of users

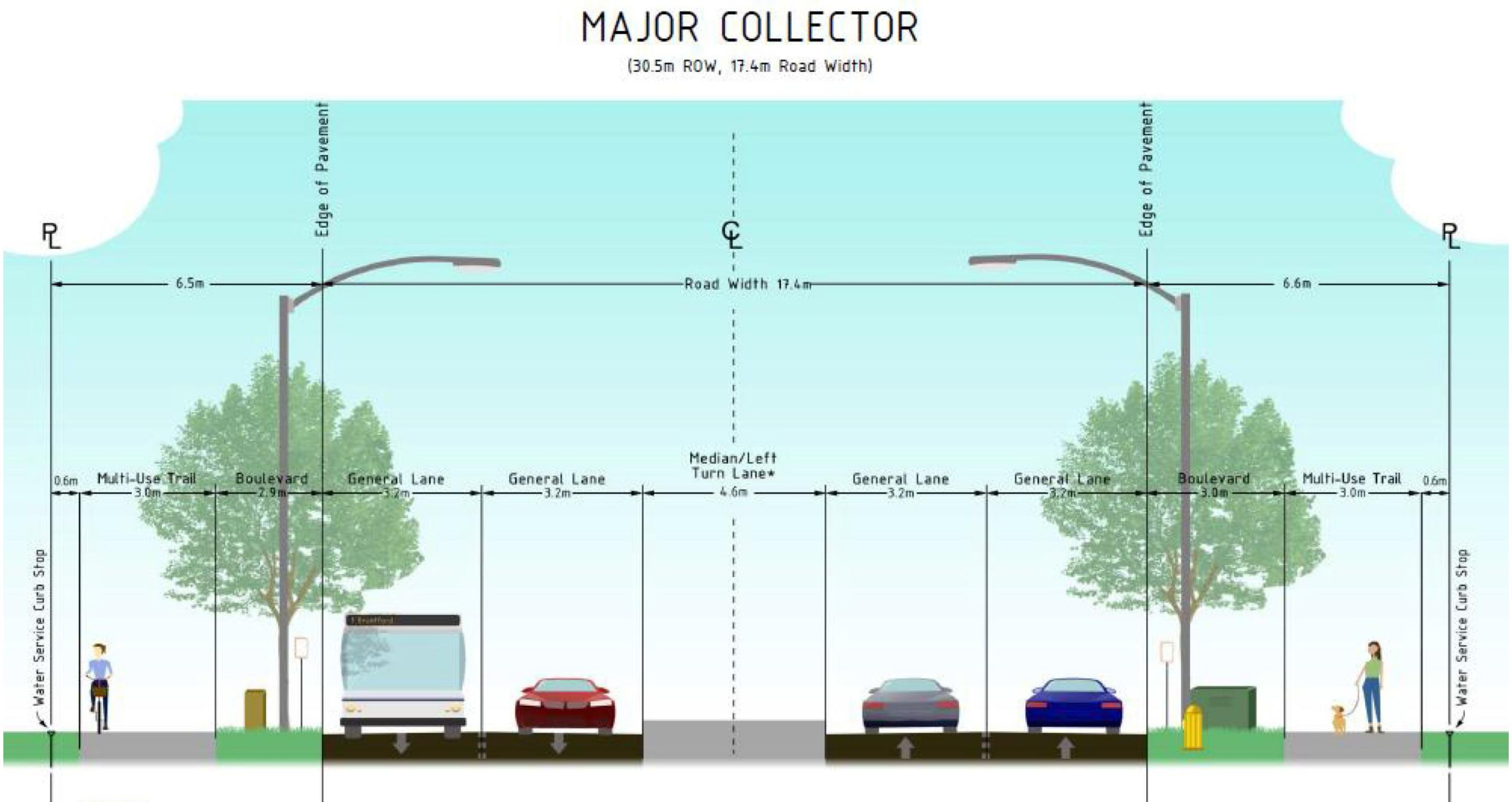
Active Transportation Opportunities



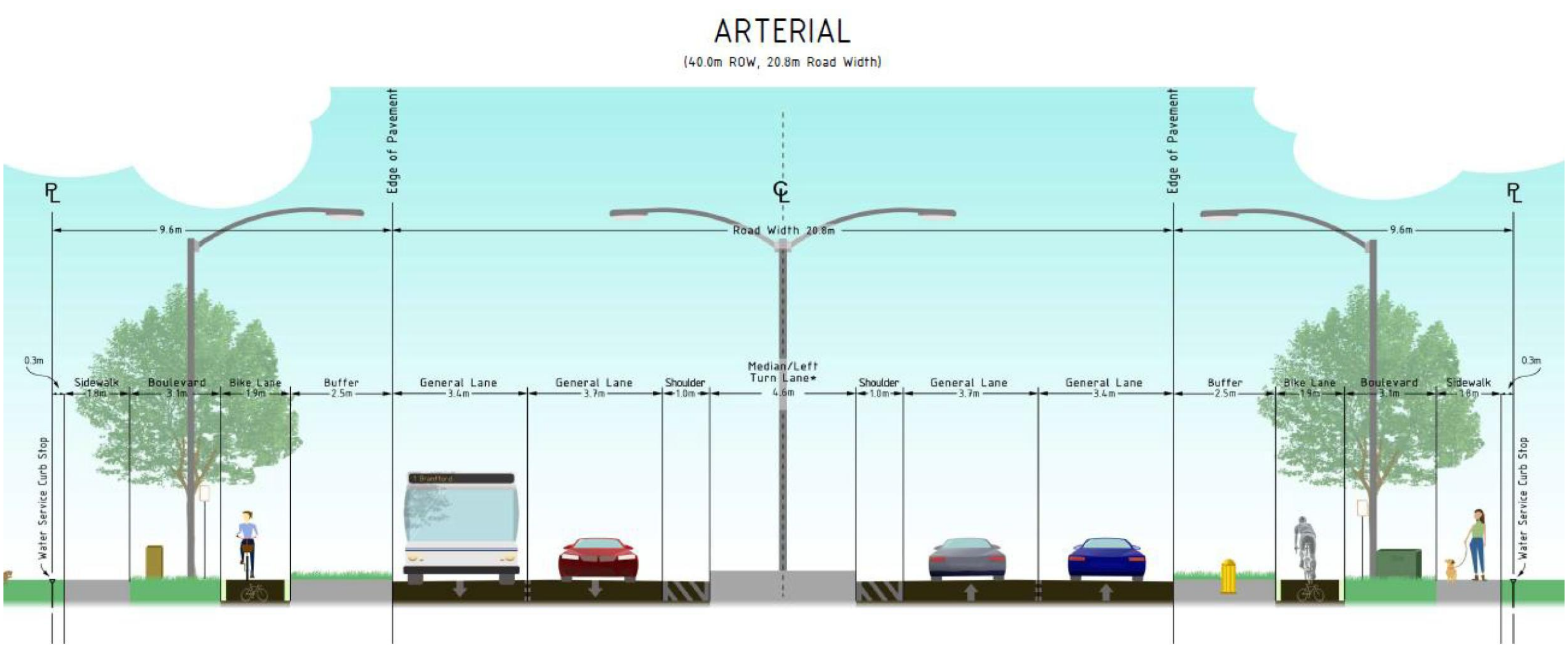
Active Transportation – Roadway Design - Collector



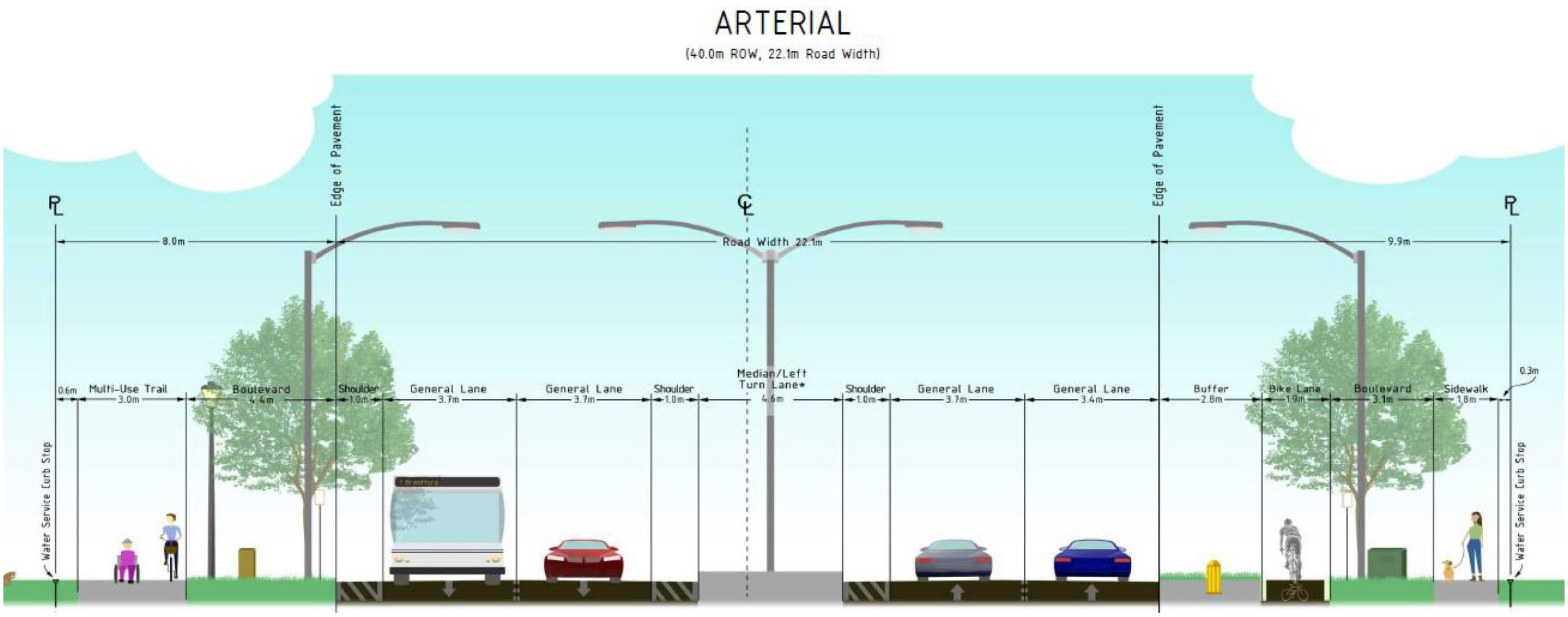
Active Transportation – Roadway Design - Collector



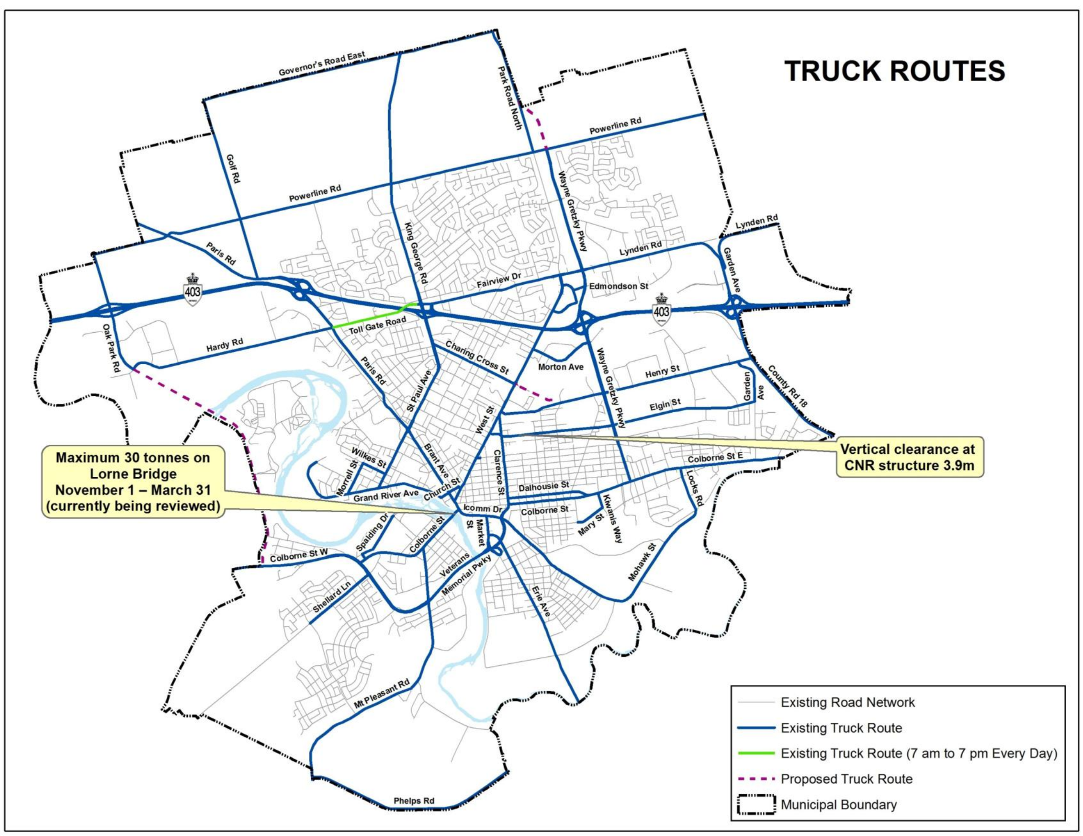
Active Transportation – Roadway Design - Arterial



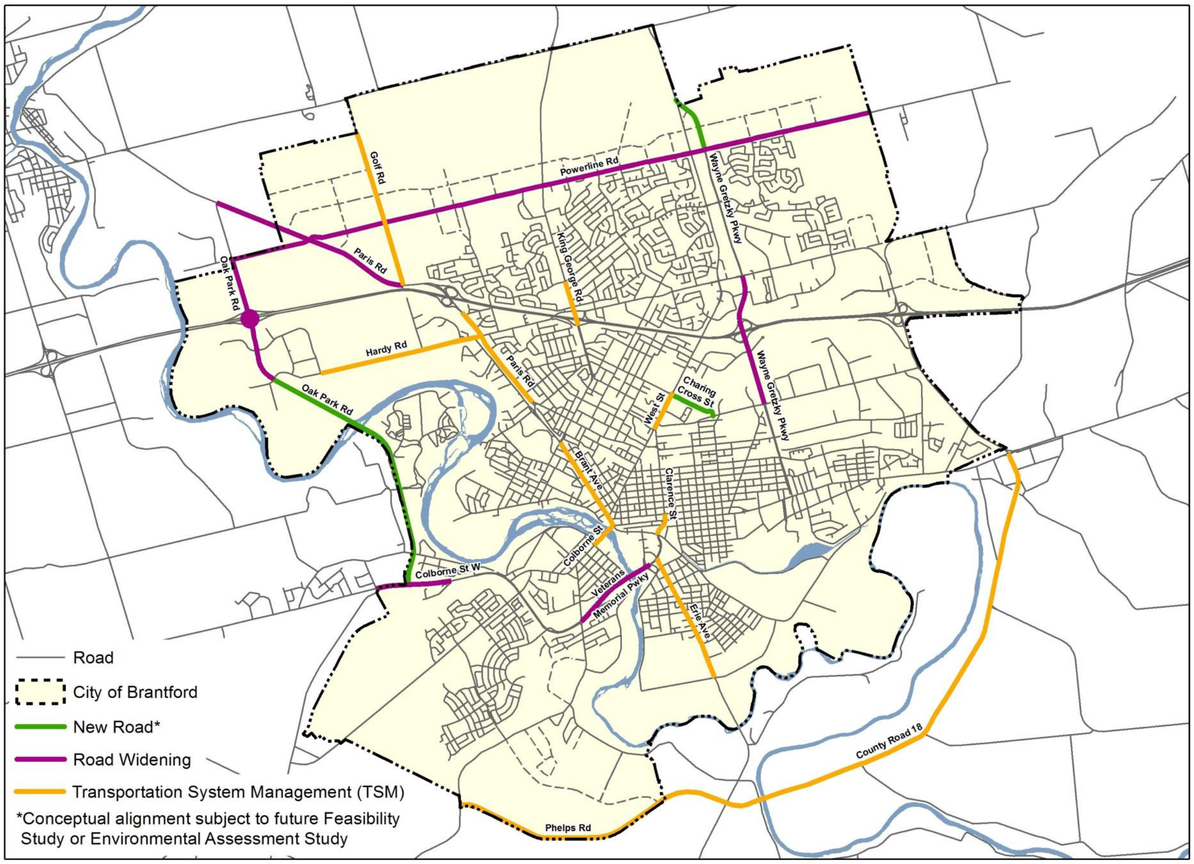
Active Transportation – Roadway Design - Arterial



Goods Movement Opportunities



2041 Preliminary Recommended Plan

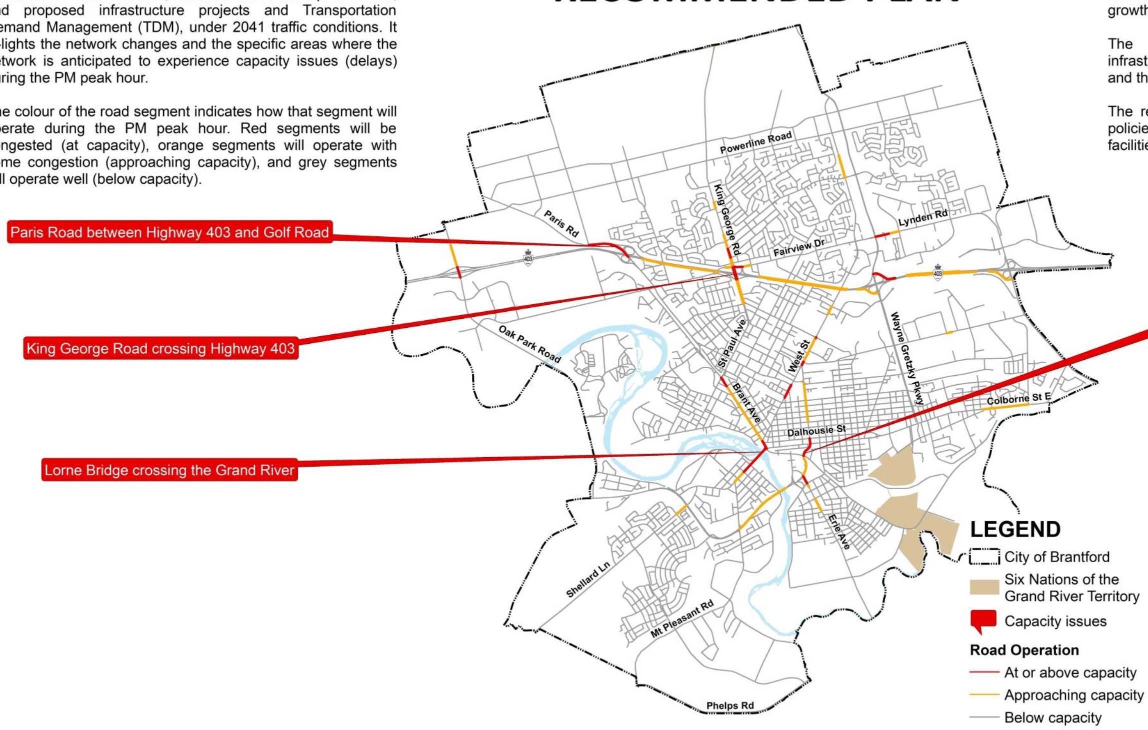


2041 Preliminary Recommended Plan - Performance

This map displays Brantford's 'RECOMMENDED' road network. It includes a combination of; committed network improvements, and proposed infrastructure projects and Transportation Demand Management (TDM), under 2041 traffic conditions. It hi-lights the network changes and the specific areas where the network is anticipated to experience capacity issues (delays) during the PM peak hour.

The colour of the road segment indicates how that segment will operate during the PM peak hour. Red segments will be congested (at capacity), orange segments will operate with some congestion (approaching capacity), and grey segments will operate well (below capacity).

RECOMMENDED PLAN



The recommended infrastructure and TDM will be necessary to accommodate the anticipated population and employment growth to 2041.

The recommended infrastructure includes a series of infrastructure projects that include the addition of new roads and the upgrading and/or widening of existing roads.

The recommended TDM includes a series of strategies and policies that call for additional / upgraded active transportation facilities and enhanced transit service.

HOW WILL THE RECOMMENDED NETWORK PERFORM?

The performance of the 2041 Recommended Plan shows that almost all of the anticipated capacity issues identified for 2041 Do-Minimal condition (where no long term investment was made in transit service or infrastructure) are resolved. A few operational issues remain: Lorne Bridge, Clarence Avenue between Icomm Drive and Colborne Street East, and Paris Road. The transportation assessment suggests that while these locations are identified as capacity constraints in the long term, the magnitude of the issue has been significantly reduced. These issues are now forecast to be marginal issues and can be successfully managed in the near- and mid-term. These locations should continue to be monitored to confirm the significance of any emerging issue.

Status – Next Steps

1 Confirm Vision
- Sustainability objectives
- Role of Modes
- Community Livability
- Affordability

2 Guiding Principles
- Road Hierarchy
- Complete Streets
- Service Standards/ Targets

3 Problems & Opportunities

Technical Analysis
- Network performance
- System gaps
- Modal Strategies

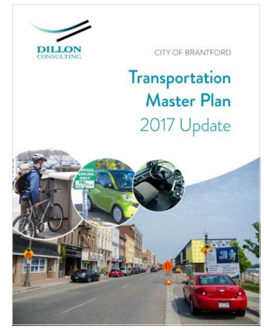
4 Alternative Solutions

Technical Analysis
- New Transit Service
- New Corridors
- Sensitivity Tests

5 Evaluation
- Identify evaluation criteria
- Evaluation of strategic planning solutions
- Identify preferred plan elements
- PIC #4 June 2020

We are here

6 Transportation Strategy
- Develop implementation plan
- Final TMP Submission September 2020
- Update 10-year Capital program



Thank You!

If you wish to submit comments or would like to be added to the project mailing list, please contact:

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Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

CITY OF BRANTFORD

MASTER SERVICING PLAN TRANSPORTATION MASTER PLAN

ENVISIONING OUR CITY: 2041

June 9, 2020 & June 30, 2020 – Virtual Public Information Centre (PIC)
Frequently Asked Questions (FAQ) Document – Transportation Master Plan (TMP)
Posted on July 28, 2020

1 Introduction

The Transportation Master Plan (TMP) is one of several studies being undertaken by the City of Brantford to help identify the City's long-term growth needs. The goal of the TMP is to develop strategies for the management of transportation demand, truck route management, transit improvements and the active transportation network, including walking and cycling networks, up to 2041. The Study will also identify the individual projects required to complement these strategies, and prioritize these projects based on need and required timing.

The objective of this document is to answer questions submitted by the public, prior to July 21st, in response to the Virtual PIC originally posted on June 9th, 2020 and Virtual PIC Questions and Answers originally posted July 30th. This document is the third and final step of the Virtual PIC process.

2 Frequently Asked Questions

Numerous questions and comments have been submitted to the Project Team throughout the first Virtual Public Information Centre process. The questions and comments received up to July 21st, 2020 have been responded to and grouped into various themes in the sections below.

2.1 Analysis

2.1.1 Shouldn't widening WGP north of Hwy 403 to Powerline Rd be needed in conjunction with the WGP extension north of Powerline Road?

Slide 38 of the PIC material, entitled “2041 Preliminary Recommended Plan – Performance”, indicates that the 4 lane cross section of WGP will be adequate to the service the forecast demand to 2041. The corridor should be protected for a potential widening to 6-lanes as volume demand may warrant beyond the 2041 horizon of the TMP.

2.1.2 Are any improvements identified for Park Road North?

No lane capacity improvements are proposed for Park Road North south of Powerline Road. Local intersection improvements will be required to optimize travel flow and accommodate changes in other road cross section (example: at Powerline Road and Park Road North). North of Powerline Road, a realignment of Park Road North will be required as it intersects with the future WGP. This realignment and intersection will be subject of a future Environmental Assessment Study for the WGP Extension.

2.1.3 Slide 8: Please explain more thoroughly how the traffic impact of up to 500 cars/hour is taking off the pressure from Brant Ave., Colborne and Clarence. Will it be 4%? 50%? It states a limited number of people will be using this 84 million dollar road.

The statements on Slide 8 do not align with the question posed. Slide 16 summarizes the analysis for Brant Avenue. Traffic forecasts for the 2041 conditions indicate that it will be operating at some 6% over capacity. Analysis of the origins and destination of these peak hour demands suggests that of the vehicles using Brant Avenue in this condition, approximately 500 (approximately 25%) of the corridor volume) of them are traveling from northwest Brantford to southwest Brantford which would be better served by OPRE. These 500 vehicles are not the only vehicles that are forecast to use the OPRE, just this that would divert from Brant Avenue.

2.1.4 TMP Slide 11: Is it too early to consider the effects of COVID-19 or a future pandemic on transit ridership? I assume no effects have been included in the ridership numbers in the TMP.

Yes, it would be premature to speculate on the impacts of future transit ridership as a result of Covid-19. The long term impacts of the pandemic and associated restrictions are not known and will not be known for some time. This analysis was conducted prior to the Covid-19 outbreak in Canada and as such, no potential Covid-19 effects have been included. In looking 20 years into the future, the assumption is that there will always checks and balances, and shifts in outlooks. The goal of the long term analysis is to flatten the impacts of such shifts and set reasonable targets that meet the long term community vision.

2.1.5 TMP Slides 13 & 14 Comparing Slides 13 & 14, the construction of the Oak Park Road Extension does not appear to have any effect on the overcapacity issues on Veterans Memorial Parkway and Clarence Street. Please comment.

The Oak Park Road Extension is expected to divert between 300-500 vehicles from the Paris Rd/ Brant Ave corridor and the Lorne Bridge (slide 16). With respect to the Veterans Memorial Parkway and Clarence Street, based on trip distribution patterns of vehicles using Veterans Memorial Parkway and Clarence Street (shown on slides 23 & 28 of the PIC material), the Oak Park Road Extension will have little to no impact on the future volumes on either Veterans Memorial Parkway or Clarence Street.

2.1.6 TMP Slides 14 & 29: With the construction of the Oak Park Road Extension, a new area of overcapacity appears on Colborne St. W., between County Road 7 (Pleasant Ridge Road) and D'Aubigny Road. Is construction of the OPRE simply going to result in moving traffic congestion from one part of the city to another?

The role of Oak Park Road extension is to serve a specific future demand that would and should be diverted from a current corridor that is not capable of serving that demand. Over capacity demand in the existing corridor (Paris Road and Brant Street, and on Lorne Bridge) results in neighbourhood infiltration that local roads are not designed to accommodate. Yes, the extension results in some additional pressure points but these pressure points can be mitigated. The section of Colborne St. W., between County Road 7 (Pleasant Ridge Road) and D'Aubigny Road currently has a 3 lane cross section (2 lanes westbound and 1 lane eastbound). It will require a road widening to match the existing 4 lane cross section east of D'Aubigny Road. This road widening is included in the 'Recommended Plan'.

2.1.7 TMP Slides 16, 20, 21 24, 26 & 29: The V/C ratios shown on these slides are those of the forecast 2041 "Do Minimal" traffic volumes. Could the consultant include additional V/C ratios using the forecast volumes in which the only alternative strategy is the construction of the Oak Park Road Extension (no TDM, TSM or road widening)? This would directly show the benefit of the OPRE to reducing the overcapacity on these roads. On Slides 20 and 23, the diagrams are very small and the V/C numbers are illegible. Could these numbers be enlarged?

The Do Minimal scenario reflects a 2041 condition with no additional TDM, TSM or road widenings. The aforementioned slides identify the travel demands and patterns of the problem areas and corridors and provide commentary on the potential for various alternatives to address that problem. As we are looking at a system wide plan to address city wide issues, the 2041 network assessment tests the alternatives in a system context. The volumes in the 2041 Preferred Plan assessment show significant demand on the Oak Park Road confirming its significant role in the future network. Testing the extension in isolation would only result in additional demand for the facility. With respect to font sizes, these will be improved and provided in the next steps of the project.

2.1.8 I have read a number of articles recently regarding a phenomenon called "induced demand" which "refers to the idea that increasing roadway capacity encourages more people to drive, thus failing to improve congestion". With this in mind, is it possible that the construction of the Oak Park Road Extension will only reduce traffic congestion on the city streets in question for a few years after which time we find that congestion reappears on those same streets?

Existing corridors are shown not to be able to accommodate future forecasts. The Oak Park Road Extension is required to serve specific future demands between West Brant and NW Brantford/Highway 403. The need and role of this infrastructure has been determined both on the basis of no TDM, TSM or road widening as well as with target TDM and TSM levels. As the demand has been consciously set to match aggressive policy goals for limiting the demand for automobile infrastructure, there will be limited room for induced growth of auto demand in the future due to the implementation of the Oak Park Road Extension. Even with the addition of the Oak Park Road Extension, very high volume demand is still expected on Brant Ave and the Lorne Bridge and as such induced demand is not considered applicable to this condition.

2.1.9 The TMP makes assumptions about the transportation decision making of residents commuting from the West Brant area to the East (i.e., assuming people will travel West to then go East). Please comment on how this is known.

The transportation analysis relies on existing traffic data (vehicle volume counts), recent travel behaviour survey for the community (2016 Transportation Tomorrow survey which provide trip purpose, origin-destination, and travel mode information for the GTA and surrounding area, including Brantford), and forecast land use information. This information is used in the City's transportation planning tools to forecast travel behaviour and magnitude of trips for the city broken down into discrete traffic analysis zones. This allows the project team to develop an understanding of the origin and destination of trips forecast for 2041.

2.1.10 How can the committee consider the 2016 travel study as current trends and be valid for a 10 year project starting in 2023? By the time the year 2028 the road is to be approximately half done, which will mean the current trends are 11 years old. The Master plan committee and developers need to be realistic and financially transparent about the costs to build the OPRE to avoid the same issue as Gretzky arena. All Builders put in unexpected costs to their budget plans, the City will need to be very clear on their overages budget and ask the constituents for extra funding, not expect we will be ok with just using our taxes to fix an unforeseen expense.

On the issue of the 2016 travel study, it is the most recent travel behaviour information available and has not changed significantly in Brantford over the last several iterations of the data collection.

The 2016 travel behaviour is used as an initial base to understand the travel relationships between areas. As the population and employment forecasts are allocated the 2041 scenario, the trip making is adjusted to reflect new growth levels and new area to area interactions.

On the issue of the capital cost, the TMP team is working with the City to identify reasonable costs for the strategic plan. These costs will be enhanced and refined as part of the Oak Park Road Extension EA study process.

2.1.11 In the Oak Park Road Extension Feasibility Study Final Report, there is no discussion regarding connections with Brant County that could be more fiscally responsible than the alternatives considered. Could you comment on why the city has not engaged with the Brant County to facilitate mutually beneficial solutions?

The TMP Project Team has engaged with County of Brant regarding the problems and opportunities, and the assessment of the alternatives. The Project Team will continue to engage the County through to the completion of the Study. Further, the City has recently initiated the Oak Park Road Extension Environmental Assessment study which will include the County as a key stakeholder. The EA will confirm the requirements of the project, develop an implementation plan, and prepare preliminary designs for the proposed infrastructure. In addition, the City is working with County on a Joint Strategic Transportation Plan to review cross boundary and joint transportation issues.

The project web site is as follows: https://www.brantford.ca/en/your-government/oak-park-road-extension.aspx

2.1.12 The proposed plan discusses how about 900 cars per peak hour will be reduced from Brant Ave, Colborne Street, and VMP combined and that commute time will decrease by about 5 minutes for those commuting. Can you explain how these numbers warrant the expense of the proposed plan?

The specific outcome related to travel time noted here is not a specific TMP outcome. Generally speaking, however, travel time savings of a group of users expanded to annual benefits over many years can be significant. In combination with the environmental benefits of reduced idling (from reduced delay) and shorter travel distances (more direct routes), as well as improving the overall safety of the network (reduced collisions, less neighborhood infiltration) are also key to understanding the benefits of the investment.

2.1.13 When highway 53 is expanded from 3 to 4 lanes from D' Aubigny there will need to be consideration to have separate signals like at Elgin and Clarence to avoid accidents. This major intersection on a hill will turn into West St. as there has been many accidents already, with poor sightlines and speeding traffic.

Comment noted.

2.1.14 The public notice in the Brantford Expositor on June 11 uses ambiguous language regarding the bridge that will be required to complete this proposed plan: "TMP (2014) recommends the extension include a four-lane arterial road with a crossing over the Grand River". Mention of a bridge is also not clear in other editions of the proposed plan. A bridge will impact the cost of the proposed plan substantially. Please comment on how the "crossing" (i.e., bridge) will be accounted for in "today's dollars" (not past projections of the bridge cost). To be transparent with taxpayers, clarification of the cost of BOTH the road and crossing (bridge) is necessary.

In the next phase of the TMP update, costs for the Recommended Plan, including various programs, service, and infrastructure, will be prepared using today's 2020 dollars using current planning and engineering benchmark unit costs. The Recommended Plan will be prioritized into discrete time periods in order to provide guidance to the 10-Year Capital Program. Further more detailed construction costs will be established as part of the on going Environmental Assessment Study. (https://www.brantford.ca/en/your-government/oak-park-road-extension.aspx)

2.1.15 Suggest extending CR18 westbound to connect to Shellard Lane. This is intended to facilitate Ward 1 traffic to use CR18 and access Hwy 403 on the northeast.

The proposed Conklin Rd extension to CR18 towards the southeast would provide this connection and role.

2.1.16 How many cars would be eliminated from Brant Ave if no right turn was allowed onto St Paul Ave and no left turn allowed from Palace, Richmond, Henrietta, and St James onto Albion. There are faster ways to access St. Paul now but don't seem apparent to drivers.

The project team will undertake additional analysis to identify the requested numbers.

2.1.17 What is the percentage individually of traffic now on Hardy road from Tollgate, Paris Road and Ava Road?

The project team will undertake additional analysis to identify the requested numbers.

2.1.18 With regard to the Tutela Heights area improvements:
- Will the proposed new road widenings in the Draft OP will be included in the finalized Transportation Master Plan?
- What are the short-term plans for Birkett Lane and Erie Ave regarding traffic flow improvements, turning lane improvements etc.?
- Is the 20.0m ROW widening for Birkett Lane scheduled to still occur or has the City decided that the 24.0m ROW widening is better suited to accommodate the City's needs?
- What are the short-term plans for Conklin Rd?
- Is there a planned ROW road widening in the near future for Conklin Rd?

The Transportation Master Plan does not identify any future improvement requirement for the existing section of Conklin Road. The specific ROWs for the roads are to be identified by the Official Plan. This comment has been provided to O.P. team.

2.2 Clarity

2.2.1 TMP Slide 13: Comparing Slide 8 to Slide 13, the overcapacity on Hardy Road has been eliminated due to TDM. Is this correct?

Yes. TDM does result in reduced volume forecasts on Hardy Rd. The impact of this reduction appears magnified due to the change from 'At or above capacity' to 'Approaching capacity'. In practice, the effects of TDM on Hardy Road are much more modest as Hardy Road is just over capacity in the 'Do Minimal' network and is just under capacity in the 'TDM' network.

2.2.2 Slide 13-14 If the committee is working with Brant County council to look at other effective transportation flow alternatives such as County Road 18, why build the OPRE, which will make commuters travel West to head East, make a left turn on a one lane road, and travel another 10 minutes to improve the commute time by 5 mins. How do you know the 500 cars/hour commuters from Shellard lane will travel to NW industrial for employment when using a 2016 travel plan? How many people moved to Shellard Lane to work in the North West industrial area as suggested in the recent replies to the master plan input session? The plan is to have the OPRE be developed over many years but with every 4 years possible council changes how can council confirm the OPRE will continue on and not be a road to no where?

The analysis does not suggest that travel demand market for OPRE is primarily to and from the East. The analysis shows that there is a capacity issue on Brant Ave, the order of magnitude of which is primarily driven by trips to/from south-west Brantford from/to the future north-west industrial area and to/from points west of Brantford.

The 2016 travel behaviour is used as an initial base to understand the travel relationships between areas. As the population and employment forecasts are allocated the 2041 scenario, the trip making is adjusted to reflect new growth levels and new area to area interactions.

The network recommendations for 2041 are based on the policy positions outlined in the Official Plan which is endorsed by Council. These plans are reviewed at regular intervals and adjusted to reflect recent or new policy initiatives.

2.2.3 Slide 26 talks about Hardy Rd and removing traffic of 300-500 cars. Would the new interchange at Oak Park and 403 not be considered the best route into the industrial park instead of travelling on Hardy Road? Those traveling now to work in the Industrial Park will probably use the 403 and get off at the new interchange at Oak Park road since the left turn issues will be resolved. The Master Plan is encouraging West Brant including Hardy Road to use public transit to get downtown. By increasing public transit why would a 4 lane over pass road need to be built? Make it the last resort to drive when the residents should be proud to use public transit that is efficient for traffic, environmentally friendly and cost effective to both patrons and city.

The 300-500 vehicles are those vehicles forecast in the Do Minimal conditions, to also be travelling along the congested Brant Avenue corridor. Using Highway 403 does not address the north-south issue connecting southwest area to the northwest area.

The future analysis already assumes a significant improvement in transit ridership. This transit ridership does not address the network deficiencies alone.

2.2.4 There is no indication of the progression of the TMP (i.e., at which end construction will begin). Are we to take the "Oak Park Road & Highway 403 interchange upgrade" as an indication of the intended direction?

The future outcome of the TMP is a Recommended Plan for service and infrastructure. This will include an implementation plan identifying the priorities, timing, and general costs for the individual projects. These steps will be undertaken subsequent to the confirmation of the current Recommended Plan. The upgrades to the Oak Park Road interchange are being conducted as a result of the planned growth in the NW Business Park. This need is independent of the potential future Oak Park Road Extension. The next step for the Oak Park Road Extension, the EA, has been initiated by the City. (https://www.brantford.ca/en/your-government/oak-park-road-extension.aspx)

2.2.5 The Plans show an arterial/collector road connection in the Expansion Lands north of Powerline Road (east of King George Road) extending north through the existing natural area. On what land parcel is this road proposed?

The alignment of this connection is conceptual at this time. Specific alignments of these development roadways will be the subject of future development submissions.

2.2.6 Within the Expansion Lands there is a proposed collector road travelling parallel to Powerline Road with proposed connections southerly to Powerline Road. How will this road be funded and, given multiple landowners, how will coordination be addressed to ensure that the road is completed in a timely and complete manner?

The timing and design elements of this roadway, and other connections required to support development, will be the subject of future EA's or Draft Plans of Subdivision as development progresses.

2.2.7 The 2041 Preliminary Recommend Plan shows only one potential connection northerly to extend through the natural area to provide access to future lands located outside of the urban boundary. However, Schedule 11 does not illustrate this same roadway as part of the Bike and Trails Network. There is a proposed off-road trail system within the natural area (east-west), shouldn't this connection also be shown?

This comment is noted. The noted roadway extension northerly in conceptual and the subject of further development related study. At such time as the roadway need and alignment is confirmed, it would be important to provide active transportation in this corridor.

2.2.8 According to Slide 37 "2041 Preliminary Recommended Plan", new roads have a conceptual alignment subject to future Feasibility Study or Environmental Assessment. We trust that 'conceptual alignment' is also true to the new loop road on the Sorbara Lands. We expect that the character, design, and alignment of the new public road is subject to further discussion and will be reviewed as part of any future development application.

This is correct. The alignment of the loop road is conceptual. This road is proposed as a collector road, the character, design, and alignment of the new public road would be subject to further study as part of the development application process.

2.3 Methodology

2.3.1 Will you be modifying your plans now that the Ontario government has lowered the population projections for our area?

With regard to the updated population and employment projections, the TMP team is working with the Official Plan team to understand the implications of the Growth Plan Amendment on the Master Servicing Plan and Transportation Master Plan.

The Technical Report prepared by Hemson Consulting for the Ministry of Municipal Affairs and Housing extends the Brantford forecasts with relatively minor additional growth through to the new planning horizon in 2051. The 2041 TMP horizon reflects a population of 163,000 residents and employment of 79,000 jobs, the new reference forecast for 2051 is now for a population of 165,000 and employment of 80,000. The recommended reference scenario for 2041 in the technical report maintains the 2041 TMP forecasts.

As the 2041 scenario is meant to reflect a long term buildout, the difference between the current 2041 and the new 2051 reference scenario (2,000 pop and 1,000 emp) is not considered significant. Therefore, the long term network conditions and requirements as assessed for the TMP are still considered to be appropriate.

2.4 Scope

2.4.1 What will happen at the entrance to Brant Park?

The City recently initiated an Environmental Assessment study which will assess alternative alignments and designs for the proposed Oak Park Road extension. This will include details related to the entrance to Brant Park. Please monitor the city's website for study notices and information. (https://www.brantford.ca/en/your-government/environmental-assessment-projects.aspx)

2.4.2 When this proposed OPRE is started where will the City begin.... we expect you to consider the bridge component of the plan before beginning construction?

The planning, design and construction plan will be developed as part of future works and is not within the scope of the TMP. The OPRE EA study will address most of these issues, while the detailed design will finalize the construction costs and phasing. Please monitor the city's website for study notices and information. (https://www.brantford.ca/en/your-government/environmental-assessment-projects.aspx)

2.4.3 To build community engagement regarding this OPRE why would the Ward One councillors not take the time to come and speak with those most effected?

As this is an issue for the OPRE EA study team, these comments have been shared with them.

2.4.4 Please clarify that the new plan has 3 bridges crossing the river in succession, if the walking bridge is kept! Has there been any consideration to the impact this will have when there is another ice jam

As this is an issue for the 3 Bridges EA study team, these comments have been shared with them.

2.4.5 Slide 30 talks about walking trails. Currently, the bridge appears in some plan documents but is not included in all. Which proposal is the City considering from the Parson's report?

A walking trail connection is to be provided across the river. The OPRE EA will identify the appropriate on road infrastructure to accommodate pedestrian and cycling

2.4.6 When the master plan is presented with the proposed budget please take time to break down the cost for the bridge separately.

The capital cost estimates for the TMP will consider and identify the bridge component.

2.4.7 To be financially accountable how can this road proceed when the economic impact from COVID-19 will need to be addressed to build the local economy first.

The effects of COVID (short-term or long-term) cannot be known at this time. The TMP is a long term (20 year plan) based on projections of population and employment and the resulting interactions between them. It is understood that there are ups and downs in any long term economic forecast but the ultimate goal is to achieve and accommodate the policy growth plan.

2.4.8 Is compensation for the residents living along the proposed OPRE to address the variety of impacts this project will have (e.g., environmental damage, noise, etc.) being considered?

The TMP is considering the impacts noted in the evaluation of the alternatives. The specific impacts of the implementation of a project will be the scope of the Environmental Assessment, as will be the identification of any mitigation and compensation potentials.

2.4.9 Are cost estimates available for the recommended alternatives?

As part of the project next steps, cost estimates for the Recommended Plan will be developed using current planning and engineering unit cost benchmarks.

2.4.10 The Master Plans Review identifies a number of improvements with existing infrastructure (roads, water, sanitary), while there is no discussion related to any programs planned either through the 10 Year Capital Program and/or the Development Charge By-law/Development Charge Background Study that would provide for the identified improvements. Can this be provided?

As part of the project next steps, cost estimates for the Recommended Plan will be developed using current planning and engineering unit cost benchmarks. An Implementation Plan identifying the Plan priorities will be developed to inform both the 10-yr Capital Program and the Development Charges process.

2.4.11 Given the impact of COVID-19 and other pressing government cuts and priorities on the city's budget (e.g., cuts to transfers from the Provincial government for healthcare, fulsomely addressing homelessness), how is the proposed plan being funded? Or even the top priority?

The cost and potential funding for the Recommended Plan will be prepared as part of the project's next steps. Ultimately, the decisions related to the spending of fiscal budgets are made by Council on the recommendation of City departments, and not an outcome of the TMP.

2.4.12 The Master Plans Review identifies a significant amount of new infrastructure required; however, it does not discuss how these improvements would be funded? A discussion on funding should be provided.

A high level discussion related to finding will be included as part of the development of the Implementation Plan in the project's next steps.

2.4.13 Would like to see the bikeway on Powerline Road to be extended eastward to WGP, or Memorial Dr at least.

Schedule 11 of the Official Plan identifies an on-road cycling facility along the full length of Powerline road through the future urban area. On-road means within the road right of way, which could take the form of a cycle lane, cycle track, or multi-use path, or a combination thereof. The exact implementation would be subject to future study and detailed design.

2.4.14 Many progressive communities (ROW, Niagara, Hamilton) are choosing to utilize roundabouts extensively. On page 9 of the posted slide presentation you discuss TSM and provide several examples – signal coordination, auxiliary turning lands, turn restrictions. I was very surprised that roundabouts were not highlighted as a major TSM tool. I know you are well aware of the benefits but I think the slide show posted on the city website, a roundabout was only mentioned once as a possibility. In an Oct. 11, 2019 article in the Brantford Expositor, the Transportation Association of Canada indicated that 20 year life cycle cost of a roundabout was $5.3 million whereas a traditional signalized intersection was 9.3 million. It was mentioned in the Q&A that as a next step you will be putting together costing. For all the benefits of roundabouts, which include improved traffic flow, I think that they should be an important part of the TMP at this time, but from the slide presentation, I really can't say that they are. We don't do TMP's very often and I can't imagine how costing can be put together unless you indicate on your 2041 Preliminary Recommend Plan (slide 37) exactly where roundabouts are an option. As an example, I think that they should be used across the Powerline Rd. from Paris Rd to Wayne Gretzky.

With regard to the implementation of roundabouts as traffic control, the TMP is a strategic network needs assessment. The actual decision related to need for and implementation of traffic control measures is not appropriate at this level. Generally speaking, we agree that roundabouts should and would be considered as TSM measures. The objective of the TMP is to identify the potential strategies and the policies, as well as provide direction to the planning and design process, that would need to be in place to provide the opportunity to implement such TSM measures.

We note that the costs for implementing the network recommendations are strategic benchmark costs. While there is a difference in the capital, construction, and maintenance costs of different measures (i.e. signalization versus roundabouts), more precise costing would be undertaken during subsequent planning and design phases (secondary plan, preliminary design, and detail design phases).

That said, the TMP will be identifying candidate sites for roundabout implementation as part of a strategic assessment based on transportation policy goals and objectives.

2.4.15 If the Oak Park Road extension is constructed, it will be built over a section of the S.C. Johnson Trail, from the Brant Park entrance driveway to the Grand River. Will a temporary trail be constructed adjacent to the new roadway for the duration of the project, allowing people to continue to use the trail, or will the trail simply be cut off and dead ended at each end? Has a traffic count ever been done, counting the number of hikers, runners and cyclists that use this section of the trail?

This detail in the construction and implementation will be undertaken as part of the next level studies, including the Oak Park Road Extension.

2.5 Other

2.5.1 TMP Slide 8: The "Oak Park Road & Highway 403 interchange upgrade" is currently under construction at a cost of $6.75 million, with completion expected by the end of 2020. One could conclude from this that the City is determined to construct the Oak Park Road Extension regardless of any objections by the citizens of Brantford. Could you please comment?

The upgrades to the Oak Park Road interchange are being conducted as a result of the planned growth in the NW Business Park. This need is independent of the potential future Oak Park Road Extension.

2.5.2 Based on discussions with councillors, the perspectives of residents living in the Ava Road area are being valued over other Brantford residents. Could you comment on this?

The problems, opportunities, and alternatives are being considered in the context of a multi-criteria evaluation and finding the best fit solutions that meet the needs of the entire community and City. No single stakeholder / stakeholder group is being valued above others.

2.5.3 Glad to hear the City is in communication with Brant County, are you speaking with Six Nations and other surrounding communities to help not dump on them a City made problem?

The TMP project team is communication with Six Nations and the County.

2.5.4 Slide 23 How can you say this will affect property values in the county but not consider those 25 plus homes from the Glendale, Kinnard and Kerr Shaver neighbourhood?

No such statement is made in the TMP presentation material.

2.5.5 Where is the money coming from, when the city mayor claiming they may have to increase property taxes and certain services and asking the government for money, which the government is going to be handing out..? Is the city going to use some of this money for this project and waste it on a project going no where ,just to please a few people and make a name for themselves. #2 we the tax payers have a right to oppose such a project which we are not being heard. #3 the cost of the bridge alone will be more then the cost of the road work, and disrupt the wild life etc. #4 It's a big NO to this project disrupting a neighbor hood for a few people who don't live in this area and could care less ,It's not in there back yard and have to contend with all the disruption. and noise. A concerned Oakhill tax payer.

The cost and potential funding for the Recommended Plan will be prepared / identified as part of the project's next steps. Ultimately, the decisions related to the spending of fiscal budgets are made by Council on the recommendation of City departments, and not an outcome of the TMP.

2.5.6 Some of the long term residents of the Glendale Rd and Kinnard Cul de sacs were told that their properties would one day have a two lane roadway running behind their properties. We checked with City Hall a few times over the years to try and stay updated on any news regarding the same. We were told that it likely wouldn't happen in our lifetimes. Now we are seeing in the Parsons report that it may become a four lane elevated roadway overlooking our properties. This will feel like we are living under the Gardiner Expressway in Toronto. We should have never been allowed to build our houses this close to this potential corridor. We feel that this roadway does not belong in the greenbelt space that is behind our homes. There has to be a better solution then building a roadway over top of people's properties. Will we be compensated for reduced property values? Who would ever want to buy our homes? When this goes before the City Council each member should honestly ask themselves that if this was in their backyards would they be in favour of it? My opinion is that no property owner, in any location, would approve this truck route / arterial road abutting their property. It's time to go back to the drawing board and come up with an alternative that doesn't gut one of the nicest green spaces in our beloved City.

These comments have been received and will be forwarded to the Oak Park Road Extension EA project team.

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THE CORPORATION OF THE CITY OF BRANTFORD

APPENDIX B

Bicycle Friendly Communities Workshop – Summary Report and Recommendations

Brantford

Bicycle Friendly Communities Workshop

April 5, 2018

Summary Report and Recommendations

Prepared by the Share the Road Cycling Coalition

Brantford Bicycle Friendly Communities Workshop – April 2018

Summary Report

On April 5, 2018 The Share the Road Cycling Coalition facilitated a Bicycle Friendly Communities Workshop and a Community-based World Café for the City of Brantford. The purpose of this Workshop was to help identify a path forward for the area to become more bicycle friendly through the development of new programs, projects and partnerships to make cycling more comfortable and accessible to all residents and visitors to the area. More than 80 community members, key stakeholders, Municipal staff and City Councilors heard new ideas and contributed their local expertise about how Brantford can become a better place for cycling during a full-day, stakeholder focused workshop and a community World Café session.

The Bicycle Friendly Communities Workshop focused the efforts of attendees on developing strategies to advance new programs to support cycling in addition to creating innovative strategies for creating a stronger network of cycling infrastructure throughout the City and surrounding region.

During the workshop, participants helped to:

- identify the existing cycling assets and some of the challenges faced within their community;
- discuss opportunities for developing new programs, projects and partnerships to foster a stronger culture of cycling in Brantford;
- articulate a five-year vision for cycling in Brantford; and
- develop a two-year workplan for making progress toward that vision.

We are confident that Brantford can achieve meaningful progress towards these goals, especially if undertaken in tandem with infrastructure improvement. The essential programmatic elements of a more Bicycle Friendly Brantford by 2023 are:

- Education – A more coordinated effort will be made by the various agencies and stakeholders working on cycling to ensure that education about cycling – both teaching people how to ride bikes safely and teaching people how to share the road with cyclists when driving, is made more available to the community. Brantford will have several trained cycling instructors, and will offer courses to new and experienced riders to help encourage safe, legal cycling practices. All schools in Brantford will have access to Bike Rodeos and other cycling education programs, and all schools will have an Active School Travel Plan to help students get to school actively and safely where possible. Educational efforts will also include public awareness campaigns designed to create better interactions between people driving and people cycling, as well as a focused campaign discussing the value of active transportation to the community.

- Encouragement – introducing new programs designed to get residents excited about cycling again is key to creating a culture of cycling. Brantford will host a variety of different events during Bike Month which will make it easy and fun for residents to get back on their bikes. Bike Valet will be provided at popular community events and high-demand locations to ease the burden on parking spaces, and more information about cycling will be available online. Community rides, signature cycling events and Open Streets events will be regular features in Brantford, and will help to grow the culture of cycling in the community.

- Enforcement – Brantford Police and local bylaw officers will patrol Brantford's trails and roads by bike more often, making cycling a more visible part of the City's identity. Brantford will have bylaws relating to cycling that will reflect best practices across the province, and will engage community partners, including the BPS, in educating the public about changes to the Highway Traffic Act.

- Evaluation & Planning – Brantford will be a leader in Ontario in the field of data collection about cycling, including cataloguing near-misses, gathering trip to school data and utilizing technology to count active transportation users, including permanent counters and video detection. More information about active transportation in Brantford will be collected and shared publicly, including trail user surveys and economic impact assessments. Bike counters and GIS data will be collected regularly to assess the success of Brantford's cycling programs.

The workplan that follows, organized under the 5 Es of the BFC Program (with the exception of Engineering), outlines recommended actions Brantford could take in the next two to three years to help it work towards achieving this 5 year vision. With more than 70 attendees between the workshop and World Café, it was not surprising that the initial list of potential actions was quite long and varied, and contained far more than would be realistic to achieve in a short time as outlined within this report. The initial list of brainstormed actions has been refined to include a number of high-impact activities, many of which are proven to be best practices in communities across North America.

It is important to remember that there are many ways to build a more bicycle-friendly community. This report contains suggestions for one path that could be followed to get there, however, it may be possible for Brantford to substitute other actions that are not included in this plan and still achieve this five year vision for increasing bicycling.

WORKPLAN

FOUNDATIONAL ACTIONS: *This workplan features recommendations from across the 5 Es of the Bicycle Friendly Communities Program – Engineering, Education, Encouragement, Enforcement and Evaluation and Planning, but these recommendations will have the most impact if the suggestions in this section are undertaken first.*

Many of the actions in this document will rely on communication, partnerships and the sharing of resources across departments in Brantford. For this reason, it is suggested that the City immediately take steps to:

- Create a Brantford Cycling Task Force (BCTF) to coordinate various programs and projects moving forward -
  - Many of the suggestions presented in this document rely on more than one stakeholder to ensure success. A strong Cycling Task Force can ensure that the required partnerships are in place to ensure the success of these new programs. Consider including engineering, planning and parks staff from the City and Lambton County, representatives from the cycling community, members of the Brantford Police Service and Lambton Public Health and representatives from the local school boards, then structure this committee to have subcommittees or working groups focused on different areas, including education, encouragement, Bike Month and more to ensure that the broader committee can focus on building partnerships and discussing "big picture" topics.
  - It is also strongly recommended that this committee have an annual budget to organize and run events and invest in infrastructure projects like bike racks, bike repair stands etc. as the committee deems necessary.

- Establish an Active Transportation Coordinator position to ensure that programs identified by the BCTF are implemented and that new partnership opportunities are developed.
  - Brantford has good staffing resources working on active transportation, but those resources are (by our understanding from the workshop) mostly concentrated within the Engineering department at the City. It is Share the Road's experience that having a dedicated staffing resource on the Active Transportation programming file (as opposed to working on infrastructure design and development) is an extremely effective way of building a stronger culture of cycling within a community the size of the City of Brantford, and it is strongly recommended that the City follow through with this initiative. This coordinator can help to minimize the duplication of efforts across the City, identify new funding opportunities and work to ensure regional implementation of new Active Transportation projects. Having a committee and a coordinator in place will dramatically improve the chances of success for this workplan.

This workplan will refer to the Brantford Cycling Task Force (BCTF) frequently, but in most places those suggestions would best be done with the support of an Active Transportation Coordinator, reflecting the importance of the coordination role that these resources will play in moving the elements of this plan forward. If these pieces are not put in place, many elements of this plan can still be moved ahead by other agencies and stakeholders, but the implementation will be made considerably easier if these resources are in place.

ENGINEERING:

Attendees highlighted many existing assets already in place in Brantford, including the Grand River Trails and the routes along the Wayne Gretzky Parkway, but also highlighted the fact that there are many gaps in the network, making it challenging to get from one place to another on a bike safely. The addition of bike lanes on City streets connecting trails to priority destinations like the Wayne Gretzky centre and downtown were seen as key priorities to create an effective network of cycling infrastructure in Brantford, and attendees were heartened to hear about the proposal to add bike lanes to North Park street, which had not been implemented at the time of this workshop. The suggestions that follow largely mirror Brantford's existing and approved Transportation Master Plan when it comes to on and off-road infrastructure, with a few updated suggestions to account for the changes in best practices in the cycling field in Ontario.

Workplan: Bike Share

One of the aspects that came up consistently across tables at the workshop was the importance of a Bike Share system in Brantford. Bike Share systems have evolved very rapidly in the past 5 years, and are now flexible enough to accommodate cities of any shape or size. For a great primer, be sure to see the latest version of the Bikeshare Planning Guide, updated in 2018 to reflect the changing nature of bike share systems. The suggestions from the workshop identified a path towards having a fully functioning Bike Share system by 2020. The necessary steps for a system to become a reality are:

1. Issue an RFP for a Bike Share Pilot project.
    - For the pilot to be successful, it is suggested that you concentrate the service in an area where potential ridership is high – areas near the Laurier University campus, downtown, the casino and the trails would be ideal places for the Bike Share pilot to begin.
    - Responsible agencies: Parks and Recreation, Engineering, Purchasing

2. Undertake a pilot project to evaluate the success of the Bike Share project
    - Ensure that the pilot provides sufficient operational time to adequately capture trends over multiple cycling seasons, potentially by having the program run for 18-24 months

3. Expand the Bike Share Pilot to a full, permanent system based on the results of the Pilot
    - Once the Pilot period is over and the results are analyzed, roll out a full Bike Share system across areas of Brantford based on the demand and the potential for cycling in those areas. If Bike Share is paired with a network of high-quality cycling infrastructure, experience has shown that it can have transformational impacts on the cycling culture of a community.

- Remember that Bike Share works best when station density is high – so focus on providing a quality service over a smaller area rather than trying to overextend the reach of the system and risking spreading it too thin. Better to have a successful program over a smaller area that can grow than a failing system over a large area!

Recommended Actions	Description	Groups Involved	Timeline
When the new OTM Book 18 is released, ensure that local design standards adhere to the updated provincial standards	OTM Book 18 is being updated through 2018 and 2019 to include more infrastructure treatments that have been proven successful in improving cycling safety across North America and the world. Once the update is complete, ensure that your design standards for cycling facilities meet or exceed the standards identified in Book 18.	Engineering staff Planning Staff	Once Book 18 update is completed – late 2019
Consider adding contra-flow cycling facilities through the downtown area	Attendees identified the one-way streets of downtown as a barrier to connecting to destinations by bike. Consider installing contra-flow bike lanes on some of the streets downtown, or consider changing those streets to accommodate 2-way traffic for all vehicles. Design guidelines for contra-flow lanes can be found in OTM Book 18.	Engineering staff	2019-2020
Add publicly accessible bike repair stands[1] to your list of end-of-trip facilities in Brantford	Bike repair stands can make it easier for riders to keep going and make simple repairs like adjusting a seat height or adjusting air pressure in tires. They're also a great way for the City to visibly display its support for cycling.	Engineering Staff, Parks and Recreation Staff	2019-2020
Create a series of Neighbourhood Access Bikeways in Brantford to take riders north-south and east-west utilizing quiet residential streets with additional traffic calming elements	One of the safest and most comfortable types of cycling infrastructure is the Bicycle Boulevard or Neighbourhood Greenway – a linear residential street that has additional traffic calming elements like traffic diversion, speed tables, chicanes and more to reduce traffic speeds and volumes in order to make the route more comfortable for people who walk, cycle and live along. Attendees suggested installing 2 east-west and 2 north-south routes across town, potentially utilizing some of the existing signed bike routes and adding traffic calming elements to them.	Planning Staff Municipal Councils BCTF	Identify routes in 2019, implement routes in 2020

[1] There are many good examples of bike repair stands on the market – see the Greenspoke offerings here: http://www.gogreenspoke.com/products?category=Bike%20Repair

As part of the overall cycling strategy, create and design effective wayfinding signage across Brantford to direct people to popular destinations.	Wayfinding signage can serve many different purposes – from highlighting safe routes to informing riders about nearby destinations. Consider creating a wayfinding signage that directs riders to the on and off-road routes through Brantford, provides clear information about the destinations and amenities along the route and provides information about the distance and estimated time to walk and cycle to those destinations[2].	BCTF, Parks and Recreation Staff, Engineering Staff	2019-2020
Develop new safe crossings where trails intersect with roadways	While Brantford is fortunate to have several high-quality trail crossings, there are a few spots where connectivity and safety could be improved. Consider installing signalized crossrides[3] where trails cross busy roads, which would benefit cycling safety and improve connectivity[4].	Engineering Staff	Identify needed crossings in 2019, install in 2020 and ongoing
Use the network gaps identified through the Transportation Master Plan process to prioritize the installation of new cycling infrastructure in the short term	Brantford's trails and existing infrastructure are extensive – the City already has a good foundation upon which a complete, safe network could be constructed. Identify priority gaps in the network and establish a short-term plan to fill those gaps, especially in places where existing demand for cycling is highest like around schools, recreation complexes and near major employment centres like downtown and the Casino.	Engineering	Fill priority gaps by 2020

[2] The City of Waterloo has developed an excellent Wayfinding signage standard that they are willing to share with other municipalities. It can be seen here: https://www.waterloo.ca/en/contentresources/resources/living/Wayfinding_sign.jpg and if you are looking to modify the template for use in your community, we can put you in touch with staff at the City to get all of the templates.
[3] For an excellent example of a signalized trail crossing where a high-volume trail crosses a high-volume road, see what has been installed in Caledon at Airport Road here: http://walkandrollpeel.ca/projects/new_infrastructure.htm
[4] There is newly released design guidance for trail crossings in Ontario as well – consult OTM Book 12A – Bicycle Traffic Signals for more information. https://ontario-traffic-council.s3.amazonaws.com/uploads/2018/07/OTM-Book-12A-Bicycle-Traffic-Signals-March-2018.pdf

Establish maintenance standards for trails infrastructure to provide opportunities for year-round riding.	Designate priority winter routes, especially trails that connect to community amenities, for enhanced winter maintenance. Also be sure to create spring and summer maintenance standards for bike routes and trails that include regular patrols, surface repair, vegetation control and path sweeping. When it comes to on-road infrastructure, Ontario's new Minimum Maintenance Standards establish clear guidelines for snow and ice removal, but standards for off-road infrastructure like trails is up to the municipality to determine. Ensure to communicate the location of priority winter routes widely. For an example of winter maintenance standards, see the City of Ottawa's winter cycling network information here.	Parks and Recreation Staff, Engineering and Public Works Staff, Lambton County Staff	2019

Workplan: Bike Parking

A consistent topic identified at the workshop was the need for more bike parking all across Brantford. Below are suggestions to make bike parking more easily accessible across the City.

Recommended Actions	Description	Groups Involved	Timeline
Create local Bike Parking Ordinances to ensure that new developments and employment areas have adequate, ample bike parking	Especially as Brantford sees new growth, a strong Bike Parking Ordinance will ensure that people who ride have a safe, secure place to park their bike when they arrive at their destination by setting requirements for the provision of bike parking in new (and existing) developments. For an example of a best practice bike parking ordinance, see Cambridge, MA's ordinance here. Also ensure that all new bike parking provided adheres to the standards created by the Association of Pedestrian and Bicycle Professionals (APBP) found here.	Planning Staff Municipal Council BCTF	BCTF to coordinate on policy in 2019, Council to approve in 2020.

Consider partnering with a local high school to manufacture new bike racks	There are excellent examples from around Ontario where municipalities and BIAs have partnered with local Secondary or Post-Secondary schools to fabricate new bike racks[5]. Consider a similar partnership to create visually interesting bike parking solutions in Brantford.	BCTF, BIAs, Chambers of Commerce, High Schools	2019
Expand the availability of bike parking all over Brantford, with a specific focus on trip generators – major employment areas, downtowns, recreation centres etc.	Undertake a bike parking inventory to determine where bike parking is available and where gaps exist. Ensure that bike parking is available at all municipally owned facilities, and work to ensure that bike parking is provided at major destinations in the community. Ensure that all new bike parking provided adheres to the standards created by the Association of Pedestrian and Bicycle Professionals (APBP) found here.	Engineering staff Parks and Recreation Staff Operations / Public Works Staff BCTF	Inventory in 2018, bike parking strategy in 2019
Create a Bike Rack Partnership program, where the City purchases a large number of bike racks and makes them available at cost to businesses and other stakeholders – especially schools.	Small business owners and other community stakeholders have a lot on their plate – researching best practices for bike racks is not likely to be high on their task list. Ensure that the bike parking that they provide on their property is of sufficiently high quality by purchasing a large number of racks, making them available at cost and helping them select an installation site and offer installation assistance as well[6]. Also consider offering businesses the opportunity to be included on the City's cycling map if they can show that they have adequate bike parking, or if they agree to purchase new bike parking capacity.	Chamber of Commerce, BIAs, Local Businesses, Public Works / Operations Staff	2018

[5] For an excellent example of such a partnership, see page 9 of the 2016 Bicycle Friendly Communities Yearbook, profiling bike racks built at Belleville's Loyalist College: http://www.sharetheroad.ca/files/2016_Yearbook_FINAL_web.pdf
[6] For an excellent example of a program like the one described here, see what Thunder Bay has done with their Bike Racks for Businesses program: https://www.thunderbay.ca/en/city-services/bike-parking.aspx

EDUCATION:

- *Cycling Education*: Giving people of all ages and abilities the skills and confidence to ride a bicycle by offering educational programs and activities designed to engage with residents on how to ride safely and conveniently throughout the community.
- *Driving Education*: Educating car and truck drivers about how to share the road safely with cyclists, demonstrating respect and care for all road users.

Attendees identified improved education as a major priority for Brantford to move forward in becoming more bicycle friendly. Attendees felt that area-wide efforts were required to better educate all residents about the value of sharing the road safely, with a special focus on cycling education for youth.

Education Workplan: Community and Public Awareness

Brantford's existing network of stakeholders that are promoting cycling is already very strong. With stakeholders like The Brant Cycling Club, SprocKids, the Safety Village, the Brantford Police and the NCCH, there is a strong network that can be leveraged to spread the word about safe road use – we suggest creating a cycling communications and engagement strategy to ensure that these groups are sharing the same message, and that the message being shared is one that builds towards the creation of a stronger culture of cycling in Brantford. Below are a suite of suggestions for more effectively engaging City Residents in the conversation about cycling and sharing the road.

Recommended Actions	Description	Groups	Timeline
Establish a cycling education subcommittee as part of the BCTF to help coordinate the development and delivery of educational campaigns throughout the City.	When it comes to cycling education, there are many existing programs that can be adapted or simply utilized as they already exist in Brantford. This subcommittee can identify the programs that would be the best fit for the community and can pool resources from all of the community partners to create new materials or modify existing campaigns. Set your communications priorities on an annual basis, and be sure to target all materials towards those objectives.	School Boards, Municipal Staff, Brant County Staff, Public Health, Brantford Police Service (BPS), BIAs and Chamber of Commerce	Late 2018 – establish committee 2019 – begin programs

As part of the work of the BCTF Education subcommittee, create a Bike Brantford brand and a vision for the key messages that the brand will share	Key messages as identified by attendees included a promotional campaign highlighting the ease of cycling in Brantford using distance and time estimates to travel to popular community destinations, an exploration of the individual and community benefits of increased cycling participation, rights and responsibilities of people cycling and driving and explanations of how novel infrastructure like Pedestrian Crossovers, Crossrides, Bike Lanes and Neighbourhood Greenways work.	BCTF	2019 and beyond
Identify education programs/ campaigns that could be replicated or modified for use in Brantford to help engender a spirit of cooperation among all road users on the roads in Brantford.	Other communities have created and tested education videos and campaigns, so why reinvent the wheel? Adapting existing resources and developing a dissemination plan can yield impressive results at a reduced cost. Good examples of existing programs include Thunder Bay's cycling education videos,[7] People For Bikes' Travel With Care program[8], the City of Peterborough's "Leave a Busload of Sapce" Bus back and bus shelter ads or Waterloo Region's Thumbs Up! Campaign[9]. For rural communities in the areas near Brantford, messaging that focuses on large agricultural vehicles is also available from The Blue Mountains[10]. Share the Road has also developed a new campaign focused on the 1m safe passing law and the new penalties for not having adequate lighting on your bike. Those resources are available to all communities here.	BCTF	2019 as early work done by BCTF
Deliver key messages about cycling safety to all households in Brantford using existing municipal mailouts, like parks and recreation guides or utility bills	Every time you send documents to the entire community, it is an opportunity to add messaging about important topics to ensure that all residents receive the information. Consider creating a utility bill or property tax bill insert to send out based on the key messages you decide to focus on for the Bike Brantford campaign. Keep messages simple and to the point – focus on one topic per campaign.	BCTF Communications Staff	2019

7 https://safecyclingthunderbay.com/really-great-stuff/ - look under "Sharing the Road Short Films"
8 https://peopleforbikes.org/travel-with-care/
9 http://thumbsupwr.com/resources/
10 http://www.thebluemountains.ca/share-the-road.cfm

Utilize your existing community assets to deliver cycling education to youth and seniors in the community	Consider integrating cycling skills education into activities already taking place at community destinations like the YMCA, Recreation Centres, Libraries, Seniors' Centres, and more. You can offer introduction to cycling courses, bike maintenance clinics or Try-A-Bike Bike rental programs at these existing community assets. A cycling skills day could be a great addition to a Day Camp program or an ongoing physical activity program.	BCTF YMCA, Stakeholder agencies like Seniors' Centres Parks and Recreation Staff	2019
Gain a better understanding of your community's needs by undertaking a survey to learn how people see cycling, why they are and aren't cycling and more	An online and telephone survey can serve two purposes – it can help to understand how residents view cycling and uncover attitudes that may need to be addressed through public awareness campaigns and it can help to serve as subtle encouragement to get more people to think about cycling. Consider delivering a broad survey in Brantford to help inform educational priorities for the BCTF for the next 5 years.	BCTF City Communications Staff	2019
Create and distribute cycling maps highlighting low-stress routes, including the time it takes to travel from one popular destination to another within Brantford	One of the topics of discussion that came up several times at the Workshop was the fact that Brantford residents may not know about some of the safe, comfortable bike routes that exist in the community. Producing a user-friendly, easy-to-read map that highlights the difficulty level[11] of each route can help to show more people in Brantford that cycling in the City is possible on low-stress routes, including neighbourhood streets. Once these routes are identified on a map, install signage including distance and estimated time to key destinations[12] and install traffic calming elements to make the routes more comfortable for inexperienced residents to ride a bike[13].	BCTF Parks Staff Engineering Staff Communications Staff GIS Staff	2019

[11] For an example of a bike map that identifies the difficulty of each route, see what Victoria, BC has done here: https://www.crd.bc.ca/docs/default-source/crd-document-library/maps/transportation/bikemap2014-frontback-web.pdf?sfvrsn=d33c6bca_8

[12] For an easy way to create and deploy signage that includes time and key destinations, try using Walk [Your City] to create signage along key routes. https://walkyourcity.org/

[13] Consider establishing routes as a "Neighbourhood Greenway" or an "Active Transportation Priority Street" where cut-through vehicle traffic is discouraged and design elements force people driving to slow down in residential areas. For guidance on implementation, see here: https://nacto.org/publication/urban-bikeway-design-guide/bicycle-boulevards/ or consult OTM Book 18.

Bring cycling safety education to where community members already are by creating a mobile cycling education and repair booth	The most important thing about cycling education is not reaching those who are already biking – it's reaching those that aren't cycling yet. Create a booth to be deployed at community events that has educational materials, including information about basic bike repair, to help encourage residents and visitors to try cycling again.	BCTF	2019
Ensure that the dedicated portal for cycling on the City of Brantford's website is relevant and always up to date	Having a website for Brantford's Cycling information is a vital way of showing the City's commitment to cycling and for disseminating information about routes, projects and events. Be sure to produce promotional materials to let residents know about the website, and ensure that City Staff communicate with members of the cycling community on a regular basis to keep content up-to-date and relevant to the community's needs. Also be sure to add pages about upcoming cycling events and some items that focus on the joy of cycling rather than just the technicalities of using the bike lanes in town.	BCTF Communications Staff	Ongoing
Create educational resources to distribute to parents in Brantford about sharing the road with cyclists and encouraging their kids to get to school actively	Parents are role models to their children – if they share the road safely, ride legally and wear bike helmets, their kids are more likely to do those things as well. Send resources home with kids from school to reach parents at home encouraging them to ride with their kids and informing them of upcoming events that include bikes. Resources are available on the Active and Safe Routes to School website here.	BCTF School boards Public Health	2019
Create a cycling partnership fund[14] to help ensure that local partners can deliver and scale up some of the existing cycling education programs in the area.	Promoting cycling in the community is a multi-faceted job. It can't be done by just one stakeholder group, but often the groups that are doing the work are relying on donations and volunteer time to ensure that educational programs are delivered. By creating a funding stream to recognize the value of that work and helping organizations to do more, the City can serve as an effective partner in fostering a stronger culture of cycling in the community.	BCTF City Staff	Spring 2019 and ongoing

[14] For a good example of a partnership grant program, see Bloomington, Indiana's Local Motion grants stream info here: https://bloomington.in.gov/grants/local-motion

Run "Stay Safe, Stay Back" trucking campaign within Brantford[15]	Local professional truck drivers should be ambassadors for safe driving practices and training them on how to share the road safely with cyclists will help them be good role models. All materials for this campaign are available from Share the Road.	Public Health, City Staff Large Employers	2019

Education Workplan: Schools and Youth

One of the keys to creating a community where cycling is more accessible and comfortable is to engage residents who aren't able to drive and to provide them with safe, reliable alternatives to being reliant on automotive transportation. Youth, by definition, cannot drive, so creating safe routes for them to cycle to school and providing them with the tools that they need to make the active, healthy choice to walk or bike to school are key to creating a great cycling community. Attendees at the Workshop and the World Café offered many great suggestions to help get more youth cycling in Brantford. Those suggestions are presented below.

Recommended Actions	Description	Groups Involved	Timeline
Work with schools to deliver School Travel Planning[16] programs and Active and Safe Routes to School programming to all schools.	The importance of active school travel came up repeatedly throughout the workshop, so it is suggested that there be a specific effort through the BCTF to work with schools to implement School Travel Planning (STP) Projects in Brantford on an ongoing basis. In order to ensure that School Travel Planning succeeds, it is recommended that the BCTF work with the local school boards and Lambton County Public Health to hire a School Travel Planning Coordinator[17]. The Ontario Active School Travel Fund makes funding available to hire STP Coordinators and bring STP programs into your community – be sure to apply for the Fall 2018 round!	BCTF School representatives Municipal Staff Public Health	2019 – STP in one school per board. 2020 – 2 schools per board 2022 – all schools in Brantford have STP

[15] This campaign has recently been adopted by the City of Toronto, City of Ottawa, Tomlinson, Cavanagh and Karson Group. Digital resources are "ready-made" for printing and sharing online. Contact bfc@sharetheroad.ca for more details or visit www.staysafestayback.ca
[16] For resources on how to create school travel plans, see here: http://ontarioactiveschooltravel.ca/steps-to-success-the-5-es/
[17] A wide variety of school travel planning resources, including a coordinator job description, is available for free here: http://ontarioactiveschooltravel.ca/school-travel-planning/school-travel-planning-toolkit/

Work to organize new programs to help to get students to school actively and safely, including bike trains and walking school buses[18].	In many cases, parents are already involved in their kids' transportation to school, driving them distances that are easily walkable or bikeable. Work through the BCTF with School boards and local community groups to recruit parents to lead bike trains or walking school buses to help get kids to school actively and safely, and to teach healthy transportation habits for life.	BCTF, School Representatives Parents	2018
Consider creating "School Streets" around schools, which are closed to cars during drop off and pick up times.	One of the most dangerous places for a child to walk or ride their bikes is the final 200m near the school, mostly because other parents are engaging in dangerous driving while dropping their own children off. Some cities are making efforts to eliminate these dangers by creating "School Streets" – roads and areas around the schools that are closed to automobile traffic during pick up and drop off times, to make active trips to school safer and more common. Consider piloting such a program around some schools in Brantford.	BCTF Engineering Staff School Boards School staff Public Health BPS	Pilot in 2020

[18] For a wide variety of resources about encouraging cycling to school, see this guide: http://www.hastebc.org/files/uploaded/mikesmith/Cycling%20Manual%20EN(1).pdf and for more information on how to start your own bike train program, see this guide from HASTe in BC http://www.hastebc.org/resources/walking-school-bus-bicycle-train

Spotlight on: Effective Cycling Education

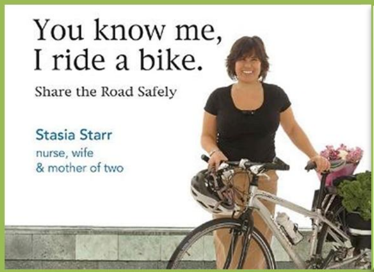
Throughout the workshop, attendees emphasized that many residents don't know the rules of the road as they apply to bikes – whether they're on a bike or behind the wheel. Every effective cycling education campaign has two main parts – one focused on those who ride and one on the general public.

Education for people who drive:

- Should emphasize that people on bikes have a right to be on the road.
- Should focus on safe, courteous passing in accordance with the 1m safe passing law.
- Should feature messaging that emphasizes that people cycling are neighbours and community members.

Cycling Education:

- Should be taught by a certified cycling instructor.
- Should be offered at flexible times, with a variety of courses available – consider a focus on beginner cycling courses*.
- Should ideally be offered on-site at large employers as a lunch and learn series.
- Should feature simple messaging for new riders, such as "stay off the sidewalks", "stay visible and predictable", and "always signal your intentions".



Thunder Bay's "You Know Me, I Ride A Bike" campaign emphasizes that people on bikes are members of the community just like people who drive.

Volunteers with Cycle Toronto hand out lights to riders to keep them visible while riding at night

Attendees identified some key ideas to create better relationships between people driving and people cycling.

1. Humanizing the people on bikes – encouraging riders to tell their story, to highlight the fact that they're community members and neighbours.
2. Getting community leaders, especially Municipal Councillors, on bikes to better understand what the infrastructure and experience is like on two wheels.
3. Broad promotion of the rights and responsibilities of each road user – encouraging cyclists to signal, ride legally etc. and letting drivers know what to expect from riders – it's the unpredictability that often causes animosity.

*Note – Share the Road is currently working to modernize the cycling education curriculum in Ontario to make it more user-friendly. Follow along with our progress at www.sharetheroad.ca/education and be sure to reach out to our staff before undertaking any education activities to see what support we offer.

ENCOURAGEMENT: *Creating a strong bike culture that welcomes and celebrates bicycling through incentives, promotions and events that inspire and enable people to ride.*

Attendees felt that there was significant room to grow the encouragement efforts within Brantford. Attendees identified a number of programs to encourage Brantford residents to get back on their bikes, & also highlighted the importance of working with schools and businesses in the area to make cycling more comfortable for their employees & their guests. The suggestions contained in this section are varied, but they all contribute to the same objective – to create a stronger culture of cycling in Brantford in the medium-term.

Recommended Actions	Description	Groups Involved	Timeline
Begin offering Bike Valet[19] at a variety of community events in Brantford, including at Canada Day, Farmers Markets and more.	Bike Valet can be a great way to reduce the parking burden at a popular event or location. With the number of sports tournaments and special events in Brantford, it was suggested at the workshop that Brantford require Bike Valet as a condition under the Special Events Permitting requirements through the City, which would be a Best Practice in Ontario when it comes to Bike Valet. Brantford could offer bike valet on an ongoing basis at places like Farmers' Markets to increase the visibility and uptake of cycling in the community. As an added value to the Bike Valet, consider duplicating the "Ride a Bike Borrow a Chair" program from Carmel, Indiana. See the "Spotlight on: Bike Valet" section of this report for more details.	Parks Staff, Events Staff, BCTF, Brant Cycling Club	Purchase equipment in early 2019 to start offering bike valet ASAP
Work with Seniors' Groups in the community to offer a series of Seniors Social Rides	Whether it is Seniors, Women, New Canadians or any other group, people tend to like riding with other people with similar skill levels and interests as themselves. Consider utilizing pre-existing social connections already built up through Seniors Centres to host social rides to reintroduce seniors to cycling. It can help keep seniors active and mobile, and lead to a more age-friendly community.	BCTF Seniors' Centres	2018

[19] For a great description of what Bike Valet is and how to run one, see here: http://www.ibike.org/engineering/event-parking.htm

Organize more social rides in Brantford to give more residents an opportunity to ride as a group. Host Slow Rides with family-friendly destinations to encourage new riders.	Attendees were pleased to see rides already happening in Brantford, but noted that most of the rides are organized by the Brant Cycling Club and focus on more of a recreational-road style of riding. Attendees felt that the number of offerings could be expanded and that the audience could be shifted to encourage new riders to come out for a more social ride. Ensure that rides offer variety for residents – family rides should be done at a no-rider-left-behind pace, and could depart from local schools as a way to highlight safe local routes to and from school in the area, with other social rides like touring rides and cyclocross rides also offered to build a culture of cycling in Brantford. Consider having the City support the development of these social rides by helping organizers obtain the necessary ride insurance to be able to deliver these types of rides. See the "Spotlight on: Social Rides" section of this report for more information and suggestions	BCTF and community partners	Ongoing
Create a Stakeholder Outreach strategy, including a web-based portal to better connect with key groups who help move cycling forward.	Attendees highlighted the importance of stakeholder collaboration to ensure that the goals and objectives of the BCTF plans are met. By engaging with stakeholder groups you can identify new avenues for outreach (by attending community events, reaching out into new community centres, pushing information out on alternative email lists etc.), identify new champions for cycling in the community and ensure that stakeholders are speaking with consistent messaging. Consider creating a stakeholder email list and a dedicated web site for stakeholders where all relevant information, including program updates, public awareness campaign materials etc., can be found.	BCTF	2019
Expand the number of local businesses participating in the Ontario By Bike Network	Ontario By Bike provides an excellent resource for cycle tourism in your community. Encourage businesses to play a more active role in promoting cycling by talking to them about the benefits of joining Ontario By Bike, and encouraging more businesses to provide bike parking, water bottle refills and other amenities for cyclists.	BCTF, Economic Development, BIAs Chamber of Commerce, Ontario By Bike	2018

Host Bike Month festivities in 2019 and beyond, expanding the number and variety of programs each year.	June is Bike Month in Ontario – and it is a great time to encourage new riders to get back on their bikes. Bring community partners together to form a Brantford Bike Month working group to decide what kinds of events should be held and to organize those events. See Share the Road's collection of Bike Event "Recipe Cards" for more inspiration.	BCTF	Form working group in late 2018 for 2019 event planning
Expand your Bike Month activities to include "Commuter Stations" along trails and popular cycle commuting routes	Partner with local businesses to be able to deliver snacks, coffee, cycling essentials like lights and bells and more to people as they ride their bikes past the pit stops. These types of events add to the sense of joy that comes from cycle commuting and are a great way to show support for cycling all over the community.	BCTF, local businesses	2019
Create a Cycling Integration Team to creatively add cycling into existing town events.	As special events and festivals approach, work with event organizers to add cycling in to the regularly scheduled activities. Add messaging about cycling to the event to reduce traffic congestion and parking, highlight the routes that residents could take and the estimated time it would take them to get there if they rode their bikes, advertise the availability of bike valet and work to integrate cycling education and encouragement efforts into the events already taking place in Brantford.	BCTF Special Events Staff Parks and Recreation Staff	2019
Work with neighbourhood associations to offer Community rides highlighting local neighbourhoods	One of the assets identified at the Workshop was the existence of a network of well-connected neighbourhood associations. These Neighbourhood Associations would be excellent hosts of local neighbourhood rides to introduce their residents to the amenities and hidden routes within their areas. Consider developing a "neighbourhood association rides guide" document to share with the associations and helping to foster the development of these rides.	BCTF, Neighbourhood Associations	2019

Spotlight on: Bike Valet

Volunteers in Windsor greet riders at their bike valet. Well-trained volunteers are a key component to a successful bike valet!

Bike Valet works like a coat check, but for your bike. You arrive at an event, check your bike in at a staffed, secure, fenced location and receive a ticket. At the end of the event, you trade your ticket in to receive your bike. Attendees were excited about the idea of a Bike Valet service in Brantford, and felt that it would be a positive addition to the City's cycling efforts.

Brantford has many special events - people come from all over Ontario and beyond to attend the festivals and celebrations in the area, and each event is a great opportunity to reduce the burden of parking and demonstrate the community's commitment to cycling! To ensure a successful bike valet, be sure to:

- Put the bike valet in a highly visible, convenient location. Make Bike Valet the best option for parking!
- Staff the Bike valet with knowledgeable volunteers or staff who are able to engage patrons in discussions about safe cycling in Brantford – use Bike Valet as an opportunity to educate while parking bikes.
- Make the Bike Valet look professional and welcoming with a tent, tables, chairs, fencing and plenty of bike storage.
- Advertise beforehand, and ensure that Bike Valet is available consistently at community events – the more residents and visitors see it, the more likely they are to try it!

Attendees identified the First Friday and the weekly Farmers Market as good places to host Bike Valet, although that should not be considered an exhaustive list. Every time there is an event in Brantford where large numbers of people are gathering in a central location, Bike Valet is a great opportunity to reduce parking demand and show support for cycling in a highly visible way!

Ensure that the Bike Valet is in a visible, conspicuous location close to the areas people want to visit – making biking to the event the easiest option for parking is the best way to get more people to leave their cars at home!

Be sure to include the costs of setting up and running a Bike Valet in event budgets, and also consider offering incentives for people who use the bike valet (discounted tickets, special offers, giveaways etc.) for the first little while until the valet service well-known enough to be self-sustaining.

Offer Bike Repair workshops at community events	Attendees felt that a bicycle repair workshop was something that could be offered to serve more people within the community by giving them the necessary skills to make the types of simple repairs that can sometimes keep an otherwise usable bike in the back of someone's garage. Partner with local bike shops to offer Bike Repair 101 at community events, and to offer more advanced bike repair courses to keen residents a couple of times a year, potentially through the parks and recreation department.	BCTF, Local Bike Shops, Parks and Recreation Staff	Ongoing
Create a series of cycling incentives at various workplaces and shops in the City	Sometimes people need a "push" to try something new. Consider launching an incentive program for employees and for customers through various businesses in Brantford, including discounts on products for people who arrive by bike, a Commuter Challenge draw, Free Bike Tune-ups at the Farmers Market and VIP access to community events for people that arrive by bike during Bike Month	BCTF, BIAs, Employers and City Staff	2020
Launch Bike to Shop, Bike to Church and other campaigns aimed at normalizing Everyday cycling	Only about 20% of the trips people make are for commuting purposes, yet Bike to Work is often one of the only focal points of promotional efforts. Often, community destinations like local stores, churches, recreation centres etc. are all close enough to bike to, but most residents still choose to drive. Create campaigns to encourage and normalize trips to these popular destinations.	BCTF Faith leaders BIAs Parks and Recreation staff	2019 as part of Bike Month
Create a "You Can Bike Here" Communications Strategy to highlight how short many trips in Brantford are	Many of the daily trips made that start and end in Brantford (i.e. trips to the grocery store, to Downtown, to recreation centres) are easily done in 15 minutes or less on a bike. Develop a campaign to show people how short the trips are by placing large posters in these popular destinations highlighting the areas of town that lie within a 5, 10 and 15 minute bike ride using concentric circles around the destination – a great example is what was done in Peterborough, which can be found in the appendices of this report as Figure 1 – Peterborough Map	BCTF, BIAs, Parks and Recreation Staff	2019

Create a Media Engagement Strategy for cycling in Brantford	Attendees noted that delivering positive messaging about cycling to the media in Brantford was an important consideration to increase community buy-in. It was suggested that the community start with "Cyclist of the Month" profiles, showcasing everyday residents in Brantford who travel by bike to humanize cyclists in the City. Attendees also suggested a series of radio ads highlighting the importance of providing all road users with respect and encouraging people to slow down while driving around people on bikes, and creating a campaign that informs people that most trips in Brantford are easily done in 15 minutes or less by bike. Ensure that messages are positive and supportive of healthy transportation choices!	City Communications staff, BCTF	2019
Launch a Trail Stewards / Bike Ambassadors program, utilizing existing cycling ambassadors and summer students	Consider hiring summer students to serve as Trail Stewards and Bike Ambassadors for Brantford, providing daily reports on conditions of the trails to Parks and Recreation Staff, providing high visibility examples of safe, legal riding on the roads, and providing wayfinding and advice, serving as a "mobile information kiosk", to visitors and residents alike on the trails. Be sure that all ambassadors receive cycling skills training and set a positive example of courteous, legal cycling at all time.	BCTF Parks and Recreation Staff	Apply for Canada Summer Jobs grant in 2019 to begin program
Work with community groups to establish a Bike Co-Op or Community Bike Hub in Brantford	Bike Co-Ops can help to get bikes into the hands of those that need them most, can provide new skills for underserved youth, can provide a meeting space for new riders who don't feel comfortable going into a traditional bike shop and can provide a space where bike culture can grow. Consider supporting the development of a Co-Op by providing space[20] and startup funding.	BCTF Economic Development and Culture Staff	2020

[20] An excellent example of a Bike Co-Op supported by the local municipality is Cobourg's Cycle Transitions – learn more here: http://cycletransitions.org/

Spotlight on: Social Rides

Social rides can provide an excellent entry point for new riders and for riders who haven't been on their bike for a while. They're a great way to build cycling culture and to raise the profile of cycling in Brantford. See below for some of the many suggestions for Social Rides that could be hosted in Brantford.

Bike-In Movies welcome cyclists to a public screening of a film – plenty of fun for the whole family!

Tweed Rides are popular around the world, giving riders a chance to dress up in their finest vintage outfits.

Suggestions for Social Rides include:

- Culinary tours of Brantford – cafe tours, restaurant rides.
- A Tour of Brantford's Public Art
- A Family Cycling Skills Day at the Recreation Centre and on the trails where children can learn how to ride safely without cars.
- Ice Cream rides – family friendly routes and shorter distances to encourage kids to participate.
- Bicycle brunches (a short ride followed by a group brunch at a local restaurant)
- A Bikes and Bites event – a Price Fixe dinner at 3-4 different restaurants by bike (appetizer at one location, main course at a second, dessert at a third)
- Women's Only Rides
- A Picnic in the Park by bike
- Bike parades / best decorated bike awards in preexisting parades.
- Seniors Rides in conjunction with local Seniors Activity Centres
- Glow Rides (night rides with lights and glow sticks adorning the bikes)
- Bicycle Scavenger Hunt / Amazing Race style events

Kidical Mass events give parents an opportunity to ride with their kids in a slow, safe group.

Canada Day Bike Parades give kids a chance to decorate their bikes and show off their Canadian Pride!

The great thing about Social Rides is that they really only require one or 2 dedicated people to make them happen! Give people the chance to explore their interests and lead a ride that showcases things they're passionate about, and you'll find that you start to see more people express an interest in leading a ride in the future!

ENFORCEMENT: *Ensuring drivers and cyclists share the road safely through equitable laws and activities that hold both groups accountable for their behavior and actions on the road*.

Attendees were happy to see the prohibition of motorized vehicles on local trails, but emphasized that there were opportunities for the Brantford Police Service (BPS) to be more involved in making cycling safer, including by engaging in positive ticketing and being engaged in more training about cycling as it relates to the Highway Traffic Act.

Enforcement Workplan

Recommended Actions	Descriptions	Groups Involved	Timeline
Have officers engage in "Positive Ticketing" campaigns.	Consider having officers distribute coupons for treats or items like pool passes to youth "caught" wearing helmets while riding. Ensure 'positive tickets' support and reinforce healthy living (i.e. swim passes etc.). More information on healthy rewards for children can be found here.	BPS, Public Health, City Staff	2019
Have officers engage in Safety Blitzes relating to cycling safety changes contained in Bill 31	Officers can disseminate information about the 1m safe passing law and the changes to penalties for not having lights on bikes during RIDE checks; consider encouraging officers to undertake these types of programs.	BPS, BCTF	2019 and beyond
Have officers engage in enforcement of the 1m safe passing law using handlebar mounted radar tools	In other jurisdictions in Ontario, a small handlebar mounted device has been used to detect infractions of the 1m safe passing law, allowing officers to engage in education and enforcement about the law[21]. Ottawa has lent the device to other municipalities to engage in enforcement blitzes – consider using the device to raise the profile of the 1m law, and consider investing in the device to help enforce the law more regularly in Brantford.	BPS BCTF	2018

[21] Learn more about Ottawa's ongoing work to educate drivers about the 1m safe passing law and their enforcement efforts here: https://ottawacitizen.com/news/local-news/police-plan-crackdown-on-one-metre-safe-passing-law-protecting-cyclists

Organize a "Ride a Mile in My Shoes" event including plainclothes police officers and cycling advocates[22]	This type of ride around common cycling routes allows officers to experience first-hand what regular cyclists face on their journeys. (Drivers often behave differently - safer - around police officers in uniform.) It also helps to build/strengthen the relationship between police and cycling advocates	BPS BCTF	Once each year
Undertake an evaluation of the City's current bylaws that relate to cycling in comparison to best practices in other Ontario Communities	Establish an Active Transportation Bylaw Review Task Force made up of interested residents and City Staff to review the existing bylaws, determine where some of the gaps and inconsistencies may be, and work to rectify the inconsistencies. Attendees identified the need to strengthen the bylaws relating to parking in bike lanes as a priority for Brantford as they move forward.	Municipal Staff, BCTF Members, BPS	Ongoing
Create a unit of bylaw enforcement officers whose role is to patrol bike lanes in the area and keep them clear of parked vehicles and to patrol trails to ensure that trail rules are being followed.	In Toronto, the Bylaw enforcement unit now employs several officers who patrol the bike lanes of Toronto ticketing people who park in bike lanes. Their presence has resulted in increased awareness of the risks of parking in a bike lane, and has lead to the creation of similar units in Hamilton and Halton Region. In Brantford, a similar unit could patrol newly installed bike lanes and provide increased law enforcement presence on the trails in the community. This officer could also serve as a liaison between the Brantford Police Service and the cycling community, potentially by sitting on the BCTF.	BPS and local bylaw enforcement	Pilot in 2019
Ensure that collision data is shared between local law enforcement and municipal staff, and that residents are encouraged to report near misses using non-emergency reporting as well	Collisions involving people on bikes can often be prevented or mitigated through design and infrastructure changes. Consider working with the BPS to identify collision "hotspots" in Brantford, and coming up with a plan to address each area. Also consider encouraging residents to self-report near misses using BikeMaps.org to help the City to identify potential problems before a collision occurs.	BCTF, Engineering and Planning Staff, BPS	2019

[22] This recommendation is based on a successful ride like this in Toronto. You can read more about it on page 21 of the 2015 BFC yearbook in the article, Ride a Mile in My Cycle Shoes. The yearbook can be found here: http://issuu.com/mrbikesabunch/docs/2015-yearbook-final-web

Consider working to offer a ticket diversion program in Brantford	Ticket diversion programs offer people who commit a traffic infraction the choice between paying the fine or attending an educational program such as a safe cycling course. Consider making this available to people driving and people cycling if they commit a cycling-related infraction.	BPS	Pilot the program in 2020
Initiate a review of procedures relating to road closures to make Open Streets events easier to host	When it comes to events that involve road closures, often times the most significant costs associated with the event are the fees paid to the local police department. Review the policies to ensure that events that rely on road closures like Open Streets events can rely more heavily on volunteers with guidance from the police to help reduce costs and make events easier to run.	BCTF, BPS, City Special Events Staff	2019

EVALUATION & PLANNING: *Processes that measure results, and planning for bicycling as a safe and viable transportation option.*

Attendees expressed support for the measurement efforts like trail counters and participation in the Transportation Tomorrow Survey that have been performed in Brantford, but also felt that more data should be collected to show the value of cycling and active transportation in Brantford, especially as new infrastructure is brought online. With that in mind, Attendees came up with a number of metrics that could potentially be incorporated into an Active Transportation Evaluation Strategy that could be integrated into the Transportation Master Plan. Suggested metrics to begin collecting now, and think about collecting in the future include:

- Trail Counter Data: while portable counters are excellent, permanent counters at key locations are even better. They show how cycling and walking changes in a community over time, and help to corroborate the findings of other, more periodic evaluation techniques. Consider investing in 2-3 of these counters every year to create a network of counters to monitor the progress of Brantford's cycling network.
- Survey Data: Attendees suggested collecting survey data from trail users, businesses, bike shops and other residents to get a better understanding of how the impact of cycling is being felt in Brantford.
- Collision data: How many cyclists are involved in a collision in Brantford each year?
- Bike Parking Utilization Counts: How many bikes are parked in key locations around City? Good examples include downtown areas, grocery stores, schools and large employers.
- Bike Share Data: If Bike Share is implemented, how many trips are being made annually? What routes and destinations are most popular among riders?
- Bike Sales and Repair volumes: are local bike shops seeing more bikes sold and serviced each year?
- Bike Valet usage: How many people are using the Bike Valet service when it is offered at City events?
- Event and program attendance: How many residents are participating in cycling events in Brantford? How many youth are being trained on how to ride safely and legally?
- Trip to School data: Using a simple Hands-Up survey program like BikeWalkRoll, how are travel patterns changing in schools within Brantford?
- Video Reach: How many people are seeing the Public Service Announcements being publicized by the BCTF and other stakeholders?
- Tourism Inquiries: How many visitors are asking about cycling when they visit Brantford?
- Resident Surveys: What do your residents think about active transportation in Brantford? What would help them choose to walk or bike more?

As you collect this data, it is of vital importance to share the progress that the City is making with your residents. With a strong focus on data collection, Brantford could create a "State of Cycling Report[23]" for the City every 2-3 years, detailing the progress being made on various important metrics like connectivity, safety and resident perception. The communication of the City's vision for active transportation and the progress being made is vital to ensure community support, so consider hosting some of the data you collect in real time on the City's website in a "cycling data dashboard" – include key data points like trail use counts, bike parking use, collisions and bike share trips in real time if they are available.

Evaluation & Planning Workplan

Recommended Actions	Description	Groups Involved	Timeline
Approve and budget for a Short-Term, High Impact Cycling Implementation Strategy to create a spine of cycling infrastructure around Brantford	When it comes to encouraging cycling, experience from around North America[24] is showing that implementing a complete network of cycling infrastructure over a short period of time has a more significant impact than spreading out investments over time and keeping the network filled with gaps. Undertake a public consultation strategy to identify the priority gaps that should be filled quickly, and create a Short-Term Implementation Strategy to provide a complete network of cycling infrastructure around Brantford, connecting the well-used routes like the riverfront trails system and the Rail Trail to popular destinations in the City like the mall and downtown.	BCTF, Engineering and Planning Staff, City Council	Consultations on Short-Term Implementation strategy in late 2018-2019 to launch investments in 2019-2020

[23] For an excellent example of a community collecting cycling data, see what the city of Calgary is doing here: http://www.calgary.ca/Transportation/TP/Pages/Cycling/Bike-Data.aspx and see what York Region has done here: http://www.york.ca/wps/portal/yorkhome/newsroom/news/yorkregioncycling%20yearbook/!ut/p/a0/04_Sj9CPykssy0xPLMnMz0vMAfGjzOKNjEzMPAydDbzc3SzNDTzDgj38TN1NDQ3cjPQLsh0VATqIFPQ!/#.WhcTD7T82CQ
[24] A Good example can be found in Edmonton, Alberta: https://www.edmonton.ca/projects_plans/downtown/bike-network.aspx where ridership doubled in the first month of their new network being operational: http://www.cbc.ca/news/canada/edmonton/edmonton-bike-cycle-lane-usage-traffic-car-bike-city-friendly-1.4242814

Collect data about the number of cyclists using the existing facilities in Brantford[25]	This data collection should include volunteers counting the number of users on Brantford's roads and trails on weekdays and weekends[26] and the number of bikes parked in existing bike racks to establish a baseline of cycling use in Brantford.	BCTF, Public Health, Public Works Staff	2019
Host biannual meetings with various stakeholder groups to provide updates about what is happening with regards to cycling in Brantford and Brant County	While many of the relevant stakeholders will likely be represented on the BCTF, some stakeholders will not be fully represented, even though they have an interest in, and feedback about, the cycling developments within the City. Consider hosting 2 meetings a year where BCTF members and City Staff can update the community about what is happening with regards to cycling, and can receive feedback from the cycling community about what could and should come next. These meetings can also provide an opportunity to liaise with Brant County Staff to discuss mutual opportunities to move cycling forward in the region.	BCTF Municipal Staff, Brant County Staff, Cycling Clubs, Bike Shops and other stakeholders	2018 – consider using this report as the basis to host the first of these meetings
Create an OpenStreetMap Inventory of Brantford's existing road network to help with future analysis of the City's network	Providing an Open Source data set can have many benefits – it gives the City a head start to use the Bicycle Network Analysis Tool developed in the United States, and can provide information about where small investments in the cycling network can create better connections.	Engineering and GIS Staff BCTF	2018 and ongoing updates to the map

[25] For a comprehensive guide to performing cycling counts, see here: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_797.pdf
[26] For an excellent example of a community monitoring and reporting on the number of people cycling on weekdays and weekends, see what is being done in Eugene, Oregon here: http://thempo.org/356/Bicycle-Counts

Ensure that the City's Development Standards include connections to existing trails and improvements to the active transportation network	While it is difficult and expensive to retrofit past developments to be better connected and safer places to walk or bike, it is much easier and cheaper to create connected, safe networks for walking and cycling by requiring connectivity to existing trails for new developments[27] and requiring high quality infrastructure to be constructed when a new development is built[28]. Be sure that your planning documents create communities that are connected, safe and multi-modal.	Planning Staff, City Council, Developers	ASAP
Host an annual staff cycling integration day to ensure that all staff understand their role in creating a more bicycle friendly community	The City of Brantford has the foundation to become a leader in Ontario when it comes to active transportation, but that can't happen without a concerted effort from all staff members. Host a staff training day once each year to educate staff about changes occurring on the cycling file, introduce new concepts with regards to how they can support more active transportation and hear from them about how cycling can play a larger role in their portfolio.	City Staff (led by Active Transportation Planner)	Begin in 2019 when new TMP is approved.
Support provincial cycling advocacy efforts through the Ontario Cycling Advocacy Network (OntarioCAN).	Many activities of provincial scope were highlighted throughout the workshop that would help to improve cycling conditions in Brantford. This includes cycling education in schools, investments in infrastructure and driver training. Once the BCTF is formed, they should ensure that they represent the Brantford as part of the Ontario Cycling Advocacy Network. This Network is facilitated by Share the Road and our aim is to have 1 representative in each electoral district (provincially)	BCTF, Share the Road, Municipal Staff	Ongoing

[27] For a good example of simple planning requirements, see what the Town of Collingwood has done: http://www.collingwood.ca/files/photos/docs/Collingwood%20Development%20Standards.pdf (See page 53, Section 4.10.4 – Trailways)

[28] For example, the City of Ottawa has released their Better and Smarter Suburbs design guidelines, which highlight that building a raised cycle track in a new development is $41,000 per km cheaper than building on-road bike lanes in that same development. http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/BBSS_final_en.pdf

Conduct an active transportation and trails survey in Brantford, asking current users and people that aren't currently walking or cycling their opinions of active transportation in the region.	Collect more qualitative data about how people are using active transportation: why they're using it, how often they use it, how they get to where they walk or bike, what improvements they would like to see to the existing network etc. Perhaps more important than the opinions of the people that are already walking or biking are the opinions of those that are not – find out what barriers are preventing them from travelling actively more often, and identify a plan to mitigate those barriers.	Public Health, Active Transportation Planner, BCTF	2019
Create an Annual Report Card on Brantford's cycling implementation	As new projects and programs are implemented, it is important to be able to quantify and communicate the benefits to the community. Consider publishing a report card annually that reports on important metrics like ridership levels, the number of children walking and biking to school, demographics of riders, the number of trips taken in Brantford, the number of vehicle kilometers travelled avoided because of cycling and information about road safety and the impact of cycling and traffic calming initiatives on collisions for all road users.	Public Health, BCTF, City Communications Staff	2019
Enact zoning bylaw changes that add requirements for end of trip facilities like bike parking, locker rooms and showers in all new multi-unit residential and commercial developments.	Employers, developers and other property owners can help to reduce the barriers to cycling by providing end of trip facilities that make cycling easier. Consider requiring secure bike storage, permitting bike parking in lieu of car parking, and provide development bonuses for items like locker rooms, showers, bike parking rooms etc. to help make it easier for people to use their bike for utilitarian purposes. The City of Kitchener has developed new draft zoning guidelines that could be a good template for Brantford – see those guidelines here.	City Council Planning Staff Operations Staff Engineering Staff	2019-2020

Appendix A – Compiled inventory of current programs and priority gaps

Engineering:

Inventory	Gaps
- 90 km of trails	- Connectivity
- 18 km of bike lanes and bike routes	- Bike racks
- Bike racks downtown	- Secure bike parking – long term
- Bike Park	- Signage
- Wayfinding signage along trails	- No Bike repair stands
- Trail amenities – benches, water etc.	- No Bike Share system
- Bike racks on buses	- No single track for mountain bike riders
- Design standards / manual	
- Counters in place along the trails	
- Showers installed at new City Hall	
- Bridge inspections done twice a year	

Education:

Inventory	Gaps
- SprocKids Program	- Ongoing PSA campaign
- SOAR program	- Active School Travel across the community
- Brant Cycling academy	- CAN-Bike Courses
- Brant Cycling Club Rides	- Staff Driver Training
- Bike Rodeos	- Mobile App
- Safety Village	- Utility and Tax Bill Inserts
- County Bike Lending program	- Municipal Cycling Challenges
- Social Media PSAs	- Bus and Shelter ads
- Lights and bumper sticker giveaways	- Staff training
- Maps	- Schools sometimes very difficult to build relationships with – need a contact and an event to get in
- Police Education Blitz	- Bike Swap
- Council Task force on road safety and speed reduction	
- Bike repair workshops at local bike shops	
- Safe Routes to School along Erie Ave	

- BCC Youth Bike Etiquette Program	
- Cycling web page on City website	

Encouragement:

Inventory	Gaps
- Bike Rodeos	- Commuter Challenge
- Bike Park	- Cycling Marketing Plan
- Bike Shops	- Bike Month Activities
- BCC Rides and Events	- Bike Safety Workshops
- Bike to School Day	- School Board Cooperation
- Neighbourhod Associations	- Open Streets
- Paris to Ancaster Race	- Bike Share
- Trail Maps	- Trail Stewards
- Mike on a Bike	- Tourism Marketing
- NCCH	- Bike to Work Day
- Bike Race in Mohawk Park	- Bike Valet
- Brant Waterways Foundation Ride Walk and Run for the Waterways and Trails	- Coordination between City departments and external stakeholders – Parks and Recreation, Health Unit, Police, Engineering and Planning, BCC
- Ontario By Bike Businesses	- Community Development and capacity building

Enforcement:

Inventory	Gaps
- Officers on bikes	- Lack of resources to do bike patrols all the time – manpower and gear
- Trail and Park Patrols	- Lack of focus on education, especially about 1m safe passing law – need 1m safe passing device for enforcement
- Trail bylaws – no motorized vehicles	- Need more enforcement of bylaws and trails user restrictions
- Collision reporting	
- Lights giveaways	
- Bike Lane Bylaws	
- EBike Trail Restrictions	

Evaluation and Planning:

Inventory	Gaps
- Cycling Master Plan	- Programming budget for cycling programs
- Trail Bike Counters	- Need more trail counters
- Parks and Recreation Master Plan	- Traffic counts don't include bikes
- Participation in Transportation for Tomorrow Survey	- Cycling Surveys
- Cycling Club Surveys	- No firm goals or commitments in the plans
- Traffic Impact Studies	- Need stronger development standards to include active transportation in new developments
- Trails Budget	- Bike parking inventory
- Economic Development and Tourism Strategy	- Bus bike counts
- Road design and trail design standards	
- Monthly trail inspections	
- Downtown Streetscape plan	
- Development charges fund hard surface trails	

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APPENDIX C

Transportation Demand Forecasting Model

CITY OF BRANTFORD

Transportation Demand Forecasting Model

Model Migration and Calibration Report

November 2020 - 17-6501

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1.0 Introduction

In 2016, in preparation for the Transportation Master Plan Update, Dillon Consulting migrated the City's 4-step travel demand model from TransCAD to VISUM[1]. The purpose of this migration was to prepare the strategic model for potential next phase microsimulation[2] activities for Secondary Plan and Environmental Assessment study analysis. The migration included the update of population and employment data (existing and future) and the recalibration of the model using update count data. At the conclusion of the TMP activities, the strategic model will be migrated back to TransCAD as required.

This transportation planning model is a representation of the County of Brant and the City of Brantford transportation facilities and the travel patterns using these facilities with a focus on the City of Brantford. The model contains inventories of the existing roadway facilities and of land use and demographic data in the area. These inventories are used to calculate 'modeled traffic counts', which are compared with current 'existing traffic counts'. When the model matches the modeled and existing traffic counts within acceptable ranges of error, the model can then be used to test future year scenarios. These scenarios may be changes in population, employment, travel behavior patterns, or roadway improvements. The transportation engineer or planner, using the transportation planning model, can project future traffic volumes without the cost of building inappropriate roadways or waiting for traffic congestion to severely impact travelers.

This document details the methodology that was used to migrate the model. Because modeling is a complex process, much of the theory, terminology, and concepts are also discussed.

1.1 Scope of Work

The scope of the project included the following primary tasks:

- A complete migration of the existing TransCAD model to the VISUM platform;
- An update of the existing and future population and employment; and
- A recalibration of strategic screenlines for auto vehicles using updated traffic count data.

[1] VISUM is a Windows based multimodal transportation modeling software made by PTV Group.

[2] Microsimulation models simulate the behaviour of individual vehicles within a predefined road network and are used to predict the likely impact of changes in traffic patterns resulting from changes to traffic flow or from changes to the physical environment. Unlike conventional intersection capacity analysis tools (such as Synchro), microsimulation models consider vehicle and driver behavior theories, and vehicles can be influenced by other vehicles, pedestrians and bicycles, roadway grades, curves, and many other factors.

1.2 Model Foundations

While enhancements to the model content have been made, the foundational elements of model have not been changed as part of this migration process. Specifically the following has not been revisited:

- Trip Generation;
- Trip Distribution;
- Mode Share; and
- Assignment Processes.

The original TransCAD model utilised the 2006 Transportation Tomorrow Survey (TTS) to capture trip making patterns of City residents throughout a typical weekday. Since that model was developed, the results of both the 2011 and 2016 TTS surveys were released. To ensure the models foundational elements were still valid, the 2016 TTS data was comparted against the 2006 TTS data. This comparison confirmed that the models foundations were still relevant and as such the model should be considered reflective of the 2016 TTS.

The TTS survey remains as the cornerstone of the model. Its findings were primarily used in the development of the transportation model and include the identification of peak travel periods, the development of trip generation rates, the identification of travel mode share, the estimation of automobile occupancy, etc.

2.0 Model Refinement & Development

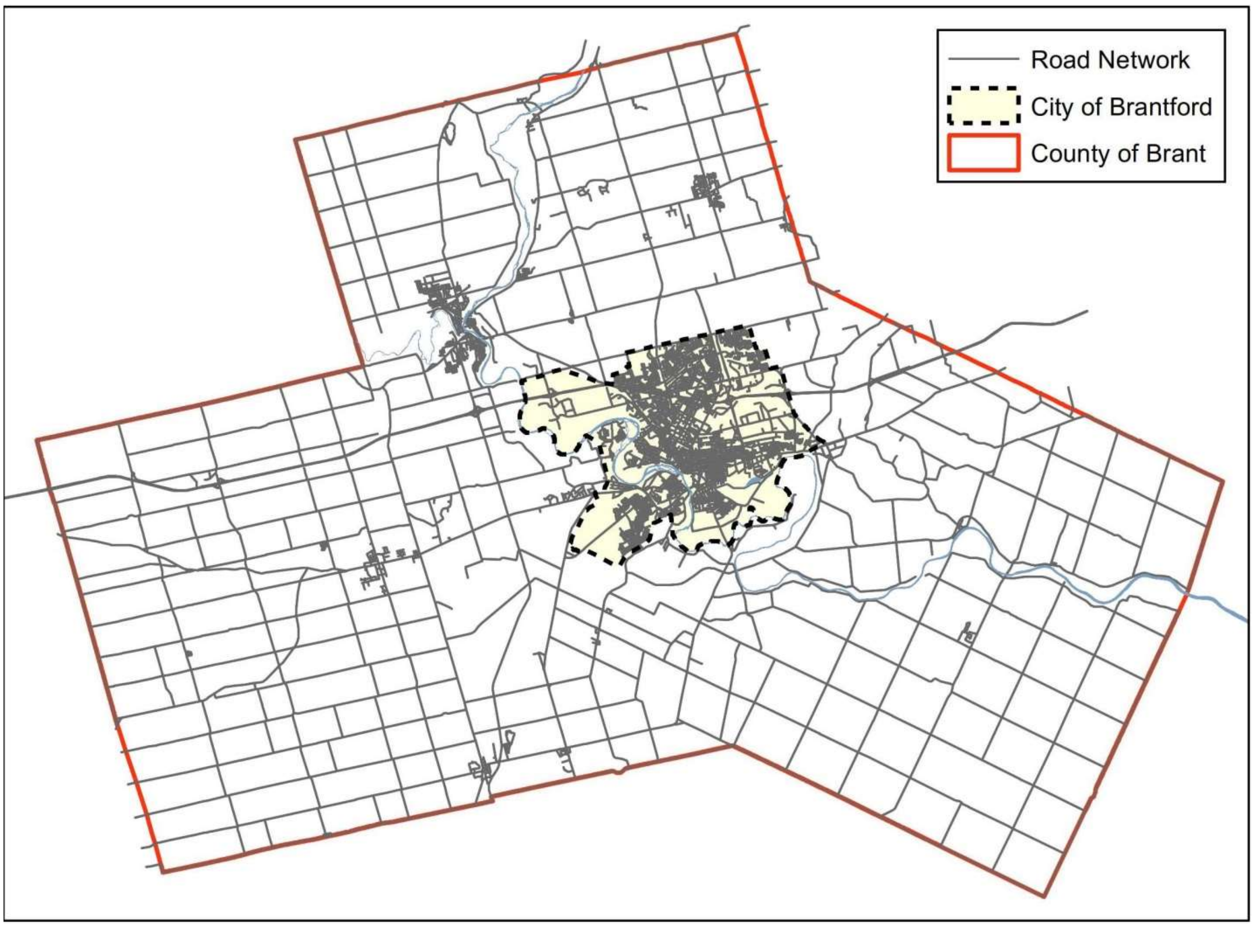
The Brantford model refinement and development involved the following items:

- Model Area;
- Transportation Network Enhancement; and
- Transportation Analysis Zones (TAZ).

2.1 Model Area

The modeling process begins with the identification of model area. In case of the Brantford model, the model contains the entire County of Brant and the City of Brantford. However, the main focus area of the model is the City of Brantford. ***Figure 1*** illustrates the model area, highlighting both the County of Brant and the City of Brantford.

Figure 1: Brantford Model Area



2.2 Transportation Network Enhancement

The road network in the transportation model is represented by a series of links and nodes, which reflect lines of travel and points where roadways intersect. Typically, links represent roadway segments and nodes represent intersections.

2.2.1 Road Links

The functional road classifications in the model are used to characterize each roadway based on how it operates and the role it serves in the transportation network. Functional road classifications were adapted from the previous TransCAD transportation model and disaggregated to allow different capacities for single road classification types with different speed limits. This method provides additional flexibility during calibration, as capacities can be modified to mimic actual operating conditions.

Each roadway link in the model was assigned a functional classification / speed (i.e., Link Type attribute in VISUM) and its directional number of lanes. Using VISUM's model run procedures (see ***Section 3.4***) the planning capacity in vehicles per hour (vph) was automatically calculated.

The planning capacities used in the model reflect free flow conditions at on a link for a given operating condition and influence the movement of traffic through the network. As an example, a typical arterial roadway has a saturation flow rate of 2200 vehicles per hour per lane (vphpl) of green time at a traffic signal. For a typical intersection of two major arterial roads, the strategic assumption is that the available green time is roughly split 50/50. After reducing the time required for the amber and all-red signal phases, approximately 41% of the available time within an hour is used for the green phase on each road. This translates to a planning capacity of 900 vphpl.

Roadways with a lower functional classification are assigned lower planning capacities to reflect the reduced flow rate due to lower priority at intersections with major roads.

The link types, functional road classifications, planning capacity, and speeds as coded in the model are defined in in ***Table 1***. The functional classifications for the roads within the County of Brant and the City of Brantford as coded in the VISUM model are shown and ***Figure 2*** and ***Figure 3***.

Table 1: Functional Road Classification, Speed Limit & Planning Capacity

Link Type Number	Functional Road Classification Name	Speed (km/h)	Planning Capacity Per Lane / Direction (vehicles / lane / hour)
11	Freeway	90 km/h	1500
12	Freeway	100 km/h	1800
15	Rural Highway	60 km/h	1000
16	Rural Highway	70 km/h	1100
17	Rural Highway	80 km/h	1200
18	Rural Highway	90 km/h	1300
21	Freeway Ramp	60 km/h	1000
22	Freeway Ramp	70 km/h	1100
23	Freeway Ramp	80 km/h	1200
31	Major Arterial	50 km/h	800
32	Major Arterial	60 km/h	900
33	Major Arterial	70 km/h	1000
34	Major Arterial	80 km/h	1100
41	Minor Arterial	50 km/h	700
42	Minor Arterial	60 km/h	800
43	Minor Arterial	70 km/h	900
44	Minor Arterial	80 km/h	1000
51	Major Collector	50 km/h	600
52	Major Collector	60 km/h	750
53	Major Collector	70 km/h	800
54	Major Collector	80 km/h	900
61	Minor Collector	50 km/h	500
62	Minor Collector	60 km/h	600
63	Minor Collector	70 km/h	700
64	Minor Collector	80 km/h	800
71	Local Road	30 km/h	350
72	Local Road	40 km/h	400
73	Local Road	50 km/h	500

Figure 2: Road Network / Classification – County of Brant

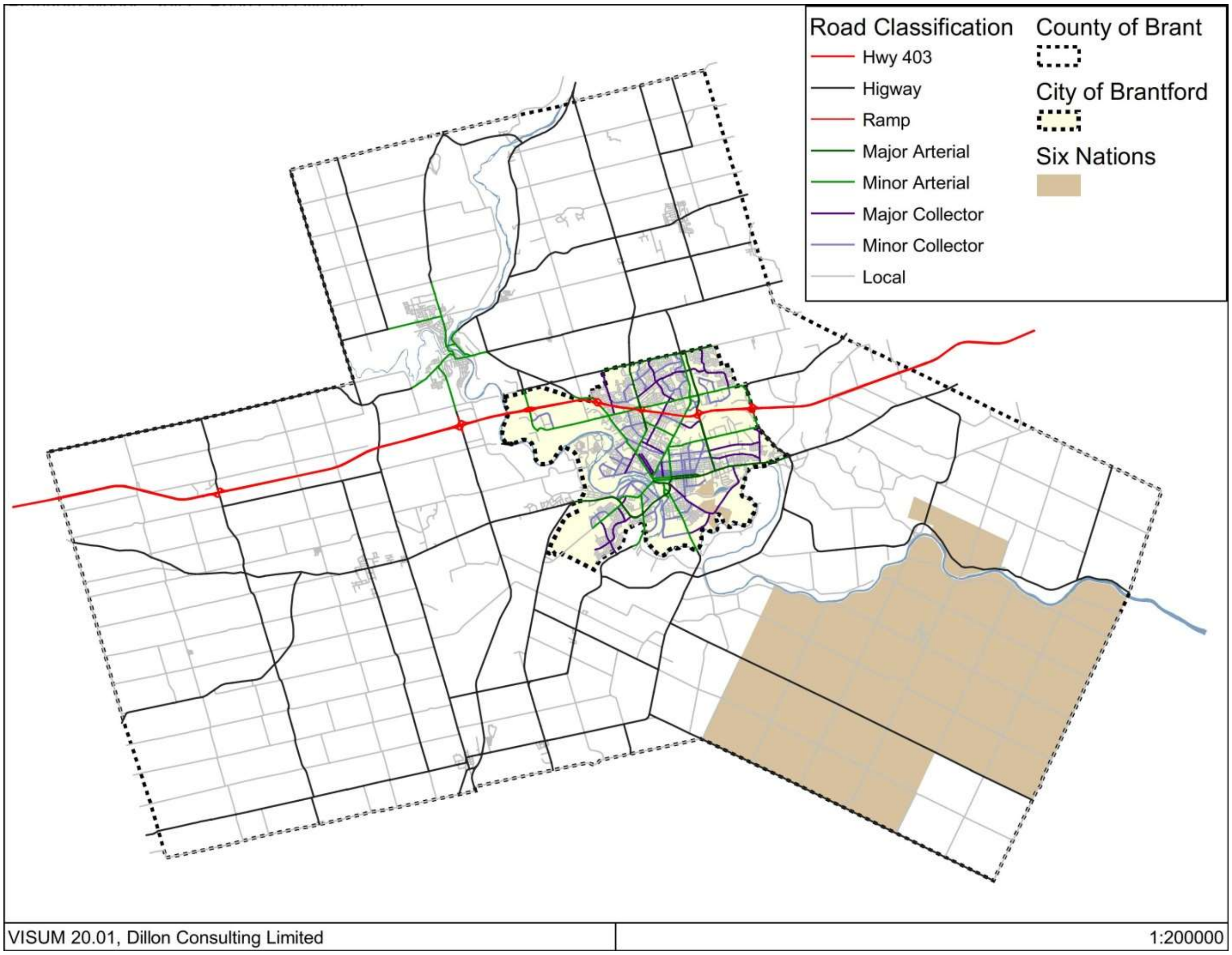
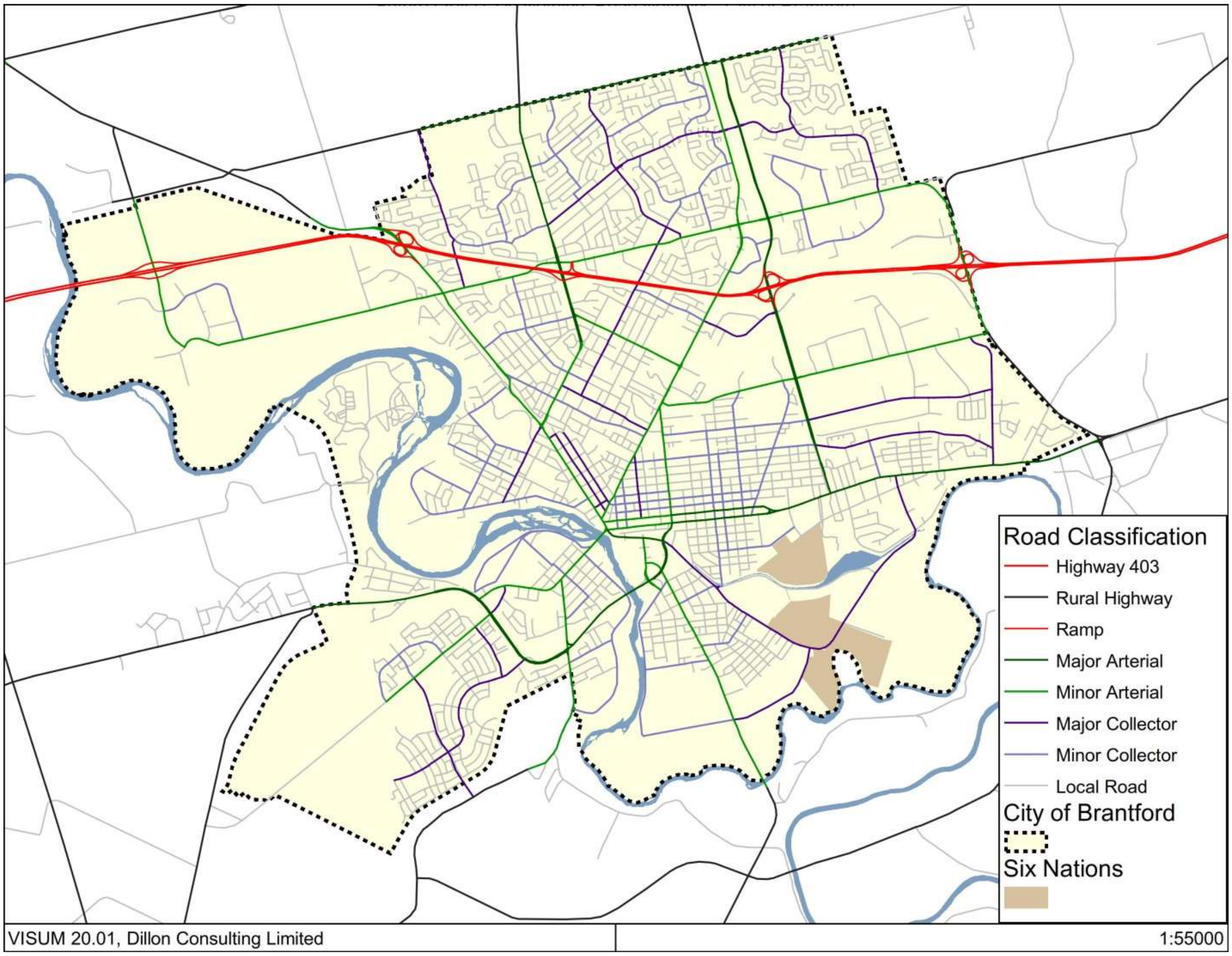


Figure 3: Road Network / Classification – City of Brantford



2.2.2 Volume Delay Function

Based on the road type, capacity, and posted speed, a volume-delay function (VDF) is used to describe how each road segment in the model behaves as traffic volumes increase. These functions are required by the Equilibrium Lohse assignment algorithm used by VISUM, for updating travel times in response to traffic volumes. As the volume using a road begins to approach the capacity of that road, the vehicle speeds will tend to drop and delays will increase the travel time on that route.

The Equilibrium Lohse assignment uses an iterative process where trips are assigned and re-assigned to the road network until the paths between specific TAZ pairs converge to a similar travel time (i.e., no traveler can improve their travel times by shifting routes) within a given threshold. The "loaded" travel times are determined by the VDF assigned to each link.

The link performance functions used are taken from the previous TransCAD model and are based on the Bureau of Public Roads (BPR) formulation, which is as follows:

$$tc = tff\,(1+\alpha\,(v/c)^{\beta})$$

where: tc = travel time based on volume

tff= free flow travel time on the link

v = link volume

c = link capacity

α,β= calibrated link performance parameters

The α and β values are applied based on the functional classification for each of the different roadway types in the model, and are shown in ***Table 2*** below:

Table 2: Link Performance Functions Parameters by Roadway Type

Roadway Type	Parameters α	Parameters β
Freeway	0.72	6.14
Rural Highway	0.72	6.14
Freeway Ramp	0.72	6.14
Major Arterial	0.60	5.87
Minor Arterial	0.51	4.96
Major Collector	0.51	4.96
Minor Collector	0.51	4.96
Local Road	0.51	4.96

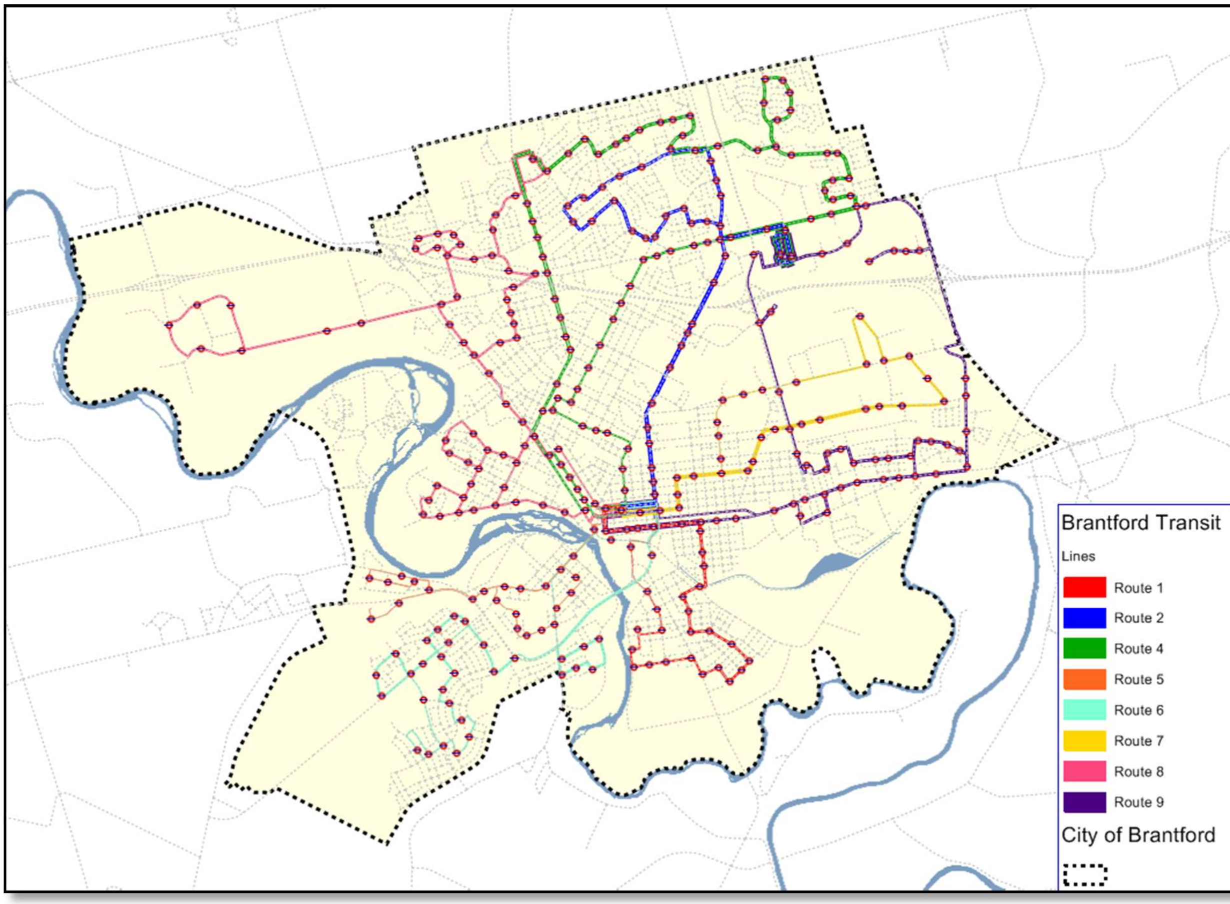
2.2.3 Transit Network

In addition to the model migration from TransCAD to VISUM, a basic transit enhancement was undertaken to allow transit person trips to be assigned along the road network, in addition to the basic automobile trip assignment. Using VISUM's native import function, the General Transit Feed Specification (GTFS) data for Brantford Transit was imported to the VISUM data format and merged with the transportation model. This included the following network objects:

- **Transit Stop Locations** – Point objects in the road network to allow for the boarding/alighting of person trips as the beginning, transfer, or end points of journeys.
- **Transit Route Paths** – Lines and line route objects along the road network where transit vehicles follow, servicing stop locations.

After the transit network was imported, detailed checks were made to ensure accuracy of the network. The resulting transit network is shown in ***Figure 4***.

Figure 4: Transit Network: Routes & Stop Locations



2.3 Transportation Analysis Zones (TAZ)

A transportation analysis zone (TAZ) is an area of geography used in conventional transportation planning models and is used to break down the city and region into a series of areas with similar land uses and travel patterns. The size and structure of the TAZ system has a definite impact on the degree of accuracy of the travel demand forecasting model.

The TAZ system for the Brantford TransCAD model contained 398 zones. This included 337 zones within the City of Brantford, 46 zones within Brant County and 15 external zones. The TAZ system from the previous model was maintained as there was no technical justification for alteration.

Figure 5 and ***Figure 6*** illustrate the traffic zone boundaries and the external traffic zones used in the model.

Figure 5: Transportation Analysis Zones – County of Brant

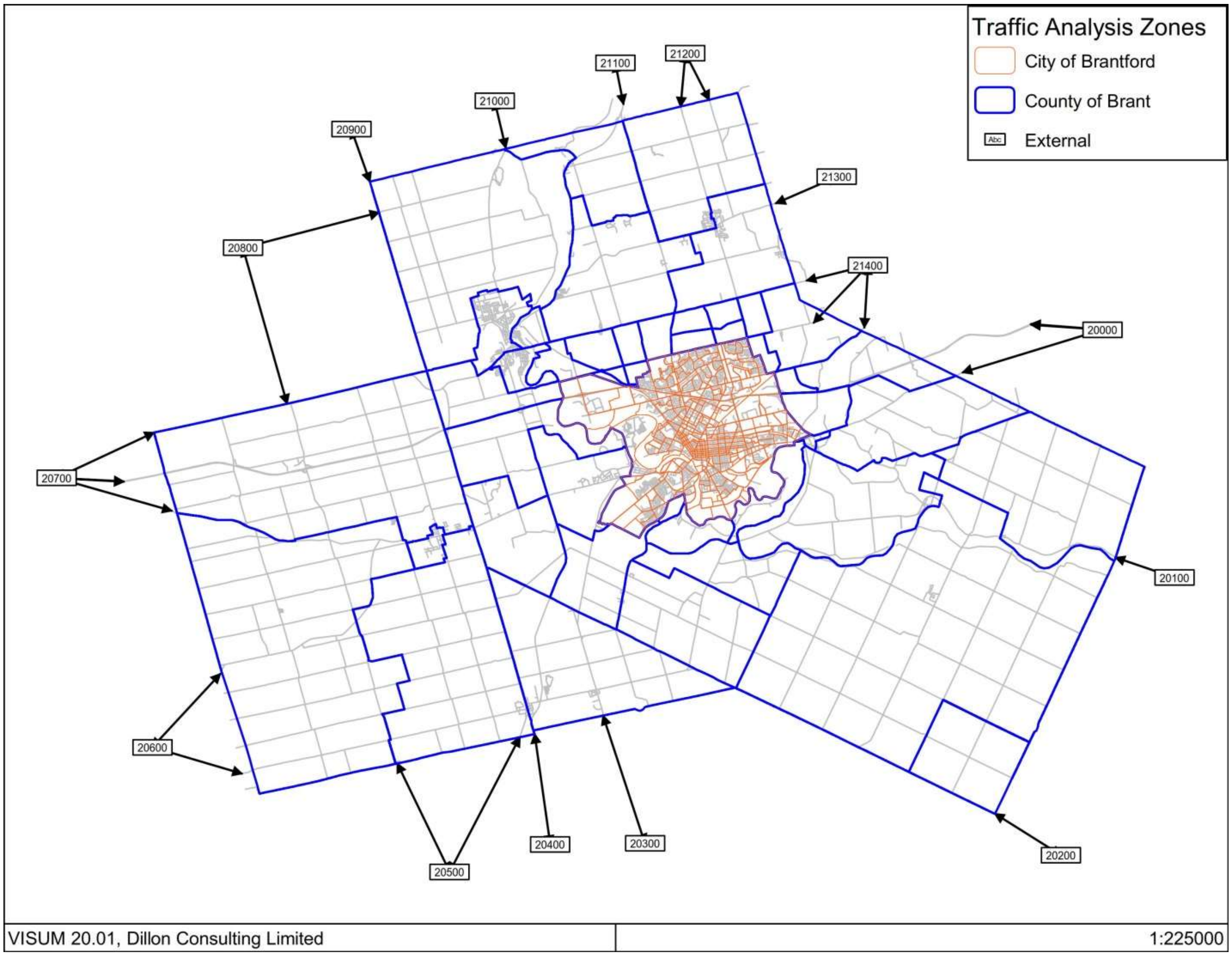
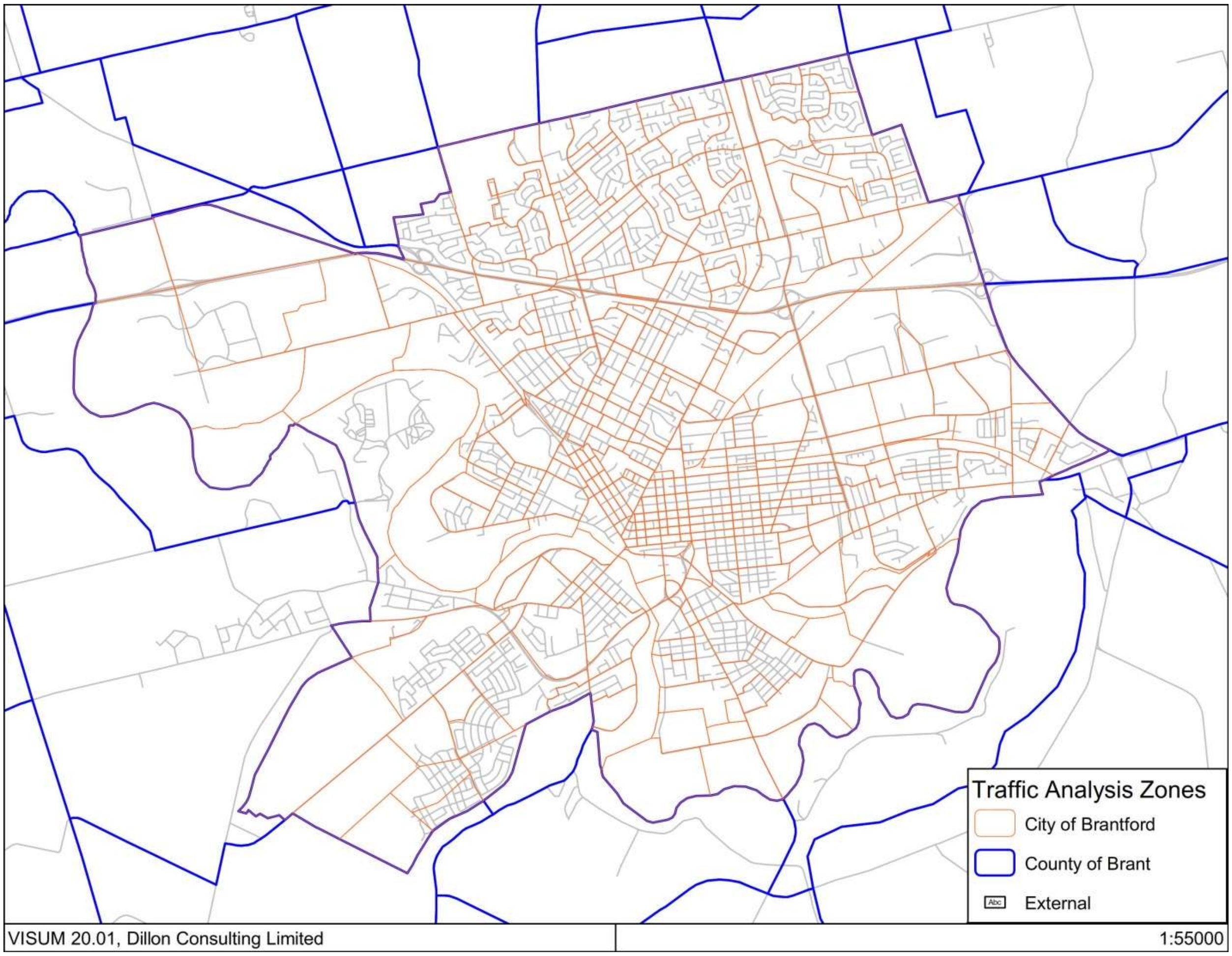


Figure 6: Transportation Analysis Zones – City of Brantford



2.3.1 TAZ Centroids and Connectors

The centroid for a TAZ is the location within a zone where all trips to/from that zone either starts or ends. Centroids are connected to the transportation network by a series of special links called connectors, which are representative links of potentially multiple streets or accesses that vehicles use to enter or exit the road network.

Connectors are usually laid out to try and emulate the loading pattern provided by the local street network, and often connect to minor intersections or local streets just upstream or downstream of a more major collector or arterial road. Trips are prohibited from using a centroid connector unless they originate or are destined to the zone.

The TAZ connectors were taken from the previous TransCAD model.

3.0 Model Approach

The 4-step travel demand model structure adopted in Visum is based on an aggregate modeling methodology which explicitly models homogeneously divided behavioral and socio-economic data aggregated at a zonal level. It involves the sequential execution of the 4 steps:

- Trip Generation;
- Trip Distribution;
- Mode Choice; and
- Trip Assignment

This procedure is consequently iterative and converges towards a solution, measured as the minimal transportation cost considering a given travel demand and characteristics of the transportation network.

3.1 Trip Generation

In a travel demand model, land use input is the key determinant in the generation of trips. The land use pattern of a particular area will have an influence on trips to/from TAZs within the area. Population and employment are used as the inputs to a TAZ area. Trip generation rates for specific land use types are applied to the TAZ level land use forecasts to estimate the trips generate by the TAZ (zonal productions and attractions). The land use data (population and employment) in the model was updated to a 2016 base year. It was provided by statistics Canada on a census tract level, this data was disaggregated by SGL Planning & Design Inc. to match the more refined TAZ level. The trip generation rates were carried forward from TransCAD to VISUM during the model migration process, as described below in this section. The model process for developing trip generation, and carried forward to the VISUM model, is described below.

Peak Period trip generation rates were developed from the 2006 Transpiration Tomorrow Survey (TTS) (and where confirmed by the 2016 TTS) for both the AM and PM peak periods. The AM peak period is defined as between 6:00 am to 9:00 am and the PM peak period is defined as between 3:00 pm to 6:00 pm, representing total person trips (independent of the mode of travel). Trip generation equations for both productions and attractions were formulated for four different trip purposes, including:

- Home-based work (HBW) trips, which include any trip with an origin or destination to or from home and work;
- Home Based Other (HBO) trips which include any non-work trips having an origin or destination to or from home;
- Non-home based (NHB) trips which have neither an origin nor destination to or from home; and

- Home-based school (HBS) trips which include any trips with an origin or destination to or from home and school.

Regression analysis was used to estimate the relevant variables used for each trip purpose as summarized in ***Table 3*** and ***Table 4***.

Table 3: Trip Generation Variables (AM Peak Period)

TRIP PURPOSE	AM								
	VARIABLES								
	TOTAL POP.	TOTAL EMP.	POP. SALES/ SERV	POP. PROF.	LABOR FORCE	EMP. OFFICE	EMP. PROF.	EMP. SALES/ SERV	EMP. MANUF.
HBW_P (Int –Int)					0.4870				
HBW_A (Int - Int)		0.5150							
HBW_P (Ext –Int)		Employment Growth Rate							
HBW_A (Ext - Int)	External Zone Population Growth Rate								
HBW_P (Int - Ext)	External Zone Population Growth Rate								
HBW_A (Int - Ext)		Employment Growth Rate							
HBO_P	0.1140								
HBO_A	0.0510						0.1170	0.3520	
NHB_P	0.0250						0.0600	0.1250	0.0900
NHB_A				0.0291			0.2910	0.0950	0.0212
HBS_P	Population Growth Rate								
HBS_A	N/A								

Table 4: Trip Generation Variables (PM Peak Period)

TRIP PURPOSE	PM								
	VARIABLES								
	TOTAL POP.	TOTAL EMP.	POP. SALES/ SERV	POP. PROF.	LABOR FORCE	EMP. OFFICE	EMP. PROF.	EMP. SALES/ SERV	EMP. MANUF.
HBW_P (Int –Int)						0.9450	0.5700	0.2000	0.4700
HBW_A (Int - Int)					0.4500				
HBW_P (Ext –Int)	External Zone Population Growth Rate								
HBW_A (Ext - Int)		Employment Growth Rate							
HBW_P (Int - Ext)		Employment Growth Rate							
HBW_A (Int - Ext)	External Zone Population Growth Rate								
HBO_P	0.1758							1.0148	
HB0_A		0.2065	1.0030	0.5074					
NHB_P	0.0064						0.3048	0.8128	
NHB_A			0.1715					0.9855	
HBS_P	N/A								
HBS_A	Population Growth Rate								

3.1.1 Trip Generation for Home Based Work Trips

The internal HBW trip production and attraction rates within the City of Brantford are:

HBW Trip Productions (AM) = 0.4807 * Labour Force
HBW Trip Attractions (AM) = 0.5150 * Total Employment

HBW Trip Productions (PM) = 0.9450 * Employment Office + 0.5700 * Employment Professional + 0.2000 * Employment Sales/Service + 0.4700 * Employment Manufacturing
HBW Trip Attractions (PM) = 0.4500 * Labour Force

External – Internal work trips produced from external zones and Internal – External work trips attracted to the external zones were assumed to grow at the same growth rates as the external traffic traveling to/ from those external zones. Historical and future population and employment data was used to develop the growth factor for each external zone. ***Table 5*** summarizes the respective external traffic growth rates used.

Table 5: External TAZ Growth Rates

TAZ	Road Link	External Area	Growth per Year: Pop	Growth per Year: Emp	Growth per Year: Pop+Emp
20000	Hwy 403 E	GTA	1.1612	1.1559	1.1594
20100	CR 54 S	Haldimand County	1.0725	1.0588	1.0688
20200	CR 20 S	Haldimand County	1.0725	1.0588	1.0688
20300	CR 7 S	Haldimand County	1.0725	1.0588	1.0688
20400	CR 16 S	Haldimand County	1.0725	1.0588	1.0688
20500	Hwy 24 S	Haldimand County	1.0725	1.0588	1.0688
20600	CR 3 W	Norwich - Oxford County	1.1487	1.1594	1.1522
20700	Hwy 2, CR 53, Hwy 403 W	Norwich - Oxford County	1.1487	1.1594	1.1522
20800	CR 25 N	Kitchener - Region of Waterloo	1.1996	1.1836	1.1941
20900	CR 16 N	Kitchener - Region of Waterloo	1.1996	1.1836	1.1941
21000	CR 24A N	Kitchener - Region of Waterloo	1.1996	1.1836	1.1941
21100	Hwy 24 N	Kitchener - Region of Waterloo	1.1996	1.1836	1.1941
21200	CR 13 N	Kitchener - Region of Waterloo	1.1996	1.1836	1.1941
21300	Hwy 5 E	Hamilton	1.0980	1.1429	1.1111
21400	CR 99 E	Hamilton	1.0980	1.1429	1.1111

3.1.2 Trip Generation for Home Based Other and Non-Home Based Trips

The HBO trip production and attraction rates within the City of Brantford are:

HBO Trip Productions (AM) = 0.1140 * Total Population
HBO Trip Attractions (AM) = 0.0510 * Total Population + 0.1170 * Employment Professional + 0.3520 Employment Sales/Service

HBO Trip Productions (PM) = 0.1758 * Total Population + 1.0148 Employment Sales/Service
HBO Trip Attractions (PM) = 0.2065 * Total Employment + 1.0030 Population Sales/Service + 0.5074 Population Professional

The NHB trip production and attraction rates within the City of Brantford are:

NHB Trip Productions (AM) = 0.0250 * Total Population + 0.0600 * Employment Professional + 0.1250 Employment Sales/Service + 0.0900 Employment Manufacturing
NHB Trip Attractions (AM) = 0.0291 * Population Professional + 0.2910 * Employment Professional + 0.0950 Employment Sales/Service + 0.0212 Employment Manufacturing

NHB Trip Productions (PM) = 0.0064 * Total Population + 0.3048 * Employment Professional + 0.8128 Employment Sales/Service
NHB Trip Attractions (PM) = 0.1715 * Population Sales/Service + 0.9855 Employment Sales/Service

3.1.3 Trip Generation for Home Based School Trips

The HBS trips are assumed to be primarily dependent on population growth for respective TAZs. School trips that are attracted to a particular TAZ are assumed to be directly correlated to the population growth in that TAZ. Therefore, trip generation rates were not estimated for school trips, and future HBS attractions were based on existing HBS trips factored by the population growth rates of the traffic zones.

3.2 Trip Distribution

Using the productions and attractions by TAZ calculated in trip generation, trip distribution is the process by which the origin-to-destination choices are derived for trip makers. The result of this process is a series of trip matrices that are used in the travel demand model for additional matrix calculations and ultimately the assignment of trips to the transportation network.

The TransCAD model utilized the Fratar Method as the trip distribution method. This process was maintained in the migration to the VISUM platform. The Fratar Method utilizes a doubly constrained "Growth Factor" method (except for HBS trips which are singly constrained) to predict future trip patterns between zones. The Fratar Method uses the existing trip matrix as a basis for forecasting the future patterns, and develops growth factors for total trip productions and attractions by traffic zone to scale the values in the matrix. The equation for the growth factor method is shown by:

$$T_{ij} = t_{ij} * a_i * b_j$$

Where T_{ij} = forecast flow between zone i and zone j
t_{ij} = the base year flow between zone i and zone j
a_i = balancing factor for row i
b_j = balancing factor for row j

The methodology uses an iterative process that alternates between factoring the productions and then factoring the attractions to match the total forecast productions and attractions for each zone, with a pre-set convergence factor.

3.3 Mode Choice

The total person trip matrices derived in trip distribution (See ***Section 3.2***) are divided into person trips by specific travel modes. Mode share matrices were retained from the TransCAD model. Mode share was derived from TTS data and produced mode share percentage relationships for specific OD pairs in the model.

The City of Brantford currently takes a "policy approach" to mode share in their travel demand model. This means that the existing base year (i.e. 2016) mode share is derived from available data and future horizon year mode shares conform to policy mode share targets. A summary of the existing mode shares implemented in the model are presented in ***Table 6*** and ***Table 7.***

Table 6: 2016 Mode Share Percentages (Full Model)

Travel Mode	Mode Share (%)
Auto Driver	77.3%
Auto Passenger	10.2%
Transit	1.7%
School Bus	4.6%
Cycle/walk	6.0%
Other	0.2%
TOTAL	**100%**

Table 7: 2016 Mode Share Percentages (Brantford Households only)

Travel Mode	Mode Share (%)
Auto Driver	73.9%
Auto Passenger	12.1%
Transit	2.4%
School Bus	4.8%
Cycle/walk	6.6%
Other	0.2%
TOTAL	**100%**

3.4 Model Run Procedures

The model run procedures implemented in VISUM were based on the previous procedures outlined in the TransCAD version of the model. The purpose of these procedures was to tie various objects, attributes, and matrices from within the travel demand model into a single one-click process that provides a reproducible, consistent approach to calculations within the VISUM model. ***Figure 7*** provides an overview screenshot of the Procedure Sequence window in VISUM.

Figure 7: VISUM Procedure Sequence Window

Number: 90	Execution	Active	Procedure	Reference object(s)	Variant/file	Comment
1	▷	☒	Group Initialize Model ...	2 - 3		Initialize Model
4		☒	Group Network Calculations - Links ...	5 - 6		Network Calculations - Links
7		☒	Group Network Calculations - Turns ...	8 - 23		Network Calculations - Turns
24		☒	Group Fratar Trip Distribution ...	25 - 44		Fratar Trip Distribution
45		☒	Group Mode Choice Calculations ...	46 - 63		Mode Choice Calculations
64		☒	Group Internal Peak Hour Auto Trips ...	65 - 68		Internal Peak Hour Auto Trips
69		☒	Group External Peak Hour Auto Trips ...	70 - 75		External Peak Hour Auto Trips
76		☒	Group Total Peak Hour Auto Trips ...	77 - 78		Total Peak Hour Auto Trips
79		☒	Group Adjustments and Auto Vehicles Assignment ...	80 - 84		Adjustments and Auto Vehicles Assignment
85		☒	Group Adjustments and Transit Persons Assignment ...	86 - 90		Adjustments and Transit Persons Assignment

Once the procedure sequence has been initiated, model run processes execute in numerical order. The Procedure Sequence functionality in VISUM is model-specific and can be tailored to the unique requirements of each model. Over time, these procedures can be modified and expanded as the travel demand model methodology continues to evolve. ***Table 8*** further details the purpose of each model procedure group.

Table 8: Brantford Travel Demand Model Methodology

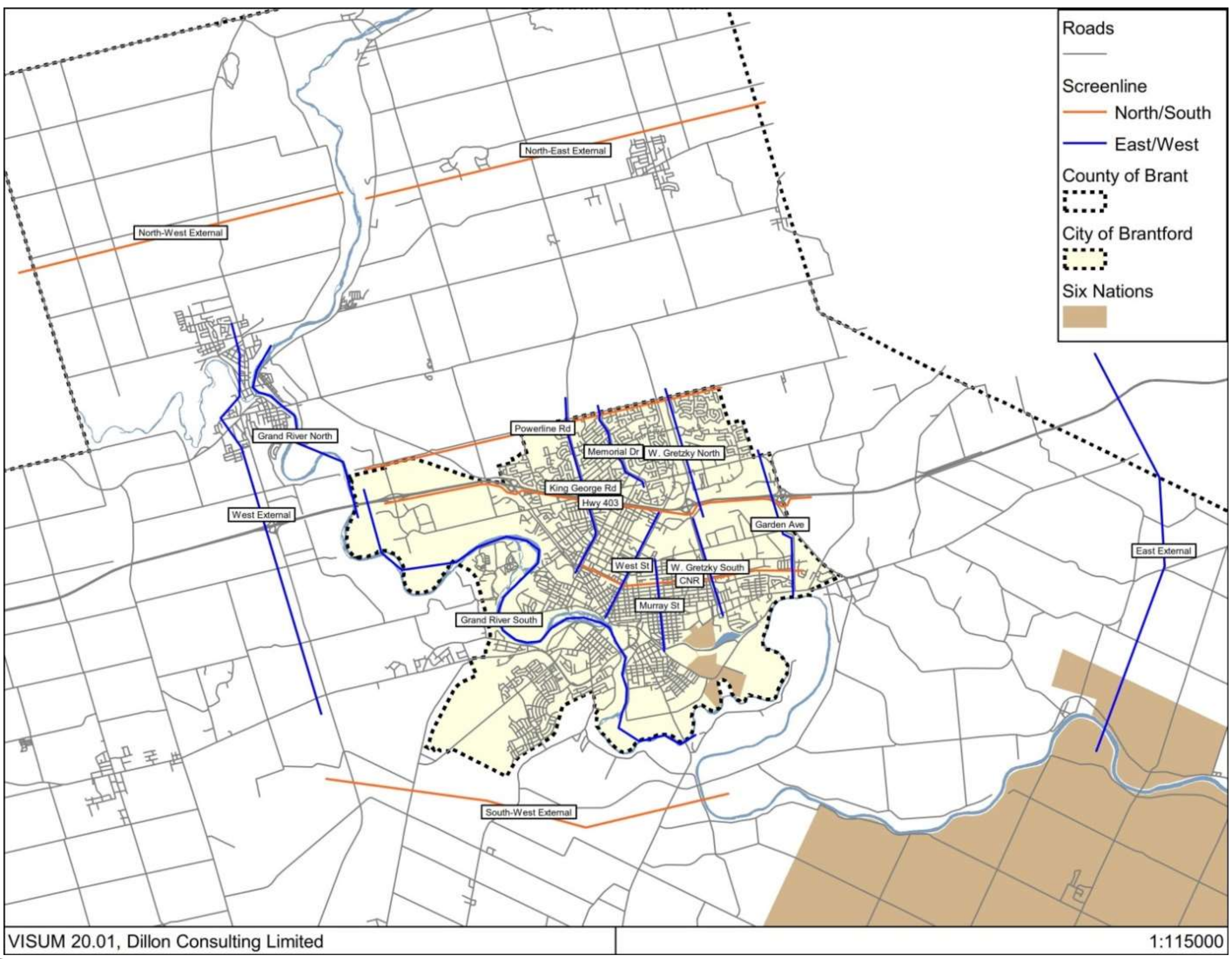
Procedure Group	Step Range	Procedure Purpose
Initialize Model	1-3	• Initialize previous assignment and filter settings to prepare for a new model run.
Network Calculations - Links	4-6	• Use Link Type attributes (see ***Table 1***) and number of lanes to calculate directional capacity and free flow speeds.
Network Calculations - Turns	7-23	• Calculate Node capacities based on sum of outbound link capacities by 0.5. • Left turn and U-turn capacities set to 10% of approach link capacity and initial delay of 10 seconds. • Right turn capacities set to 15% of approach link capacity and initial delay of 1 second.
Fratar Trip Distribution	24-44	• Apply growth factor method (Fratar) or Iterative Proportional Fitting (IPF) to initial seed matrix, using trip end totals.
Mode Choice Calculations	45-63	• Sum Trip Purposes to Total Internal Person Trips. • Multiply Total Internal Person Trips by each mode share.
Internal Peak Hour Auto Trips	64-68	• Sum Internal Auto Person Trips. • Convert Auto Person Trips to Vehicle Trips by using an Auto Occupancy factor. • Convert peak period (3-hour) demands to peak hour by using a Peak Hour Factor (PHF).
External Peak Hour Auto Trips	69-75	• Sum External Auto Person Trips • Apply 1% Compound Annual Growth Rate (CAGR) to External-Through matrix. • Convert peak period (3-hour) demands to peak hour by using a Peak Hour Factor (PHF).
Total Peak Hour Auto Trips	76-78	• Sum all Auto Vehicle matrices from 'Internal Peak Hour Auto Trips' and 'External Peak Hour Auto Trips'
Adjustments and Auto Vehicles Assignment	79-84	• Apply auto vehicle matrix correction factors. • Run 500 iterations of "Equilibrium Lohse" type assignment.
Adjustments and Transit Persons Assignment	85-90	• Apply transit vehicle matrix correction factors. • Run "Headway-based" assignment.

4.0 Calibration and Validation

Once the updated model was calibrated to predict base year trip generation, the model was tested to determine if the trip assignment process could replicate existing observed volumes on the road network. This process is referred to as validation.

For automobile vehicle trips, validation of the model was performed by comparing the observed volumes from the existing traffic count data[3] (2015-2018) with the simulated volumes for the same links from the model. Validation is usually undertaken at the screenline level of detail in travel demand models. Screenlines are imaginary lines, in which the locations are chosen strategically to capture traffic that crosses major arterial roads, rivers, or other major physical boundaries in an area. ***Figure 8*** displays the strategic screenline locations in the Brantford travel demand model.

Figure 8: Screenline Locations



[3] Existing traffic count data consists of 65 Turing Movement Counts (TMC) or Automatic Traffic Recorder (ATR) counts that were collected between 2015 and 2018, of which 71% or 46 of the counts were collected in 2017 and 2018.

Based on the validation results presented in ***Table 9*** and ***Table 10*** for the AM peak Hour and ***Table 11*** and ***Table 12*** for the PM Peak Hour, the updated model is capable of forecasting flows within 5-10% (or a GEH[4] of 5.0) of observed volumes across most major screenlines. Screenlines are used to compare model estimated volumes with traffic counts in key areas of the City and they are also used to determine corridors that have road network deficiencies.

Table 9: Screenline Calibration Results – AM Peak Hour (summary)

SCREENLINES	***Passed 6 of 6***								ON
Criteria	***Flow Range***		***Criteria***		***Goal***	***Current***	***Count***	***Model***	
Within 150 veh/h, for Flow < 1500 veh/h > 85% of cases	0	1500	150	veh	85%	100%	12	12	✓
Within 15%, for 1500 veh/h < Flow < 5000 >85% of cases	1500	5000	15	%	85%	100%	22	22	✓
Within 750 veh/h, for Flow > 5000 veh/h > 85% of cases	5000		750	veh	85%	--	0	0	
Sum of all screenline flows within 5% of sum of all screenline counts	Overall		5	%	5%	1%	68998	68635	✓
GEH < 5 for Individual screenline Flows > 85% of cases	Overall		5	GEH	85%	100%	34	34	✓
GEH < 10 for individual screenline flows, 95% of cases	Overall		10	GEH	95%	100%	34	34	✓
GEH < 4 for sum of all screenline counts	Overall		4	GEH	4.0	1.4	68998	68635	✓

[4] GEH statistic is a formula used in traffic modelling to compare two sets of traffic volumes. It provides a goodness-of-fit measures that takes into account the significant variability in real world traffic volumes. For example, a freeway may carry 5000 vehicles per hour, while one of the on-ramps leading to the freeway might carry only 50 vehicles per hour. In that situation it would not be possible to select a single percentage of variation that is acceptable for both volumes. A GEH value of less than 5.0 is considered a good match between the modelled and observed hourly volumes, while a GEH of between 5.0 and 10.0 may warrant investigation, and a GEH greater than 10.0 is a poor match.

Table 10: Screenline Calibration Results – AM Peak Hour (detailed)

SCREENLINE ANALYSIS

Analysis Period	AM Car
Secondary	

ACCEPTABLE RANGE	
VOLUME	750
% DIFF	10
GEH	5

SCREENLINE SUMMARY

#	Name	Direction	Count	Model	DIFF	% DIFF	GEH
1	Grand River South	EB	3628	3619	-9	-0.2%	0.1
	Grand River South	WB	2514	2510	-4	-0.2%	0.1
2	Grand River North	EB	1918	2011	93	4.8%	2.1
	Grand River North	WB	1656	1662	6	0.4%	0.1
3	Highway 403	NB	3857	3999	142	3.7%	2.3
	Highway 403	SB	4672	4650	-22	-0.5%	0.3
4	King George Road	EB	3336	3206	-130	-3.9%	2.3
	King George Road	WB	2594	2403	-191	-7.4%	3.8
5	Wayne Gretzky Parkway (North)	EB	3056	3153	97	3.2%	1.7
	Wayne Gretzky Parkway (North)	WB	3121	3172	51	1.6%	0.9
6	Wayne Gretzky Parkway (South)	EB	1398	1499	101	7.2%	2.7
	Wayne Gretzky Parkway (South)	WB	1082	1070	-12	-1.1%	0.4
7	Memorial Drive	EB	1031	949	-82	-8.0%	2.6
	Memorial Drive	WB	1148	1145	-3	-0.3%	0.1
8	West Street	EB	1527	1431	-96	-6.3%	2.5
	West Street	WB	1486	1506	20	1.3%	0.5
9	CNR Corridor	NB	3006	3071	65	2.2%	1.2
	CNR Corridor	SB	2788	2793	5	0.2%	0.1
10	Garden Avenue	EB	3158	3108	-50	-1.6%	0.9
	Garden Avenue	WB	2994	2895	-99	-3.3%	1.8
11	Powerline Road	NB	1616	1602	-14	-0.9%	0.3
	Powerline Road	SB	2027	2041	14	0.7%	0.3
12	Murray Street	EB	1255	1247	-8	-0.6%	0.2
	Murray Street	WB	1129	1209	80	7.1%	2.3
13	West External	EB	1676	1601	-75	-4.5%	1.9
	West External	WB	1535	1478	-57	-3.7%	1.5
14	South-West External	NB	1595	1564	-31	-1.9%	0.8
	South-West External	SB	823	836	13	1.6%	0.5
15	East External	EB	2667	2466	-201	-7.5%	4.0
	East External	WB	2392	2204	-188	-7.9%	3.9
16	North-East External	NB	561	682	121	21.6%	4.9
	North-East External	SB	453	482	29	6.4%	1.3
17	North-West External	NB	713	728	15	2.1%	0.6
	North-West External	SB	586	643	57	9.7%	2.3

Table 11: Screenline Calibration Results – PM Peak Hour (summary)

SCREENLINES	Passed 7 of 7								ON
Criteria	Flow Range		Criteria		Goal	Current	Count	Model	
Within 150 veh/h, for Flow < 1500 veh/h > 85% of cases	0	1500	150	veh	85%	86%	7	6	✓
Within 15%, for 1500 veh/h < Flow < 5000 >85% of cases	1500	5000	15	%	85%	100%	25	25	✓
Within 750 veh/h, for Flow > 5000 veh/h > 85% of cases	5000		750	veh	85%	100%	2	2	✓
Sum of all screenline flows within 5% of sum of all screenline counts	Overall		5	%	5%	1%	88396	89602	✓
GEH < 5 for Individual screenline Flows > 85% of cases	Overall		5	GEH	85%	97%	34	33	✓
GEH < 10 for individual screenline flows, 95% of cases	Overall		10	GEH	95%	100%	34	34	✓
GEH < 4 for sum of all screenline counts	Overall		4	GEH	4.0	4.0	88396	89602	✓

Table 12: Screenline Calibration Results – PM Peak Hour (detailed)

SCREENLINE ANALYSIS

Analysis Period	PM Car
Secondary	

ACCEPTABLE RANGE	
VOLUME	750
% DIFF	10
GEH	5

SCREENLINE SUMMARY

#	Name	Direction	Count	Model	DIFF	% DIFF	GEH
1	Grand River South	EB	3614	3566	-48	-1.3%	0.8
	Grand River South	WB	3762	3939	177	4.7%	2.9
2	Grand River North	EB	2327	2365	38	1.6%	0.8
	Grand River North	WB	2261	2429	168	7.4%	3.5
3	Highway 403	NB	5783	5884	101	1.7%	1.3
	Highway 403	SB	5349	5582	233	4.4%	3.2
4	King George Road	EB	3533	3490	-43	-1.2%	0.7
	King George Road	WB	3817	3747	-70	-1.8%	1.1
5	Wayne Gretzky Parkway (North)	EB	3652	3766	114	3.1%	1.9
	Wayne Gretzky Parkway (North)	WB	3989	4256	267	6.7%	4.2
6	Wayne Gretzky Parkway (South)	EB	1438	1534	96	6.7%	2.5
	Wayne Gretzky Parkway (South)	WB	1818	2031	213	11.7%	4.9
7	Memorial Drive	EB	1688	1691	3	0.2%	0.1
	Memorial Drive	WB	1537	1432	-105	-6.8%	2.7
8	West Street	EB	1799	1948	149	8.3%	3.4
	West Street	WB	2236	2268	32	1.4%	0.7
9	CNR Corridor	NB	3557	3602	45	1.3%	0.8
	CNR Corridor	SB	4164	4385	221	5.3%	3.4
10	Garden Avenue	EB	3835	3590	-245	-6.4%	4.0
	Garden Avenue	WB	4099	3963	-136	-3.3%	2.1
11	Powerline Road	NB	2512	2605	93	3.7%	1.8
	Powerline Road	SB	2470	2555	85	3.4%	1.7
12	Murray Street	EB	1483	1408	-75	-5.1%	2.0
	Murray Street	WB	1818	1881	63	3.5%	1.5
13	West External	EB	2091	2053	-38	-1.8%	0.8
	West External	WB	1923	1833	-90	-4.7%	2.1
14	South-West External	NB	1038	1045	7	0.7%	0.2
	South-West External	SB	1729	1696	-33	-1.9%	0.8
15	East External	EB	2858	2611	-247	-8.6%	4.7
	East External	WB	2902	2837	-65	-2.2%	1.2
16	North-East External	NB	705	806	101	14.3%	3.7
	North-East External	SB	917	1112	195	21.3%	6.1
17	North-West External	NB	780	819	39	5.0%	1.4
	North-West External	SB	912	873	-39	-4.3%	1.3

5.0 Conclusion

Based on the foregoing, the City of Brantford's 4-step travel demand model was successfully migrated from the TransCAD platform to the VISUM platform. The model captures travel behavior for the area and calibrates well against measured data. Its procedure parameters are suitable for use when testing land use and transport facility scenarios for forecasting demand and assignment of travel.

6.0 Future Assessment

The *Places to Grow* (May 2019) policies include growth forecasts for the City of Brantford with a residential population of 163,000 and an employment level of 79,000 by 2041. Brantford's 2041 population and employment forecasts were disaggregated by SGL Planning & Design Inc. to match the Traffic Analysis Zone (TAZ) structure within the City's strategic transportation model. The allocations were based on intensification policies and targets, Schedule 1: Growth Management in the City's draft Official Plan, land use designations, and sites with known development potential.

At a summary level, the growth forecasts used in this TMP growth analysis are shown in ***Table 13*** and ***Table 14*** below for the City of Brantford and County of Brant respectively. Detailed TAZ level population and employment data for Brantford and Brant County (2016 and 2041) can be found in ***Appendix A***.

Table 13: City of Brantford Population and Employment to 2041

Horizon Year	Population (Persons)	Employment (Jobs)
2016	101,700	44,900
2021	111,300	53,600
2026	125,200	60,300
2031	139,000	67,000
2036	152,000	72,000
2041	163,000	79,000

Source: Envisioning Brantford -MCR Part 1 Report, SGL Planning and Design et al.

Table 14: County of Brant Population and Employment to 2041

Horizon Year	Population (Persons)	Employment (Jobs)
2016	36,700	22,100
2021 Est	39,000	22,000
2026 Est	44,000	22,000
2031	49,000	22,000
2036	53,000	24,000
2041	57,000	26,000

Source: A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2019

Applying updated growth forecasts, disaggregated to the TAZ level-of-detail, the City's model was utilized to forecast future travel demands (i.e. Future Conditions) resulting from population growth, employment growth, and future land use patterns and densities as provided by the City. These were further enhanced using output from the ongoing Official Plan Update. Forecasted Future Conditions and various alternative transportation strategies were subsequently assessed based on the strategic direction criteria.

6.1 2041 'Do Minimal' Scenario

The 2041 'Do Minimal' Scenario accounts for proposed growth under a transportation network scenario with minimal improvements over today's condition, were identified. The changes to the road network include only short term committed projects (e.g. The Oak Park Road/Highway 403 interchange upgrade) and collector roads required to support the expansion growth areas (required to provide access to future development).

An overview of the link attributes and volumes (AM and PM) and screenline capacities for the 2041 'Do Minimal' network are illustrated in ***Appendix B*** and ***Appendix C*** respectively.

6.2 2041 Manage Travel Demand Scenario

The 2041 Mange Travel Demand Scenario increases the transit mode share from 2.8% under existing conditions to 5.8% and the combined Active Transportation (walking and cycling) modes shares to 10%. This Transportation Demand Management (TDM) scenario is assigned to the 'Do Minimal' network.

An overview of the link volumes and screenline capacities for the 2041 Mange Travel Demand network are illustrated in ***Appendix B*** and ***Appendix C*** respectively.

6.3 2041 Increase Infrastructure Scenario

The 2041 Increase Infrastructure Scenario enhances the carrying capacity of the network through strategic road widenings and extensions. This includes short-term committed improvements, as well as a full program of infrastructure projects as was identified in the 2014 Transportation Master Plan (excluding a Veteran's Memorial Parkway extension, due to recent Glebe Lands resolution).

An overview of the link volumes and screenline capacities for the 2041 Increase Infrastructure network are illustrated in ***Appendix B*** and ***Appendix C*** respectively.

6.4 2041 Recommended Scenario

The 2041 Recommended Scenario combines the mode shares from the 2041 Mange Travel Demand Scenario, with many of the infrastructure projects from the 2041 Increase Infrastructure Scenario and a number of additional infrastructure projects. A comprehensive list of the Recommended Scenario infrastructure projects include:

- Infrastructure widenings:
    - Wayne Gretzky Parkway between Henry Street and Lynden Road;
    - Veterans Memorial Parkway between Mount Pleasant and Market Street South;

  - Colborne Street West from County Road 7 to the existing 4-lane section;
  - Paris Road from Golf Road to Oak Park Road;
  - Oak Park Road from Hardy Road to Powerline Road; and
  - Powerline Road from Oak Park Road to the City east limits.
- New roads:
  - Oak Park Road extension to Colborne Road West;
  - Wayne Gretzky Parkway extension to connect with Park Road; and
  - Charing Cross Street extension to Henry Street.
- Corridor Transportation System Management (TSM):
  - Golf Road;
  - Paris Road;
  - Brant Ave;
  - Hardy Road;
  - West Street;
  - King George Road;
  - Erie Avenue;
  - Clarence Street; and
  - County Road 18 (note that this is a County Road. The City will work with the County to determine potential for improvements to the corridor).

An overview of the link volumes and screenline capacities for the 2041 Recommended network are illustrated in ***Appendix B*** and ***Appendix C*** respectively.

Appendix A

TAZ Population & Employment

Brantford Model: TAZ Population & Employment

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
101	1,675	40	1,570	144
102	0	0	0	0
103	85	2	212	308
104	870	21	763	67
105	960	23	839	61
106	630	15	556	43
107	410	10	363	41
108	270	115	448	140
109	200	761	536	805
110	70	172	110	180
111	30	1	24	5
201	225	916	934	982
202	390	9	341	38
203	240	6	247	21
204	270	6	239	21
205	5	176	79	187
206	425	10	420	40
207	880	21	771	76
301	585	14	587	61
302	520	143	485	189
303	820	20	717	66
304	55	1	33	14
305	80	383	0	429
306	495	234	576	260
401	490	171	428	221
402	245	6	219	24
403	270	166	326	190
404	165	4	149	25
405	5	518	1,032	573
406	0	1,204	461	1,125
407	115	316	367	339
501	720	17	685	50
502	990	24	883	61
503	520	12	460	47
504	275	126	866	153
505	525	13	459	45
506	880	186	785	239
507	475	11	428	29
508	725	17	638	59
509	895	21	786	56
510	545	13	490	48
511	1,050	25	937	56

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
512	350	492	625	543
513	445	11	628	22
514	930	22	1,002	58
515	1,145	164	1,129	221
516	195	5	362	12
601	355	9	309	45
602	545	13	488	60
603	955	23	831	61
604	915	22	795	49
605	725	17	635	50
606	1,000	24	867	74
701	0	694	0	769
702	0	546	174	602
703	0	1,623	141	1,493
704	0	995	267	951
705	5	916	701	1,009
706	0	381	357	445
707	0	154	0	489
708	0	887	1,251	954
801	0	2,042	0	2,351
901	5	1,826	649	2,953
902	0	506	0	544
903	0	319	0	372
1001	0	836	819	919
1002	0	364	406	399
1003	15	1,180	0	1,190
1004	0	1,525	0	1,419
1005	5	404	0	467
1006	0	0	0	13
1007	0	597	0	666
1008	0	0	0	296
1101	30	1	0	10
1102	45	1	0	14
1103	35	1	21	4
1104	425	10	454	28
1105	140	185	135	205
1106	200	130	533	190
1107	315	8	279	56
1108	330	8	307	26
1109	455	11	436	25
1110	575	14	546	29
1201	55	155	186	191
1202	150	4	221	22
1203	155	607	377	822

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
1204	75	258	57	298
1205	0	193	0	219
1206	5	0	662	31
1301	365	9	436	26
1302	190	5	184	13
1303	25	1	0	51
1304	600	14	682	50
1305	60	1	0	5
1306	120	3	125	9
1307	240	6	222	24
1308	65	2	47	4
1309	25	126	110	136
1310	345	8	657	20
1311	205	170	184	200
1312	60	1	0	8
1401	245	245	306	273
1402	305	7	272	16
1403	305	7	290	24
1404	145	3	159	16
1405	320	8	296	25
1406	240	6	217	18
1407	440	11	429	42
1408	465	290	423	361
1501	100	1,715	147	1,778
1502	415	10	492	29
1503	105	3	135	6
1504	245	6	240	19
1505	30	1	12	2
1506	115	3	154	5
1507	240	6	244	20
1508	200	261	273	278
1509	355	145	410	167
1510	720	273	826	317
1511	315	8	301	25
1512	50	206	47	215
1601	485	12	479	68
1602	560	127	738	165
1603	520	12	455	53
1604	315	326	275	380
1605	125	3	112	13
1606	720	17	644	61
1607	185	306	250	331
1608	635	15	559	63
1609	255	6	239	28

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
1610	330	8	320	29
1611	420	10	382	37
1612	155	4	138	25
1701	0	0	0	1,131
1702	5	546	38	3,406
1703	0	0	0	2,943
1704	5	2,486	0	2,771
1801	315	8	279	82
1802	465	142	429	291
1803	130	3	118	19
1804	475	11	420	41
1805	110	372	109	452
1806	410	10	418	30
1901	285	155	399	371
1902	0	438	0	479
1903	370	288	333	338
1904	205	5	186	18
1905	725	17	789	48
2001	865	21	770	104
2002	0	0	0	67
2003	0	0	0	19
2004	85	804	0	870
2005	0	165	59	186
2006	45	1	0	24
2007	175	4	225	16
2008	295	7	349	22
2101	130	3	119	34
2102	795	19	860	68
2103	305	7	308	20
2104	130	3	136	7
2105	30	1	3	1
2106	310	371	308	452
2201	195	5	242	10
2202	80	2	3	2
2203	80	2	0	2
2204	45	1	0	2
2205	55	1	4	1
2206	85	2	0	4
2207	55	1	0	3
2208	135	3	241	28
2209	75	2	3	2
2210	65	2	0	2
2211	25	1	0	2
2212	55	1	0	2

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
2213	135	3	164	9
2214	130	3	144	10
2215	230	6	272	15
2216	405	10	503	26
2217	50	1	8	3
2218	50	1	1	4
2301	50	1	14	53
2302	85	2	134	55
2303	35	1	0	30
2304	175	4	242	86
2305	80	2	47	41
2306	55	1	53	42
2307	45	1	0	60
2308	65	349	30	418
2309	120	3	136	63
2310	195	5	256	65
2401	0	0	0	12
2402	5	0	31	24
2403	15	0	38	40
2404	20	0	34	33
2405	5	705	111	749
2406	20	0	38	26
2407	25	1	38	24
2408	40	115	34	143
2409	60	1	29	25
2410	5	0	39	38
2411	0	142	45	185
2412	30	405	50	457
2413	120	213	210	262
2414	0	119	0	144
2415	0	0	0	20
2416	45	1	12	21
2417	15	222	15	260
2418	20	262	22	301
2419	0	0	37	31
2420	0	301	69	362
2421	5	0	46	30
2422	460	176	702	219
2423	10	0	42	29
2424	40	1	0	29
2425	145	168	260	279
2501	35	1	0	54
2502	465	11	479	75
2503	480	12	555	42

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
2504	230	6	258	32
2505	145	3	193	47
2506	255	6	335	52
2507	125	3	213	44
2508	130	3	115	8
2509	355	9	359	21
2510	300	7	290	19
2511	175	4	164	11
2512	190	5	207	12
2513	155	4	170	11
2514	155	4	215	8
2601	65	2	10	6
2602	280	7	256	20
2603	245	6	238	16
2604	110	3	95	6
2605	95	2	0	4
2606	30	1	0	2
2607	0	0	11	0
2608	95	2	0	7
2609	335	8	327	27
2610	445	11	398	32
2611	120	3	122	10
2612	520	12	715	28
2613	15	0	40	2
2614	105	3	99	9
2615	70	2	158	13
2701	485	142	444	165
2702	35	416	31	444
2703	200	5	191	19
2704	95	2	0	13
2705	85	2	108	9
2706	475	137	468	167
2707	635	15	821	38
2708	900	22	1,013	61
2709	145	3	209	22
2710	620	15	903	57
2801	70	2	0	38
2802	90	2	3	9
2803	345	8	478	25
2804	770	18	704	85
2805	75	2	5	4
2806	195	5	264	62
2807	0	0	0	1
2808	0	0	0	26

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
2901	0	0	104	13
2902	0	0	155	5
2903	0	0	0	5
2904	350	202	574	237
3001	735	177	889	212
3002	385	9	420	31
3003	930	130	1,053	170
3004	545	150	555	185
3101	0	0	313	19
3102	5	0	602	29
3103	0	0	0	1
3104	0	222	0	265
3105	0	0	0	287
3201	1,450	132	1,328	197
3202	685	136	814	169
3203	165	4	507	70
3204	10	0	180	17
3205	0	0	0	9
3301	730	18	2,808	150
3302	1,500	36	1,399	97
3401	0	939	666	1,254
3402	0	0	124	213
3403	0	392	3,557	684
3404	0	365	0	384
3405	0	0	23	54
3406	75	2	23	185
3407	0	0	1,307	92
3501	430	10	411	39
3502	5	0	1	13
3503	425	10	372	29
3504	135	3	131	7
3505	550	13	601	38
3506	505	12	563	43
3507	205	5	1,499	67
3508	10	0	0	20
3509	30	1	551	17
3510	10	364	33	384
3511	10	0	0	2
3512	10	0	622	18
3601	295	7	274	45
3602	320	8	288	37
3603	50	1	90	32
3604	5	0	0	78
3701	0	0	3,221	91

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
3702	405	84	4,235	243
3703	845	20	778	22
3704	465	11	1,462	167
3705	165	249	132	288
3706	925	22	1,082	33
3707	1,400	34	1,222	94
3708	2,120	148	2,458	268
3709	1,620	39	1,425	157
3710	310	7	301	23
3901	0	0	0	335
4501	5	0	2,549	326
4502	475	11	882	39
4503	2,780	732	2,901	893
4601	0	0	0	102
4602	30	1	1,092	131
4603	0	0	53	3
4701	450	11	390	104
4702	255	6	219	23
4703	420	10	385	26
4704	95	2	841	27
4705	300	7	261	14
4706	770	18	751	22
4801	980	695	952	812
4802	1,605	192	1,824	262
4803	760	18	987	60
4901	545	13	520	45
4902	370	9	326	32
4903	895	21	785	62
4904	655	16	589	51
4905	1,280	31	1,901	69
4906	415	10	389	31
5001	0	0	0	657
5002	5	0	0	509
5003	0	0	0	323
5004	20	0	0	1,065
5101	0	0	0	2
5102	0	0	0	0
5103	0	0	0	4
5104	0	0	0	0
5105	0	0	651	18
5106	0	0	223	6
5107	0	0	1,892	87
5200	33	70	47	55
5201	0	0	0	0

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
5202	0	0	0	0
5203	0	0	203	7
5204	0	0	0	1
5205	5	0	916	29
5206	40	1	0	2
5300	79	72	75	88
5301	0	0	61	2
5302	0	0	54	1
5303	0	0	0	0
5401	0	0	182	226
5402	0	0	563	32
5403	0	0	590	22
5404	0	0	554	64
5405	10	0	428	718
5406	0	0	1,178	57
5407	0	0	502	22
5408	15	0	639	29
5501	0	0	1,055	275
5502	0	0	938	36
5503	0	0	425	13
5504	0	0	206	10
5505	0	0	137	10
5506	0	0	447	88
5507	45	1	783	162
5508	5	0	741	44
5509	0	0	496	35
5510	5	0	414	31
5511	0	0	701	85
5512	5	0	794	154
5601	15	0	0	0
5602	0	0	0	0
5603	15	0	0	0
5604	0	0	0	0
5605	0	0	0	0
5606	0	0	0	0
5607	0	0	0	0
5608	0	0	0	0
5609	0	0	0	0
5610	0	0	0	0
5611	15	188	22	200
5612	0	0	7	0
5613	0	0	0	0
5614	0	0	0	0
5615	0	0	0	0

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
5701	25	1	0	0
5702	0	0	0	0
5703	30	1	0	0
5704	0	0	0	0
5705	0	0	0	0
5706	10	0	5	2
5707	0	0	487	30
5708	0	0	532	31
5709	0	0	606	213
5710	5	0	919	97
5711	0	0	787	44
5712	0	0	360	80
5801	0	0	0	209
5802	0	0	0	0
5803	10	0	0	844
5804	0	0	232	462
5805	0	0	0	478
5806	15	0	204	375
5900	20	0	0	747
5901	10	0	0	810
5902	0	0	0	563
5903	15	0	1,225	44
5904	0	0	2,186	92
6000	64	71	38	44
6001	0	0	0	6
6002	0	0	0	8
6003	0	0	0	6
6004	0	0	0	38
6005	0	0	0	425
6006	0	0	0	786
6007	5	0	0	872
6008	0	0	0	21
6009	10	0	0	681
6010	0	0	0	548
7000	79	740	94	1,131
7001	0	0	0	0
7100	5,233	1,983	15,918	10,606
7200	868	251	1,172	282
7300	8,684	501	11,720	565
7400	1,042	1,504	1,406	1,692
7500	1,042	752	1,406	846
7600	695	501	937	565
7700	2,084	501	2,813	565
7800	2,952	1,002	3,985	1,128

TAZ	2016		2041	
	Pop	Emp	Pop	Emp
7900	250	67	450	104
7901	145	3	125	4
8000	397	102	473	153
8100	159	197	190	300
8200	0	1,304	0	1,980
8300	714	740	851	1,131
8400	79	72	94	110
8500	0	53	33	27
8501	40	1	636	19
8502	530	13	2,220	69
8600	70	2	4,399	181
8700	759	71	899	104
8701	35	1	127	9
8800	476	72	568	110
8900	1,032	72	1,230	110
9000	1,190	740	1,419	1,131
9100	556	72	663	110
9200	317	496	378	752
9300	476	72	568	110
9400	1,671	381	1,893	429
9500	1,193	508	1,352	572
9600	859	127	973	143
9700	1,050	254	1,189	286
9800	1,389	287	1,585	322
9900	780	110	891	123
10000	692	164	790	184
10100	793	126	898	143
10200	0	0	0	0
Total	**134,332**	**58,628**	**219,133**	**106,154**

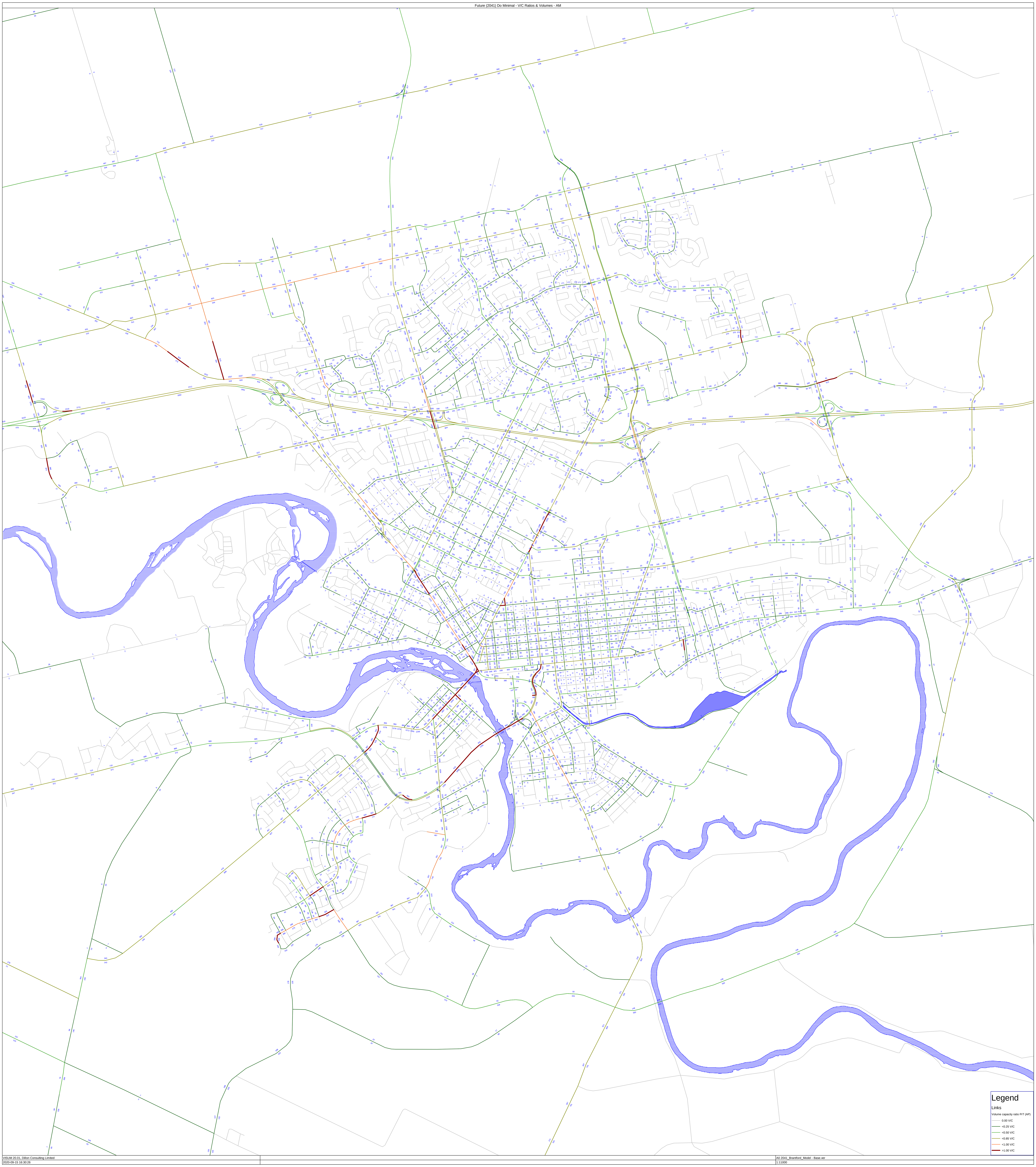
Appendix B

Model Plots – Link Attributes & Volumes

Future (2041) Do Minimal - Link attributes

VISUM 20.01, Dillon Consulting Limited		A0 2041_Brantford_Model - Base.ver
15.09.2020/16:25:11		1:11000

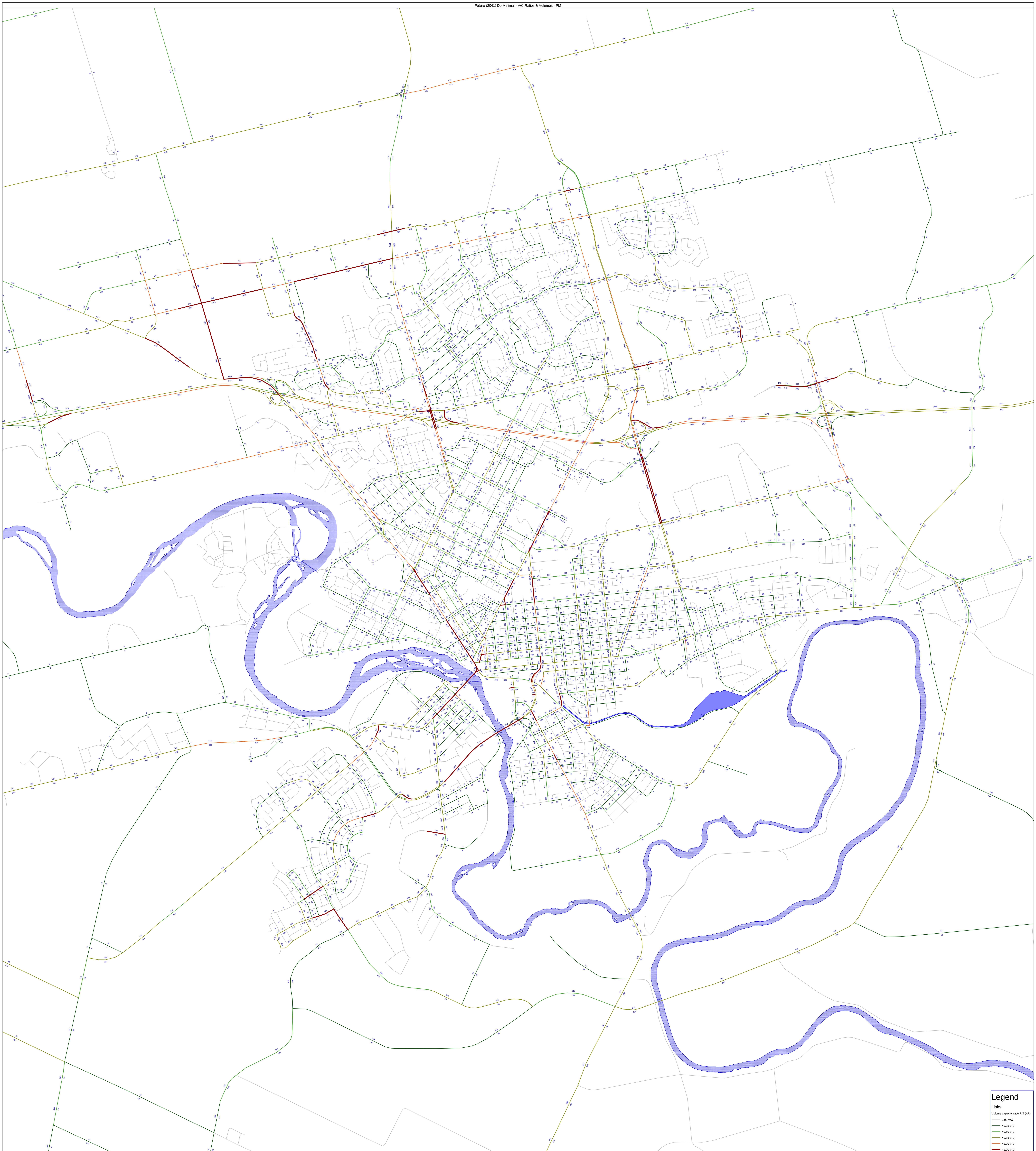
Future (2041) Do Minimal - V/C Ratios & Volumes - AM



VISUM 20.01, Dillon Consulting Limited
2020-09-15 16:30:26

A0 2041_Brantford_Model - Base.ver
1:11000

Future (2041) Do Minimal - V/C Ratios & Volumes - PM

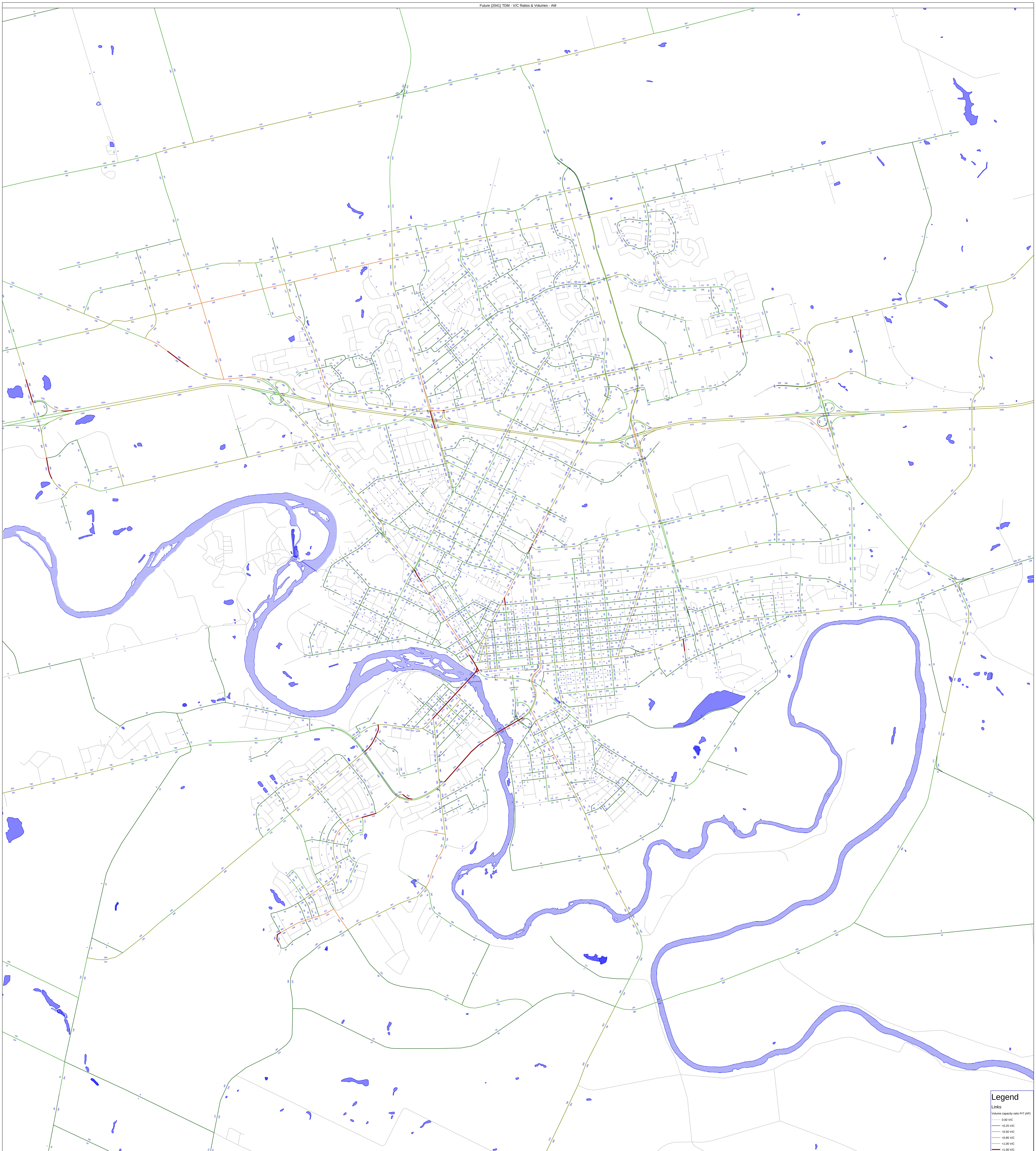


VISUM 20.01, Dillon Consulting Limited	A0 2041_Brantford_Model - Base.ver
2020-09-15 16:27:32	1:11000

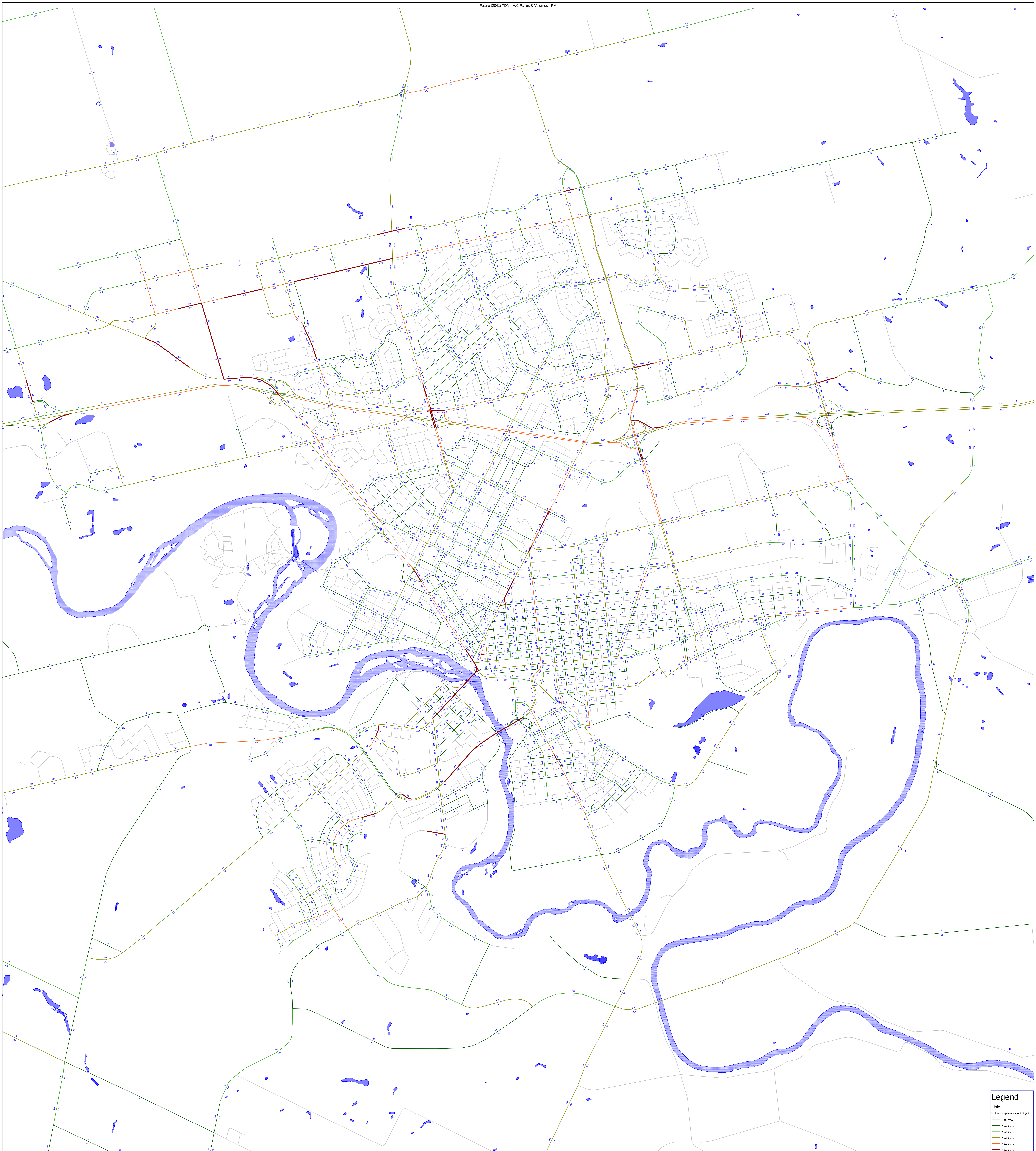
Future (2041) TDM - Link attributes

VISUM 20.01, Dillon Consulting Limited		A2 2041_Brantford_Model - Base + Road Diet + Transit Network & MS + AT MS.ver
05.10.2020/23:37:47		1:11000

Future (2041) TDM - V/C Ratios & Volumes - AM

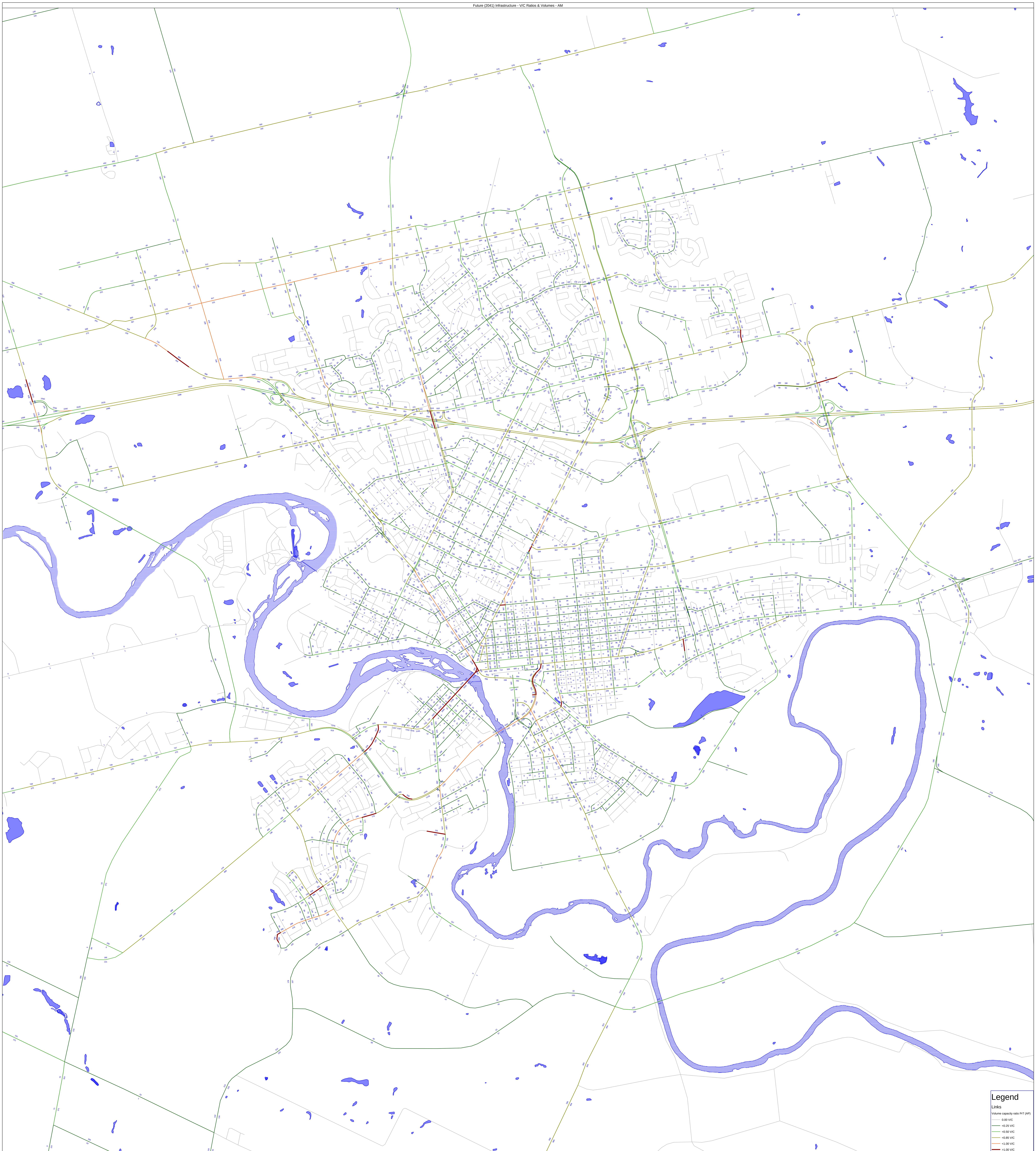


Future (2041) TDM - V/C Ratios & Volumes - PM



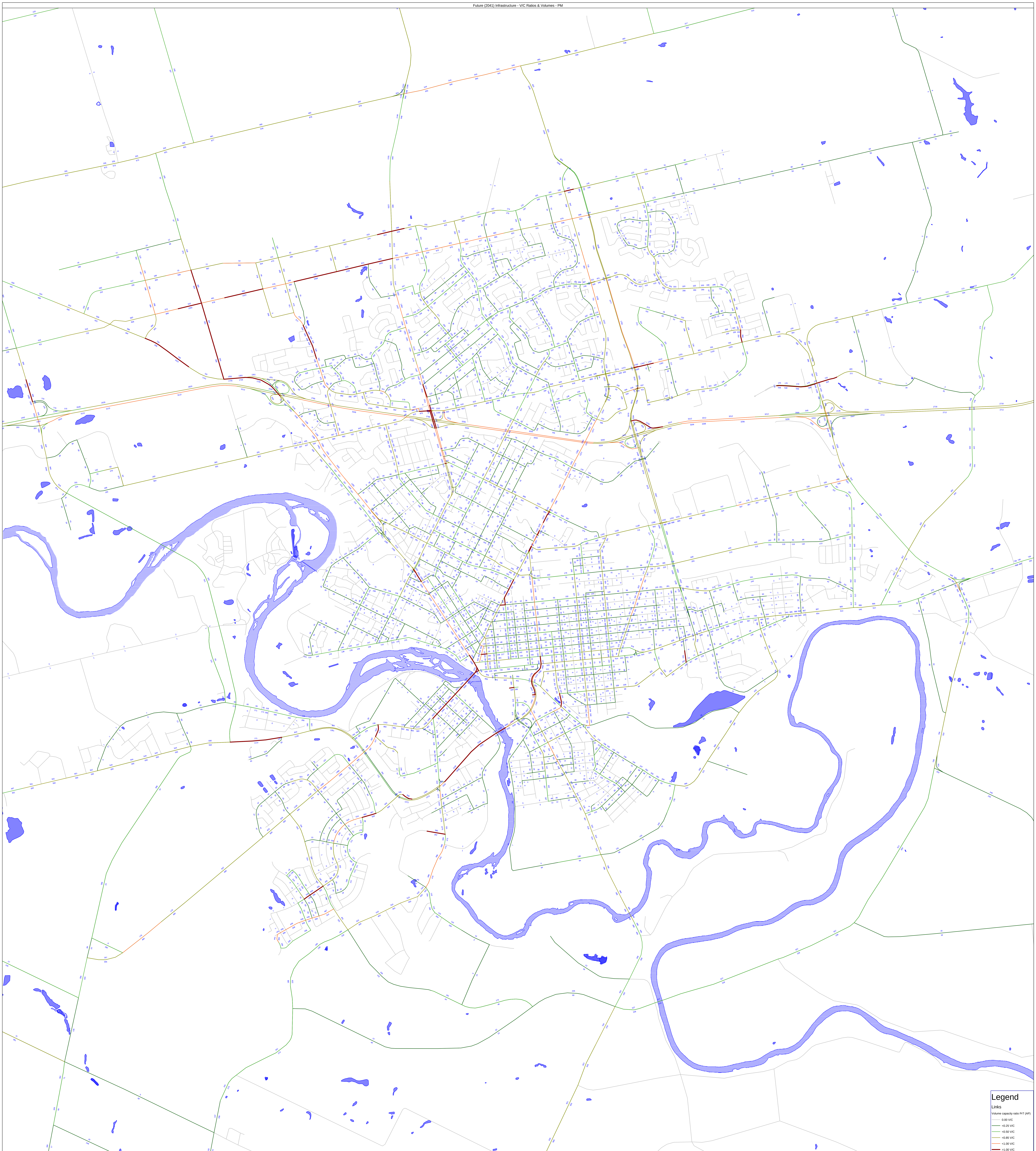
VISUM 20.01, Dillon Consulting Limited	A2 2041_Brantford_Model - Base + Road Diet + Transit Network & MS + AT MS.ver
2020-10-05 23:55:22	1:11000

Future (2041) Infrastructure - V/C Ratios & Volumes - AM



VISUM 20.01, Dillon Consulting Limited	A1b 2041_Brantford_Model - Base + TMP - VMP.ver
2020-10-05 23:59:06	1:11000

Future (2041) Infrastructure - V/C Ratios & Volumes - PM

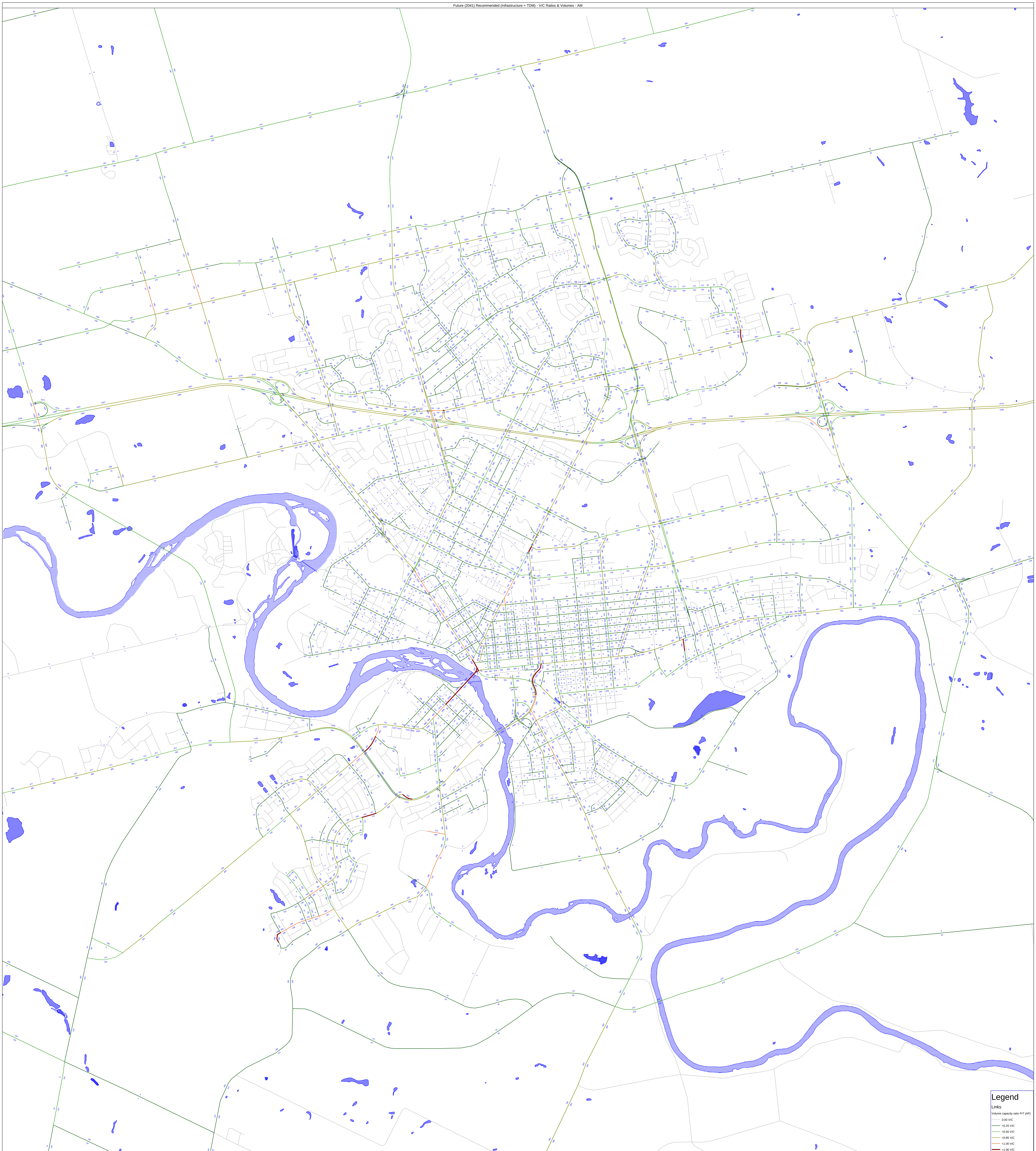


VISUM 20.01, Dillon Consulting Limited
2020-10-06 00:01:46
A1b 2041_Brantford_Model - Base + TMP - VMP.ver
1:11000

Future (2041) Recommended (Infrastructure + TDM) - Link attributes

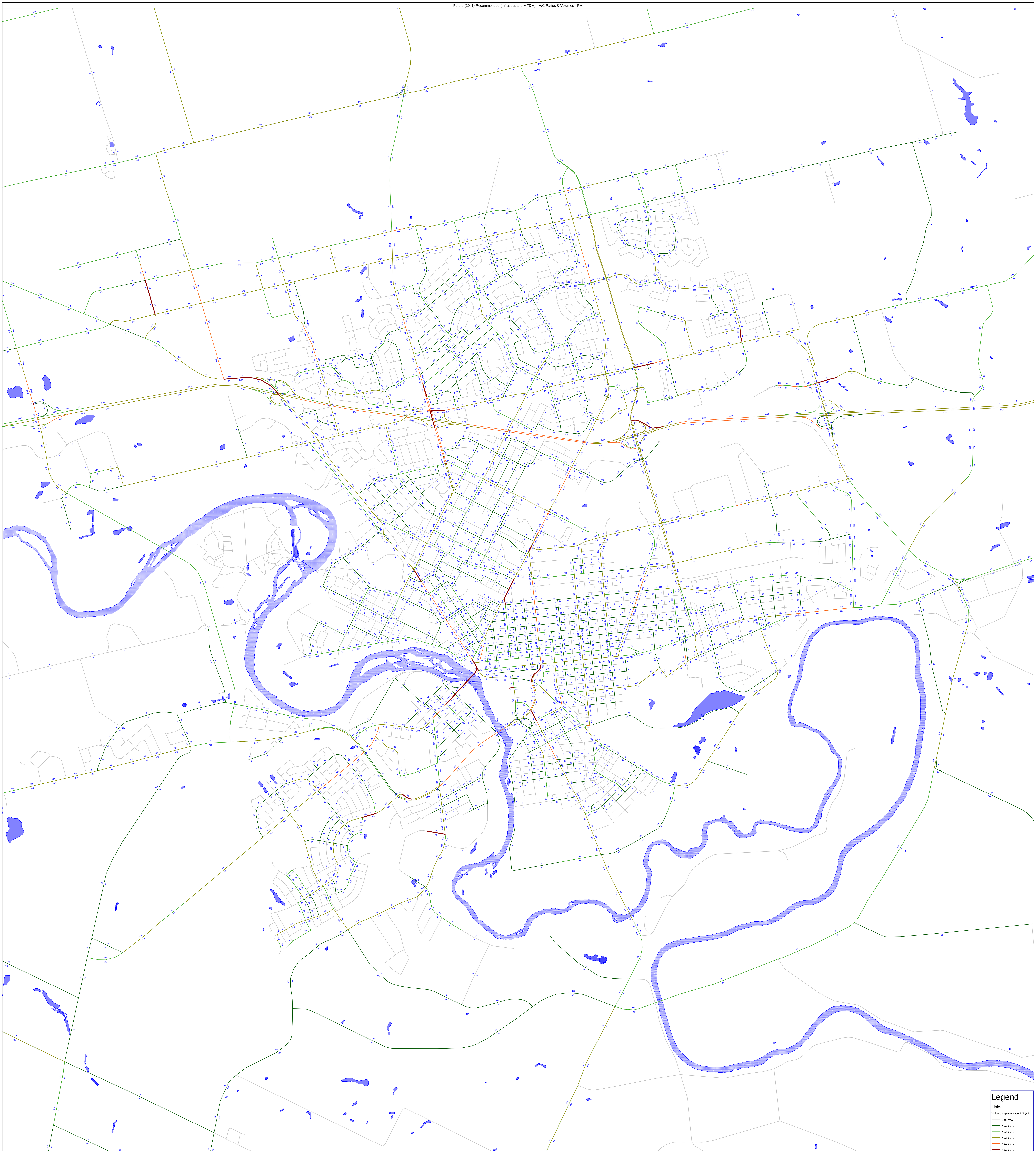
VISUM 20.01, Dillon Consulting Limited		A4 2041_Brantford_Model - Recommended Plan.ver
15.09.2020/16:00:58		1:11000

Future (2041) Recommended (Infrastructure + TDM) - V/C Ratios & Volumes - AM



VISUM 20.01, Dillon Consulting Limited		A4 2041_Brantford_Model - Recommended Plan.ver
2020-09-15 15:54:32		1:11000

Future (2041) Recommended (Infrastructure + TDM) - V/C Ratios & Volumes - PM



VISUM 20.01, Dillon Consulting Limited	A4 2041_Brantford_Model - Recommended Plan.ver
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Appendix C

Screenline Summary

Future 'Do Minimal' Screenline Summary

2041

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	7	8,100	6,696	0.83	6,073	0.75
1	Grand River South	WB	7	8,100	4,404	0.54	7,450	0.92
2	Grand River North	EB	4	5,200	3,096	0.60	4,113	0.79
2	Grand River North	WB	5	6,000	2,756	0.46	3,822	0.64
3	Highway 403	NB	13	10,800	6,908	0.64	9,039	0.84
3	Highway 403	SB	13	10,800	7,296	0.68	9,254	0.86
4	King George Road	EB	11	9,600	5,201	0.54	8,413	0.88
4	King George Road	WB	11	9,600	6,792	0.71	7,269	0.76
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,399	0.58	6,210	0.82
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,312	0.70	5,827	0.77
6	Wayne Gretzky Parkway (South)	EB	7	4,900	1,986	0.41	2,302	0.47
6	Wayne Gretzky Parkway (South)	WB	7	4,900	1,600	0.33	2,822	0.58
7	Memorial Drive	EB	9	6,100	1,687	0.28	3,025	0.50
7	Memorial Drive	WB	9	6,100	2,339	0.38	2,599	0.43
8	West Street	EB	6	4,300	2,074	0.48	3,041	0.71
8	West Street	WB	6	4,300	2,671	0.62	3,032	0.71
9	CNR Corridor	NB	11	7,900	4,369	0.55	4,986	0.63
9	CNR Corridor	SB	11	7,900	4,231	0.54	6,068	0.77
10	Garden Avenue	EB	9	8,800	4,571	0.52	5,701	0.65
10	Garden Avenue	WB	9	8,800	4,389	0.50	6,052	0.69
11	Powerline Road	NB	13	9,400	4,158	0.44	5,843	0.62
11	Powerline Road	SB	13	9,400	4,671	0.50	6,092	0.65
12	Murray Street	EB	7	4,400	1,932	0.44	1,860	0.42
12	Murray Street	WB	8	5,200	1,589	0.31	2,381	0.46
13	West External	EB	7	7,300	1,711	0.23	2,241	0.31
13	West External	WB	7	7,300	1,664	0.23	2,190	0.30
14	South-West External	NB	4	4,300	1,560	0.36	1,168	0.27
14	South-West External	SB	4	4,300	949	0.22	1,632	0.38
15	East External	EB	5	6,900	2,931	0.42	3,448	0.50
15	East External	WB	5	6,900	2,996	0.43	3,634	0.53
16	North-East External	NB	3	3,200	1,355	0.42	1,614	0.50
16	North-East External	SB	3	3,200	1,168	0.37	2,281	0.71
17	North-West External	NB	3	3,300	780	0.24	929	0.28
17	North-West External	SB	3	3,300	791	0.24	978	0.30

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction		Capacity		AM Peak Hour		PM Peak Hour	
Screenline	1			Lanes	Total	Volume	V/C	Volume	V/C
Name	Grand River South		EB	7	8,100	6,696	0.83	6,073	0.75
Direction	EB-WB		WB	7	8,100	4,404	0.54	7,450	0.92

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,798	0.50	2,212	0.61
2	Highway 403	32103934	WB	1,800	2	3,600	1,619	0.45	2,069	0.57
3	Colborne Street	32102414	EB	800	2	1,600	2,494	1.56	2,003	1.25
4	Colborne Street	32102414	WB	800	2	1,600	1,407	0.88	2,685	1.68
5	Veterans Memorial Parkway	32101861	EB	1,000	1	1,000	1,256	1.26	1,095	1.10
6	Veterans Memorial Parkway	32101861	WB	1,000	1	1,000	978	0.98	1,353	1.35
7	Erie Avenue	32102875	EB	800	1	800	598	0.75	505	0.63
8	Erie Avenue	32102875	WB	800	1	800	252	0.32	648	0.81
9	Phelps Road (Brant Road 18)	31646482	EB	1,100	1	1,100	550	0.50	258	0.23
10	Phelps Road (Brant Road 18)	31646482	WB	1,100	1	1,100	148	0.13	695	0.63
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	2	Direction
Name	Grand River North	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
4	5,200	3,096	0.60	4,113	0.79
5	6,000	2,756	0.46	3,822	0.64

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,798	0.50	2,212	0.61
2	Highway 403	32103934	WB	1,800	2	3,600	1,619	0.45	2,069	0.57
3	Brant Road 2	32103340	EB	800	1	800	508	0.64	1,084	1.36
4	Brant Road 2	32103340	WB	800	1	800	674	0.84	811	1.01
5	William Street	31634058	EB	800	1	800	790	0.99	817	1.02
6	William Street	31634058	WB	800	2	1,600	463	0.29	942	0.59
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

			Capacity		AM Peak Hour		PM Peak Hour	
Screenline	3	Direction	Lanes	Total	Volume	V/C	Volume	V/C
Name	Highway 403							
Direction	NB-SB	NB	13	10,800	6,908	0.64	9,039	0.84
		SB	13	10,800	7,296	0.68	9,254	0.86

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32104457	NB	800	2	1,600	385	0.24	667	0.42
2	Oak Park Road	32104457	SB	800	2	1,600	932	0.58	425	0.27
3	Paris Road	32102313	NB	800	2	1,600	1,253	0.78	1,246	0.78
4	Paris Road	32102313	SB	800	2	1,600	661	0.41	1,596	1.00
5	King George Road	31683713	NB	800	2	1,600	1,282	0.80	1,431	0.89
6	King George Road	32102332	SB	800	2	1,600	1,238	0.77	1,492	0.93
7	Wayne Gretzky Parkway	31703983	NB	1,000	2	2,000	1,650	0.83	2,196	1.10
8	Wayne Gretzky Parkway	31703908	SB	1,000	2	2,000	1,843	0.92	2,220	1.11
9	Garden Avenue	32104072	NB	800	2	1,600	999	0.62	1,409	0.88
10	Garden Avenue	32104072	SB	800	2	1,600	1,047	0.65	1,497	0.94
11	North Park Street	31689884	NB	800	1	800	298	0.37	685	0.86
12	North Park Street	31689884	SB	800	1	800	461	0.58	673	0.84
13	West Street	31691064	NB	800	2	1,600	1,041	0.65	1,405	0.88
14	West Street	31691064	SB	800	2	1,600	1,114	0.70	1,351	0.84
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
Screenline	4							
Name	King George Road							
Direction	EB-WB	EB	11	9600	5201	0.54	8413	0.88
		WB	11	9600	6792	0.71	7269	0.76

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31663494	EB	1,000	1	1,000	689	0.69	1,014	1.01
2	Powerline Road	31663494	WB	1,000	1	1,000	922	0.92	909	0.91
3	Oxford Street	31685991	EB	500	1	500	202	0.40	225	0.45
4	Oxford Street	31685991	WB	500	1	500	133	0.27	238	0.48
5	Toll Gate Road	32101902	EB	800	1	800	622	0.78	835	1.04
6	Toll Gate Road	32101902	WB	800	1	800	550	0.69	870	1.09
7	Highway 403	32104048	EB	1,800	2	3,600	1,953	0.54	3,442	0.96
8	Highway 403	32104051	WB	1,800	2	3,600	3,042	0.85	2,713	0.75
9	Queensway Drive	31683036	EB	500	1	500	138	0.28	189	0.38
10	Queensway Drive	31683036	WB	500	1	500	90	0.18	215	0.43
11	St. George Street	31682564	EB	500	1	500	96	0.19	237	0.47
12	St. George Street	31682564	WB	500	1	500	60	0.12	140	0.28
13	Terrace Hill Street	31670392	EB	500	1	500	207	0.41	277	0.55
14	Terrace Hill Street	31670392	WB	500	1	500	154	0.31	265	0.53
15	Brant Avenue	31669648	EB	800	2	1,600	862	0.54	1,562	0.98
16	Brant Avenue	31669648	WB	800	2	1,600	1,420	0.89	1,286	0.80
17	New East/West Road	32104408	EB	600	1	600	432	0.72	632	1.05
18	New East/West Road	32104408	WB	600	1	600	421	0.70	633	1.06
19										
20										

Legned:		V/C Range	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	5	Direction
Name	Wayne Gretzky Parkway (North)	
Direction	EB-WB	EB
		WB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
EB	7	7,600	4,399	0.58	6,210	0.82
WB	7	7,600	5,312	0.70	5,827	0.77

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31711969	EB	1,000	1	1,000	218	0.22	624	0.62
2	Powerline Road	31711969	WB	1,000	1	1,000	638	0.64	427	0.43
3	Dunsdon Street	32102051	EB	800	1	800	288	0.36	554	0.69
4	Dunsdon Street	32102051	WB	800	1	800	441	0.55	342	0.43
5	Lynden Road	32103996	EB	800	2	1,600	1,090	0.68	1,443	0.90
6	Lynden Road	32103996	WB	800	2	1,600	1,077	0.67	1,735	1.08
7	Highway 403	32104061	EB	1,800	2	3,600	2,716	0.75	3,159	0.88
8	Highway 403	32104062	WB	1,800	2	3,600	2,815	0.78	3,178	0.88
9	New East/West Road	32104398	EB	600	1	600	87	0.15	430	0.72
10	New East/West Road	32104398	WB	600	1	600	341	0.57	145	0.24
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
Screenline	6		Lanes	Total	Volume	V/C	Volume	V/C
Name	Wayne Gretzky Parkway (South)							
Direction	EB-WB	EB	7	4,900	1,986	0.41	2,302	0.47
		WB	7	4,900	1,600	0.33	2,822	0.58

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	31701117	EB	800	2	1,600	691	0.43	910	0.57
2	Henry Street	31701117	WB	800	2	1,600	611	0.38	1,178	0.74
3	Elgin Street	31702288	EB	600	1	600	420	0.70	287	0.48
4	Elgin Street	31702288	WB	600	1	600	227	0.38	470	0.78
5	Grey Street	31701124	EB	600	1	600	225	0.38	330	0.55
6	Grey Street	31701124	WB	600	1	600	275	0.46	272	0.45
7	Chatham Street	31700439	EB	500	1	500	83	0.17	78	0.16
8	Chatham Street	31700439	WB	500	1	500	35	0.07	109	0.22
9	Colborne Street	31700015	EB	800	2	1,600	567	0.35	697	0.44
10	Colborne Street	31700015	WB	800	2	1,600	452	0.28	793	0.50
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	7	
Name	Memorial Drive	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
9	6,100	1,687	0.28	3,025	0.50
9	6,100	2,339	0.38	2,599	0.43

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Varadi Avenue	32101917	EB	500	1	500	33	0.07	136	0.27
2	Varadi Avenue	32101917	WB	500	1	500	39	0.08	108	0.22
3	Dunsdon Street	31687743	EB	600	2	1,200	207	0.17	299	0.25
4	Dunsdon Street	31687743	WB	600	2	1,200	242	0.20	257	0.21
5	North Park Street	32101953	EB	600	2	1,200	167	0.14	375	0.31
6	North Park Street	32101953	WB	600	2	1,200	369	0.31	357	0.30
7	Fairview Drive	32102031	EB	800	2	1,600	341	0.21	819	0.51
8	Fairview Drive	32102031	WB	800	2	1,600	690	0.43	735	0.46
9	Powerline Road	31688305	EB	1,000	1	1,000	678	0.68	971	0.97
10	Powerline Road	31688305	WB	1,000	1	1,000	808	0.81	824	0.82
11	New East/West Road	32104387	EB	600	1	600	261	0.44	425	0.71
12	New East/West Road	32104387	WB	600	1	600	191	0.32	318	0.53
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	8	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	West Street								
Direction	EB-WB	EB		6	4,300	2,074	0.48	3,041	0.71
		WB		6	4,300	2,671	0.62	3,032	0.71

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Morton Avenue	31691008	EB	500	1	500	89	0.18	94	0.19
2	Morton Avenue	31691008	WB	500	1	500	133	0.27	187	0.37
3	Charing Cross Street	31689369	EB	800	2	1,600	435	0.27	653	0.41
4	Charing Cross Street	31689369	WB	800	2	1,600	649	0.41	800	0.50
5	Dundas Street	31679012	EB	600	1	600	345	0.58	462	0.77
6	Dundas Street	31679012	WB	600	1	600	204	0.34	341	0.57
7	Brant Avenue	31670814	EB	800	2	1,600	1,205	0.75	1,832	1.15
8	Brant Avenue	31670814	WB	800	2	1,600	1,685	1.05	1,704	1.07
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	9	Direction		Capacity		AM Peak Hour		PM Peak Hour	
Name	CNR Corridor			Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB		11	7,900	4,369	0.55	4,986	0.63
		SB		11	7,900	4,231	0.54	6,068	0.77

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	St. Paul Avenue	32103535	NB	800	2	1,600	698	0.44	927	0.58
2	St. Paul Avenue	32103535	SB	800	2	1,600	948	0.59	1,006	0.63
3	West Street	31678374	NB	800	1	800	624	0.78	749	0.94
4	West Street	31678374	SB	800	1	800	766	0.96	924	1.16
5	Clarence Street	31678962	NB	800	2	1,600	1,329	0.83	1,379	0.86
6	Clarence Street	31678962	SB	800	2	1,600	1,133	0.71	1,612	1.01
7	Murray Street	31681384	NB	500	1	500	129	0.26	217	0.43
8	Murray Street	31681384	SB	500	1	500	91	0.18	379	0.76
9	Rawdon Street	31698868	NB	500	1	500	270	0.54	165	0.33
10	Rawdon Street	31698868	SB	500	1	500	85	0.17	390	0.78
11	Stanley Street	31698979	NB	500	1	500	404	0.81	364	0.73
12	Stanley Street	31698979	SB	500	1	500	303	0.61	442	0.88
13	Wayne Gretzky Parkway	31700977	NB	900	2	1,800	699	0.39	1,038	0.58
14	Wayne Gretzky Parkway	31700971	SB	900	2	1,800	730	0.41	1,036	0.58
15	Garden Avenue	32079892	NB	600	1	600	216	0.36	147	0.25
16	Garden Avenue	32079892	SB	600	1	600	175	0.29	279	0.47
17										
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	10	Direction
Name	Garden Avenue	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
9	8,800	4,571	0.52	5,701	0.65
9	8,800	4,389	0.50	6,052	0.69

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Lynden Road	31708958	EB	800	2	1,600	744	0.47	1,066	0.67
2	Lynden Road	31708958	WB	800	2	1,600	710	0.44	1,185	0.74
3	Highway 403	32104066	EB	1,800	2	3,600	2,716	0.75	3,159	0.88
4	Highway 403	32104065	WB	1,800	2	3,600	2,815	0.78	3,178	0.88
5	Henry Street	32081112	EB	800	1	800	361	0.45	605	0.76
6	Henry Street	32081112	WB	800	1	800	358	0.45	543	0.68
7	Elgin Street	32079965	EB	600	1	600	97	0.16	201	0.34
8	Elgin Street	32079965	WB	600	1	600	125	0.21	116	0.19
9	Grey Street	32079358	EB	600	1	600	107	0.18	63	0.11
10	Grey Street	32079358	WB	600	1	600	52	0.09	101	0.17
11	Colborne Street	32102783	EB	800	2	1,600	546	0.34	607	0.38
12	Colborne Street	32102783	WB	800	2	1,600	329	0.21	929	0.58
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	11	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Powerline Road		Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB	13	9,400	4,158	0.44	5,843	0.62
		SB	13	9,400	4,671	0.50	6,092	0.65

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32103349	NB	800	1	800	454	0.57	697	0.87
2	Oak Park Road	32103349	SB	800	1	800	550	0.69	614	0.77
3	Paris Road	32104353	NB	800	1	800	406	0.51	380	0.48
4	Paris Road	32104353	SB	800	1	800	230	0.29	465	0.58
5	Golf Road	32103116	NB	500	1	500	491	0.98	305	0.61
6	Golf Road	32103116	SB	500	1	500	203	0.41	565	1.13
7	Balmoral Drive	32104424	NB	600	1	600	386	0.64	301	0.50
8	Balmoral Drive	32104424	SB	600	1	600	197	0.33	433	0.72
9	King George Road	32101870	NB	800	2	1,600	811	0.51	1,145	0.72
10	King George Road	32101870	SB	800	2	1,600	1,111	0.69	1,174	0.73
11	Memorial Drive	31688335	NB	600	2	1,200	121	0.10	412	0.34
12	Memorial Drive	31688335	SB	600	2	1,200	328	0.27	419	0.35
13	Greenfield Road	31709585	NB	500	1	500	43	0.09	57	0.11
14	Greenfield Road	31709585	SB	500	1	500	36	0.07	39	0.08
15	Wayne Gretzky Parkway	31696170	NB	1,000	2	2,000	793	0.40	1,646	0.82
16	Wayne Gretzky Parkway	32101994	SB	1,000	2	2,000	1,297	0.65	1,485	0.74
17	Brantwood Park Road	32103099	NB	600	1	600	194	0.32	273	0.46
18	Brantwood Park Road	32103099	SB	600	1	600	173	0.29	270	0.45
19	Park Road North	32101996	NB	800	1	800	459	0.57	627	0.78
20	Park Road North	32101996	SB	800	1	800	546	0.68	628	0.79

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	12	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Murray Street		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	7	4,400	1,932	0.44	1,860	0.42
		WB	8	5,200	1,589	0.31	2,381	0.46

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	32102230	EB	800	1	800	313	0.39	339	0.42
2	Henry Street	32102230	WB	800	1	800	376	0.47	398	0.50
3	Elgin Street	32102140	EB	500	1	500	80	0.16	108	0.22
4	Elgin Street	32102140	WB	500	1	500	170	0.34	171	0.34
5	Grey Street	31680485	EB	500	1	500	78	0.16	164	0.33
6	Grey Street	31680485	WB	500	1	500	79	0.16	92	0.18
7	Colborne Street	31680092	EB	800	2	1,600	954	0.60	941	0.59
8	Dalhousie Street	31680105	WB	800	3	2,400	735	0.31	1,068	0.45
9	Mary Street	31677408	EB	500	1	500	174	0.35	54	0.11
10	Mary Street	31677408	WB	500	1	500	54	0.11	177	0.35
11	Greenwich Street	31677317	EB	500	1	500	333	0.67	254	0.51
12	Greenwich Street	31677317	WB	500	1	500	175	0.35	475	0.95
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	13	
Name	West External	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
7	7,300	1,711	0.23	2,241	0.31
7	7,300	1,664	0.23	2,190	0.30

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Silver Street (Brant Road 52)	31635739	EB	800	1	800	232	0.29	325	0.41
2	Silver Street (Brant Road 52)	31635739	WB	800	1	800	169	0.21	193	0.24
3	Brant Road 2	31627987	EB	800	1	800	320	0.40	237	0.30
4	Brant Road 2	31627987	WB	800	1	800	192	0.24	618	0.77
5	Powerline Road	32103319	EB	500	1	500	52	0.10	59	0.12
6	Powerline Road	32103319	WB	500	1	500	54	0.11	61	0.12
7	Highway 403	32103921	EB	1,800	2	3,600	830	0.23	1,185	0.33
8	Highway 403	32103924	WB	1,800	2	3,600	934	0.26	1,115	0.31
9	Bethel Road	31626662	EB	500	1	500	0	0.00	25	0.05
10	Bethel Road	31626662	WB	500	1	500	0	0.00	0	0.00
11	Colborne Street (Brant Road 53)	32103323	EB	1,100	1	1,100	277	0.25	410	0.37
12	Colborne Street (Brant Road 53)	32103323	WB	1,100	1	1,100	315	0.29	203	0.18
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	14	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	South-West External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB	4	4,300	1,560	0.36	1,168	0.27
		SB	4	4,300	949	0.22	1,632	0.38

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Rest Acres Road (Highway 24)	31623575	NB	1,200	1	1,200	386	0.32	246	0.21
2	Rest Acres Road (Highway 24)	31623575	SB	1,200	1	1,200	374	0.31	393	0.33
3	Mount Pleasant Road (Brant Road 24)	31641599	NB	1,000	1	1,000	220	0.22	229	0.23
4	Mount Pleasant Road (Brant Road 24)	31641599	SB	1,000	1	1,000	198	0.20	266	0.27
5	Pleasant Ridge Road (Brant Road 7)	31641036	NB	1,000	1	1,000	145	0.15	99	0.10
6	Pleasant Ridge Road (Brant Road 7)	31641036	SB	1,000	1	1,000	66	0.07	152	0.15
7	Cockshutt Road (Brant Road 4)	32103199	NB	1,100	1	1,100	809	0.74	594	0.54
8	Cockshutt Road (Brant Road 4)	32103199	SB	1,100	1	1,100	311	0.28	821	0.75
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	15	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	East External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	5	6,900	2,931	0.42	3,448	0.50
		WB	5	6,900	2,996	0.43	3,634	0.53

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32104077	EB	1,800	2	3,600	2,276	0.63	2,711	0.75
2	Highway 403	32104074	WB	1,800	2	3,600	2,461	0.68	2,665	0.74
3	Brant Road 2	32087178	EB	1,100	2	2,200	391	0.18	348	0.16
4	Brant Road 2	32087178	WB	1,100	2	2,200	234	0.11	590	0.27
5	Brant Road 54	32079101	EB	1,100	1	1,100	264	0.24	389	0.35
6	Brant Road 54	32079101	WB	1,100	1	1,100	301	0.27	379	0.34
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	16	Direction
Name	North-East External	
Direction	NB-SB	NB
		SB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
3	3,200	1,355	0.42	1,614	0.50
3	3,200	1,168	0.37	2,281	0.71

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	East River Road	31664248	NB	1,000	1	1,000	286	0.29	199	0.20
2	East River Road	31664248	SB	1,000	1	1,000	113	0.11	483	0.48
3	Highway 24	32104116	NB	1,200	1	1,200	749	0.62	927	0.77
4	Highway 24	32104116	SB	1,200	1	1,200	597	0.50	1,133	0.94
5	St. George Road	31864585	NB	1,000	1	1,000	320	0.32	488	0.49
6	St. George Road	31864585	SB	1,000	1	1,000	458	0.46	665	0.67
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	17	Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Name	North-West External							
Direction	NB-SB	NB	3	3,300	780	0.24	929	0.28
		SB	3	3,300	791	0.24	978	0.30

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Brant-Oxford Road	31625759	NB	1,100	1	1,100	249	0.23	218	0.20
2	Brant-Oxford Road	31625759	SB	1,100	1	1,100	265	0.24	261	0.24
3	Ayr Road	31626456	NB	1,100	1	1,100	3	0.00	5	0.00
4	Ayr Road	31626456	SB	1,100	1	1,100	3	0.00	21	0.02
5	Pinehurst Road	32103147	NB	1,100	1	1,100	528	0.48	706	0.64
6	Pinehurst Road	32103147	SB	1,100	1	1,100	523	0.48	696	0.63
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Future Manage Travel Demand Screenline Summary

2041

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	7	8,100	6,367	0.79	5,794	0.72
1	Grand River South	WB	7	8,100	4,035	0.50	6,973	0.86
2	Grand River North	EB	4	5,200	2,941	0.57	3,977	0.76
2	Grand River North	WB	5	6,000	2,565	0.43	3,587	0.60
3	Highway 403	NB	13	10,800	6,422	0.59	8,432	0.78
3	Highway 403	SB	13	10,800	6,994	0.65	8,736	0.81
4	King George Road	EB	11	9,600	4,996	0.52	8,046	0.84
4	King George Road	WB	11	9,600	6,415	0.67	6,743	0.70
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,264	0.56	5,965	0.78
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,147	0.68	5,624	0.74
6	Wayne Gretzky Parkway (South)	EB	6	4,100	1,911	0.47	2,146	0.52
6	Wayne Gretzky Parkway (South)	WB	6	4,100	1,467	0.36	2,650	0.65
7	Memorial Drive	EB	7	4,900	1,594	0.33	2,775	0.57
7	Memorial Drive	WB	7	4,900	2,181	0.45	2,374	0.48
8	West Street	EB	6	4,300	1,916	0.45	2,951	0.69
8	West Street	WB	6	4,300	2,579	0.60	2,952	0.69
9	CNR Corridor	NB	11	7,900	4,080	0.52	4,694	0.59
9	CNR Corridor	SB	11	7,900	3,935	0.50	5,748	0.73
10	Garden Avenue	EB	8	8,000	4,462	0.56	5,421	0.68
10	Garden Avenue	WB	8	8,000	4,317	0.54	5,807	0.73
11	Powerline Road	NB	12	9,000	3,965	0.44	5,521	0.61
11	Powerline Road	SB	12	9,000	4,487	0.50	5,740	0.64
12	Murray Street	EB	7	4,400	1,916	0.44	1,734	0.39
12	Murray Street	WB	8	5,200	1,528	0.29	2,326	0.45
13	West External	EB	7	7,300	1,664	0.23	2,211	0.30
13	West External	WB	7	7,300	1,602	0.22	2,141	0.29
14	South-West External	NB	4	4,300	1,548	0.36	1,161	0.27
14	South-West External	SB	4	4,300	935	0.22	1,637	0.38
15	East External	EB	5	6,900	2,940	0.43	3,444	0.50
15	East External	WB	5	6,900	3,007	0.44	3,648	0.53
16	North-East External	NB	3	3,200	1,341	0.42	1,599	0.50
16	North-East External	SB	3	3,200	1,161	0.36	2,253	0.70
17	North-West External	NB	3	3,300	755	0.23	912	0.28
17	North-West External	SB	3	3,300	788	0.24	937	0.28

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	1	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Grand River South		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	7	8,100	6,367	0.79	5,794	0.72
		WB	7	8,100	4,035	0.50	6,973	0.86

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,695	0.47	2,137	0.59
2	Highway 403	32103934	WB	1,800	2	3,600	1,492	0.41	1,941	0.54
3	Colborne Street	32102414	EB	800	2	1,600	2,405	1.50	1,875	1.17
4	Colborne Street	32102414	WB	800	2	1,600	1,234	0.77	2,518	1.57
5	Veterans Memorial Parkway	32101861	EB	1,000	1	1,000	1,229	1.23	1,053	1.05
6	Veterans Memorial Parkway	32101861	WB	1,000	1	1,000	914	0.91	1,311	1.31
7	Erie Avenue	32102875	EB	800	1	800	552	0.69	504	0.63
8	Erie Avenue	32102875	WB	800	1	800	250	0.31	582	0.73
9	Phelps Road (Brant Road 18)	31646482	EB	1,100	1	1,100	486	0.44	225	0.20
10	Phelps Road (Brant Road 18)	31646482	WB	1,100	1	1,100	145	0.13	621	0.56
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	2	Direction
Name	Grand River North	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
4	5,200	2,941	0.57	3,977	0.76
5	6,000	2,565	0.43	3,587	0.60

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,695	0.47	2,137	0.59
2	Highway 403	32103934	WB	1,800	2	3,600	1,492	0.41	1,941	0.54
3	Brant Road 2	32103340	EB	800	1	800	453	0.57	1,066	1.33
4	Brant Road 2	32103340	WB	800	1	800	624	0.78	725	0.91
5	William Street	31634058	EB	800	1	800	793	0.99	774	0.97
6	William Street	31634058	WB	800	2	1,600	449	0.28	921	0.58
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	3	Direction
Name	Highway 403	
Direction	NB-SB	NB
		SB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
NB	13	10,800	6,422	0.59	8,432	0.78
SB	13	10,800	6,994	0.65	8,736	0.81

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32104460	NB	800	2	1,600	359	0.22	561	0.35
2	Oak Park Road	32104460	SB	800	2	1,600	898	0.56	361	0.23
3	Paris Road	32102313	NB	800	2	1,600	1,170	0.73	1,095	0.68
4	Paris Road	32102313	SB	800	2	1,600	610	0.38	1,554	0.97
5	King George Road	31683713	NB	800	2	1,600	1,215	0.76	1,396	0.87
6	King George Road	32102332	SB	800	2	1,600	1,192	0.75	1,433	0.90
7	Wayne Gretzky Parkway	31703983	NB	1,000	2	2,000	1,557	0.78	2,133	1.07
8	Wayne Gretzky Parkway	31703908	SB	1,000	2	2,000	1,778	0.89	2,192	1.10
9	Garden Avenue	32104072	NB	800	2	1,600	895	0.56	1,334	0.83
10	Garden Avenue	32104072	SB	800	2	1,600	1,025	0.64	1,392	0.87
11	North Park Street	31689884	NB	800	1	800	277	0.35	584	0.73
12	North Park Street	31689884	SB	800	1	800	421	0.53	572	0.72
13	West Street	31691064	NB	800	2	1,600	949	0.59	1,329	0.83
14	West Street	31691064	SB	800	2	1,600	1,070	0.67	1,232	0.77
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	4	Direction
Name	King George Road	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
11	9600	4996	0.52	8046	0.84
11	9600	6415	0.67	6743	0.7

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31663494	EB	1,000	1	1,000	684	0.68	1,006	1.01
2	Powerline Road	31663494	WB	1,000	1	1,000	907	0.91	873	0.87
3	Oxford Street	31685991	EB	500	1	500	189	0.38	226	0.45
4	Oxford Street	31685991	WB	500	1	500	130	0.26	227	0.45
5	Toll Gate Road	32101902	EB	800	1	800	596	0.75	742	0.93
6	Toll Gate Road	32101902	WB	800	1	800	509	0.64	744	0.93
7	Highway 403	32104048	EB	1,800	2	3,600	1,903	0.53	3,346	0.93
8	Highway 403	32104051	WB	1,800	2	3,600	2,869	0.80	2,624	0.73
9	Queensway Drive	31683036	EB	500	1	500	123	0.25	183	0.37
10	Queensway Drive	31683036	WB	500	1	500	80	0.16	203	0.41
11	St. George Street	31682564	EB	500	1	500	68	0.14	181	0.36
12	St. George Street	31682564	WB	500	1	500	44	0.09	104	0.21
13	Terrace Hill Street	31670392	EB	500	1	500	199	0.40	269	0.54
14	Terrace Hill Street	31670392	WB	500	1	500	129	0.26	265	0.53
15	Brant Avenue	31669648	EB	800	2	1,600	815	0.51	1,486	0.93
16	Brant Avenue	31669648	WB	800	2	1,600	1,349	0.84	1,113	0.70
17	New East/West Road	32104408	EB	600	1	600	419	0.70	607	1.01
18	New East/West Road	32104408	WB	600	1	600	398	0.66	590	0.98
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	5	Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Name	Wayne Gretzky Parkway (North)							
Direction	EB-WB	EB	7	7,600	4,264	0.56	5,965	0.78
		WB	7	7,600	5,147	0.68	5,624	0.74

#	Name	Link	Direction	Capacity Per	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
1	Powerline Road	31711969	EB	1,000	1	1,000	194	0.19	579	0.58
2	Powerline Road	31711969	WB	1,000	1	1,000	600	0.60	380	0.38
3	Dunsdon Street	32102051	EB	800	1	800	279	0.35	526	0.66
4	Dunsdon Street	32102051	WB	800	1	800	423	0.53	317	0.40
5	Lynden Road	32103996	EB	800	2	1,600	986	0.62	1,314	0.82
6	Lynden Road	32103996	WB	800	2	1,600	1,004	0.63	1,668	1.04
7	Highway 403	32104061	EB	1,800	2	3,600	2,735	0.76	3,138	0.87
8	Highway 403	32104062	WB	1,800	2	3,600	2,796	0.78	3,123	0.87
9	New East/West Road	32104398	EB	600	1	600	70	0.12	408	0.68
10	New East/West Road	32104398	WB	600	1	600	324	0.54	136	0.23
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	6	Direction
Name	Wayne Gretzky Parkway (South)	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
6	4,100	1,911	0.47	2,146	0.52
6	4,100	1,467	0.36	2,650	0.65

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	31701117	EB	800	2	1,600	650	0.41	815	0.51
2	Henry Street	31701117	WB	800	2	1,600	531	0.33	1,176	0.74
3	Elgin Street	31702288	EB	600	1	600	418	0.70	263	0.44
4	Elgin Street	31702288	WB	600	1	600	212	0.35	478	0.80
5	Grey Street	31701124	EB	600	1	600	220	0.37	359	0.60
6	Grey Street	31701124	WB	600	1	600	261	0.44	300	0.50
7	Chatham Street	31700439	EB	500	1	500	79	0.16	129	0.26
8	Chatham Street	31700439	WB	500	1	500	31	0.06	146	0.29
9	Colborne Street	31700015	EB	800	1	800	544	0.68	580	0.73
10	Colborne Street	31700015	WB	800	1	800	432	0.54	550	0.69
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	7	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	Memorial Drive								
Direction	EB-WB	EB		7	4,900	1,594	0.33	2,775	0.57
		WB		7	4,900	2,181	0.45	2,374	0.48

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Varadi Avenue	32101917	EB	500	1	500	33	0.07	135	0.27
2	Varadi Avenue	32101917	WB	500	1	500	38	0.08	107	0.21
3	Dunsdon Street	31687743	EB	600	2	1,200	206	0.17	339	0.28
4	Dunsdon Street	31687743	WB	600	2	1,200	273	0.23	286	0.24
5	North Park Street	32101953	EB	800	1	800	160	0.20	391	0.49
6	North Park Street	32101953	WB	800	1	800	347	0.43	318	0.40
7	Fairview Drive	32102031	EB	800	1	800	311	0.39	541	0.68
8	Fairview Drive	32102031	WB	800	1	800	540	0.68	537	0.67
9	Powerline Road	31688305	EB	1,000	1	1,000	641	0.64	961	0.96
10	Powerline Road	31688305	WB	1,000	1	1,000	807	0.81	837	0.84
11	New East/West Road	32104387	EB	600	1	600	243	0.41	408	0.68
12	New East/West Road	32104387	WB	600	1	600	176	0.29	289	0.48
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	8	Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Name	West Street							
Direction	EB-WB	EB	6	4,300	1,916	0.45	2,951	0.69
		WB	6	4,300	2,579	0.60	2,952	0.69

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Morton Avenue	31691008	EB	500	1	500	84	0.17	113	0.23
2	Morton Avenue	31691008	WB	500	1	500	123	0.25	184	0.37
3	Charing Cross Street	31689369	EB	800	2	1,600	440	0.28	659	0.41
4	Charing Cross Street	31689369	WB	800	2	1,600	628	0.39	846	0.53
5	Dundas Street	31679012	EB	600	1	600	294	0.49	431	0.72
6	Dundas Street	31679012	WB	600	1	600	187	0.31	299	0.50
7	Brant Avenue	31670814	EB	800	2	1,600	1,098	0.69	1,748	1.09
8	Brant Avenue	31670814	WB	800	2	1,600	1,641	1.03	1,623	1.01
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10										
11										
12										
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
Screenline	9		Lanes	Total	Volume	V/C	Volume	V/C
Name	CNR Corridor	NB	11	7,900	4,080	0.52	4,694	0.59
Direction	NB-SB	SB	11	7,900	3,935	0.50	5,748	0.73

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	St. Paul Avenue	32103535	NB	800	2	1,600	655	0.41	948	0.59
2	St. Paul Avenue	32103535	SB	800	2	1,600	872	0.55	1,001	0.63
3	West Street	31678374	NB	800	1	800	604	0.76	718	0.90
4	West Street	31678374	SB	800	1	800	743	0.93	916	1.15
5	Clarence Street	31678962	NB	800	2	1,600	1,266	0.79	1,284	0.80
6	Clarence Street	31678962	SB	800	2	1,600	1,040	0.65	1,529	0.96
7	Murray Street	31681384	NB	500	1	500	101	0.20	161	0.32
8	Murray Street	31681384	SB	500	1	500	90	0.18	345	0.69
9	Rawdon Street	31698868	NB	500	1	500	242	0.48	150	0.30
10	Rawdon Street	31698868	SB	500	1	500	76	0.15	360	0.72
11	Stanley Street	31698979	NB	500	1	500	402	0.80	329	0.66
12	Stanley Street	31698979	SB	500	1	500	275	0.55	430	0.86
13	Wayne Gretzky Parkway	31700977	NB	900	2	1,800	630	0.35	963	0.54
14	Wayne Gretzky Parkway	31700971	SB	900	2	1,800	677	0.38	956	0.53
15	Garden Avenue	32079892	NB	600	1	600	180	0.30	141	0.24
16	Garden Avenue	32079892	SB	600	1	600	162	0.27	211	0.35
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	10	
Name	Garden Avenue	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
8	8,000	4,462	0.56	5,421	0.68
8	8,000	4,317	0.54	5,807	0.73

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Lynden Road	31708958	EB	800	2	1,600	677	0.42	947	0.59
2	Lynden Road	31708958	WB	800	2	1,600	708	0.44	1,149	0.72
3	Highway 403	32104066	EB	1,800	2	3,600	2,735	0.76	3,138	0.87
4	Highway 403	32104065	WB	1,800	2	3,600	2,796	0.78	3,123	0.87
5	Henry Street	32081112	EB	800	1	800	326	0.41	568	0.71
6	Henry Street	32081112	WB	800	1	800	348	0.44	520	0.65
7	Elgin Street	32079965	EB	600	1	600	96	0.16	154	0.26
8	Elgin Street	32079965	WB	600	1	600	101	0.17	124	0.21
9	Grey Street	32079358	EB	600	1	600	105	0.18	64	0.11
10	Grey Street	32079358	WB	600	1	600	49	0.08	148	0.25
11	Colborne Street	32102783	EB	800	1	800	523	0.65	550	0.69
12	Colborne Street	32102783	WB	800	1	800	315	0.39	743	0.93
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
Screenline	11		Lanes	Total	Volume	V/C	Volume	V/C
Name	Powerline Road	NB	12	9,000	3,965	0.44	5,521	0.61
Direction	NB-SB	SB	12	9,000	4,487	0.50	5,740	0.64

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32103349	NB	800	1	800	491	0.61	667	0.83
2	Oak Park Road	32103349	SB	800	1	800	530	0.66	578	0.72
3	Paris Road	32104353	NB	800	1	800	380	0.48	303	0.38
4	Paris Road	32104353	SB	800	1	800	219	0.27	409	0.51
5	Golf Road	32103116	NB	500	1	500	468	0.94	288	0.58
6	Golf Road	32103116	SB	500	1	500	187	0.37	550	1.10
7	Balmoral Drive	32104424	NB	600	1	600	362	0.60	295	0.49
8	Balmoral Drive	32104424	SB	600	1	600	177	0.30	431	0.72
9	King George Road	32101870	NB	800	2	1,600	751	0.47	1,133	0.71
10	King George Road	32101870	SB	800	2	1,600	1,085	0.68	1,133	0.71
11	Memorial Drive	31688335	NB	800	1	800	121	0.15	367	0.46
12	Memorial Drive	31688335	SB	800	1	800	290	0.36	390	0.49
13	Greenfield Road	31709585	NB	500	1	500	38	0.08	63	0.13
14	Greenfield Road	31709585	SB	500	1	500	34	0.07	37	0.07
15	Wayne Gretzky Parkway	31696170	NB	1,000	2	2,000	748	0.37	1,571	0.79
16	Wayne Gretzky Parkway	32101994	SB	1,000	2	2,000	1,269	0.63	1,361	0.68
17	Brantwood Park Road	32103099	NB	600	1	600	187	0.31	247	0.41
18	Brantwood Park Road	32103099	SB	600	1	600	162	0.27	248	0.41
19	Park Road North	32101996	NB	800	1	800	419	0.52	587	0.73
20	Park Road North	32101996	SB	800	1	800	534	0.67	603	0.75

Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Screenline	12							
Name	Murray Street							
Direction	EB-WB	EB	7	4,400	1,916	0.44	1,734	0.39
		WB	8	5,200	1,528	0.29	2,326	0.45

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	32102230	EB	800	1	800	320	0.40	313	0.39
2	Henry Street	32102230	WB	800	1	800	367	0.46	465	0.58
3	Elgin Street	32102140	EB	500	1	500	102	0.20	105	0.21
4	Elgin Street	32102140	WB	500	1	500	148	0.30	143	0.29
5	Grey Street	31680485	EB	500	1	500	90	0.18	136	0.27
6	Grey Street	31680485	WB	500	1	500	74	0.15	83	0.17
7	Colborne Street	31680092	EB	800	2	1,600	938	0.59	906	0.57
8	Dalhousie Street	31680105	WB	800	3	2,400	717	0.30	990	0.41
9	Mary Street	31677408	EB	500	1	500	167	0.33	40	0.08
10	Mary Street	31677408	WB	500	1	500	55	0.11	188	0.38
11	Greenwich Street	31677317	EB	500	1	500	299	0.60	234	0.47
12	Greenwich Street	31677317	WB	500	1	500	167	0.33	457	0.91
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	13	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	West External								
Direction	EB-WB	EB		7	7,300	1,664	0.23	2,211	0.30
		WB		7	7,300	1,602	0.22	2,141	0.29

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Silver Street (Brant Road 52)	31635739	EB	800	1	800	224	0.28	289	0.36
2	Silver Street (Brant Road 52)	31635739	WB	800	1	800	166	0.21	170	0.21
3	Brant Road 2	31627987	EB	800	1	800	280	0.35	226	0.28
4	Brant Road 2	31627987	WB	800	1	800	193	0.24	571	0.71
5	Powerline Road	32103319	EB	500	1	500	52	0.10	59	0.12
6	Powerline Road	32103319	WB	500	1	500	54	0.11	59	0.12
7	Highway 403	32103921	EB	1,800	2	3,600	831	0.23	1,206	0.34
8	Highway 403	32103924	WB	1,800	2	3,600	928	0.26	1,119	0.31
9	Bethel Road	31626662	EB	500	1	500	0	0.00	25	0.05
10	Bethel Road	31626662	WB	500	1	500	0	0.00	0	0.00
11	Colborne Street (Brant Road 53)	32103323	EB	1,100	1	1,100	277	0.25	406	0.37
12	Colborne Street (Brant Road 53)	32103323	WB	1,100	1	1,100	261	0.24	222	0.20
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	14	
Name	South-West External	
Direction	NB-SB	NB
		SB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
NB	4	4,300	1,548	0.36	1,161	0.27
SB	4	4,300	935	0.22	1,637	0.38

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Rest Acres Road (Highway 24)	31623575	NB	1,200	1	1,200	410	0.34	245	0.20
2	Rest Acres Road (Highway 24)	31623575	SB	1,200	1	1,200	374	0.31	430	0.36
3	Mount Pleasant Road (Brant Road 24)	31641599	NB	1,000	1	1,000	223	0.22	233	0.23
4	Mount Pleasant Road (Brant Road 24)	31641599	SB	1,000	1	1,000	187	0.19	265	0.27
5	Pleasant Ridge Road (Brant Road 7)	31641036	NB	1,000	1	1,000	146	0.15	103	0.10
6	Pleasant Ridge Road (Brant Road 7)	31641036	SB	1,000	1	1,000	64	0.06	150	0.15
7	Cockshutt Road (Brant Road 4)	32103199	NB	1,100	1	1,100	769	0.70	580	0.53
8	Cockshutt Road (Brant Road 4)	32103199	SB	1,100	1	1,100	310	0.28	792	0.72
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	15	Direction
Name	East External	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
5	6,900	2,940	0.43	3,444	0.50
5	6,900	3,007	0.44	3,648	0.53

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32104077	EB	1,800	2	3,600	2,289	0.64	2,715	0.75
2	Highway 403	32104074	WB	1,800	2	3,600	2,477	0.69	2,706	0.75
3	Brant Road 2	32087178	EB	1,100	2	2,200	391	0.18	348	0.16
4	Brant Road 2	32087178	WB	1,100	2	2,200	234	0.11	561	0.26
5	Brant Road 54	32079101	EB	1,100	1	1,100	260	0.24	381	0.35
6	Brant Road 54	32079101	WB	1,100	1	1,100	296	0.27	381	0.35
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8										
9										
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12										
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16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	16	Direction
Name	North-East External	
Direction	NB-SB	NB
		SB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
NB	3	3,200	1,341	0.42	1,599	0.50
SB	3	3,200	1,161	0.36	2,253	0.70

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	East River Road	31664248	NB	1,000	1	1,000	281	0.28	197	0.20
2	East River Road	31664248	SB	1,000	1	1,000	75	0.08	464	0.46
3	Highway 24	32104116	NB	1,200	1	1,200	742	0.62	919	0.77
4	Highway 24	32104116	SB	1,200	1	1,200	630	0.53	1,132	0.94
5	St. George Road	31864585	NB	1,000	1	1,000	318	0.32	483	0.48
6	St. George Road	31864585	SB	1,000	1	1,000	456	0.46	657	0.66
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	17	Direction
Name	North-West External	
Direction	NB-SB	NB
		SB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
3	3,300	755	0.23	912	0.28
3	3,300	788	0.24	937	0.28

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Brant-Oxford Road	31625759	NB	1,100	1	1,100	248	0.23	218	0.20
2	Brant-Oxford Road	31625759	SB	1,100	1	1,100	267	0.24	266	0.24
3	Ayr Road	31626456	NB	1,100	1	1,100	2	0.00	5	0.00
4	Ayr Road	31626456	SB	1,100	1	1,100	1	0.00	22	0.02
5	Pinehurst Road	32103147	NB	1,100	1	1,100	505	0.46	689	0.63
6	Pinehurst Road	32103147	SB	1,100	1	1,100	520	0.47	649	0.59
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Future Increase Infrastructure Screenline Summary

2041

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	10	11,100	6,261	0.56	7,118	0.64
1	Grand River South	WB	10	11,100	5,359	0.48	7,336	0.66
2	Grand River North	EB	4	5,200	2,872	0.55	4,232	0.81
2	Grand River North	WB	5	6,000	2,819	0.47	3,652	0.61
3	Highway 403	NB	14	11,800	7,192	0.61	9,095	0.77
3	Highway 403	SB	14	11,800	7,291	0.62	9,712	0.82
4	King George Road	EB	11	9,600	5,167	0.54	8,054	0.84
4	King George Road	WB	11	9,600	6,409	0.67	7,125	0.74
5	Wayne Gretzky Parkway (North)	EB	7	7,600	4,496	0.59	6,279	0.83
5	Wayne Gretzky Parkway (North)	WB	7	7,600	5,281	0.69	5,910	0.78
6	Wayne Gretzky Parkway (South)	EB	7	4,900	1,991	0.41	2,298	0.47
6	Wayne Gretzky Parkway (South)	WB	7	4,900	1,656	0.34	2,957	0.60
7	Memorial Drive	EB	9	6,100	1,700	0.28	2,989	0.49
7	Memorial Drive	WB	9	6,100	2,302	0.38	2,577	0.42
8	West Street	EB	6	4,300	2,032	0.47	3,005	0.70
8	West Street	WB	6	4,300	2,513	0.58	3,063	0.71
9	CNR Corridor	NB	12	8,800	4,362	0.50	5,143	0.58
9	CNR Corridor	SB	12	8,800	4,225	0.48	6,085	0.69
10	Garden Avenue	EB	9	8,800	4,717	0.54	5,601	0.64
10	Garden Avenue	WB	9	8,800	4,378	0.50	6,081	0.69
11	Powerline Road	NB	13	9,400	4,145	0.44	5,828	0.62
11	Powerline Road	SB	13	9,400	4,689	0.50	6,125	0.65
12	Murray Street	EB	7	4,400	1,989	0.45	1,800	0.41
12	Murray Street	WB	8	5,200	1,635	0.31	2,681	0.52
13	West External	EB	7	7,300	1,716	0.24	2,249	0.31
13	West External	WB	7	7,300	1,666	0.23	2,155	0.30
14	South-West External	NB	4	4,300	1,597	0.37	1,208	0.28
14	South-West External	SB	4	4,300	965	0.22	1,727	0.40
15	East External	EB	5	6,900	2,929	0.42	3,447	0.50
15	East External	WB	5	6,900	2,996	0.43	3,635	0.53
16	North-East External	NB	3	3,200	1,355	0.42	1,616	0.51
16	North-East External	SB	3	3,200	1,168	0.37	2,278	0.71
17	North-West External	NB	3	3,300	779	0.24	929	0.28
17	North-West External	SB	3	3,300	791	0.24	978	0.30

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
Screenline	1		Lanes	Total	Volume	V/C	Volume	V/C
Name	Grand River South							
Direction	EB-WB	EB	10	11,100	6,261	0.56	7,118	0.64
		WB	10	11,100	5,359	0.48	7,336	0.66

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,565	0.43	2,366	0.66
2	Highway 403	32103934	WB	1,800	2	3,600	1,669	0.46	1,942	0.54
3	Oak Park Road	32104240	WB	1,000	2	2,000	876	0.44	327	0.16
4	Oak Park Road	32104240	EB	1,000	2	2,000	179	0.09	911	0.46
5	Colborne Street	32102414	EB	800	2	1,600	1,910	1.19	1,600	1.00
6	Colborne Street	32102414	WB	800	2	1,600	1,236	0.77	1,948	1.22
7	Veterans Memorial Parkway	32101861	EB	1,000	2	2,000	1,786	0.89	1,525	0.76
8	Veterans Memorial Parkway	32101861	WB	1,000	2	2,000	1,175	0.59	2,106	1.05
9	Erie Avenue	32102875	EB	800	1	800	432	0.54	488	0.61
10	Erie Avenue	32102875	WB	800	1	800	260	0.33	486	0.61
11	Phelps Road (Brant Road 18)	31646482	EB	1,100	1	1,100	389	0.35	228	0.21
12	Phelps Road (Brant Road 18)	31646482	WB	1,100	1	1,100	143	0.13	527	0.48
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	2	Direction	
Name	Grand River North		
Direction	EB-WB	EB	
		WB	

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
4	5,200	2,872	0.55	4,232	0.81
5	6,000	2,819	0.47	3,652	0.61

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,565	0.43	2,366	0.66
2	Highway 403	32103934	WB	1,800	2	3,600	1,669	0.46	1,942	0.54
3	Brant Road 2	32103340	EB	800	1	800	505	0.63	1,072	1.34
4	Brant Road 2	32103340	WB	800	1	800	670	0.84	773	0.97
5	William Street	31634058	EB	800	1	800	802	1.00	794	0.99
6	William Street	31634058	WB	800	2	1,600	480	0.30	937	0.59
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	3	Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Name	Highway 403							
Direction	NB-SB	NB	14	11,800	7,192	0.61	9,095	0.77
		SB	14	11,800	7,291	0.62	9,712	0.82

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32104456	NB	800	2	1,600	979	0.61	840	0.53
2	Oak Park Road	32104456	SB	800	2	1,600	985	0.62	1,084	0.68
3	Paris Road	32102313	NB	800	2	1,600	1,066	0.67	1,143	0.71
4	Paris Road	32102313	SB	800	2	1,600	606	0.38	1,437	0.90
5	King George Road	31683713	NB	800	2	1,600	1,255	0.78	1,432	0.90
6	King George Road	32102332	SB	800	2	1,600	1,244	0.78	1,450	0.91
7	Wayne Gretzky Parkway	31703983	NB	1,000	3	3,000	1,702	0.57	2,452	0.82
8	Wayne Gretzky Parkway	31703908	SB	1,000	3	3,000	1,936	0.65	2,468	0.82
9	Garden Avenue	32104072	NB	800	2	1,600	836	0.52	1,209	0.76
10	Garden Avenue	32104072	SB	800	2	1,600	1,010	0.63	1,348	0.84
11	North Park Street	31689884	NB	800	1	800	302	0.38	643	0.80
12	North Park Street	31689884	SB	800	1	800	442	0.55	622	0.78
13	West Street	31691064	NB	800	2	1,600	1,052	0.66	1,376	0.86
14	West Street	31691064	SB	800	2	1,600	1,068	0.67	1,303	0.81
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction		Capacity		AM Peak Hour		PM Peak Hour	
				Lanes	Total	Volume	V/C	Volume	V/C
Screenline	4								
Name	King George Road								
Direction	EB-WB	EB		11	9600	5167	0.54	8054	0.84
		WB		11	9600	6409	0.67	7125	0.74

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31663494	EB	1,000	1	1,000	674	0.67	1,001	1.00
2	Powerline Road	31663494	WB	1,000	1	1,000	917	0.92	898	0.90
3	Oxford Street	31685991	EB	500	1	500	202	0.40	223	0.45
4	Oxford Street	31685991	WB	500	1	500	132	0.26	237	0.47
5	Toll Gate Road	32101902	EB	800	1	800	622	0.78	878	1.10
6	Toll Gate Road	32101902	WB	800	1	800	543	0.68	878	1.10
7	Highway 403	32104048	EB	1,800	2	3,600	2,017	0.56	3,425	0.95
8	Highway 403	32104051	WB	1,800	2	3,600	2,997	0.83	2,766	0.77
9	Queensway Drive	31683036	EB	500	1	500	148	0.30	219	0.44
10	Queensway Drive	31683036	WB	500	1	500	98	0.20	259	0.52
11	St. George Street	31682564	EB	500	1	500	78	0.16	140	0.28
12	St. George Street	31682564	WB	500	1	500	41	0.08	98	0.20
13	Terrace Hill Street	31670392	EB	500	1	500	207	0.41	291	0.58
14	Terrace Hill Street	31670392	WB	500	1	500	124	0.25	256	0.51
15	Brant Avenue	31669648	EB	800	2	1,600	798	0.50	1,265	0.79
16	Brant Avenue	31669648	WB	800	2	1,600	1,136	0.71	1,112	0.70
17	New East/West Road	32104408	EB	600	1	600	421	0.70	612	1.02
18	New East/West Road	32104408	WB	600	1	600	421	0.70	621	1.04
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	5	Direction	
Name	Wayne Gretzky Parkway (North)		
Direction	EB-WB	EB	
		WB	

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
7	7,600	4,496	0.59	6,279	0.83
7	7,600	5,281	0.69	5,910	0.78

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31711969	EB	1,000	1	1,000	218	0.22	625	0.63
2	Powerline Road	31711969	WB	1,000	1	1,000	641	0.64	446	0.45
3	Dunsdon Street	32102051	EB	800	1	800	292	0.37	558	0.70
4	Dunsdon Street	32102051	WB	800	1	800	444	0.56	344	0.43
5	Lynden Road	32103996	EB	800	2	1,600	1,100	0.69	1,460	0.91
6	Lynden Road	32103996	WB	800	2	1,600	1,048	0.66	1,763	1.10
7	Highway 403	32104061	EB	1,800	2	3,600	2,799	0.78	3,206	0.89
8	Highway 403	32104062	WB	1,800	2	3,600	2,807	0.78	3,212	0.89
9	New East/West Road	32104398	EB	600	1	600	87	0.15	430	0.72
10	New East/West Road	32104398	WB	600	1	600	341	0.57	145	0.24
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	6	Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Name	Wayne Gretzky Parkway (South)							
Direction	EB-WB	EB	7	4,900	1,991	0.41	2,298	0.47
		WB	7	4,900	1,656	0.34	2,957	0.60

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	31701117	EB	800	2	1,600	701	0.44	887	0.55
2	Henry Street	31701117	WB	800	2	1,600	643	0.40	1,230	0.77
3	Elgin Street	31702288	EB	600	1	600	424	0.71	294	0.49
4	Elgin Street	31702288	WB	600	1	600	228	0.38	500	0.83
5	Grey Street	31701124	EB	600	1	600	228	0.38	339	0.57
6	Grey Street	31701124	WB	600	1	600	280	0.47	280	0.47
7	Chatham Street	31700439	EB	500	1	500	85	0.17	80	0.16
8	Chatham Street	31700439	WB	500	1	500	36	0.07	108	0.22
9	Colborne Street	31700015	EB	800	2	1,600	553	0.35	698	0.44
10	Colborne Street	31700015	WB	800	2	1,600	469	0.29	839	0.52
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	7	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	Memorial Drive								
Direction	EB-WB	EB		9	6,100	1,700	0.28	2,989	0.49
		WB		9	6,100	2,302	0.38	2,577	0.42

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Varadi Avenue	32101917	EB	500	1	500	33	0.07	136	0.27
2	Varadi Avenue	32101917	WB	500	1	500	38	0.08	107	0.21
3	Dunsdon Street	31687743	EB	600	2	1,200	209	0.17	300	0.25
4	Dunsdon Street	31687743	WB	600	2	1,200	231	0.19	252	0.21
5	North Park Street	32101953	EB	600	2	1,200	165	0.14	378	0.32
6	North Park Street	32101953	WB	600	2	1,200	378	0.32	337	0.28
7	Fairview Drive	32102031	EB	800	2	1,600	347	0.22	781	0.49
8	Fairview Drive	32102031	WB	800	2	1,600	670	0.42	744	0.47
9	Powerline Road	31688305	EB	1,000	1	1,000	689	0.69	970	0.97
10	Powerline Road	31688305	WB	1,000	1	1,000	795	0.80	821	0.82
11	New East/West Road	32104387	EB	600	1	600	257	0.43	424	0.71
12	New East/West Road	32104387	WB	600	1	600	190	0.32	316	0.53
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	8	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	West Street		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	6	4,300	2,032	0.47	3,005	0.70
		WB	6	4,300	2,513	0.58	3,063	0.71

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Morton Avenue	31691008	EB	500	1	500	80	0.16	99	0.20
2	Morton Avenue	31691008	WB	500	1	500	114	0.23	151	0.30
3	Charing Cross Street	31689369	EB	800	2	1,600	551	0.34	898	0.56
4	Charing Cross Street	31689369	WB	800	2	1,600	694	0.43	1,023	0.64
5	Dundas Street	31679012	EB	600	1	600	291	0.49	358	0.60
6	Dundas Street	31679012	WB	600	1	600	180	0.30	244	0.41
7	Brant Avenue	31670814	EB	800	2	1,600	1,110	0.69	1,650	1.03
8	Brant Avenue	31670814	WB	800	2	1,600	1,525	0.95	1,645	1.03
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	9	
Name	CNR Corridor	
Direction	NB-SB	NB
		SB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
12	8,800	4,362	0.50	5,143	0.58
12	8,800	4,225	0.48	6,085	0.69

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	St. Paul Avenue	32103535	NB	800	2	1,600	774	0.48	1,004	0.63
2	St. Paul Avenue	32103535	SB	800	2	1,600	911	0.57	1,100	0.69
3	West Street	31678374	NB	800	1	800	599	0.75	725	0.91
4	West Street	31678374	SB	800	1	800	763	0.95	886	1.11
5	Clarence Street	31678962	NB	800	2	1,600	1,261	0.79	1,339	0.84
6	Clarence Street	31678962	SB	800	2	1,600	1,099	0.69	1,515	0.95
7	Murray Street	31681384	NB	500	1	500	99	0.20	172	0.34
8	Murray Street	31681384	SB	500	1	500	92	0.18	325	0.65
9	Rawdon Street	31698868	NB	500	1	500	291	0.58	258	0.52
10	Rawdon Street	31698868	SB	500	1	500	131	0.26	365	0.73
11	Stanley Street	31698979	NB	500	1	500	406	0.81	382	0.76
12	Stanley Street	31698979	SB	500	1	500	313	0.63	434	0.87
13	Wayne Gretzky Parkway	31700977	NB	900	3	2,700	731	0.27	1,053	0.39
14	Wayne Gretzky Parkway	31700971	SB	900	3	2,700	733	0.27	1,204	0.45
15	Garden Avenue	32079892	NB	600	1	600	201	0.34	210	0.35
16	Garden Avenue	32079892	SB	600	1	600	183	0.31	256	0.43
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	10	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	Garden Avenue								
Direction	EB-WB	EB		9	8,800	4,717	0.54	5,601	0.64
		WB		9	8,800	4,378	0.50	6,081	0.69

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Lynden Road	31708958	EB	800	2	1,600	749	0.47	1,025	0.64
2	Lynden Road	31708958	WB	800	2	1,600	676	0.42	1,155	0.72
3	Highway 403	32104066	EB	1,800	2	3,600	2,799	0.78	3,206	0.89
4	Highway 403	32104065	WB	1,800	2	3,600	2,807	0.78	3,212	0.89
5	Henry Street	32081112	EB	800	1	800	363	0.45	534	0.67
6	Henry Street	32081112	WB	800	1	800	380	0.48	526	0.66
7	Elgin Street	32079965	EB	600	1	600	97	0.16	161	0.27
8	Elgin Street	32079965	WB	600	1	600	125	0.21	122	0.20
9	Grey Street	32079358	EB	600	1	600	99	0.17	62	0.10
10	Grey Street	32079358	WB	600	1	600	59	0.10	100	0.17
11	Colborne Street	32102783	EB	800	2	1,600	610	0.38	613	0.38
12	Colborne Street	32102783	WB	800	2	1,600	331	0.21	966	0.60
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	11	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Powerline Road		Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB	13	9,400	4,145	0.44	5,828	0.62
		SB	13	9,400	4,689	0.50	6,125	0.65

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32103349	NB	800	1	800	442	0.55	668	0.84
2	Oak Park Road	32103349	SB	800	1	800	578	0.72	669	0.84
3	Paris Road	32104353	NB	800	1	800	419	0.52	389	0.49
4	Paris Road	32104353	SB	800	1	800	220	0.28	464	0.58
5	Golf Road	32103116	NB	500	1	500	473	0.95	295	0.59
6	Golf Road	32103116	SB	500	1	500	198	0.40	552	1.10
7	Balmoral Drive	32104424	NB	600	1	600	386	0.64	301	0.50
8	Balmoral Drive	32104424	SB	600	1	600	196	0.33	446	0.74
9	King George Road	32101870	NB	800	2	1,600	823	0.51	1,147	0.72
10	King George Road	32101870	SB	800	2	1,600	1,090	0.68	1,156	0.72
11	Memorial Drive	31688335	NB	600	2	1,200	118	0.10	414	0.35
12	Memorial Drive	31688335	SB	600	2	1,200	319	0.27	410	0.34
13	Greenfield Road	31709585	NB	500	1	500	42	0.08	56	0.11
14	Greenfield Road	31709585	SB	500	1	500	35	0.07	39	0.08
15	Wayne Gretzky Parkway	31696170	NB	1,000	2	2,000	785	0.39	1,658	0.83
16	Wayne Gretzky Parkway	32101994	SB	1,000	2	2,000	1,328	0.66	1,482	0.74
17	Brantwood Park Road	32103099	NB	600	1	600	195	0.33	281	0.47
18	Brantwood Park Road	32103099	SB	600	1	600	171	0.29	277	0.46
19	Park Road North	32101996	NB	800	1	800	462	0.58	619	0.77
20	Park Road North	32101996	SB	800	1	800	554	0.69	630	0.79

Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

Screenline	12	Direction	Capacity		AM Peak Hour		PM Peak Hour		2041
Name	Murray Street		Lanes	Total	Volume	V/C	Volume	V/C	
Direction	EB-WB	EB	7	4,400	1,989	0.45	1,800	0.41	
		WB	8	5,200	1,635	0.31	2,681	0.52	

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	32102230	EB	800	1	800	366	0.46	350	0.44
2	Henry Street	32102230	WB	800	1	800	442	0.55	549	0.69
3	Elgin Street	32102140	EB	500	1	500	76	0.15	76	0.15
4	Elgin Street	32102140	WB	500	1	500	132	0.26	176	0.35
5	Grey Street	31680485	EB	500	1	500	94	0.19	137	0.27
6	Grey Street	31680485	WB	500	1	500	76	0.15	101	0.20
7	Colborne Street	31680092	EB	800	2	1,600	911	0.57	921	0.58
8	Dalhousie Street	31680105	WB	800	3	2,400	737	0.31	1,153	0.48
9	Mary Street	31677408	EB	500	1	500	228	0.46	55	0.11
10	Mary Street	31677408	WB	500	1	500	25	0.05	228	0.46
11	Greenwich Street	31677317	EB	500	1	500	314	0.63	261	0.52
12	Greenwich Street	31677317	WB	500	1	500	223	0.45	474	0.95
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	13	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	West External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	7	7,300	1,716	0.24	2,249	0.31
		WB	7	7,300	1,666	0.23	2,155	0.30

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Silver Street (Brant Road 52)	31635739	EB	800	1	800	233	0.29	297	0.37
2	Silver Street (Brant Road 52)	31635739	WB	800	1	800	169	0.21	194	0.24
3	Brant Road 2	31627987	EB	800	1	800	281	0.35	295	0.37
4	Brant Road 2	31627987	WB	800	1	800	193	0.24	628	0.79
5	Powerline Road	32103319	EB	500	1	500	52	0.10	60	0.12
6	Powerline Road	32103319	WB	500	1	500	54	0.11	61	0.12
7	Highway 403	32103921	EB	1,800	2	3,600	838	0.23	1,242	0.35
8	Highway 403	32103924	WB	1,800	2	3,600	1,001	0.28	1,027	0.29
9	Bethel Road	31626662	EB	500	1	500	0	0.00	27	0.05
10	Bethel Road	31626662	WB	500	1	500	0	0.00	0	0.00
11	Colborne Street (Brant Road 53)	32103323	EB	1,100	1	1,100	312	0.28	328	0.30
12	Colborne Street (Brant Road 53)	32103323	WB	1,100	1	1,100	249	0.23	245	0.22
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Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
		Direction		Lanes	Total	Volume	V/C	Volume	V/C
Screenline	14								
Name	South-West External								
Direction	NB-SB	NB		4	4,300	1,597	0.37	1,208	0.28
		SB		4	4,300	965	0.22	1,727	0.40

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Rest Acres Road (Highway 24)	31623575	NB	1,200	1	1,200	468	0.39	231	0.19
2	Rest Acres Road (Highway 24)	31623575	SB	1,200	1	1,200	372	0.31	508	0.42
3	Mount Pleasant Road (Brant Road 24)	31641599	NB	1,000	1	1,000	225	0.23	273	0.27
4	Mount Pleasant Road (Brant Road 24)	31641599	SB	1,000	1	1,000	213	0.21	241	0.24
5	Pleasant Ridge Road (Brant Road 7)	31641036	NB	1,000	1	1,000	210	0.21	126	0.13
6	Pleasant Ridge Road (Brant Road 7)	31641036	SB	1,000	1	1,000	70	0.07	229	0.23
7	Cockshutt Road (Brant Road 4)	32103199	NB	1,100	1	1,100	694	0.63	578	0.53
8	Cockshutt Road (Brant Road 4)	32103199	SB	1,100	1	1,100	310	0.28	749	0.68
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	15	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	East External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	5	6,900	2,929	0.42	3,447	0.50
		WB	5	6,900	2,996	0.43	3,635	0.53

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32104077	EB	1,800	2	3,600	2,276	0.63	2,711	0.75
2	Highway 403	32104074	WB	1,800	2	3,600	2,461	0.68	2,718	0.76
3	Brant Road 2	32087178	EB	1,100	2	2,200	391	0.18	348	0.16
4	Brant Road 2	32087178	WB	1,100	2	2,200	234	0.11	537	0.24
5	Brant Road 54	32079101	EB	1,100	1	1,100	262	0.24	388	0.35
6	Brant Road 54	32079101	WB	1,100	1	1,100	301	0.27	380	0.35
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	16	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	North-East External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB	3	3,200	1,355	0.42	1,616	0.51
		SB	3	3,200	1,168	0.37	2,278	0.71

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	East River Road	31664248	NB	1,000	1	1,000	282	0.28	199	0.20
2	East River Road	31664248	SB	1,000	1	1,000	116	0.12	481	0.48
3	Highway 24	32104116	NB	1,200	1	1,200	754	0.63	928	0.77
4	Highway 24	32104116	SB	1,200	1	1,200	594	0.50	1,133	0.94
5	St. George Road	31864585	NB	1,000	1	1,000	319	0.32	489	0.49
6	St. George Road	31864585	SB	1,000	1	1,000	458	0.46	664	0.66
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity Lanes	Capacity Total	AM Peak Hour Volume	AM Peak Hour V/C	PM Peak Hour Volume	PM Peak Hour V/C
Screenline	17	NB	3	3,300	779	0.24	929	0.28
Name	North-West External	SB	3	3,300	791	0.24	978	0.30
Direction	NB-SB							

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Brant-Oxford Road	31625759	NB	1,100	1	1,100	248	0.23	218	0.20
2	Brant-Oxford Road	31625759	SB	1,100	1	1,100	265	0.24	261	0.24
3	Ayr Road	31626456	NB	1,100	1	1,100	2	0.00	5	0.00
4	Ayr Road	31626456	SB	1,100	1	1,100	2	0.00	19	0.02
5	Pinehurst Road	32103147	NB	1,100	1	1,100	529	0.48	706	0.64
6	Pinehurst Road	32103147	SB	1,100	1	1,100	524	0.48	698	0.63
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

Future Recommended Screenline Summary

2041

#	Name	Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
1	Grand River South	EB	10	11,100	6,628	0.60	6,199	0.56
1	Grand River South	WB	10	11,100	4,235	0.38	7,408	0.67
2	Grand River North	EB	4	5,200	2,770	0.53	4,114	0.79
2	Grand River North	WB	5	6,000	2,672	0.45	3,524	0.59
3	Highway 403	NB	14	11,800	6,709	0.57	8,565	0.73
3	Highway 403	SB	14	11,800	6,987	0.59	9,137	0.77
4	King George Road	EB	12	10,600	4,961	0.47	7,958	0.75
4	King George Road	WB	12	10,600	6,231	0.59	6,832	0.64
5	Wayne Gretzky Parkway (North)	EB	8	8,600	4,322	0.50	6,035	0.70
5	Wayne Gretzky Parkway (North)	WB	8	8,600	5,117	0.60	5,728	0.67
6	Wayne Gretzky Parkway (South)	EB	6	4,100	1,904	0.46	2,144	0.52
6	Wayne Gretzky Parkway (South)	WB	6	4,100	1,515	0.37	2,765	0.67
7	Memorial Drive	EB	8	5,900	1,635	0.28	3,004	0.51
7	Memorial Drive	WB	8	5,900	2,290	0.39	2,460	0.42
8	West Street	EB	6	4,300	1,875	0.44	2,786	0.65
8	West Street	WB	6	4,300	2,391	0.56	2,913	0.68
9	CNR Corridor	NB	11	7,900	4,109	0.52	4,812	0.61
9	CNR Corridor	SB	11	7,900	3,923	0.50	5,696	0.72
10	Garden Avenue	EB	8	8,000	4,562	0.57	5,349	0.67
10	Garden Avenue	WB	8	8,000	4,291	0.54	5,859	0.73
11	Powerline Road	NB	14	10,700	4,170	0.39	5,834	0.55
11	Powerline Road	SB	14	10,700	4,577	0.43	6,099	0.57
12	Murray Street	EB	7	4,400	1,968	0.45	1,664	0.38
12	Murray Street	WB	8	5,200	1,603	0.31	2,522	0.49
13	West External	EB	7	7,300	1,668	0.23	2,250	0.31
13	West External	WB	7	7,300	1,634	0.22	2,124	0.29
14	South-West External	NB	4	4,300	1,583	0.37	1,157	0.27
14	South-West External	SB	4	4,300	933	0.22	1,713	0.40
15	East External	EB	5	6,900	2,938	0.43	3,444	0.50
15	East External	WB	5	6,900	3,007	0.44	3,643	0.53
16	North-East External	NB	3	3,200	1,340	0.42	1,601	0.50
16	North-East External	SB	3	3,200	1,161	0.36	2,258	0.71
17	North-West External	NB	3	3,300	754	0.23	912	0.28
17	North-West External	SB	3	3,300	785	0.24	933	0.28

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	1	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Grand River South		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	10	11,100	6,628	0.60	6,199	0.56
		WB	10	11,100	4,235	0.38	7,408	0.67

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,515	0.42	2,242	0.62
2	Highway 403	32103934	WB	1,800	2	3,600	1,529	0.42	1,876	0.52
3	Oak Park Road	32104456	WB	1,000	2	2,000	175	0.09	906	0.45
4	Oak Park Road	32104456	EB	1,000	2	2,000	783	0.39	274	0.14
5	Colborne Street	32102414	EB	800	2	1,600	1,821	1.14	1,560	0.98
6	Colborne Street	32102414	WB	800	2	1,600	1,090	0.68	1,769	1.11
7	Veterans Memorial Parkway	32101861	EB	1,000	2	2,000	1,698	0.85	1,428	0.71
8	Veterans Memorial Parkway	32101861	WB	1,000	2	2,000	1,043	0.52	1,936	0.97
9	Erie Avenue	32102875	EB	800	1	800	435	0.54	485	0.61
10	Erie Avenue	32102875	WB	800	1	800	256	0.32	458	0.57
11	Phelps Road (Brant Road 18)	31646482	EB	1,100	1	1,100	376	0.34	210	0.19
12	Phelps Road (Brant Road 18)	31646482	WB	1,100	1	1,100	142	0.13	463	0.42
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	2	Direction	
Name	Grand River North		
Direction	EB-WB	EB	
		WB	

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
4	5,200	2,770	0.53	4,114	0.79
5	6,000	2,672	0.45	3,524	0.59

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32103935	EB	1,800	2	3,600	1,515	0.42	2,242	0.62
2	Highway 403	32103934	WB	1,800	2	3,600	1,529	0.42	1,876	0.52
3	Brant Road 2	32103340	EB	800	1	800	462	0.58	1,063	1.33
4	Brant Road 2	32103340	WB	800	1	800	672	0.84	713	0.89
5	William Street	31634058	EB	800	1	800	793	0.99	809	1.01
6	William Street	31634058	WB	800	2	1,600	471	0.29	935	0.58
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
Screenline	3		Lanes	Total	Volume	V/C	Volume	V/C
Name	Highway 403							
Direction	NB-SB	NB	14	11,800	6,709	0.57	8,565	0.73
		SB	14	11,800	6,987	0.59	9,137	0.77

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32104461	NB	800	2	1,600	920	0.58	791	0.49
2	Oak Park Road	32104461	SB	800	2	1,600	962	0.60	1,062	0.66
3	Paris Road	32102313	NB	800	2	1,600	992	0.62	1,003	0.63
4	Paris Road	32102313	SB	800	2	1,600	558	0.35	1,328	0.83
5	King George Road	31683713	NB	800	2	1,600	1,193	0.75	1,429	0.89
6	King George Road	32102332	SB	800	2	1,600	1,206	0.75	1,446	0.90
7	Wayne Gretzky Parkway	31703983	NB	1,000	3	3,000	1,586	0.53	2,359	0.79
8	Wayne Gretzky Parkway	31703908	SB	1,000	3	3,000	1,863	0.62	2,347	0.78
9	Garden Avenue	32104072	NB	800	2	1,600	776	0.49	1,149	0.72
10	Garden Avenue	32104072	SB	800	2	1,600	991	0.62	1,220	0.76
11	North Park Street	31689884	NB	800	1	800	273	0.34	528	0.66
12	North Park Street	31689884	SB	800	1	800	403	0.50	521	0.65
13	West Street	31691064	NB	800	2	1,600	969	0.61	1,306	0.82
14	West Street	31691064	SB	800	2	1,600	1,004	0.63	1,213	0.76
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction	Capacity		AM Peak Hour		PM Peak Hour	
			Lanes	Total	Volume	V/C	Volume	V/C
Screenline	4	EB	12	10600	4961	0.47	7958	0.75
Name	King George Road	WB	12	10600	6231	0.59	6832	0.64
Direction	EB-WB							

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31663494	EB	1,000	2	2,000	738	0.37	1,670	0.84
2	Powerline Road	31663494	WB	1,000	2	2,000	1,307	0.65	1,226	0.61
3	Oxford Street	31685991	EB	500	1	500	182	0.36	212	0.42
4	Oxford Street	31685991	WB	500	1	500	124	0.25	212	0.42
5	Toll Gate Road	32101902	EB	800	1	800	588	0.74	716	0.90
6	Toll Gate Road	32101902	WB	800	1	800	453	0.57	701	0.88
7	Highway 403	32104048	EB	1,800	2	3,600	1,903	0.53	3,199	0.89
8	Highway 403	32104051	WB	1,800	2	3,600	2,737	0.76	2,678	0.74
9	Queensway Drive	31683036	EB	500	1	500	137	0.27	192	0.38
10	Queensway Drive	31683036	WB	500	1	500	92	0.18	224	0.45
11	St. George Street	31682564	EB	500	1	500	55	0.11	90	0.18
12	St. George Street	31682564	WB	500	1	500	33	0.07	80	0.16
13	Terrace Hill Street	31670392	EB	500	1	500	184	0.37	270	0.54
14	Terrace Hill Street	31670392	WB	500	1	500	107	0.21	249	0.50
15	Brant Avenue	31669648	EB	800	2	1,600	753	0.47	1,129	0.71
16	Brant Avenue	31669648	WB	800	2	1,600	1,064	0.67	973	0.61
17	New East/West Road	32104408	EB	600	1	600	421	0.70	480	0.80
18	New East/West Road	32104408	WB	600	1	600	314	0.52	489	0.82
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	5	Direction
Name	Wayne Gretzky Parkway (North)	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
8	8,600	4,322	0.50	6,035	0.70
8	8,600	5,117	0.60	5,728	0.67

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Powerline Road	31711969	EB	1,000	2	2,000	203	0.10	614	0.31
2	Powerline Road	31711969	WB	1,000	2	2,000	673	0.34	423	0.21
3	Dunsdon Street	32102051	EB	800	1	800	274	0.34	527	0.66
4	Dunsdon Street	32102051	WB	800	1	800	416	0.52	299	0.37
5	Lynden Road	32103996	EB	800	2	1,600	990	0.62	1,339	0.84
6	Lynden Road	32103996	WB	800	2	1,600	960	0.60	1,688	1.06
7	Highway 403	32104061	EB	1,800	2	3,600	2,787	0.77	3,179	0.88
8	Highway 403	32104062	WB	1,800	2	3,600	2,782	0.77	3,188	0.89
9	New East/West Road	32104398	EB	600	1	600	68	0.11	376	0.63
10	New East/West Road	32104398	WB	600	1	600	286	0.48	130	0.22
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12										
13										
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

		Direction
Screenline	6	
Name	Wayne Gretzky Parkway (South)	
Direction	EB-WB	EB
		WB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
6	4,100	1,904	0.46	2,144	0.52
6	4,100	1,515	0.37	2,765	0.67

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	31701117	EB	800	2	1,600	660	0.41	800	0.50
2	Henry Street	31701117	WB	800	2	1,600	563	0.35	1,201	0.75
3	Elgin Street	31702288	EB	600	1	600	422	0.70	257	0.43
4	Elgin Street	31702288	WB	600	1	600	212	0.35	497	0.83
5	Grey Street	31701124	EB	600	1	600	226	0.38	366	0.61
6	Grey Street	31701124	WB	600	1	600	289	0.48	319	0.53
7	Chatham Street	31700439	EB	500	1	500	80	0.16	131	0.26
8	Chatham Street	31700439	WB	500	1	500	33	0.07	147	0.29
9	Colborne Street	31700015	EB	800	1	800	516	0.65	590	0.74
10	Colborne Street	31700015	WB	800	1	800	418	0.52	601	0.75
11										
12										
13										
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18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	7	Direction
Name	Memorial Drive	
Direction	EB-WB	EB
		WB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
EB	8	5,900	1,635	0.28	3,004	0.51
WB	8	5,900	2,290	0.39	2,460	0.42

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Varadi Avenue	32101917	EB	500	1	500	33	0.07	65	0.13
2	Varadi Avenue	32101917	WB	500	1	500	25	0.05	43	0.09
3	Dunsdon Street	31687743	EB	600	2	1,200	195	0.16	296	0.25
4	Dunsdon Street	31687743	WB	600	2	1,200	222	0.19	276	0.23
5	North Park Street	32101953	EB	800	1	800	158	0.20	350	0.44
6	North Park Street	32101953	WB	800	1	800	336	0.42	288	0.36
7	Fairview Drive	32102031	EB	800	1	800	306	0.38	520	0.65
8	Fairview Drive	32102031	WB	800	1	800	498	0.62	500	0.63
9	Powerline Road	31688305	EB	1,000	2	2,000	703	0.35	1,539	0.77
10	Powerline Road	31688305	WB	1,000	2	2,000	1,117	0.56	1,096	0.55
11	New East/West Road	32104387	EB	600	1	600	240	0.40	234	0.39
12	New East/West Road	32104387	WB	600	1	600	92	0.15	257	0.43
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14										
15										
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	8	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	West Street								
Direction	EB-WB	EB		6	4,300	1,875	0.44	2,786	0.65
		WB		6	4,300	2,391	0.56	2,913	0.68

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Morton Avenue	31691008	EB	500	1	500	74	0.15	82	0.16
2	Morton Avenue	31691008	WB	500	1	500	112	0.22	150	0.30
3	Charing Cross Street	31689369	EB	800	2	1,600	567	0.35	873	0.55
4	Charing Cross Street	31689369	WB	800	2	1,600	666	0.42	982	0.61
5	Dundas Street	31679012	EB	600	1	600	242	0.40	300	0.50
6	Dundas Street	31679012	WB	600	1	600	178	0.30	220	0.37
7	Brant Avenue	31670814	EB	800	2	1,600	992	0.62	1,531	0.96
8	Brant Avenue	31670814	WB	800	2	1,600	1,435	0.90	1,561	0.98
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	9	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	CNR Corridor		Lanes	Total	Volume	V/C	Volume	V/C
Direction	NB-SB	NB	11	7,900	4,109	0.52	4,812	0.61
		SB	11	7,900	3,923	0.50	5,696	0.72

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	St. Paul Avenue	32103535	NB	800	2	1,600	746	0.47	1,005	0.63
2	St. Paul Avenue	32103535	SB	800	2	1,600	834	0.52	1,048	0.66
3	West Street	31678374	NB	800	1	800	571	0.71	677	0.85
4	West Street	31678374	SB	800	1	800	744	0.93	840	1.05
5	Clarence Street	31678962	NB	800	2	1,600	1,224	0.77	1,260	0.79
6	Clarence Street	31678962	SB	800	2	1,600	1,004	0.63	1,459	0.91
7	Murray Street	31681384	NB	500	1	500	87	0.17	145	0.29
8	Murray Street	31681384	SB	500	1	500	88	0.18	319	0.64
9	Rawdon Street	31698868	NB	500	1	500	277	0.55	235	0.47
10	Rawdon Street	31698868	SB	500	1	500	132	0.26	338	0.68
11	Stanley Street	31698979	NB	500	1	500	397	0.79	348	0.70
12	Stanley Street	31698979	SB	500	1	500	280	0.56	429	0.86
13	Wayne Gretzky Parkway	31700977	NB	900	2	1,800	634	0.35	983	0.55
14	Wayne Gretzky Parkway	31700971	SB	900	2	1,800	671	0.37	1,069	0.59
15	Garden Avenue	32079892	NB	600	1	600	173	0.29	159	0.27
16	Garden Avenue	32079892	SB	600	1	600	170	0.28	194	0.32
17										
18										
19										
20										

Legned:		V/C Range	From	To
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	10	Direction
Name	Garden Avenue	
Direction	EB-WB	EB
		WB

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
EB	8	8,000	4,562	0.57	5,349	0.67
WB	8	8,000	4,291	0.54	5,859	0.73

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Lynden Road	31708958	EB	800	2	1,600	676	0.42	928	0.58
2	Lynden Road	31708958	WB	800	2	1,600	664	0.42	1,133	0.71
3	Highway 403	32104066	EB	1,800	2	3,600	2,787	0.77	3,179	0.88
4	Highway 403	32104065	WB	1,800	2	3,600	2,782	0.77	3,188	0.89
5	Henry Street	32081112	EB	800	1	800	331	0.41	508	0.64
6	Henry Street	32081112	WB	800	1	800	371	0.46	485	0.61
7	Elgin Street	32079965	EB	600	1	600	96	0.16	116	0.19
8	Elgin Street	32079965	WB	600	1	600	101	0.17	125	0.21
9	Grey Street	32079358	EB	600	1	600	103	0.17	66	0.11
10	Grey Street	32079358	WB	600	1	600	57	0.10	160	0.27
11	Colborne Street	32102783	EB	800	1	800	569	0.71	552	0.69
12	Colborne Street	32102783	WB	800	1	800	316	0.40	768	0.96
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14										
15										
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18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	11	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	Powerline Road								
Direction	NB-SB	NB		14	10,700	4,170	0.39	5,834	0.55
		SB		14	10,700	4,577	0.43	6,099	0.57

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Oak Park Road	32103349	NB	800	2	1,600	663	0.41	1,007	0.63
2	Oak Park Road	32103349	SB	800	2	1,600	673	0.42	874	0.55
3	Paris Road	32104353	NB	800	2	1,600	263	0.16	242	0.15
4	Paris Road	32104353	SB	800	2	1,600	211	0.13	397	0.25
5	Golf Road	32103116	NB	600	1	600	478	0.80	323	0.54
6	Golf Road	32103116	SB	600	1	600	186	0.31	573	0.96
7	Balmoral Drive	32104424	NB	600	1	600	426	0.71	268	0.45
8	Balmoral Drive	32104424	SB	600	1	600	156	0.26	424	0.71
9	King George Road	32101870	NB	800	2	1,600	783	0.49	1,160	0.73
10	King George Road	32101870	SB	800	2	1,600	1,083	0.68	1,145	0.72
11	Memorial Drive	31688335	NB	800	1	800	138	0.17	319	0.40
12	Memorial Drive	31688335	SB	800	1	800	251	0.31	381	0.48
13	Greenfield Road	31709585	NB	500	1	500	40	0.08	46	0.09
14	Greenfield Road	31709585	SB	500	1	500	35	0.07	43	0.09
15	Wayne Gretzky Parkway	31696170	NB	1,000	2	2,000	740	0.37	1,574	0.79
16	Wayne Gretzky Parkway	32101994	SB	1,000	2	2,000	1,274	0.64	1,383	0.69
17	Brantwood Park Road	32103099	NB	600	1	600	197	0.33	272	0.45
18	Brantwood Park Road	32103099	SB	600	1	600	164	0.27	258	0.43
19	Park Road North	32101996	NB	800	1	800	442	0.55	623	0.78
20	Park Road North	32101996	SB	800	1	800	544	0.68	621	0.78

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	12	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	Murray Street		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	7	4,400	1,968	0.45	1,664	0.38
		WB	8	5,200	1,603	0.31	2,522	0.49

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Henry Street	32102230	EB	800	1	800	348	0.44	309	0.39
2	Henry Street	32102230	WB	800	1	800	457	0.57	584	0.73
3	Elgin Street	32102140	EB	500	1	500	134	0.27	68	0.14
4	Elgin Street	32102140	WB	500	1	500	128	0.26	161	0.32
5	Grey Street	31680485	EB	500	1	500	92	0.18	122	0.24
6	Grey Street	31680485	WB	500	1	500	85	0.17	117	0.23
7	Colborne Street	31680092	EB	800	2	1,600	893	0.56	898	0.56
8	Dalhousie Street	31680105	WB	800	3	2,400	711	0.30	1,016	0.42
9	Mary Street	31677408	EB	500	1	500	212	0.42	42	0.08
10	Mary Street	31677408	WB	500	1	500	15	0.03	203	0.41
11	Greenwich Street	31677317	EB	500	1	500	289	0.58	225	0.45
12	Greenwich Street	31677317	WB	500	1	500	207	0.41	441	0.88
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	13	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	West External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	7	7,300	1,668	0.23	2,250	0.31
		WB	7	7,300	1,634	0.22	2,124	0.29

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Silver Street (Brant Road 52)	31635739	EB	800	1	800	222	0.28	258	0.32
2	Silver Street (Brant Road 52)	31635739	WB	800	1	800	166	0.21	170	0.21
3	Brant Road 2	31627987	EB	800	1	800	237	0.30	271	0.34
4	Brant Road 2	31627987	WB	800	1	800	194	0.24	563	0.70
5	Powerline Road	32103319	EB	500	1	500	52	0.10	60	0.12
6	Powerline Road	32103319	WB	500	1	500	54	0.11	56	0.11
7	Highway 403	32103921	EB	1,800	2	3,600	830	0.23	1,270	0.35
8	Highway 403	32103924	WB	1,800	2	3,600	991	0.28	1,092	0.30
9	Bethel Road	31626662	EB	500	1	500	0	0.00	4	0.01
10	Bethel Road	31626662	WB	500	1	500	0	0.00	0	0.00
11	Colborne Street (Brant Road 53)	32103323	EB	1,100	1	1,100	327	0.30	387	0.35
12	Colborne Street (Brant Road 53)	32103323	WB	1,100	1	1,100	229	0.21	243	0.22
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14										
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18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

				Capacity		AM Peak Hour		PM Peak Hour	
Screenline	14	Direction		Lanes	Total	Volume	V/C	Volume	V/C
Name	South-West External								
Direction	NB-SB	NB		4	4,300	1,583	0.37	1,157	0.27
		SB		4	4,300	933	0.22	1,713	0.40

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Rest Acres Road (Highway 24)	31623575	NB	1,200	1	1,200	457	0.38	287	0.24
2	Rest Acres Road (Highway 24)	31623575	SB	1,200	1	1,200	372	0.31	557	0.46
3	Mount Pleasant Road (Brant Road 24)	31641599	NB	1,000	1	1,000	217	0.22	222	0.22
4	Mount Pleasant Road (Brant Road 24)	31641599	SB	1,000	1	1,000	181	0.18	231	0.23
5	Pleasant Ridge Road (Brant Road 7)	31641036	NB	1,000	1	1,000	210	0.21	111	0.11
6	Pleasant Ridge Road (Brant Road 7)	31641036	SB	1,000	1	1,000	74	0.07	220	0.22
7	Cockshutt Road (Brant Road 4)	32103199	NB	1,100	1	1,100	699	0.64	537	0.49
8	Cockshutt Road (Brant Road 4)	32103199	SB	1,100	1	1,100	306	0.28	705	0.64
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Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	15	Direction	Capacity		AM Peak Hour		PM Peak Hour	
Name	East External		Lanes	Total	Volume	V/C	Volume	V/C
Direction	EB-WB	EB	5	6,900	2,938	0.43	3,444	0.50
		WB	5	6,900	3,007	0.44	3,643	0.53

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Highway 403	32104077	EB	1,800	2	3,600	2,289	0.64	2,715	0.75
2	Highway 403	32104074	WB	1,800	2	3,600	2,477	0.69	2,747	0.76
3	Brant Road 2	32087178	EB	1,100	2	2,200	391	0.18	348	0.16
4	Brant Road 2	32087178	WB	1,100	2	2,200	234	0.11	520	0.24
5	Brant Road 54	32079101	EB	1,100	1	1,100	258	0.23	381	0.35
6	Brant Road 54	32079101	WB	1,100	1	1,100	296	0.27	376	0.34
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	16	Direction	
Name	North-East External		
Direction	NB-SB	NB	
		SB	

Direction	Capacity		AM Peak Hour		PM Peak Hour	
	Lanes	Total	Volume	V/C	Volume	V/C
NB	3	3,200	1,340	0.42	1,601	0.50
SB	3	3,200	1,161	0.36	2,258	0.71

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	East River Road	31664248	NB	1,000	1	1,000	279	0.28	197	0.20
2	East River Road	31664248	SB	1,000	1	1,000	114	0.11	468	0.47
3	Highway 24	32104116	NB	1,200	1	1,200	745	0.62	921	0.77
4	Highway 24	32104116	SB	1,200	1	1,200	591	0.49	1,133	0.94
5	St. George Road	31864585	NB	1,000	1	1,000	316	0.32	483	0.48
6	St. George Road	31864585	SB	1,000	1	1,000	456	0.46	657	0.66
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

SCREENLINE DETAILS

2041

Screenline	17	Direction
Name	North-West External	
Direction	NB-SB	NB
		SB

Capacity		AM Peak Hour		PM Peak Hour	
Lanes	Total	Volume	V/C	Volume	V/C
3	3,300	754	0.23	912	0.28
3	3,300	785	0.24	933	0.28

#	Name	Link	Direction	Capacity			AM Peak Hour		PM Peak Hour	
				Per	Lanes	Total	Volume	V/C	Volume	V/C
1	Brant-Oxford Road	31625759	NB	1,100	1	1,100	247	0.22	218	0.20
2	Brant-Oxford Road	31625759	SB	1,100	1	1,100	265	0.24	262	0.24
3	Ayr Road	31626456	NB	1,100	1	1,100	1	0.00	5	0.00
4	Ayr Road	31626456	SB	1,100	1	1,100	1	0.00	10	0.01
5	Pinehurst Road	32103147	NB	1,100	1	1,100	506	0.46	689	0.63
6	Pinehurst Road	32103147	SB	1,100	1	1,100	519	0.47	661	0.60
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Legned:		*V/C Range*	*From*	*To*
X	Good Capacity Conditions		0.00	0.70
X	Approaching Capacity Conditions		0.70	0.85
X	Over Capacity Conditions		0.85	-

APPENDIX D

Costs

City of Brantford: 2020 Transportation Master Plan Update - Active Transportation Capital Cost Estimates

#	Proposed Project	Facility Type	Length of ROW (km)	Sub-Total Cost	Contingency**	TOTAL Cost
SHORT-TERM 2021 – 2025 (0-5 years)						
1	Colborne Street – Wayne Gretzky Parkway to Garden Avenue	Road Diet	2.1	$ 132,300	$ 19,845	$ 152,145
2	Colborne Street – Dalhousie Street to Wayne Gretzky Parkway	Bike Lanes	0.7	$ 490,000	$ 73,500	$ 563,500
3	Colborne Street – Clarence Street to Dalhousie Street	Bike Lanes	1.3	$ 39,000	$ 5,850	$ 44,850
3	Dalhousie Street – Colborne Street to Clarence Street	Bike Lanes	1.3	$ 39,000	$ 5,850	$ 44,850
4	Clarence Street - Rail Corridor to Colborne Street	MUP	0.5	$ 162,500	$ 24,375	$ 186,875
5	Fairview Road – King George Road to West Street	Road Diet	2.3	$ 144,900	$ 21,735	$ 166,635
6	Tollgate Road – Paris Road to King George Road	Road Diet	1.5	$ 94,500	$ 14,175	$ 108,675
7	Oak Park Road – Powerline Road to Hardy Road*	Bike Lanes	1.3			
8	Hardy Road – St. Andrews Drive to Paris Road	Bike Lanes	0.3	$ 210,000	$ 31,500	$ 241,500
9	Veterans Memorial Parkway – Mount Pleasant Street to Erie Avenue*	MUP	1.2			
10	Dalhousie Street to Brant's Crossing	MUP	0.2	$ 70,000	$ 10,500	$ 80,500
11	Colborne Street West – CR7 to D'Aubigny Road*	MUP	1.2			
12	Colborne Street West –D'Aubigny Road to D'Aubigny Trail (Oakhill Dr / Spalding Dr)	MUP	0.7	$ 227,500	$ 34,125	$ 261,625
13	Wayne Gretzky Parkway Extension – Powerline Road to Park Road*	MUP	0.9			
14	Balmoral Drive – Powerline Road to Oxford Street	Bike Lanes	2.2	$ 66,000	$ 9,900	$ 75,900
15	Oxford Street – Balmoral Drive to King George Road	Bike Lanes	0.5	$ 15,000	$ 2,250	$ 17,250
16	Dunsdon Street - King George Road to Park Road	Road Diet	3.1	$ 195,300	$ 29,295	$ 224,595
17	Dundas Street / Elgin Street - North Park to Wayne Gretzky Parkway	Bike Priority Street	3.0	$ 330,000	$ 49,500	$ 379,500
18	1/4 of total Bike Route / Shared Use Lane projects around the City	Bike Route / Shared Use Lane	7.6	$ 9,120	$ 1,368	$ 10,488
19	Programs (Studies, Events, Initiatives)	N/A	N/A	$ 820,000	$ -	$ 820,000
MEDIUM-TERM 2026 – 2030 (6-10 years)						
20	Oak Park Road Extension – Hardy Road to Colborne Street*	MUP	4.3			
21	Paris Road - Oak Park Road to Golf Road*	Bike Lanes/Paved Shoulder	2.8			
22	Paris Road - Golf Road to Hardy Road	Bike Lanes/Paved Shoulder	1.6	$ 504,000	$ 75,600	$ 579,600
23	Powerline Road – Oak Park Road to King George Road*	MUP & Bike Lanes	3.7			
24	Charing Cross Extension – West Street to Henry Street*	Bike Lanes	0.7			
25	Henry Street – Charing Cross Extension to WGP	Bike Lanes	0.8	$ 560,000	$ 84,000	$ 644,000
26	Charing Cross – King George Road to West Street	Bike Lanes	1.5	$ 1,050,000	$ 157,500	$ 1,207,500
27	Golf Road - Paris Road to Proposed mid-term Development Limit*	Bike Lanes/Paved Shoulder	1.9			
28	Lynden Road – West Street to Garden Avenue	Buffered Bike Lanes	2.4	$ 1,968,000	$ 295,200	$ 2,263,200
29	Garden Avenue – Lynden Road to Henry Street	Buffered Bike Lanes	2.1	$ 1,722,000	$ 258,300	$ 1,980,300
30	Henry Street – Garden Avenue to Garden Avenue	Bike Lanes	0.2	$ 140,000	$ 21,000	$ 161,000
31	Garden Avenue – Henry Street to Elgin Street	Bike Lanes	0.8	$ 120,000	$ 18,000	$ 138,000
32	Brantwood Park Road - Dunsdon Street to Lynden Road	Bike Lanes	1.6	$ 100,800	$ 15,120	$ 115,920
33	Market Street to Mohawk Street	MUP	1.0	$ 350,000	$ 52,500	$ 402,500
34	Shallow Creek Trail - Lynnwood Drive	MUP	1.1	$ 385,000	$ 57,750	$ 442,750
35	Willian Street – Bedford Street to West Street	Road Diet	1.2	$ 25,800	$ 3,870	$ 29,670
36	Albion Street – Bedford Street to West Street	Road Diet	1.1	$ 23,650	$ 3,548	$ 27,198
37	Memorial / Baxter / Farringford / Edmondson – North Park Street to Wayne Gretzky Parkway Trail	Bike Priority Street	1.7	$ 187,000	$ 28,050	$ 215,050
38	Queensway Drive - St. George Street to King George Road	Bike Priority Street	0.6	$ 66,000	$ 9,900	$ 75,900
39	McMurry / Wells / North Park - Albion Street to St George Street	Bike Priority Street	0.8	$ 88,000	$ 13,200	$ 101,200
40	1/4 of total Bike Route / Shared Use Lane projects around the City	Bike Route / Shared Use Lane	7.6	$ 9,120	$ 1,368	$ 10,488
41	Programs (Studies, Events, Initiatives)	N/A	N/A	$ 690,000	$ -	$ 690,000

#	Proposed Project	Facility Type	Length of ROW (km)	Sub-Total Cost	Contingency**	TOTAL Cost
LONG-TERM 2031 – 2040 (11-20 years)						
42	Powerline Road – King George Road to East City Boundary*	MUP & Bike Lanes	4.0			
43	Brantwood Park Road – Powerline Road to Banbury Road	Bike Lanes	0.7	$ 44,100	$ 6,615	$ 50,715
44	Conklin Road Extension – Mt. Pleasant Road to Phelps Road*	Bike Lanes	2.8			
45	Conklin Road – L.E. & N Trail to Mt. Pleasant	Bike Lanes	0.2	$ 140,000	$ 21,000	$ 161,000
46	Elgin Street – Wayne Gretzky Parkway to Garden Avenue	Bike Lanes	2.3	$ 1,610,000	$ 241,500	$ 1,851,500
47	Roy Boulevard – Lynden Park Mall to Lynden Road	Bike Lanes	1.5	$ 1,050,000	$ 157,500	$ 1,207,500
48	Diana Avenue	Bike Lanes	0.7	$ 21,000	$ 3,150	$ 24,150
49	Erie Avenue – Birkett Lane to City Boundary	Bike Lanes/Paved Shoulder	0.8	$ 120,000	$ 18,000	$ 138,000
50	Mohawk Street – Proposed trail (Cayuga St / Greenwich St) to Hamilton Brantford Rail Trail	Bike Lanes/Paved Shoulder	1.9	$ 693,500	$ 104,025	$ 797,525
51	Paris Road – Hardy Road to Henderson Avenue	MUP	1.1	$ 357,500	$ 53,625	$ 411,125
52	Colborne Street to Grey Street	MUP	0.5	$ 175,000	$ 26,250	$ 201,250
53	Dante Crescent to Ludlow Crescent	MUP	0.2	$ 70,000	$ 10,500	$ 80,500
54	Blackfriers Lane to Dunsdon Street	MUP	0.8	$ 280,000	$ 42,000	$ 322,000
55	Colborne Street to Bruce Street	MUP	1.1	$ 357,500	$ 53,625	$ 411,125
56	SC Johnson Trail (Dufferin Ave) - SC Johnson Trail (Yorkshire St)	MUP	1.7	$ 552,500	$ 82,875	$ 635,375
57	New East/West Road – Paris Road to King George Road*	Buffered Bike Lanes	4.2			
58	New East/West Road – King George Road to East City Boundary*	Buffered Bike Lanes	4.5			
59	North Brantford Expansion – Golf Road to Wayne Gretzky Parkway	MUP	5.7	$ 1,995,000	$ 299,250	$ 2,294,250
60	North Brantford Expansion Collector Roads	Bike Lanes	7.0	$ 4,900,000	$ 735,000	$ 5,635,000
61	Tutela Heights Expansion – L.E. & N Trail to New Collector Road	MUP	0.3	$ 105,000	$ 15,750	$ 120,750
62	Tutela Heights Expansion Collector Roads	Bike Lanes	1.4	$ 980,000	$ 147,000	$ 1,127,000
63	Davern Road – Tutela Heights Road to Conklin Road Extension	Bike Lanes	0.8	$ 656,000	$ 98,400	$ 754,400
64	Lynden/Garden Expansion Collector Roads	Bike Lanes	1.1	$ 770,000	$ 115,500	$ 885,500
65	Lynden Road – Garden Avenue to East City Boundary	Bike Lanes	1.5	$ 225,000	$ 33,750	$ 258,750
66	Rawdon Street - Darling Street to Able Avenue	Bike Priority Street	1.2	$ 132,000	$ 19,800	$ 151,800
67	Wellington Street - West Street to Park Road North	Bike Priority Street	2.7	$ 297,000	$ 44,550	$ 341,550
68	1/2 of total Bike Route / Shared Use Lane projects around the City	Bike Route / Shared Use Lane	15.2	$ 18,240	$ 2,736	$ 20,976
69	Programs (Studies, Events, Initiatives)	N/A	N/A	$ 1,375,000	$ -	$ 1,375,000
			145.0	$ 27,958,830	$ 3,761,075	$ 31,719,905

Notes: All costs stated in 2020 dollars

* Costs captured as part of a roadway infrastructure project

** Contingency of 30% for Engineering assumed

City of Brantford: 2020 Transportation Master Plan Update - Transit Infrastructure Capital Cost Estimates

Conventional

	2016	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	Short Term	Mid-Term	Long-Term
Pop 2016 forecast	100,431	110,700	113,300	115,860	118,431	121,002	123,573	126,144																		
Pop 2020 forecast	101,700	106,500	111,300	114,080	116,860	119,640	122,420	125,200	127,960	130,720	133,480	136,240	139,000	141,600	144,200	146,800	149,400	152,000	154,200	156,400	158,600	160,800	163,000			
Bus Fleet	31	31	31	31	31	31	31	32	33	33	35	35	35	36	36	38	38	39	39	39	39	40	40			
Revenue Hrs - Base		91,703	91,703	93,597	99,696	107,257	115,349	123,504	132,403	136,774	141,193	144,832	149,824	154,988	159,113	159,113	170,183	170,183	175,853	175,853	175,853	175,853	181,253			
Revenue Hrs - Increase			1,894	6,099	7,561	8,092	8,155	8,899	4,371	4,419	3,639	4,992	5,164	4,125	-	11,070	-	5,670	-	-	-	5,400	-			
Revenue Hrs - Total		91,703	93,597	99,696	107,257	115,349	123,504	132,403	136,774	141,193	144,832	149,824	154,988	159,113	159,113	170,183	170,183	175,853	175,853	175,853	175,853	181,253	181,253			
Bus Expansion							$ 1,100,000	$ 1,100,000		$ 1,100,000				$ 1,100,000		$ 2,200,000		$ 1,100,000				$ 1,100,000		$ 1,100,000	$ 2,200,000	$ 5,500,000
Bus Replacement			$ 2,200,000	$ 3,300,000	$ 3,300,000	$ 3,300,000	$ 2,200,000	$ 1,100,000	$ 1,100,000	$ 2,200,000	$ 2,200,000	$ 2,200,000	$ 2,200,000	$ 2,200,000	$ 2,200,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 1,100,000	$ 14,300,000	$ 11,000,000	$ 13,200,000
Terminal (1 locations)														$ 3,750,000	$ 3,750,000									$ -	$ -	$ 7,500,000
Lynden Mall					$ 250,000																			$ 250,000	$ -	$ -
Brantford Commons					$ 250,000																			$ 250,000	$ -	$ -
Bus Stop/Signage														$ 120,000		$ 540,000		$ 150,000				$ 270,000		$ -	$ -	$ 1,080,000
Additional Shelters								$ 100,000						$ 60,000		$ 270,000		$ 75,000				$ 135,000		$ -	$ 100,000	$ 540,000
Transit Center								$ 1,100,000																$ -	$ 1,100,000	$ -
ITS					$ 121,000	$ 170,000	$ 270,000	$ 373,000	$ 178,000															$ 561,000	$ 551,000	$ -
Studies (i.e.. Transit TMP)			$ 375,000						$ 100,000															$ 375,000	$ 100,000	$ -
							$ 16,836,000						$ 15,051,000										$ 27,820,000	$ 16,836,000	$ 15,051,000	$ 27,820,000

Specialized

	2016	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	Short Term	Mid-Term	Long-Term
In Service Vehicles			14	14	14	14	14	14	14	14	14	14	14	15	15	16	16	17	17	17	17	17	17			
# Vehicles Replaced			2	3	3	2	4	3	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2			
Vehicle Expansion														1		1		1								
Revenue Hours																										
Vehicle Replacement			$ 220,000	$ 330,000	$ 330,000	$ 220,000	$ 440,000	$ 750,000	$ 500,000	$ 750,000	$ 500,000	$ 750,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 1,540,000	$ 3,750,000	$ 5,000,000
New Vehicles			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -	$ 250,000	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 750,000
Telecom Software			$ 30,000											$ 50,000										$ 30,000	$ -	$ 50,000
							$ 1,570,000						$ 3,750,000										$ 5,800,000	$ 1,570,000	$ 3,750,000	$ 5,800,000
TOTAL Conventional + Specialized							$ 18,406,000						$ 18,801,000										$ 33,620,000			

Notes: 2021 -2031 based on 2016 Transit Service Plan 2017-2026, with update to cost assumptions as discussed Aug 28/20
2031-2041 based on service expansion and enhancement to Expansion Lands

City of Brantford: 2020 Transportation Master Plan Update - Road Infrastructure Capital Cost Estimates

#	Proposed Project	Length of ROW (km)	ROW Lane Costs						Structure Costs	Sub-Total Cost	Contingency***		TOTAL Cost
			Roads	Sidewalks	MUP	Bike lane	Paved	Total Roadway			Construction	Engineering	
SHORT-TERM 2021 – 2025 (0-5 years)													
1	Veterans Memorial Parkway Widening (4 lanes – Mount Pleasant Street to Erie Avenue)*	1.19						$ 11,477,705	$ 18,454,800	$ 29,932,505	$ 5,986,501	$ 4,489,876	$ 40,408,881
2	Oak Park Road Widening (4 lanes – Powerline Road to Hwy 403 & Fen Ridge Court/Savannah Oaks Drive to Hardy Road)	1.33	$ 3,072,300	$ 957,600	$ -	$ -	$ 232,750			$ 4,262,650	$ 852,530	$ 1,278,795	$ 6,393,975
3	Colborne Street West widening (4 lanes – CR7 to D'Aubigny Road)	1.15	$ 1,328,250	$ 414,000	$ 373,750	$ -	$ 201,250			$ 2,317,250	$ 463,450	$ 695,175	$ 3,475,875
4	Wayne Gretzky Parkway Extension (4 lanes - Powerline Road to Park Road North)	0.85	$ 1,963,500	$ 306,000	$ 276,250	$ -	$ 148,750			$ 2,694,500	$ 538,900	$ 808,350	$ 4,041,750
MEDIUM-TERM 2026 – 2030 (6-10 years)													
5	Oak Park Road Extension (4 Lanes – Hardy Road to Colborne Street)**	4.3						$ 29,330,385	$ 35,497,728	$ 64,828,113	$ 19,765,590	$ 14,234,246	$ 98,827,949
6	Paris Road widening (4 lanes – Oak Park Road to Golf Road)	2.81	$ 6,491,100	$ -	$ -	$ -	$ 688,450			$ 7,179,550	$ 1,435,910	$ 2,153,865	$ 10,769,325
7A	Powerline Road widening (4 lanes – Oak Park Road to King George Road)	3.74	$ 8,639,400	$ 1,346,400	$ 1,215,500	$ 2,042,040	$ -			$ 13,243,340	$ 2,648,668	$ 3,973,002	$ 19,865,010
8	Charing Cross Extension (4 Lanes – West Street to Henry Street)	0.74	$ 1,709,400	$ 532,800	$ -	$ 404,040	$ -		$ 10,000,000	$ 12,646,240	$ 2,529,248	$ 3,793,872	$ 18,969,360
9	Golf Road TSM (Paris Road to Proposed Development Limit) MID-TERM	1.9	$ -	$ 1,368,000	$ -	$ -	$ 1,316,700			$ 2,684,700	$ 536,940	$ 805,410	$ 4,027,050
LONG-TERM 2031 – 2040 (11-20 years)													
10	Wayne Gretzky Parkway widening (6 Lane – Lynden Road to Henry Street)	2.02	$ 6,999,300	$ -	$ -	$ -	$ 353,500		$ 12,000,000	$ 19,352,800	$ 3,870,560	$ 5,805,840	$ 29,029,200
7B	Powerline Road widening (4 lanes – King George Road to East City Boundary)	3.95	$ 9,124,500	$ 1,422,000	$ 1,283,750	$ 2,156,700	$ -			$ 13,986,950	$ 2,797,390	$ 4,196,085	$ 20,980,425
11	Conklin Road Extension (2 lanes - Mt. Pleasant Road to Phelps Road)	2.8	$ 3,234,000	$ 2,016,000	$ -	$ 1,528,800	$ -			$ 6,778,800	$ 1,355,760	$ 2,033,640	$ 10,168,200
12A	New East/West Road (2 lanes – Oak Park Road to King George Road)	4.2	$ 4,851,000	$ 3,024,000	$ -	$ 2,293,200	$ -			$ 10,168,200	$ 2,033,640	$ 3,050,460	$ 15,252,300
12B	New East/West Road (2 lanes – King George Road to East City Boundary)	4.5	$ 5,197,500	$ 3,240,000	$ -	$ 2,457,000	$ -			$ 10,894,500	$ 2,178,900	$ 3,268,350	$ 16,341,750
Development Driven													
										$ 200,970,098	$ 46,993,987	$ 50,586,966	$ 298,551,050

Notes: All costs stated in 2020 dollars unless identified otherwise in reference reports (i.e. feasibility reports)

* Reference Costs Source: Veterans Memorial Parkway Widening and Extension, CIMA+, October 2018 - [Assume: Mt Pleasant to Bridge = 950 m (from feasibility study) and Bridge to existing 4-lane cross section west of Erie = 240 m]

** Reference Costs Source Oak Park Road Extension Feasibility Study , Parsons, July 2019

*** Contingency of 20% for Construction and 30% for Engineering assumed unless stated specifically in reference reports (i.e. feasibility reports).