

The Corporation of the Town of Whitby

Transportation and Pedestrian Safety Action Plan

Final Report

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SUBMITTED BY CIMA CANADA INC.

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1. Background to the Project

The Town of Whitby (The Town) is pursuing a goal in which Downtown Whitby becomes a more vibrant and inviting place where people want to work, play and shop and have the opportunity to use other modes of transportation like transit, walking and cycling, and not only motorized vehicles. CIMA+ was retained to work with the Town to develop a Transportation and Pedestrian Safety Action Plan to accomplish this goal.

Recently the Council of the Town of Whitby adopted a set of goals for the 2018-2022 period which included the goal of accelerating “*the pedestrian focus of the Town’s historic downtown cores*”. This report addresses this key goal for Downtown Whitby by examining essential elements that influence a pedestrian focus including: safety, comfort, connectivity and accessibility. By improving these elements, the aim is to improve the experience for pedestrians and encourage an increase in the tendency for people to favour walking.

2. Project Objectives

As indicated in the Terms of Reference, the objective of this assignment is to develop an Action Plan that considers all modes of transportation for all user groups with an emphasis on further creating and encouraging a walkable Downtown that supports the Town Council's goal to build downtowns that are pedestrian-focused destinations.

To accomplish this objective, a holistic complete streets approach that ensures that all elements of the road right-of-way are planned, designed, operated and maintained to support a balanced and safe use by all roadway users: vehicular traffic, pedestrians, and cyclists is required.

It should be noted that the objective of this Action Plan is not the full and immediate reconstruction of the pedestrian realm servicing the Downtown Area, but to provide the Town with a set of measurable actions and recommended practices that – in time, will improve the safety and comfort of the pedestrian infrastructure servicing the areas under study.

To this purpose, CIMA+ made use of information and experience collected during the completion of similar assignments for the City of Windsor, the Town of Grimsby, the City of Cambridge, and the City of Vaughan, to identify a set of Guiding Principles relevant to the enhancement and promotion of nonvehicular trips, especially by walking.

2.1. Guiding Principles

2.1.1. The pedestrian infrastructure should provide adequate connectivity between origins and destinations.

From a connectivity perspective, the choice of mode of transportation depends on the distance required to travel, and the number and location of travel opportunities offered to the users.

2.1.2. The pedestrian infrastructure should be accessible to all.

Although the concept of accessibility evaluates the quality of the opportunities offered to the roadway users between origin and destination, in the Province of Ontario, accessibility requirements for municipal organizations are described in the Accessibility for Ontarians with Disabilities Act and Regulations as well as the related Design of Public Spaces Standard.

2.1.3. The pedestrian infrastructure should be safe and comfortable.

The way in which a roadway user perceives the level of safety and comfort of the different elements composing the urban environment is individual in nature, and it is not possible to identify a single item that defines the potential response of the roadway user. However, the design of sidewalks, walkways, and crossings should consider the

removal of identified hazards and the minimization of conflicts with external factors (i.e. vehicular traffic).

2.1.4. The pedestrian infrastructure should consider the interaction with other modes of transportation.

Each trip has a purpose that mostly depends on the type of urban environment in which the trip takes place. In the case of the downtown core, the potential purpose of the trip could be shopping or dining after arriving to the location by car or transit, while for roadway users in the residential area it could be going to school, walking or cycling.

2.1.5. The pedestrian infrastructure should provide a positive environment.

From a Complete Street perspective, the choice of transportation mode will depend on the perceived environment along the trip as a whole rather than individual elements of the roadway network along the route, for example areas to rest while travelling or trees to provide shade and a sense of enclosure.

These Guiding Principles were used for the evaluation of existing conditions, determination of potential alternatives and will be considered for the further implementation and monitoring of the proposed recommendations.

2.2. Review of Planning Policies and Pedestrian Safety

Plans and policies developed and implemented at municipal level can serve as the basis for a more integrated transportation network in which the needs of all modes of transportation, including pedestrian safety, are equally addressed.

To this purpose, a comprehensive review of plans and policies currently implemented or in development by the Town was conducted at the beginning of the assignment. The main objectives of this review were (1) to identify specific goals, objectives and actions included as part of these plans and policies that provide direction to this study of Downtown Whitby and (2) how it can be related with the Guiding Principles identified in the previous section of this document.

2.2.1. Whitby Transportation Master Plan (2010)

The [Whitby Transportation Master Plan](#) (TMP) includes an Active Transportation Strategy with a goal to reduce automobile mode share by 15%. In order to achieve this goal, growth in Whitby needs to follow certain policies and strategies, including the following:

- Improve overall road network connectivity with **appropriate pedestrian and cycling infrastructure**;
- Incorporate cycling facilities in accordance with the Town's Cycling and Leisure Trails Plan;¹
- Provide **sidewalks that are accessible** for persons with disabilities on both sides of all new and reconstructed urban collector and arterial roads;
- Create opportunities to expand and dedicate facilities and routes for active travel modes and urban renewal;
- **Improve the extent and quality of pedestrian and cyclist infrastructure** based on the principles of connectivity and continuity, directness of route, and safety and comfort;
- Partner with residents, businesses, property owners, and developers to encourage and educate citizens toward sustainable transportation choices; and
- In conjunction with Durham Region Transit DRT, **increase coordination between the transit network and bicycle and pedestrian trips** (including the provision of bicycle parking along proposed higher order transit routes and stations).

Based on the TMP, the following key elements should be part of guiding principles for streets that relate to the present study:

- Pedestrian and transit oriented streets through pedestrian scale design;
- Sidewalks located on both sides of the street and wide to accommodate high flow of pedestrians;
- Roadway width policies to minimize pedestrian crossings; and
- Street lighting and trees which defines the space for pedestrians and street trees that also provide shade in the summer.

2.2.2. Whitby Active Transportation Plan

The Town of Whitby [Active Transportation Plan](#) (ATP) has been undertaken to build upon the Town of Whitby Cycling and Leisure Trails Plan (2010) and Town of Whitby Transportation Master Plan (2010) and to develop a comprehensive forward looking plan that contributes to **increased transportation options** and outlines the Town's short, medium and long term Active Transportation strategy for walking, cycling, and other forms of active transportation.

The ATP is intended to create a network and associated policies to guide future development in the implementation of active transportation.

¹ Within the study area, the Cycling and Leisure Trails Plan includes Mary Street and Athol Street/Dunlop Street/Hickory Street.

2.2.3. Brooklin Transportation Master Plan (2017)

The [Brooklin Transportation Master Plan](#) (TMP) provides an assessment of the long-term transportation system infrastructure and mobility requirements across all modes of transportation in the Brooklin area of the Town of Whitby. The study area for the Brooklin TMP is outside of the limits of this study however the following guiding principles identified in the study are applicable to the present study:

- **Create a “streets for people” environment** where all users feel safe and secure, particularly in the Downtown. This will involve removing barriers to travelling to/from and between destinations, enhancing crossing locations and encouraging active transportation and transit use;
- **New and reconstructed arterial roads shall be built with sidewalks on both sides** and cycling provided through on-road facilities and/or off-road multi-use paths. The location of multi-use paths will be determined based on connectivity to public transit, active transportation routes and maximizing safety and use;
- An **active transportation network which connects to destinations within and beyond the neighbourhood** such as schools, parks, the downtown, commercial areas and employment areas shall be planned;
- **Active transportation connections across barriers** (natural and infrastructure) shall be planned at appropriate walking/cycling intervals to reduce barriers and connect neighbourhoods and increase accessibility for all ages and abilities;
- Where possible, upon approval by the Town, **road and right-of-way widths may be reduced** if active transportation connections and improved transit are provided to move people through the community;
- **All new local roads shall consider sidewalks on both sides** and set back from the curb, to support a safe and connected pedestrian environment. Exceptions may be considered in Low Density Residential areas on short streets and crescents, which do not lead to trails, schools or parks and provided accessibility requirements are met; and
- To establish a walkable community **consider wider sidewalks and enhanced pedestrian crossings** within Downtown Brooklin.

2.2.4. Whitby Official Plan (Office Consolidation)

The [Whitby Official Plan](#) includes the following design policies applicable to pedestrian safety in the Downtown area:

- 4.4.3.4, f) – Parking areas shall be established based upon the standards contained in the Zoning By-law. Access to such parking shall be controlled and designed to minimize danger to vehicular and **pedestrian traffic**;
- 4.4.3.4, g) – Outdoor display and café areas shall be regulated to **ensure safe pedestrian movement**, emergency access, and where required, separation from residential uses;

- 4.13.4.4 d) – **Barrier free access for persons** using walking or mobility aids shall be provided in all new public and publicly accessible buildings and facilities and along major pedestrian routes;
- 8.1.3.7.4 – Where **pedestrian movement** is required adjacent to roads, boulevards shall separate pedestrians from vehicles, where possible;
- 8.1.3.7.10 – Wherever possible in the **design of bicycle and/or pedestrian facilities**, Council shall encourage and support measures which will improve their accessibility for handicapped;
- 11.4.10.2.1 All core area land uses shall have an adequate, **safe and convenient pedestrian circulation system** comprising the following elements:
 - a) well-lighted sidewalks with minimal road crossings where intersection controls can facilitate pedestrian movements; and
 - b) hard surfaced pedestrian walkways: coloured to contrast with road pavements; landscaped for visual emphasis and to provide wind screening; linked to major road crossing points and various transit facilities; and provided with safe lighting of a consistent standard.

2.2.5. Downtown Whitby Action Plan

The Downtown Whitby Action Plan has four objectives, each with a set of associated action items. The four objectives are:

- Objective 1: Enable new opportunities for a prosperous and innovative Downtown.
- Objective 2: Create Downtown Whitby as a **walkable pedestrian-focused destination**.
- Objective 3: Inspire and enhance cultural life.
- Objective 4: Cultivate downtown connections and promotion.

Some of the actions items that relate to pedestrian and bicycle safety already in progress, according to the [Report to Planning and Development Committee dated October 16, 2017](#), include:

- Included **streetscape enhancements** in annual sidewalk boulevard improvement projects;
- Introduced **accessible pedestrian sidewalk connections** on Athol Street and Centre Street South;

Additionally, a “Downtown Whitby Walkability Base Map” was established to help measure success of the Action Plan as redevelopment occurs.

2.2.6. Parking Master Plan (PMP) for Downtown Whitby and Downtown Brooklin

The purpose of the Parking Master Plan is to review and analyze the existing conditions and longer-term parking needs in the Downtowns as well as the identification and recommendation of physical and operational strategies for on-street and off-street

parking to support the Town's vision of vibrant, viable, innovative and walkable Downtown Areas.

Elements to be considered as part of the PMP relevant for this assignment includes:

- Develop policies that can be further developed and incorporated into their related studies such as the Traffic By-Law.
- Community dialogue with area residents, businesses and stakeholders to ensure their concerns are identified, reviewed and considered in the development of the Parking Master Plan.

2.2.7. Downtown Whitby Historic Core Area and Entry Feature Locations

In the [Report to Planning and Development Committee dated February 27, 2017](#), Town staff proposed that the north, south, east and west historic entry feature locations be generally defined as follows:

- North - Brock Street at Mary Street;
- South - Brock Street at Ontario/Gilbert Streets;
- East - Dundas Street at Hickory Street; and
- West - Dundas Street at Henry Street/Euclid Street.

Among the reasons for proposing the above noted locations is the frequent requirement for both pedestrians and motorists often required to slow/stop at the intersections, **providing an opportunity for people to take in their surroundings** such as an entry feature, which indicates that they are entering a special area.

2.2.8. Town of Whitby Council Goals

On December 12, 2018 Whitby Council adopted 10 goals to guide the Council's work in the 2018-2022 term. The following Council goals are applicable to the present study:

- **#7 To accelerate the pedestrian focus of our historic downtown cores;** to leverage municipal tools and resources to generate downtown supportive investments; to facilitate the continued growth of our Innovation District; and to gain care and control of Baldwin Street through downtown Brooklin.
- **#8 To make our streets and neighbourhoods safer** through innovative and best practices design standards and traffic calming measures that reduce traffic speeds; to increase citizen involvement in building Complete Streets; to effectively manage parking on residential streets and in our downtowns; and to reduce the traffic impact of new developments on existing neighbourhoods.
- **#9 To remain the community of choice for families and become the community of choice for seniors and job creators;** and to focus new growth around the principles of **strong, walkable and complete neighbourhoods that offer mobility choices.**

2.2.9. Summary of Town of Whitby Goals and Objectives

The review of goals and objectives of various plans and policies of the Town of Whitby indicates that the pedestrian safety related goals and objectives are in alignment with the Complete Street approach. It is recommended that the Town should consider developing a formal Complete Street policy and related guidelines for Downtown Whitby and determine right-of-way requirements for the future roadway network based on the Complete Street approach.

The association between the different goals and objectives of various plans and policies with respect to pedestrian safety in Downtown Whitby is summarized in **Table 1**.

The table shows that there is a consistency among various plans and policies with a focused message on improving the pedestrian environment with the aim of both increasing pedestrian usage while making it a more pleasant and safe activity.

Table 1: Pedestrian Safety Related Goals and Objectives – Plans and Policies

Plans and Policies	Pedestrian Safety Related Goals and Objectives				
	Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
Whitby Transportation Master Plan	Providing appropriate pedestrian and cycling infrastructure	Sidewalks on both sides of all new and reconstructed urban collectors and arterial roads	Improve the extent and quality of pedestrian infrastructure Reduce crossing widths at intersections where possible	Increase coordination between transit network and pedestrian trips	Pedestrian scale design Street lighting and trees
Whitby Active Transportation Plan	Supporting policy & routing to increase pedestrian activity and cycling	Supports provision for additional sidewalks and AODA considerations	Increase pedestrian and cyclist safety	Increase transportation options	Plan promote complete streets approach
Brooklin Transportation Master Plan	Active transportation network which connects to destinations within and beyond the neighbourhood	New and reconstructed arterials shall be built with sidewalks on both sides All new local roads shall consider sidewalks on both sides	Road and right-of-way widths may be reduced	Increase transportation options	Create “streets for people” environment Consider wider sidewalks and enhanced pedestrian crossings
Whitby Official Plan	Not Applicable	Design pedestrian facilities to improve accessibility for handicapped	Ensure safe pedestrian movement Safe and convenient circulation system	Not Applicable	Not Applicable
Downtown Whitby Action Plan	Not Applicable	Accessible pedestrian sidewalk connections	May increase pedestrian and cyclist safety	Not Applicable	Not Applicable
Parking Master Plan (PMP) for Downtown Whitby and Downtown Brooklin	Reaffirms recommendations to install pedestrian Crossing infrastructure such as Intersection Pedestrian Signals	Proposes to work with the Accessibility Advisory Committee to finalize location of on-street accessible parking and updates to the Traffic By-law	Proposes Municipal lot design guidelines which considers lighting and pedestrian connectivity	Encourages Transportation Demand Measures guidelines be developed and that the Zoning By-law related to parking requirements be updated	Promotes Considerations of all users
Downtown Whitby Historic Core Area and Entry Feature Locations	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Provide an opportunity for people to take in their surroundings
Town of Whitby Council Goals	Not Applicable	Promote accessibility on general basis	Make our streets and neighbourhood safer	Strong, walkable and complete neighbourhood that offer mobility choices	Accelerate the pedestrian focus of our historic downtown cores

2.3. Jurisdictional Scan of Downtown Related Initiatives

CIMA+ conducted a review of actions and strategies used by other municipalities to improve the pedestrian and cycling environment. The following references were reviewed:

- City of London – Creating Dundas Place²
- Town of Oakville – Downtown Transportation and Streetscape Study³
- City of Cambridge – Preston Town Centre Streetscape Plan and Urban Design Guidelines⁴
- Huron County – Urban Design Guide⁵
- Town of New Tecumseth – Downtown Enhancement Master Plan
- Canadian Institute of Planners – Healthy Communities Practice Guide⁶

The main objective of the jurisdictional scan was the identification of engineering, urban design and streetscape elements implemented by other municipal jurisdictions to enhance the pedestrian environment in Downtown areas. A summary of the results of our jurisdictional scan are presented in **Table 2**.

The various elements outlined in the following table present a list of opportunities that might apply to different parts of Downtown Whitby.

Following the table, the next section of this report documents a site review of the various sections of the Downtown Whitby study area from a pedestrian safety perspective.

² <https://www.london.ca/residents/Roads-Transportation/Transportation-Planning/Documents/Creating-Dundas-Place-LR-2015-01-14.pdf>

³ <https://www.oakville.ca/assets/general%20-%20town%20hall/DTS-final-report.pdf>

⁴ <https://www.cambridge.ca/en/build-invest-grow/resources/Preston-Streetscape-Plan-and-Urban-Design-Guidelines.pdf>

⁵ <https://www.huroncounty.ca/wp-content/uploads/2016/05/Urban-Design-Guide-for-Traditional-Downtowns.pdf>

⁶ https://www.cip-icu.ca/Files/Healthy-Communities/CIP-Healthy-Communities-Practice-Guide_FINAL_lowre.aspx

Table 2: Pedestrian Safety Related Goals and Objectives - Engineering, Urban Design and Streetscaping Elements

Engineering, Urban Design and Streetscaping Elements	Pedestrian Safety Related Actions and Strategies				
	Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
Shared/Flexible Streets	Not Applicable	Curb removal and wall-to-wall paving in commercial / business areas Use of rolled curbs	Not Applicable	Not Applicable	Flexible parking/sidewalk system with the use of removable bollards "Sharrow" lanes and/or buffered bicycle lanes
Surface Materials	Not Applicable	Not Applicable	Use of alternative (often colour) surface treatments to improve pedestrian safety	Not Applicable	Not Applicable
Road Geometry	Not Applicable	Not Applicable	Provision of minimum lane widths and corner radii, where feasible Redesign of channelized turning lanes	Not Applicable	Not Applicable
Street Furniture/Landscaping	Not Applicable	Not Applicable	Creation of attractive spaces in downtown area Providing a "landscape strip" or "amenity strip" between sidewalk and road	Not Applicable	Planting trees Inclusion of benches, public art, lighting, bollards, bicycle infrastructure and litter receptacles Embellishing of entrances to alleyways
Parking	Not Applicable	Not Applicable	Not Applicable	Removal of on-street parking Addition of bicycle parking	Not Applicable
Sidewalks and Boulevards	Not Applicable	Widen sidewalks	Provision of curb extensions at intersection corners	Not Applicable	Provision of curb extensions to widen sidewalk Use of canopies and awnings along store fronts
Intersections and Crosswalks	Improved traffic signal synchronization to improve gaps in traffic	Not Applicable	Improved lighting at intersections Provision of decorative band	Not Applicable	Not Applicable

Engineering, Urban Design and Streetscaping Elements	Pedestrian Safety Related Actions and Strategies				
	Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
	Provision of controlled crossings Not Applicable		paving at signalized intersection		
Transit	Not Applicable	Not Applicable	Not Applicable	Provision of transit shelters at transit stops Relocation of bus routes from main street	Not Applicable

3. Description/Inventory of the Downtown

There are two study zones that indicate the main areas of emphasis for this study. Zone 1 indicates the core heritage area of Downtown Whitby while Zone 2 indicates the overall Downtown area. Zone 1 is bounded by Elm Street to the north, Dunlop Street to the south, Green Street to the east, Bryon Street to the west. Zone 2 is bounded by Mary Street to the north, Burns Street to the south, Annes Street/Cochrane Street to the west and Reynolds Street to the east. It is within these two zones that physical and operational modifications are to be considered.

Figure 1 and **Figure 2** illustrate traffic/pedestrian volumes and existing infrastructure in the two study zones (larger versions are provided in **Appendix A**) based on information provided by the Town. Main findings are listed below:

- The busiest pedestrian intersections are along Brock Street, with approximately 1,600 pedestrians in a 10-hour period at the intersection of Dundas Street followed by Brock Street & Colborne Street, Brock Street & Mary Street, and Brock Street & Dunlop Street with approximately 600 to 800 pedestrian crossings in a 10-hour period.
- Along Dundas Street intersections, there are 300 to 400 pedestrian crossings in a 10-hour period.
- Annual Average Daily Traffic (AADT) is higher along Brock Street and Dundas Street, where it typically exceeds 20,000 vehicles per day. Mary Street and Henry Street present AADTs in the range of 5,000 to 10,000 vehicles per day, while other streets near the intersection of Brock Street & Dundas Street (e.g. Colborne Street, Dunlop Street) are in the 2,500 to 5,000 range.
- As the distance from the intersection of Brock Street & Dundas Street increases, pedestrian volumes tend to decrease further (particularly due to the predominance of residential land use, as opposed to commercial).
- Most of the study area has sidewalks on at least one side of the road. Sidewalks on both sides of the road are more common near the commercial areas around Brock Street and Dundas Street, although not limited to this area.
- Most of the study area has on-street parking on at least one side of the road. On-street parking on both sides of the road is more common near the commercial areas around Brock Street and Dundas Street, although not limited to this area.
- Dedicated cycling facilities are relatively limited in the study area: they are provided along Mary Street, Henry Street, and Athol Street/Dunlop Street W/Hickory Street.
- Right of way widths in the study area are generally between 20 and 23 metres, with a few exceptions between 12 and 16 metres (**Appendix A** includes maps showing right of way widths for all streets in the study area).
- Elm Street is one-way from Brock Street to Byron Street North

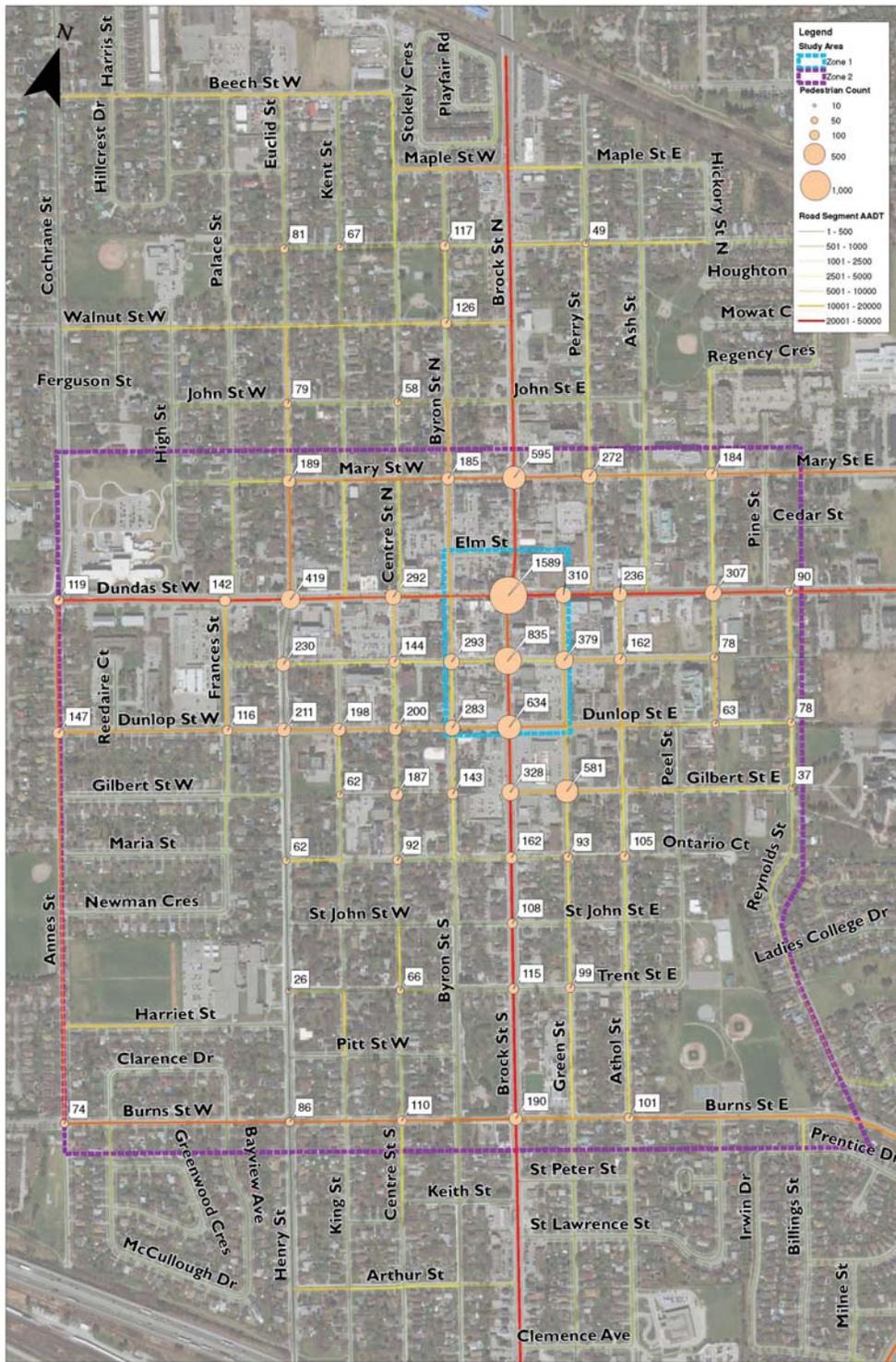


Figure 1: Traffic and Pedestrian Volumes

3.1. Downtown Whitby Field Review

CIMA+ completed a field review on Tuesday, October 3, 2017, to gain an understanding of existing pedestrian and bicycle facilities, travel patterns, opportunities for improvements, and any elements that may enhance or compromise safety for these users.

This section summarizes CIMA+'s findings from the field review from a pedestrian safety perspective. The Primary Zone 2 area is sub-divided by corridor and neighbourhoods to consider contiguous areas in terms of neighbourhood and street character.

3.1.1. Dundas Street between Euclid Street and Hickory Street

Table 3: Field Review Findings - Dundas Street between Euclid Street and Hickory Street

Photo Illustration	Field Observations	Comments
	<p>The signalized intersection of Dundas Street & Euclid Street is located approximately 400 metres from the next pedestrian crossing opportunity to the east (signalized intersection at Brock Street).</p> <p>Further east, the next crossing opportunity is located 370 metres away (signalized intersection at Hickory Street).</p>	<p>Based on OTM Book 15, a pedestrian crossing treatment (such as PXO) can be considered if the nearest controlled crossing is more than 200 metres away (among other criteria).</p>
	<p>Due to the distance between controlled crossings, pedestrians can be frequently observed crossing Dundas Street at two-way stop controlled intersections and mid-block locations, both east and west of Brock Street.</p> <p>Pedestrian volumes</p>	<p>Following the field investigation, mid-block pedestrian counts were conducted on December 1, 2017 between 10:00 a.m. and 2:00 p.m. The section of Dundas Street between Brock Street and Hickory Street had a total of 105 mid-block pedestrian crossings, with a peak hour of 31, while the section between Brock Street</p>

Photo Illustration	Field Observations	Comments
	<p>were observed to be higher during the mid-day peak (11:00 a.m. to 1:00 p.m.).</p>	<p>and Euclid Street had a total of 61 mid-block pedestrian crossings, with a peak hour of 24.</p>
	<p>Bicycle volumes were observed to be relatively low. Most cyclists were observed during the mid-day and PM/evening peaks, some of whom were riding on the sidewalks.</p>	<p>Bicycle counts were collected on December 1, 2017 between 10:00 a.m. and 2:00 p.m. in the vicinity of the Dundas Street & Brock Street, and it was found that 14% (2 out of 14) cyclists were riding on the sidewalk.</p>
	<p>Sidewalks are provided on both sides of road on Dundas Street. At some locations, the boulevard between the sidewalk and curb is narrow (less than 0.5m).</p> <p>The overall sidewalk width is approximately 2.2 metres, however at some restricted locations (e.g. adjacent to store fronts and trees) the width is reduced to approximately 1.2 metres due to tree plantings (as illustrated in the picture to the left), which is less than the minimum required by the AODA.⁷</p>	<p>Vehicle travel lanes are 3.7-metre wide, which is relatively wide for a downtown area. There may be opportunity to reassign some space to pedestrians and/or cyclists when reconstructed.</p>

⁷ Minimum clear width of 1.50 metres per O.Reg. 191/11 – Integrated Accessibility Standards, Part IV.1 80.23.

Photo Illustration	Field Observations	Comments
	<p>There is on-street parking along at least one side of Dundas Street west of Brock Street (available on both sides between Brock Street and Byron Street).</p> <p>On-street parking may block visibility for drivers turning left from side streets turning onto Dundas Street, who may pay more attention to their left side and not notice pedestrians crossing mid-block.</p> <p>Some street parking is also provided on Dundas Street east of Brock Street (between Green Street and Athol Street) however lay-bys remove parked vehicles from the roadway.</p>	<p>A by-law restricting parking within 10 metres of an intersection is in place; the 10-metre restriction is adequate at some locations, however visibility may still be limited at others. In urban areas with on-street parking, this is normal with drivers having to move forward past the stop line to make a safe turn.</p>
	<p>Transit services are provided by Durham Region Transit Route 900 (Pulse) along Dundas Street with bus stops at Pine Street, Hickory Street, Brock Street, and Euclid Street.</p> <p>Route 312, Whitby Community Bus, serves the community by connecting to parks, recreation centres, plazas and residential areas throughout the</p>	<p>No bus bays are provided at the bus stop locations along Dundas Street.</p> <p>Accommodations for transit users vary along the route.</p> <p>Bus stops are only identified along Dunlop Street by signs with no additional accommodations.</p> <p>No seating or bike rack facility at transit stops.</p>

Photo Illustration	Field Observations	Comments
	Town.	

Table 4 below indicates the areas of potential safety improvement for pedestrians along this section of Dundas Street.

Table 4: Pedestrian Safety Related Actions and Strategies for Consideration - Dundas Street between Euclid Street and Hickory Street

Pedestrian Safety Related Actions and Strategies for Consideration				
Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
Numerous pedestrians are crossing mid-block (IPS or PXO)	Ensure sidewalks are sufficiently wide (AODA)	Lane width reduction potential on Dundas Street Speed limit reduction to 40km/h Enhanced street lighting	Reassign right-of-way space for pedestrians, cyclists and transit users Provision of benches and bike parking facilities at transit stops.	

3.1.2. Brock Street between Mary Street and Dunlop Street

Table 5: Field Review Findings - Brock Street between Mary Street and Dunlop Street

Photo Illustration	Field Observations	Comments
	<p>In this section, Brock Street has wide and continuous sidewalks on both sides of the road. Most of this section has the sidewalk adjacent to shops.</p> <p>The overall sidewalk width is 2.3 metres (including boulevard) and presents some obstacles (parking meters, waste bins, trees, etc. which have been</p>	<p>The boulevard between the sidewalk and on-street parking is typically 0.5m (occasionally less) which could be increased in some locations (boulevard is recommended on commercial streets, TAC recommends a minimum width of 0.5m and desirable width of 3.0m).</p>

Photo Illustration	Field Observations	Comments
	<p>consolidated in the boulevard area) which reduces the effective width to 1.8 metres.</p>	
	<p>AODA push buttons with locator tone (no countdown) are present at the Brock Street and Mary Street E intersection. Only one corner of the Brock Street & Mary Street E intersection has tactile plates.</p>	<p>Some pedestrians were observed crossing mid-block north of Dundas Street during the mid-day peak hour, and low bicycle volumes were observed during the mid-day and PM/evening peak hours. Most cyclists observed used sidewalks rather than the roadway. On-street, parallel parking is provided on both sides of the street.</p>
	<p>Transit services are provided by Durham Region Transit Route 81 and 302 along Brock Street with bus stops at Mary Street E, and Dundas Street.</p>	<p>No bus bays are provided at the bus stop location with accommodations from transit users only provided for the northbound direction (southeast portion of the Dundas Street/Brock Street intersection).</p> <p>No seating or bike rack facility at transit stops</p>

Table 6 below indicates the areas of potential safety improvement for pedestrians along this section of Brock Street.

Table 6: Pedestrian Safety Related Actions and Strategies for Consideration - Brock Street between Mary Street and Dunlop Street

Pedestrian Safety Related Actions and Strategies for Consideration				
Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
Introduction of controlled pedestrian crossing opportunities on Brock Street south of Dundas Street.	AODA compliant features at intersections and crosswalk improvements Speed limit reduction to 40 km/h Enhanced street lighting		If feasible, increase sidewalk and/or boulevard width Provide sufficient space for street features such as bus shelters, parking meters, waste bins, trees, etc. (in boulevard) Provision of benches and bike parking facilities at transit stops.	

3.1.3. Dundas Street and Brock Street Intersection

Table 7: Field Review Findings - Dundas Street and Brock Street Intersection

Photo Illustration	Field Observations	Comments
	<p>The intersection of Dundas Street and Brock Street has a channelized westbound right-turn.</p> <p>The intersection has no push buttons, locator tones, or tactile plates at the corners, and some curb depressions are not fully aligned with the crosswalks.</p> <p>Crosswalks across Dundas Street are 2.4 to 2.6 metres wide.</p> <p>Left turn movements are prohibited at the intersection, which reduces vehicle-pedestrian conflict points.</p>	<p>Channelizations are typically less safe for pedestrians, as right-turning vehicles could enter them at higher speeds (although collision history does not suggest a problem). Drivers at this channelization may have difficulty seeing pedestrians waiting to cross due to its geometry.</p> <p>Typically, channelizations also force drivers to an uncomfortable angle looking for gaps in northbound traffic.</p> <p>According to OTM Book 11, crosswalks must be at least 2.5 m wide, and widths between 3 and 4 m are typical of urban areas with significant pedestrian activity.</p>

Photo Illustration	Field Observations	Comments
	Illumination is provided on all four legs of the intersection and on both sides of the road.	Sufficient illumination is provided.

Table 8 indicates the areas of potential safety improvement for pedestrians at the Brock Street & Dundas Street intersection.

Table 8: Pedestrian Safety Related Actions and Strategies for Consideration - Dundas Street and Brock Street Intersection

Pedestrian Safety Related Actions and Strategies for Consideration		
Accessibility	Safety and Comfort	Modal Split
AODA compliant features at this intersection	Redesign of the channelized westbound right-turn including relocation of the pedestrian crosswalk	

3.1.4. Residential Area North of Dundas Street and South of Mary Street

Table 9: Field Review Findings - Residential Area North of Dundas Street and South of Mary Street

Photo Illustration	Field Observations	Comments
	On Mary Street W, urban paved shoulders begin at Euclid Street and end at Byron Street, then begin again at Perry Street and continue towards Hickory Street.	For the two blocks where the urban paved shoulders are interrupted, “Share the Road” signage is present, indicating an expected bicycle demand that is likely to use the buffers as bicycle lanes.

Photo Illustration	Field Observations	Comments
	<p>On-street parking is generally permitted in this residential area.</p> <p>Lane widths are 3.7 metres, and 1.5-metre wide sidewalks are provided on at least one side of the road at most locations.</p> <p>On Mary Street, one bicycle parking post was noted present on south side, located on a textured buffered paved shoulder between the sidewalk and the curb. Some are also provided along Brock Street, north of Dundas Street and on Mary Street.</p>	<p>The area has an opportunity for additional bicycle parking.</p>

Table 10 below indicates the areas of potential safety improvement for pedestrians in this neighbourhood.

Table 10: Pedestrian Safety Related Actions and Strategies for Consideration - Residential Area North of Dundas Street and South of Mary Street

Pedestrian Safety Related Actions and Strategies for Consideration		
Safety and Comfort	Modal Split	Complete Streets
Provide benches and bike parking	Provide dedicated space for cyclists	Provision of additional bicycle parking posts

3.1.5. Commercial/Residential Area South of Dundas Street and North of Dunlop Street

Table 11: Field Review Findings - Commercial/Residential Area South of Dundas Street and North of Dunlop Street

Photo Illustration	Field Observations	Comments
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Photo Illustration	Field Observations	Comments
	<p>There are no marked crosswalks at some intersections in this area (Colborne Street W & Frances Street, Colborne Street W & Henry Street, Colborne Street & King Street, Colborne Street E & Green Street, Colborne Street E & Athol Street, Colborne Street E & Hickory Street S, as illustrated in Figure 6), with the exception of the intersections with Brock Street.</p> <p>The area presents continuous, 1.5 metre wide sidewalks on both sides of the road, and travel lanes vary between 3.0 (northbound lane on Green Street south of Dundas Street) and 3.5 metres.</p> <p>Signalized intersections (Dundas Street W & Euclid Street/Henry Street and Dundas Street E & Hickory Street) do not have AODA push buttons.</p>	<p>There is an opportunity to implement AODA compliant features at intersections and crosswalk improvements where unmarked crosswalks are present.</p>

Photo Illustration	Field Observations	Comments
	<p>Hickory Street S has 1.5m urban paved shoulders on both sides between Dunlop Street E and Dundas Street E. Parked vehicles in the urban paved shoulder encroach into the thru lane.</p>	<p>The travel lane is approximately 3.5 metres wide, and the reduced width due to parked vehicles could cause drivers to cross the centre line.</p>

Table 12 below indicates the areas of potential safety improvement for pedestrians in this neighbourhood.

Table 12: Pedestrian Safety Related Actions and Strategies for Consideration- Commercial/Residential Area South of Dundas Street and North of Dunlop Street

Pedestrian Safety Related Actions and Strategies for Consideration		
Accessibility	Safety and Comfort	Modal Split
AODA compliant features at intersections and crosswalk improvements		Provide dedicated space for cyclists

3.1.6. Residential Area South of Dunlop Street and North of Burns Street

Table 13: Field Review Findings - Residential Area South of Dunlop Street and North of Burns Street

Photo Illustration	Field Observations	Comments
	<p>The sidewalks on Trent Street E and St. John Street E do not continue east of Athol Street, which interrupts the pedestrian route leading to Peel Park.</p> <p>Additionally, the west side of Rotary Centennial Park (i.e. along Byron Street S) has a partial sidewalk between Trent Street</p>	<p>Consider sidewalk connectivity as part of reconstruction.</p> <p>Review and discuss with property owners, the provision of a potential bike trough or a ramp for cyclists.</p>

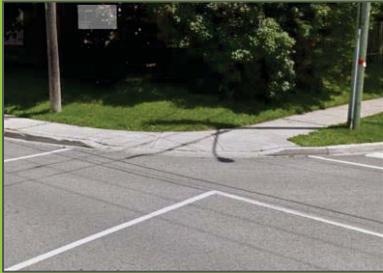
Photo Illustration	Field Observations	Comments
	<p>W and Pitt Street W. A sidewalk is present on the opposite side of the street, however no crossing treatments are provided.</p> <p>A pedestrian connection (stair) at Gilbert Street W between Byron Street S and Brock Street S exist through the plaza located on the west side of Brock Street S, however it is not accessible. There is a large grade difference at this location. The commercial plaza provides bike parking facility.</p>	
	<p>Most of the area presents sidewalks on at least one side of the road; however the sidewalk width is typically 1.2 metres and most intersections have no marked crosswalks.</p> <p>Tactile plates are present only at the intersection of Brock Street and John Street.</p>	<p>Increase sidewalk width as part of reconstruction or resurfacing.</p>

Photo Illustration	Field Observations	Comments
	<p>Transit services are provided by Durham Region Transit Route 81 and 302 along Brock Street with bus stops at Burns Street, Trent Street, Ontario Street and Gilbert Street.</p>	<p>No bus bays are provided at the bus stop locations along Brock Street.</p> <p>Bus stops are only identified along Brock Street by signs with no additional accommodations.</p> <p>No seating or bike rack facility at transit stops</p>

Table 14 below indicates the areas of potential safety improvement for pedestrians in this neighbourhood.

Table 14: Pedestrian Safety Related Actions and Strategies for Consideration - Residential Area South of Dunlop Street and North of Burns Street

Pedestrian Safety Related Actions and Strategies for Consideration				
Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
<p>Provide sidewalk connections between priority locations in Downtown</p>	<p>AODA compliant features at intersections</p>	<p>Ensure sidewalks are sufficiently wide (AODA)</p>	<p>Provision of sidewalks on both sides of the road to support pedestrian movements</p> <p>Provision of benches and bike parking facilities at transit stops.</p>	

3.1.7. General Findings

Table 15: Field Review - General Findings

Photo Illustration	Field Observations	Comments
	<p>There are urban paved shoulders present on some streets in the study area (e.g. Mary Street, Dunlop Street) that may be wide enough for use by cyclists (1.1 m + gutter).</p> <p>At some locations (e.g. Hickory Street where these urban paved shoulders are present, on-street parking is not prohibited, and parked vehicles block the path of cyclists that may use these urban paved shoulders.</p>	<p>These urban paved shoulders are not part of the Town’s Cycling and Leisure Trails Plan.</p> <p>No symbols or signage are provided to indicate whether these are intended for bicycles and they do not meet the OTM Book 18 width requirement of 1.5 m.</p>
	<p>The following elements are only present at some intersections throughout the area:</p> <ul style="list-style-type: none"> • AODA push buttons (e.g. present at Mary Street and Brock Street) • Pedestrian countdown signal heads (e.g. present at Euclid Street and Dundas Street) • Tactile plates (e.g. present at Mary Street W and Byron Street N) • Crosswalk pavement markings (e.g. not provided at Athol Street and 	<p>Address AODA element deficiencies at intersections.</p>

Photo Illustration	Field Observations	Comments
	Trent Street E near Peel Park)	
	Drainage grates throughout the study area present an angled pattern, reducing risk for cyclists.	No modifications to the existing drainage grates are required.

Table 16 below indicates general findings concerning potential safety improvement for pedestrians in the study area.

Table 16: Pedestrian Safety Related Actions and Strategies for Consideration - General Findings

Pedestrian Safety Related Actions and Strategies for Consideration				
Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
AODA compliant features at intersections to facilitate pedestrian movements through Downtown		Provide dedicated and separate space for cyclists and pedestrians free of obstacles		

3.2. Downtown Whitby Desktop Review

3.2.1. Connectivity and Accessibility Review

Based on the information collected on the field, aerial photography provided by the Town of Whitby, and the Downtown Whitby Walkability Base Map (September 2017), the connectivity and accessibility of the current pedestrian network servicing the primary and secondary study areas was reviewed.

With this purpose, several locations within these two study areas were identified as key pedestrian destinations. The key pedestrian destinations are illustrated in **Figure 3** and include:

- Parks
- Schools

- Retirement Facilities
- Community Facilities
- Places of Worship
- Theatres
- Museums

Pedestrian volumes in the vicinity of these locations are typically higher than elsewhere in the study area. Providing appropriate pedestrian facilities between these locations is essential in creating a connected pedestrian network. The current Town of Whitby policy identifies the need to provide a sidewalk on one side of the road only on local roads. In order to improve connectivity and promote complete streets, it is recommended that this policy be revised to include sidewalk on both sides of the road on local roads in the downtown core, where feasible. Providing sidewalks on both sides of the road follows the placemaking approach by supporting public spaces that are well connected and promotes people's health, happiness, and well-being.

Table 17 and **Figure 4** provide a summary of the identified gaps in the pedestrian network between key pedestrian generators.

From an accessibility perspective, AODA requires that exterior paths of travel including sidewalks provide a minimum clear width of 1.5 metres free of obstacles.

Table 17: Gaps in Pedestrian Network

Location	Observations
Trent Street East	<ul style="list-style-type: none"> • Discontinuous sidewalk east of Athol Street to Peel Street • No sidewalks from Athol Street to Peel Street (discontinuous route to Peel Park)
St. John Street East	<ul style="list-style-type: none"> • Discontinuous sidewalk east of Athol Street to Peel Street
Ontario Street East	<ul style="list-style-type: none"> • Discontinuous sidewalk east of Athol Street to Peel Street
Byron Street South	<ul style="list-style-type: none"> • No sidewalk on east side from Pitt Street W to Burns Street W (adjacent to Rotary Centennial Park)⁸

⁸ The provision of sidewalks at this location is not feasible due to physical constraints and has therefore been removed from the recommendations.

Location	Observations
Peel Street	<ul style="list-style-type: none"> No sidewalks on either side of road from Dunlop Street E to Trent Street E (with the exemption of a segment of sidewalk on the west side between Ontario Street E and Gilbert Street E), discontinuous route to Peel Park

Table 18 and **Figure 5** identify the locations in downtown Whitby that currently provide insufficient sidewalk width.

Table 18: Insufficient Sidewalk Width

Location	Observations
Dundas Street	<ul style="list-style-type: none"> At constrained locations (e.g. adjacent to shops and store fronts) the sidewalk width is 1.2 m – 1.3 m⁹ Buffered paved shoulders are provided adjacent to sidewalks however obstructions are present in some locations (e.g. hydro poles) which does not provide clear width
Centre Street South	<ul style="list-style-type: none"> 1.2 m Sidewalk width on east side between Ontario Street W and St. John Street W¹⁰
St. John Street West	<ul style="list-style-type: none"> 1.2 m Sidewalk width on south side between Henry Street and Byron Street S
Pitt Street West	<ul style="list-style-type: none"> 1.2 m sidewalk on north side from Henry Street to Byron Street S

⁹ Following the 2017 field review, deficient sidewalks on Dundas Street were updated as part of Dundas Street Resurfacing project in 2018.

¹⁰ Following the 2017 field review, this sidewalk was upgraded to AODA standards.

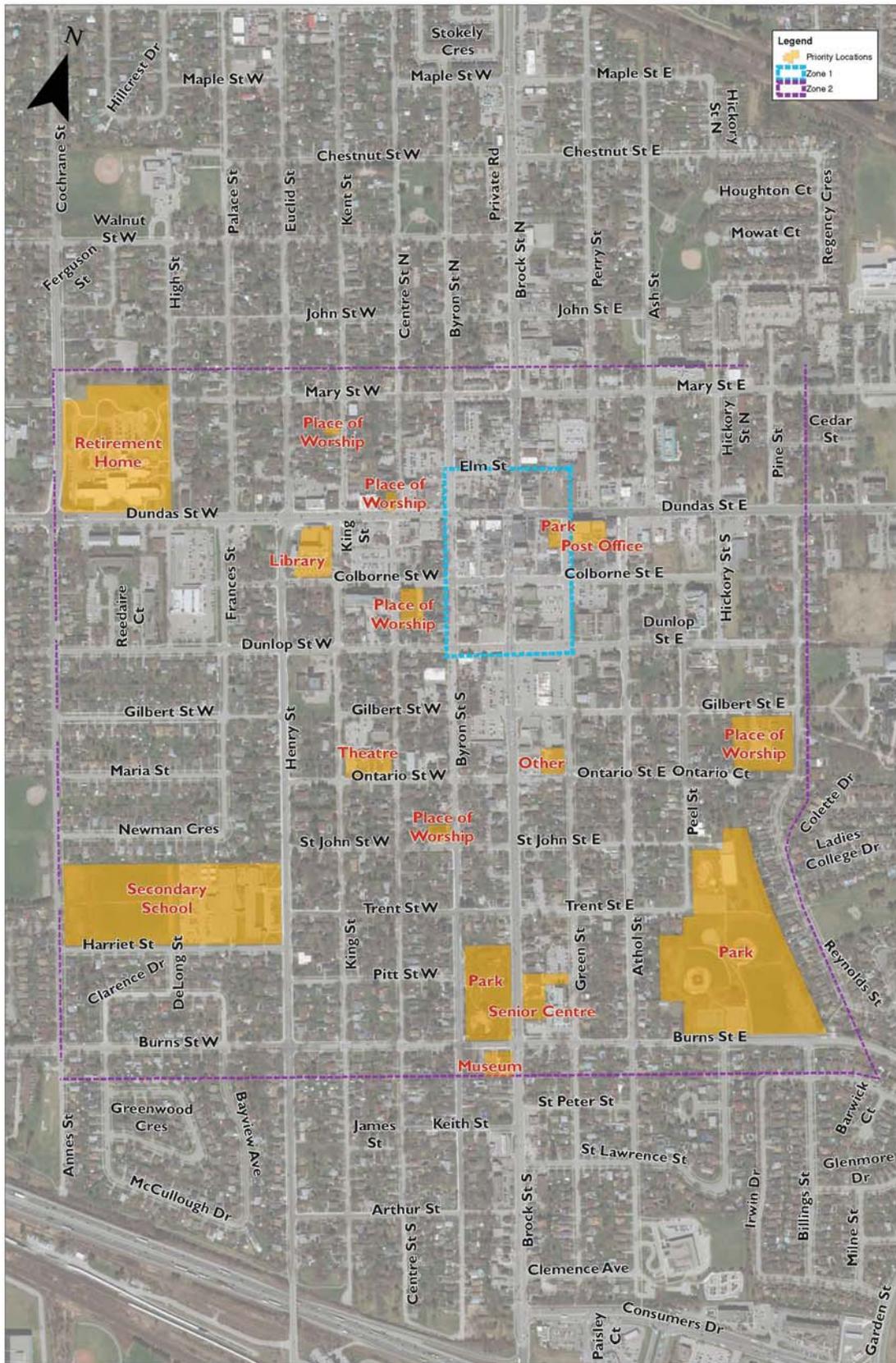


Figure 3: Key Pedestrian Destinations

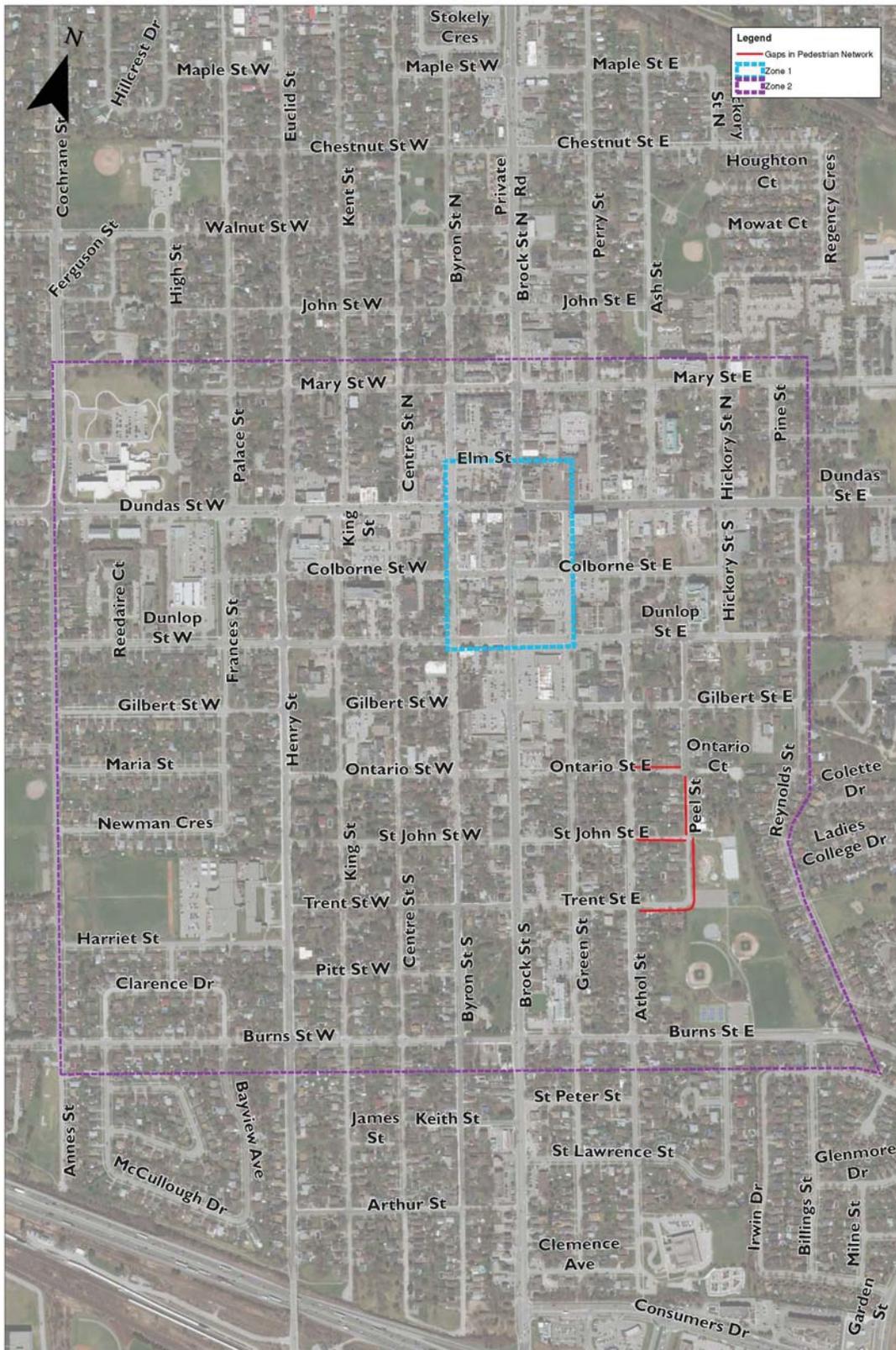


Figure 4: Gaps in Pedestrian Network

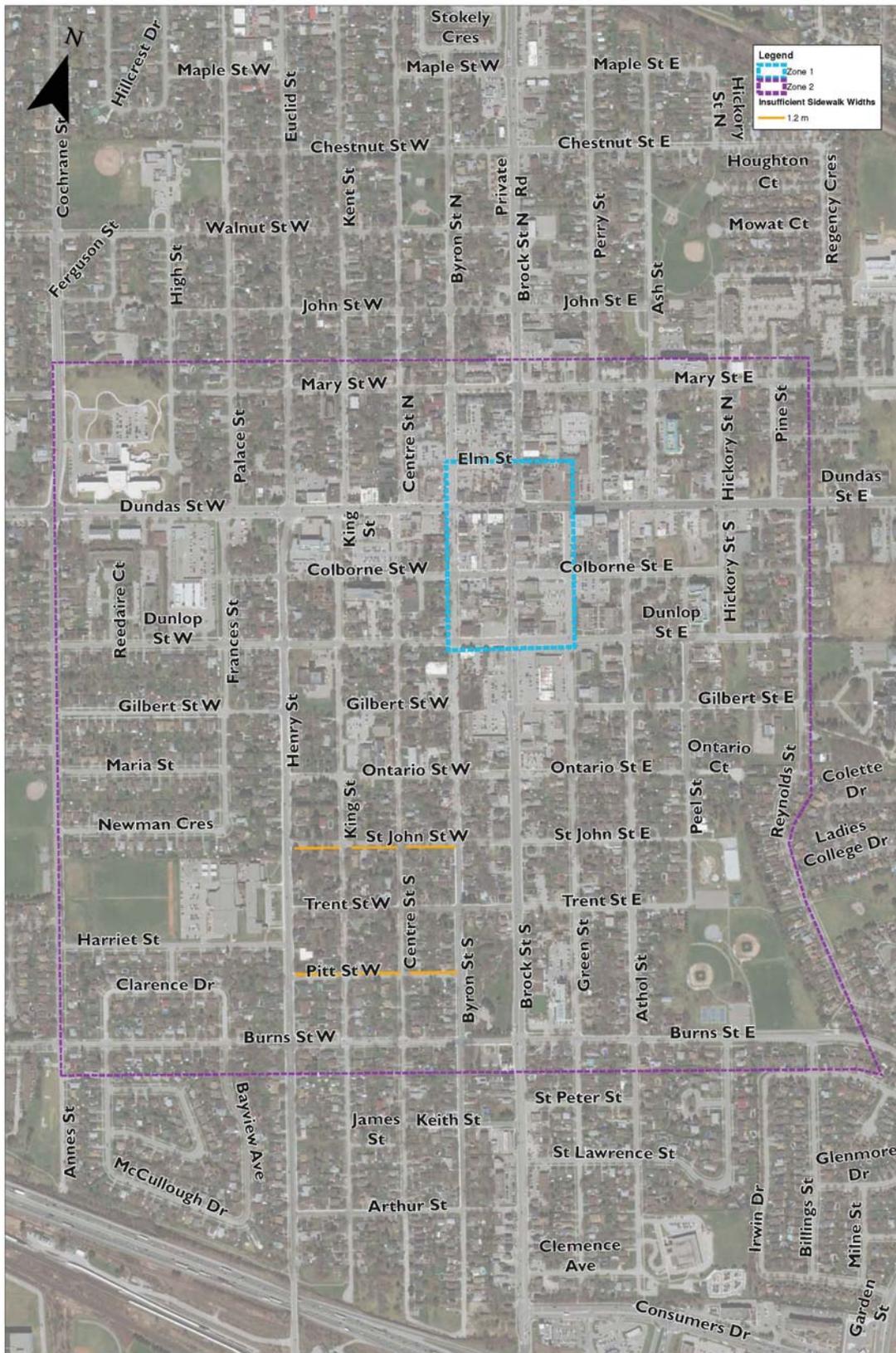


Figure 5: Insufficient Sidewalk Widths

3.2.2. Collision Review

5-year Collision data provided by the Town and the Region of Durham was summarized and reviewed with the purpose of identifying potential issues or recurrent patterns at intersections controlled by stop signs at all corners.

Table 19 below presents the number of collisions per location and collision details for comparison purposes.

Table 19: Summary of 5-year Collision Data

# of Collisions (2012-2017)	Location	Traffic Control	Most Frequent type of Impact	Most Frequent type of vehicle manoeuvre	Collision involving Pedestrians
13	Gilbert Street East at Green Street	All-way Stop	Angle	Through	-
7	Henry Street (R.R. 45) at Dunlop Street West	All-way Stop	Angle	Through	3
6	Mary Street East at Perry Street	All-way Stop	Angle	Through	-
5	Athol Street at Dunlop Street East	All-way Stop	Angle	Through	-
4	Centre Street S at Dunlop Street West	All-way Stop	Angle	Through	-
3	Byron Street S at Colborne Street West	All-way Stop	Angle	Through	-

Although the collision reports do not provide the drivers actions, based on the location, type of impact and vehicle maneuver it could be possible to assume that the most frequent driver actions were (1) disobeying a traffic sign and (2) failing to yield the right of way.

Under this assumption items to be considered for further evaluation are:

- Review of sight distance at intersections
- Review of current street lighting levels and enhance street lighting
- Removal of potential obstructions (i.e. streetscaping closer to the intersection)

- Improve visibility of the intersection (pavement markings and signs)
- Enforcement
- Review unwarranted all-way stops

The collision reports for the Henry Street and Dunlop Street West intersection did not include the potential cause of the incident or the injuries received by the pedestrian. As such, there is not enough information available in order to consider what intersections improvements could be considered at this location to reduce the number of collisions involving pedestrians. However, it is recommended that the Town should implement Vision Zero countermeasures in the downtown area, as required, and work with the Region of Durham to reduce pedestrian and cyclist injuries and/or fatalities at various downtown signalized intersections.

In addition to the review of existing all-way stop controlled intersections; a review of the following intersections was conducted to determine if a modification of the existing intersection control was warranted. The selection of these intersections was based on their potential to improve connectivity and safety of the pedestrian desire lines identified along Trent and Ontario Street corridors:

- Trent Street West at Henry Street (3-legged, minor street stop control)
 - Desire lines from northeast corner of intersection to west side of Henry Street
- Trent Street West at Centre Street South (4-legged, all-way stop control)
 - Desire lines from east side of intersection to west side
- Ontario Street West at Henry Street (3-legged, minor street stop control)
 - Desire lines from north side of intersection to south side and from east side to west side

The results of the analysis indicated that all-way stop controls of the reviewed intersections are not warranted. However, it is suggested by the Town of Whitby that the intersections in the downtown area should have a definite pattern of traffic control including all-way stop controls and roundabouts. Given the built-up environment and potential property constraints in the downtown core, the Town of Whitby considers mini roundabouts as a viable traffic control solution. It is recommended that the Town consider construction of mini-roundabouts in the downtown area prior to installation of new all-way stop control and explore opportunities to implement mini-roundabouts at existing intersections, where feasible.

3.3. Summary of Main Findings and Opportunities

Based on the field and desktop review, the main findings and potential opportunities for improvement are summarized in **Table 20** and **Figure 6**.

Table 20: Summary of Main Findings and Opportunities

Pedestrian Safety Related Actions and Strategies for Consideration			
Location	Connectivity	Accessibility	Safety and Comfort
Dundas Street between Euclid Street and Hickory Street	Our findings show that based on Book 15 justifications, a mid-block pedestrian signal or rapid flashing beacon are appropriate to provide a pedestrian crossing on Dundas Street in the vicinity of Centre Street and Athol Street (see Section 5.1). Consider reducing the existing speed limit to 40km/h in the core area of the Downtown to enhance pedestrian safety and comfort. Review current street lighting levels and consider enhancing street lighting as part of reconstruction/resurfacing project.		Wider sidewalks with a buffered paved shoulder can be achieved by narrowing travel lanes on Dundas Street. The additional right-of-way width can be utilized for wider pedestrian facilities including enhanced transit facilities (bus shelters) This would require reconstruction of the curb and sidewalk.
Brock Street between Mary Street and Dunlop Street	Our findings show that based on Book 15 justifications, a mid-block pedestrian signal or rapid flashing beacon are appropriate to provide a pedestrian crossing on Brock Street at Trent Street (see Section 5.1).	Intersections can be improved to include AODA compliant features such as pedestrian indicators (i.e. countdown signal and timing), as well as crosswalk improvements (i.e. tactile surface indicators). Reduce the existing speed limit to 40km/h in the core area of the Downtown. Review current street lighting levels and consider enhancing street lighting as part of reconstruction/resurfacing project.	Wider sidewalks and/or a buffered paved shoulder with trees and street furniture can enhance the pedestrian facilities along Brock Street. Wider sidewalks might be achieved by narrowing travel lanes. The additional right-of-way width can be utilized for wider pedestrian facilities, other active transportation uses and transit infrastructure (bus shelters) This would require reconstruction of the curb and sidewalk.
Dundas Street and Brock Street Intersection	Not Applicable	Curb cuts and tactile plates at the channelization can improve accessibility for pedestrians with visual impairments by providing an indication of the direction of travel and location of crosswalks. The intersection can be improved to include AODA compliant features such as pedestrian indicators (i.e. countdown signal and timing), as well as crosswalk improvements (i.e. tactile surface indicators and wider crosswalks). If feasible, improvements to the geometry of the channelized westbound right-turn can improve visibility for drivers allowing them to better identify pedestrians crossing at the channelization.	Improvements to the geometry include modification to the turning radius and relocation of the pedestrian crosswalk in accordance with OTM Book 15. Not Applicable

Pedestrian Safety Related Actions and Strategies for Consideration					
Location	Connectivity	Accessibility	Safety and Comfort	Modal Split	Complete Streets
Residential Area North of Dundas Street and South of Mary Street	Not Applicable	Not Applicable	Not Applicable	Review Parking Policy for the downtown. This review considers parking demand and supply in the downtown.	
Commercial/Residential Area South of Dundas Street and North of Dunlop Street	Not Applicable	Intersections can be improved to include AODA compliant features such as pedestrian indicators (i.e. countdown signal and timing) and AODA push buttons as well as crosswalk improvements (i.e. tactile surface indicators).			Not Applicable
Residential Area South of Dunlop Street and North of Burns Street	Sidewalks along both sides of the road can provide continuous pedestrian routes leading from the downtown to key pedestrian destinations in the residential area.	Intersections can be updated to include crosswalk improvements such as tactile surface indicators and pavement markings	Where applicable, curb extensions could be provided in order to reduce pedestrian crossing distance.	Continuous sidewalks can increase the attractiveness of walking over other modes of transportation. Opportunities for potential enhancement of transit related infrastructure	

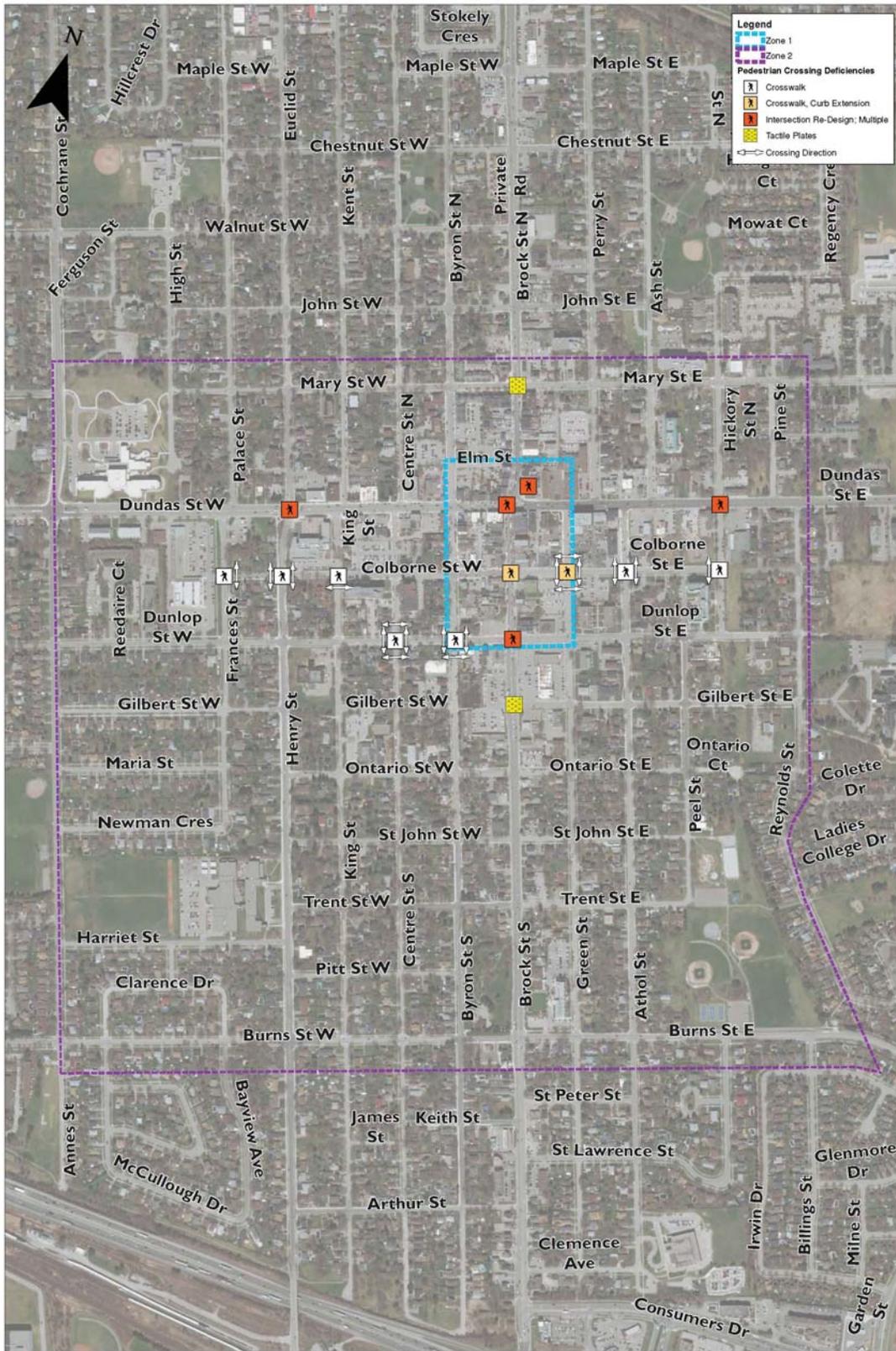


Figure 6: Main Findings and Opportunities – Pedestrian Crossing Deficiencies

4. Public and Stakeholder Consultation

From a transportation engineering and urban planning perspective the relationship of the different roadway elements (i.e. number and type of pedestrian crossings, volumes and speed of vehicular traffic, etc.) and the safety and level of service of the pedestrian environment can be identified and quantified.

However, from a public and stakeholder perspective, the perception of safety cannot be quantified since it varies depending on elements external to the roadway environment such as: age and experience of pedestrians and cyclists, the different roles of the roadway user (driver or pedestrian), or the type of activities conducted by the roadway user (work or leisure).

To consider the public and stakeholder perception of pedestrian safety in Downtown Whitby, the following public outreach activities were completed as part of this assignment:

- A Public Open House on December 1st, 2017 at the Whitby Annual Christmas Tree Lighting event from 6:00 PM to 8:00 PM at Celebration Square (Dundas Street West and Henry Street) in the Town of Whitby, and
- A Stakeholder Meeting on April 5, 2018 at Town Hall to present the preliminary findings of the field investigation and potential solutions, as well as to receive comments from stakeholders on study area issues and potential improvements.

This section of the report summarizes the comments and suggestions provided as part of these events.

4.1. Public Open House

The Open House was an opportunity for members of the community to provide comments and suggestions on how to improve active modes (walking and cycling) of transportation in Downtown Whitby. Display boards were provided presenting the following:

- Background on the Transportation and Pedestrian Safety Action Plan
- We want to hear from you!
 - Do you have any pedestrian safety concerns for Downtown Whitby?
 - Do you think any of the areas in Downtown Whitby are in need of improvements for pedestrian safety?
- Study Area Map – Pedestrian Counts and AADT

Comment sheets were provided and a map of downtown Whitby was displayed for the public to directly indicate problem areas and their concerns. A summary of the comments provided by the public is presented in **Table 21**.

Figure 7 shows the areas the public identified as needing pedestrian safety improvements (#1-5).

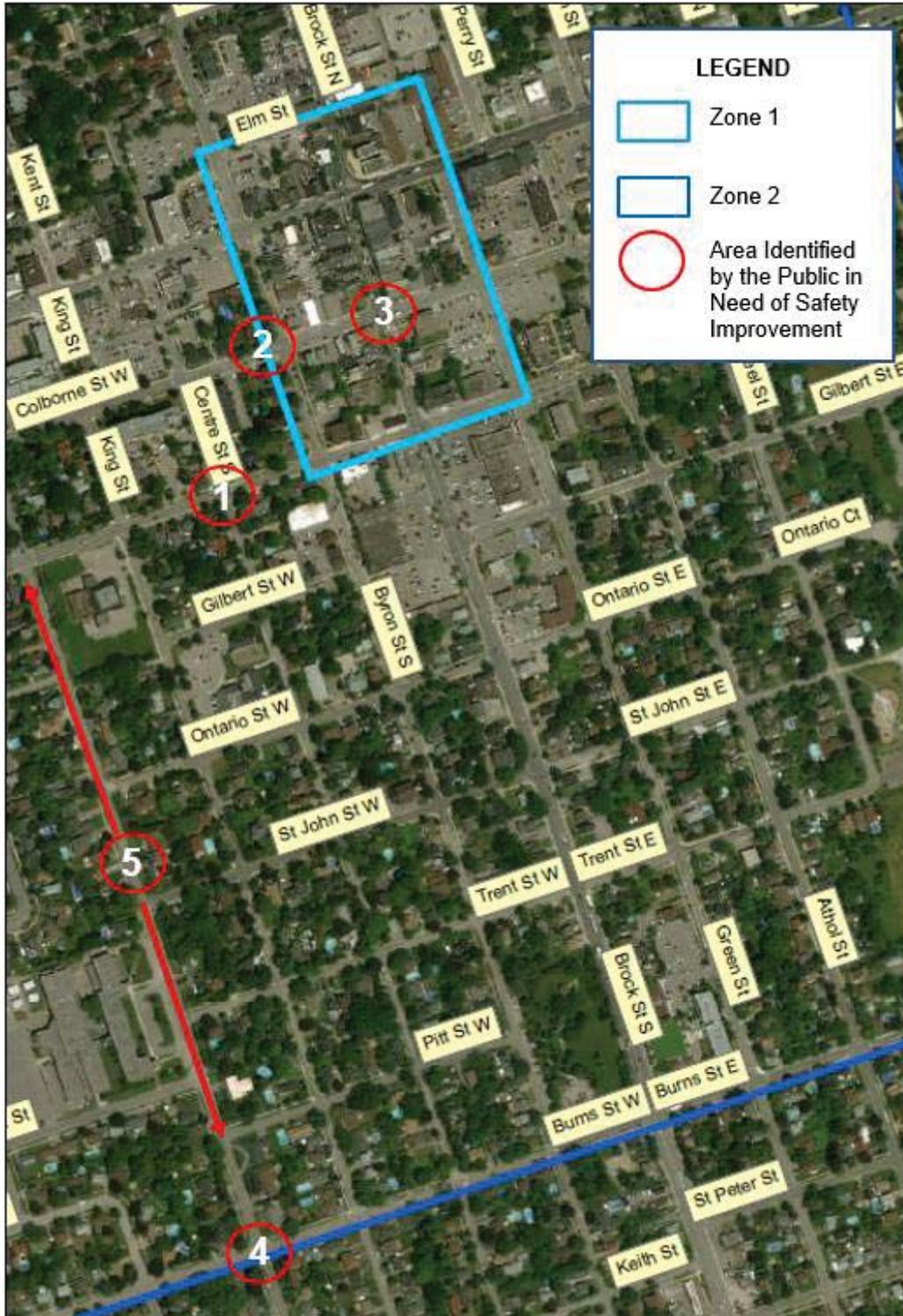


Figure 7: Key Map for Open House Comments

Table 21: Summary of Open House Comments

Locations	Comments
Location 1. Dunlop Street West and Centre Street South	No pedestrian crosswalks at this intersection Fatal pedestrian collision <ul style="list-style-type: none"> Note: This intersection was previously a 2-way stop controlled intersection and has been modified to a 4-way stop controlled intersection (2014).
Location 2. Colborne Street West and Byron Street South	No pedestrian crosswalks at this intersection. Collision involved pedestrian <ul style="list-style-type: none"> Note: This intersection was previously a 2-way stop controlled intersection and has been modified to a 4-way stop controlled intersection (2016).
Location 3. Colborne Street and Brock Street	Pedestrian crosswalks only on the east and west sides of the intersection crossing Colborne Street. High frequency of pedestrian crossings
Location 4. Henry Street and Burns Street West	Signalized intersection Pedestrian crosswalks are available as part of the signalized intersection Near pedestrian collisions <ul style="list-style-type: none"> Note: This intersection was previously a 4-way stop controlled intersection and has been modified to a signalized intersection (2015).
Location 5. Henry Street north of Hwy 401	Commuters travelling to/from the Whitby GO station travel at high speeds <ul style="list-style-type: none"> Note: This road is within the Region of Durham jurisdiction.
Henry Street / Euclid Street	High speeds observed around school zones. <ul style="list-style-type: none"> Note: There are no school zones designated on Euclid Street.
Dundas Street and Brock Street	Need more pedestrian crossing facilities on Dundas Street and Brock Street. In favor of activated pedestrian crossovers.
King Street and Dunlop Street West	Cyclists using sidewalks conflict with pedestrians (enforcement issue – not easily done)

4.2. Stakeholder Meeting

Seventeen individuals attended the meeting including stakeholders from the following agencies and groups:

- Region of Durham – Public Works
- Town of Whitby – Public Works
- Town of Whitby – Operations
- Town of Whitby – Accessibility
- Town of Whitby – Planning
- Olde Whitby Neighbourhood Association (OWNA)
- Active Transportation and Safe Roads Advisory Committee (ATSRAC)
- Durham Regional Police Service (DRPS)
- Downtown Whitby Business Improvement Association (BIA)
- Whitby Public Library

The general comment categories noted at the meeting or received from stakeholders following the meeting are summarized in **Table 22**. These categories were generally considered in the various analyses conducted throughout this study.

Detailed minutes of meeting summarizing comments received by the stakeholders are included in **Appendix B**.

Table 22: Summary of Stakeholder Comments

Stakeholder Comment Categories	Connectivity	Accessibility	Safety and Comfort	Modal Split
Pedestrians and Vulnerable Road Users	X	X	X	X
Complete Streets & Streetscaping			X	
Transit	X	X		
Traffic Calming			X	

5. Alternative Solutions and Concepts

A diverse set of engineering, urban design and streetscape treatments that are known for its potential to improve the quality and level of service of pedestrian environments in urban areas were selected for review and evaluation based on the information collected as part of the assignment.

Each of the treatments presented in this section of the document were selected to respond to specific needs (i.e. connectivity, accessibility, safety and comfort, modal split, and complete streets) identified as part of our field review as well as comments provided by public and stakeholders.

5.1. Implementation of New Pedestrian Crossing Treatments

Ontario Traffic Manual (OTM) Book 15 Section 5 provides guidance for the selection of the most appropriate pedestrian crossing treatments based on a comprehensive set of variables such as: vehicular and pedestrian volumes, number of lanes, distance to the nearest controlled intersection, presence of desire lines, etc.

To support the selection process, the OTM Book 15 provides a decision support tool for the selection of the most appropriate pedestrian treatments, as illustrated in **Figure 8**.

The selection process includes the following steps:

- The first step in selecting a pedestrian crossing treatment is to determine whether traffic signals (including IPS, MPS or full traffic signals) are warranted, based on OTM Book 12 guidance;
- The next step in the preliminary assessment is to determine if a specific site is a candidate for a PXO. The warrant for a PXO considers the following elements:
 - Pedestrian and vehicular volumes.
 - The requirement for system connectivity or the presence of pedestrian desire lines,
 - The distance from other traffic control devices (minimum 200 metres) are also taken into consideration. The following sections discuss these elements in further detail.

This selection process was conducted for the following locations:

- Dundas Street west of Brock Street
- Dundas Street east of Brock Street
- Brock Street and St. John Street;
- Brock Street and Trent Street;
- Brock Street and Colborne Street; and
- Brock Street and Elm Street

Upon preliminary review of these locations the intersection of Brock Street S & Colborne Street, and Brock Street N & Elm Street were not feasible for a potential pedestrian crossing due to the close proximity to the major signalized intersection of Brock Street &

Dundas Street. However, an Intersection Pedestrian Signal is recommended by the Town to support walkability in the Downtown core.

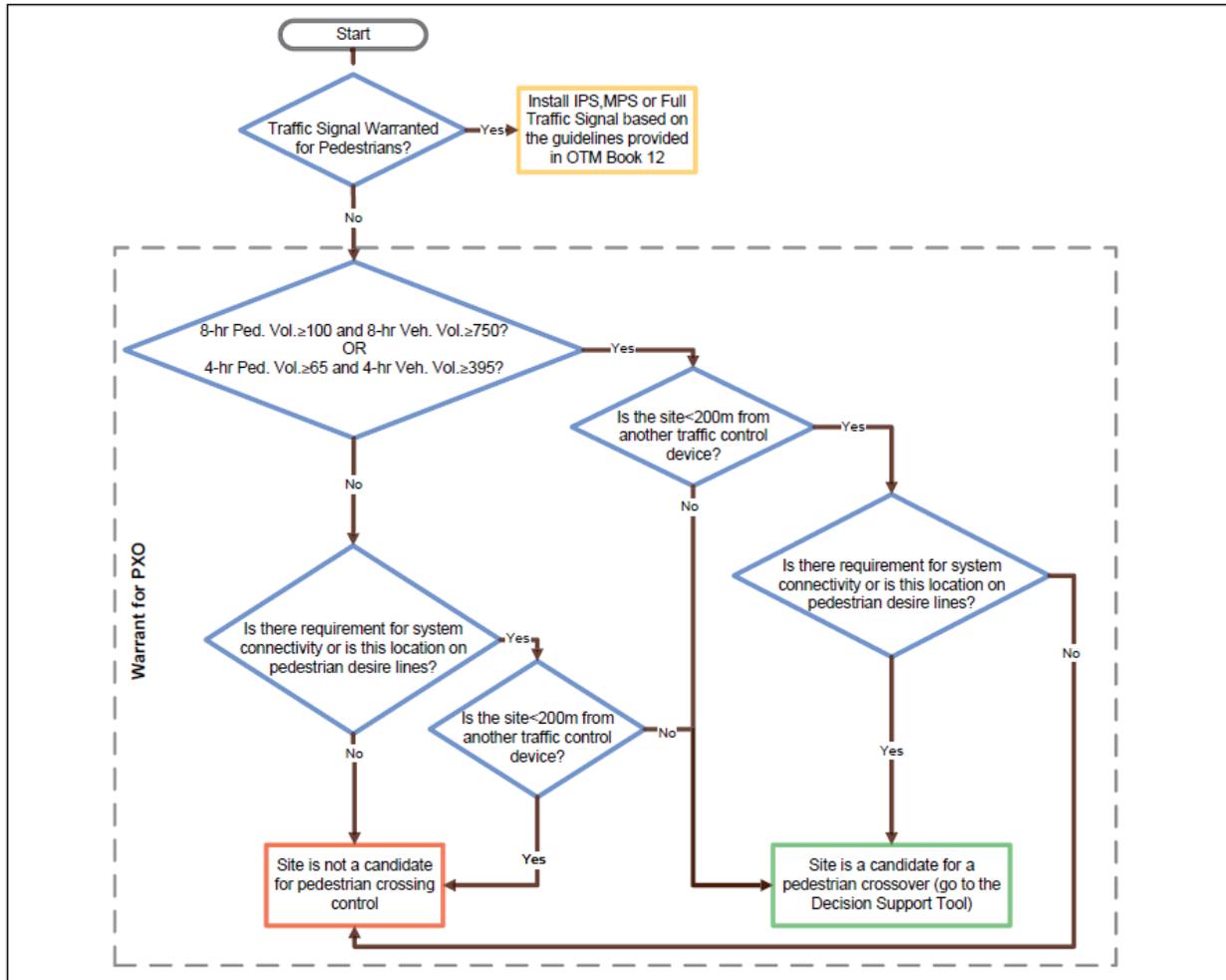


Figure 8: OTM Book 15 Decision Support Tool – Preliminary Assessment

5.1.1. Dundas Street - East and West of Brock Street

8-Hour and 4-Hour Vehicle and Pedestrian Volumes

The first criteria when reviewing whether a PXO is warranted refers to vehicle and pedestrian volumes. It should be noted that although the first step in selecting a pedestrian crossing treatment is to determine whether traffic signals (including IPS, MPS or full traffic signals) are warranted, this requires 8-hour pedestrian classification and delay studies, which are not currently available, and considering the results of the traffic operations review, it is assumed, for the purposes of this preliminary assessment,

that traffic signals are not warranted. The 4-hour vehicle and pedestrian volumes along Dundas Street are provided in **Table 23**.

Given that the 4-hour vehicle volume on Dundas Street west of Brock Street is 4,159 and the posted speed limit is 50 km/h, the OTM Book 15 Pedestrian Crossover Selection Matrix (**Figure 9**) indicates that a PXO is not recommended for sites with a four-lane cross section without a raised refuge, and that generally a traffic signal is warranted for such conditions. The OTM Book 12 traffic signal justification was also reviewed and the traffic volumes do not warrant a traffic signal at this location.

Table 23: 4-Hour Vehicle and Pedestrian Volumes

Location	4-Hour Vehicle Volume	4-Hour Pedestrian Volume
Dundas Street West of Brock Street	4159 ¹¹	61 ¹²
Dundas Street East of Brock Street	2618 ¹³	105 ¹⁴

Requirements for System Connectivity/Pedestrian Desire Lines

Several locations along the Dundas Street corridor have been identified as priority destinations for pedestrians by the Town and the public:

- Whitby Public Library
- Fairview Lodge (Retirement Home)
- All Saints (Place of Worship)
- Whitby Oshawa Baptist Church
- Canada Post Office
- Medical Center

In addition to the priority destinations listed above, several commercial developments are present adjacent to Dundas Street. The commercial developments on Dundas

¹¹ Classification Report on October 26, 2016 between Centre Street and Byron Street from 10:00 to 14:00, total EB and WB vehicles

¹² 4 hour pedestrian counts collected by OTI on January 12, 2017 between 10:00 and 14:00 for Dundas Street West of Brock Street

¹³ Classification Report on October 27, 2016 between Athol Street and Ash Street from 10:00 to 14:00, total EB and WB vehicles

¹⁴ 4 hour pedestrian counts collected by OTI on January 12, 2017 between 10:00 and 14:00 for Dundas Street East of Brock Street

Street and associated pedestrian desire lines are illustrated in **Figure 10**. As shown in **Figure 8**, the process for the analysis and evaluation of pedestrian supportive infrastructure includes the determination of pedestrian desire lines, in a form similar to the Transportation Association of Canada (TAC) decision support tool in which latent pedestrian crossing demand is used to support the identification of this type of infrastructure. The TAC decision support tool and latent crossing demand methodology are illustrated in **Figure 11** and **Figure 12**, respectively.

On-street parking is provided adjacent to Dundas Street west of Brock Street and between Green Street and Athol Street. As such, pedestrian desire lines exist across Dundas Street as pedestrians utilize the on-street parking when destined to commercial areas that do not have dedicated parking.

Two-way Vehicular Volume			Posted Speed Limit (km/h)	Total Number of Lanes for the Roadway Cross Section ¹			
Time Period	Lower Bound	Upper Bound		1 or 2 Lanes	3 lanes	4 lanes w/raised refuge	4 lanes w/o raised refuge
8 Hour	750	2,250	≤50	Level 2 Type D	Level 2 Type C ³	Level 2 Type D ²	Level 2 Type B
4 Hour	395	1,185					
8 Hour	750	2,250	60	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	395	1,185					
8 Hour	2,250	4,500	≤50	Level 2 Type D	Level 2 Type B	Level 2 Type D ²	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	2,250	4,500	60	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	4,500	6,000	≤50	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	4,500	6,000	60	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	6,000	7,500	≤50	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 1 Type A
4 Hour	3,155	3,950					
8 Hour	6,000	7,500	60	Level 2 Type B	Level 2 Type B		
4 Hour	3,155	3,950					
8 Hour	7,500	17,500	≤50	Level 2 Type B	Level 2 Type B		
4 Hour	3,950	9,215					
8 Hour	7,500	17,500	60	Level 2 Type B			
4 Hour	3,950	9,215					

Dundas Street & Athol Street

Dundas Street & Centre Street

Legend: Type A (orange), Type B (light blue), Type C (medium blue), Type D (light green)

Approaches to roundabouts should be considered a separate roadways.

¹The total number of lanes is representative of crossing distance. The width of these lanes is assumed to be between 3.0 m and 3.75 m according to MTO Geometric Design Standards for Ontario Highways (Chapter D.2). A cross sectional feature (e.g. bike lane or on-street parking) may extend the average crossing distance beyond this range of lane widths.

²Use of two sets of side mounted signs for each direction (one on the right side and one on the median)

³Use Level 2 Type B PXD up to 3 lanes total, cross section one-way.

The hatched cells in this table show that a PXD is not recommended for sites with these traffic and geometric conditions. Generally a traffic signal is warranted for such conditions.

Figure 9: OTM Book 15 Pedestrian Crossover Selection Matrix (Dundas Street)

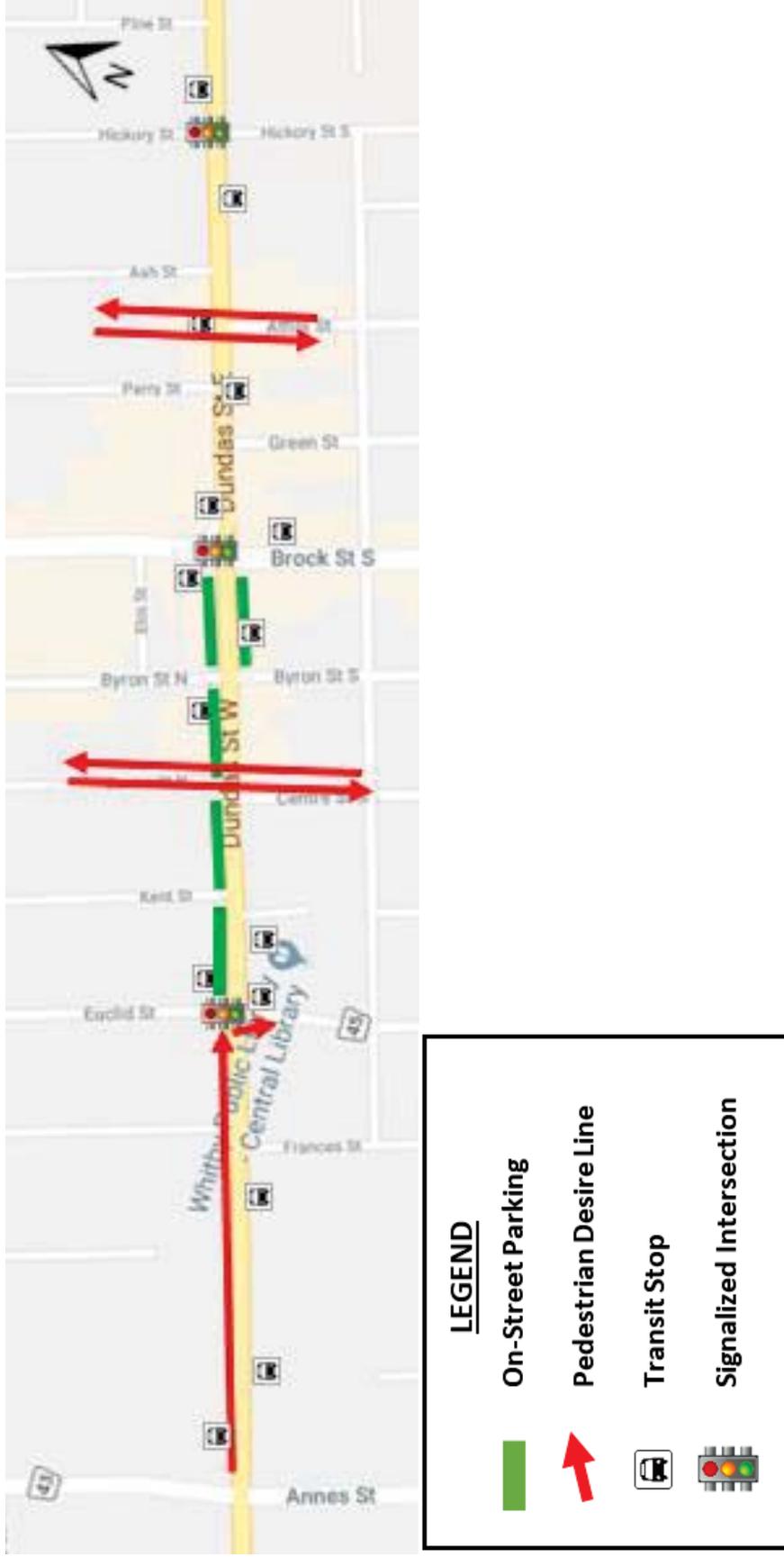


Figure 10: Pedestrian Desire Lines along Dundas Street

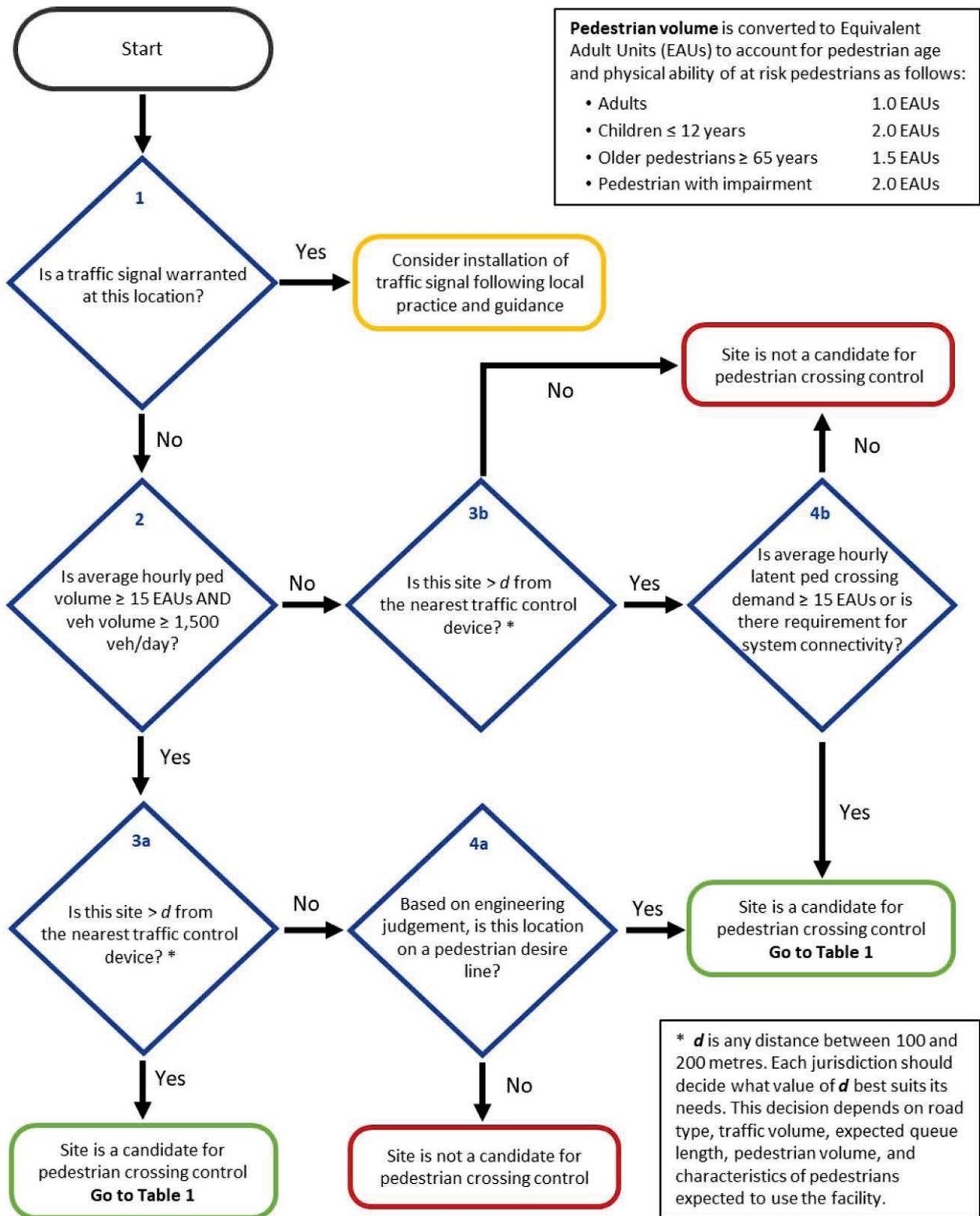


Figure 11: TAC Pedestrian Crossing Control Guide - Decisions Support Tool

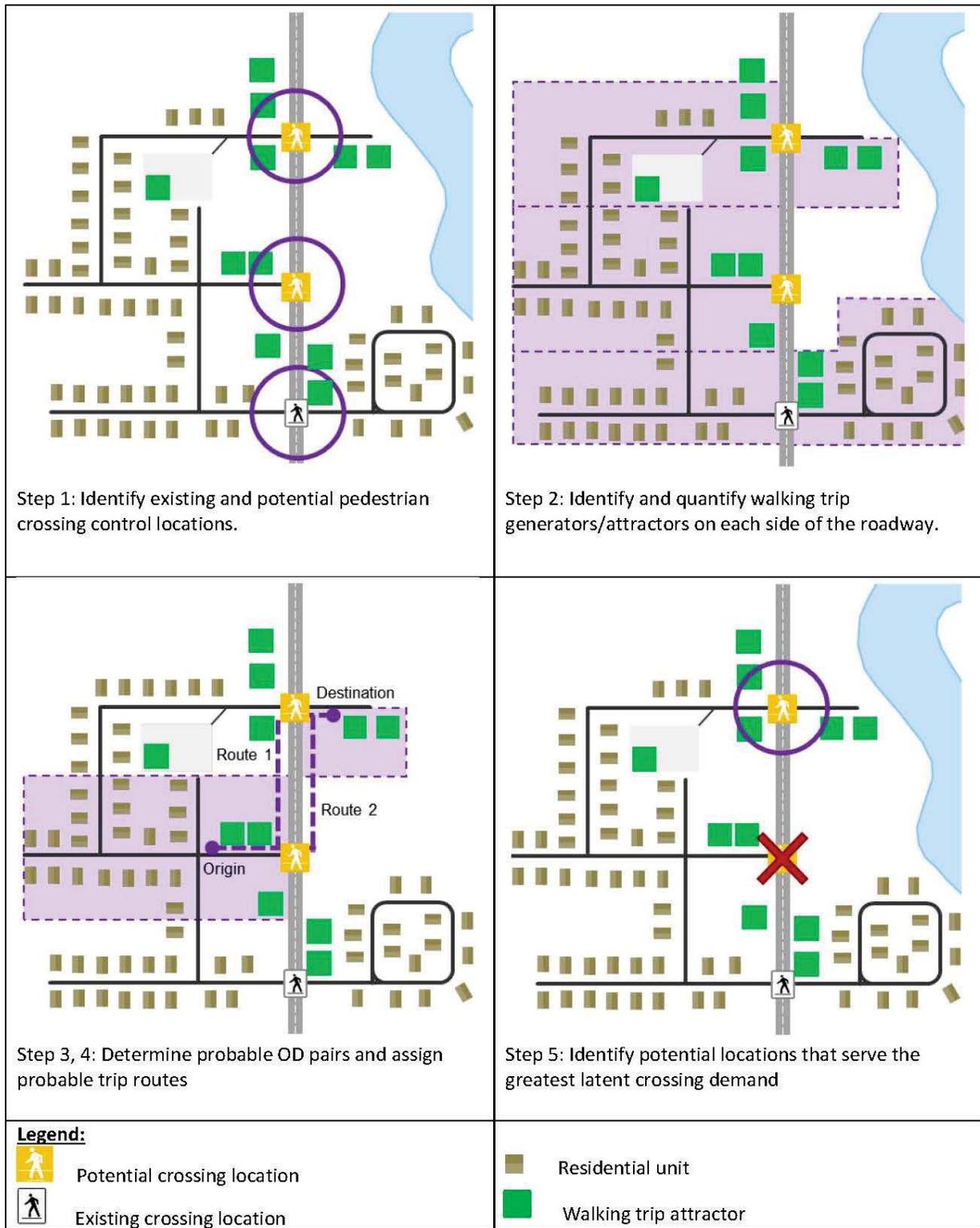


Figure 12: TAC Pedestrian Crossing Control Guide - Latent Crossing Demand Methodology

Transit stops are frequent along Dundas Street and desire lines also exist across Dundas Street for transit users. For example, a pedestrian may exit an eastbound bus at Athol Street onto the north side of Dundas Street; however they are destined for a commercial shop on the south side of Dundas Street requiring them to walk 200 m to the west or 165m to the east to cross at a signalized intersection. Transit ridership along Dundas Street is summarized in **Table 24**.

Table 24: Transit Ridership on Dundas Street

Stop Name	Daily Average Boarding	Daily Average Alighting	Total Ridership
Dundas Street Eastbound @ Frances Street	27.3	15.6	43
Dundas Street Eastbound @ King Street	75.7	75.2	151
Dundas Street Eastbound @ Brock Street	230	158.7	389
Dundas Street Eastbound @ Perry Street	43.8	17.5	61
Dundas Street Eastbound @ Hickory Street	80.7	36	117
Dundas Street Westbound @ Euclid Street	71.1	100.5	172
Dundas Street Westbound @ Byron Street	10.2	27.4	38
Dundas Street Westbound @ Brock Street	173.9	213.5	387
Dundas Street Westbound @ Athol Street	17.3	53	70
Dundas Street Westbound @ Pine Street	41	66.2	107

As discussed in Section 5 of this document pedestrians were observed crossing Dundas Street mid-block east and west of Brock Street. In order to achieve system connectivity, pedestrian facilities should be provided between pedestrian generators along desire lines.

Distance from Traffic Control Devices

There are three signalized intersections along Dundas Street as illustrated in **Figure 13**.

West of Brock Street, there are 395 m between traffic control devices. Therefore, the distance between the Dundas Street/Brock Street and Euclid Street/Dundas Street intersections is sufficient to justify a PXO in the vicinity of Centre Street (approximately 200 m from either signal).

East of Brock Street, the distance between the Dundas Street/Brock Street and Hickory Street/Dundas Street intersections is not sufficient to justify a PXO, since any candidate location would be closer than 200 m from an existing traffic signal.



Figure 13: Traffic Signal Spacing on Dundas Street

Results of the Selection Process

Dundas Street West, West of Brock Street

A crossing treatment on Dundas Street West, west of Brock Street is recommended. An Intersection Pedestrian Signal (IPS) is recommended over a PXO as this type of treatment is more familiar to drivers and pedestrians (i.e. pavement markings, signage, etc.) and is therefore likely to be safer for all road users at this location.

The implementation of an IPS on Dundas Street West will require the removal of on-street parking spaces near Centre Street.

There are no existing bus stops near the two recommended intersections, therefore no impacts to transit users are expected; however, the provision of new transit stops in the future will need to consider the presence of the IPS/PXO to select proper locations. It would be beneficial to provide transit stops near the IPS/PXO to allow transit users to

cross Dundas Street without the need to walk a long distance and discourage crossings outside the designated locations.

Dundas Street East, East of Brock Street

The Dundas Street East/Athol Street location satisfies the criteria for the installation of a PXO. However from consistency and driver expectations point of view, the use of different pedestrian crossing controls within short distance should be avoided to alleviate driver confusion. Therefore, the Dundas Street/Athol Street location is recommended for implementation of an IPS. Although the distance to existing traffic signals is less than the 200 m requirement (approximately 175 to 195 m), an IPS can be considered because the vehicle and pedestrian volumes in this area exceed the minimum requirements, and pedestrian desire lines exist at this location due to the retail/commercial developments along Dundas Street.

The implementation of an IPS near Athol Street will not require the removal of parking spaces as on-street parking is currently prohibited.

Finally, the installation of IPS at the recommended locations will place them closer than 215 m from existing signals, less than the minimum recommended by OTM Book 12 – Traffic Signals (approximately between 190 m to 195 m). In order to allow drivers to recognize and react to the device, the use of optically programmable traffic signals is recommended.

5.1.2. Brock Street

A pedestrian crossing review was conducted at the following locations along Brock Street:

- Brock Street South and St. John Street; and
- Brock Street South and Trent Street.

These two locations were selected for review because they are located approximately at the mid-point between the two traffic signals separated by the longest distance in the study area (approximately 600 metres between Gilbert Street and Burns Street).

It should be noted that Brock Street/Colborne Street was not reviewed due to the low pedestrian volumes crossing in the east/west direction, across Brock Street (71 pedestrians in 8 hours)¹⁵ and to the proximity to other traffic signal (120 metres from the crosswalks at Dundas Street and Dunlop Street), which does not meet the minimum requirement from OTM Book 15. However, an Intersection Pedestrian Signal is recommended by the Town to support walkability in the Downtown core.

¹⁵ Brock Street and Colborne Street Traffic Count Summary, May 28, 2015, Town of Whitby

8-Hour and 4-Hour Vehicle and Pedestrian Volumes

The 8-hour vehicle and pedestrian volumes along Brock Street are provided in **Table 25**.

Table 25: 8-Hour Vehicle and Pedestrian Volumes

Location	8-Hour Vehicle Volume	8-Hour Pedestrian Volume
Brock Street and St. John Street ¹⁶	6859	60
Brock Street and Trent Street ¹⁷	8447	89

At Brock Street and St. John Street, the 8-hour, 2-way vehicle volumes along the corridor exceed the minimum volume requirement of 750 vehicles. The 8-hour pedestrian volumes along the corridor do not exceed the minimum volume requirement of 100.

At Brock Street and Trent Street, the 8-hour, 2-way vehicle volumes along the corridor exceed the minimum volume requirement of 750 vehicles. The 8-hour pedestrian volumes along the corridor do not exceed the minimum volume requirement of 100 but are reasonably close.

The 4-hour vehicle and pedestrian volumes along Brock Street are provided in **Table 26**.

Table 26: 4-Hour Vehicle and Pedestrian Volumes

Location	4-Hour Vehicle Volume	4-Hour Pedestrian Volume
Brock Street and St. John Street ¹⁸	4072	31
Brock Street and Trent Street ¹⁹	4934	67

¹⁶ Brock Street and St. John Street Traffic Count Summary, November 8, 2016, Town of Whitby

¹⁷ Trent Street and Brock Street Traffic Count Summary, November 8, 2016, Town of Whitby

¹⁸ Brock Street and St. John Street Traffic Count Summary, November 8, 2016, Town of Whitby

¹⁹ Trent Street and Brock Street Traffic Count Summary, November 8, 2016, Town of Whitby

At Brock Street and St. John Street, the 4-hour, 2-way vehicle volumes along the corridor exceed the minimum volume requirement of 395 vehicles. The 4-hour pedestrian volumes along the corridor do not exceed the minimum volume requirement of 65.

At Brock Street and Trent Street, the 4-hour, 2-way vehicle volumes along the corridor exceed the minimum volume requirement of 395 vehicles and the 4-hour pedestrian volumes along the corridor exceed the minimum volume requirement of 65.

Requirements for System Connectivity/Pedestrian Desire Lines

Given that Brock Street is a central north-south route through Downtown Whitby, pedestrians are required to cross Brock Street in order to travel between the east and west sides of the Downtown.

There are three priority destinations at the south end of Brock Street:

- Henry Street High School
- Centennial Park
- Peel Park

Transit stops are also frequent along Brock Street. Transit ridership along Brock Street is summarized in **Table 27**.

Desire lines are present across Brock Street connecting Henry Street High School in the west to Peel Park in the east. Additionally, pedestrians may travel along Pitt Street through the trail within Centennial Park. The pedestrian desire lines across Brock Street are illustrated in **Figure 14**. To achieve system connectivity, pedestrian facilities should be provided along desire lines.

Table 27: Transit Ridership on Brock Street

Stop Name	Daily Average Boarding	Daily Average Alighting	Total Ridership
Brock Street Northbound @ John Street	17.2	8.7	26
Brock Street Northbound @ Dundas Street	133.7	69.8	204
Brock Street Northbound @ Ontario Street	12.3	18	30
Brock Street Northbound @ Trent Street	2.9	1.7	5
Brock Street Northbound @ Burns Street	13	1.9	15
Brock Street Northbound @ St Peter Street	6.8	1.4	8
Brock Street Southbound @ Mary Street	5	16.1	21
Brock Street Southbound @ Dundas Street	54	134.4	188
Brock Street Southbound @ Gilbert Street	16.7	17.6	34
Brock Street Southbound @ Ontario Street	2.6	0.8	3

Stop Name	Daily Average Boarding	Daily Average Alighting	Total Ridership
Brock Street Southbound @ Trent Street	1.8	3.8	6
Brock Street Southbound @ Burns Street	2.8	17.7	21



Figure 14: Brock Street Pedestrian Desire Lines

Distance from Traffic Control Devices

There are three signalized intersections along Brock Street as illustrated in **Figure 15**. There are 595 m between the traffic signals at Gilbert Street and Burns Street. Therefore, the distance between the Gilbert Street & Brock Street and Burns Street & Brock Street intersections is sufficient to justify a PXO at Trent Street or St. John Street.

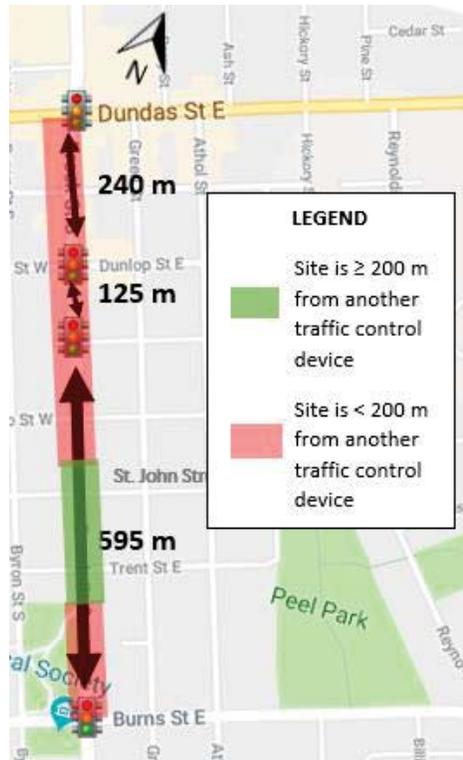


Figure 15: Brock Street Signal Spacing

Results of the Selection Process

Based on the high pedestrian and vehicle volumes and spacing between traffic control devices, the intersection of Trent Street & Brock Street is the best candidate for a PXO compared to other options. A PXO in proximity of this intersection will also improve east-west connectivity from Henry Street High School in the west, through Centennial Park, to Peel Park in the east. Given that the pedestrian desire lines along Brock Street align directly with the Trent Street & Brock Street intersection (**Figure 14**), the St. John Street & Brock Street location was not carried forward for further consideration.

However, given the current geometric conditions at this location (4-lane cross section without raised refuge), the OTM Book 15 Pedestrian Crossover Selection Matrix (**Figure 16**) indicates that a PXO is not recommended and generally a traffic signal is warranted for such conditions. OTM Book 12 traffic signal justification was also reviewed for the intersection, however existing traffic volumes do not warrant a traffic signal at this location.

As part of discussions sustained with the Town during the completion of this assignment, the possibility of pursuing a road diet on Brock Street and/or Dundas Street in the downtown study area was considered as a potential opportunity in the future. This would involve reducing Brock Street to a 3-lane cross-section within the area evaluated for a potential pedestrian crossing as well as curb extensions at Brock Street and Trent Street to reduce the pedestrian crossing distance at the intersection. The OTM Book 15 Pedestrian Cross Selection Matrix (**Figure 16**) indicates that a Level 2 Type B PXO may be

considered if a road diet were to be completed. Additional details regarding the potential road diet are discussed in **Section 5.5**.

Two-way Vehicular Volume			Posted Speed Limit (km/h)	Total Number of Lanes for the Roadway Cross Section ¹			
Time Period	Lower Bound	Upper Bound		1 or 2 Lanes	3 lanes	4 lanes w/raised refuge	4 lanes w/o raised refuge
8 Hour	750	2,250	≤50	Level 2 Type D	Level 2 Type C ³	Level 2 Type D ²	Level 2 Type B
4 Hour	395	1,185					
8 Hour	750	2,250	60	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	395	1,185					
8 Hour	2,250	4,500	≤50	Level 2 Type D	Level 2 Type B	Level 2 Type D ²	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	2,250	4,500	60	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	1,185	2,370					
8 Hour	4,500	6,000	≤50	Level 2 Type C	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	4,500	6,000	60	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 2 Type B
4 Hour	2,370	3,155					
8 Hour	6,000	7,500	≤50	Level 2 Type B	Level 2 Type B	Level 2 Type C ²	Level 1 Type A
4 Hour	3,155	3,950					
8 Hour	6,000	7,500	60	Level 2 Type B	Level 2 Type B	Hatched	Hatched
4 Hour	3,155	3,950					
8 Hour	7,500	17,500	≤50	Level 2 Type B	Level 2 Type B	Hatched	Hatched
4 Hour	3,950	9,215					
8 Hour	7,500	17,500	60	Level 2 Type B	Hatched	Hatched	Hatched
4 Hour	3,950	9,215					

Type A Type B Type C Type D

Approaches to roundabouts should be considered a separate roadways.

¹The total number of lanes is representative of crossing distance. The width of these lanes is assumed to be between 3.0 m and 3.75 m according to MTO Geometric Design Standards for Ontario Highways (Chapter D.2). A cross sectional feature (e.g. bike lane or on-street parking) may extend the average crossing distance beyond this range of lane widths.

²Use of two sets of side mounted signs for each direction (one on the right side and one on the median)

³Use Level 2 Type B PXO up to 3 lanes total, cross section one-way.

The hatched cells in this table show that a PXO is not recommended for sites with these traffic and geometric conditions. Generally a traffic signal is warranted for such conditions.

Figure 16: OTM Book 15 Pedestrian Crossover Selection Matrix (Brock Street)

5.2. Redesign and Improvements of Existing Intersections

5.2.1. Intersection Redesign - Dundas Street and Brock Street

The intersection of Dundas Street and Brock Street has a channelized westbound right-turn. Typically, channelizations are less safe for pedestrians, as right-turning vehicles could enter them at higher speeds (although collision history does not suggest a problem). This channelization may create a visibility issue making it difficult for drivers to see pedestrians waiting to cross the intersection. This geometry can also force drivers to an uncomfortable angle looking for gaps in northbound traffic.

Improvements to the geometry of the channelized westbound right-turn can improve visibility for drivers allowing them to better identify pedestrians crossing at the channelization. Three options for improvements to the geometry of the channelized westbound right-turn at the Dundas Street & Brock Street intersection were developed and are illustrated in **Figure 17** through **Figure 19**.

Option 1: Enlarge the Island

Option 2: Enlarge the Island to Include a Truck Apron Around Outside Channel

Option 3: Smart Channel

Option 1 provides a larger traffic island with an increase in the road entry angle for vehicles. The larger traffic island reduces the north-south crossing distance for pedestrians on the east leg of the intersection. The reduced channelization radius provides a realignment of the crosswalk such that vehicles approach the crosswalk at an improved angle (at a tangent) which can improve driver visibility of pedestrians.

Option 2 provides similar improvements to Option 1 with the addition of an apron around the outside of the channelization. The apron provides additional area for WB-20 trucks and emergency vehicles to maneuver around the channelization if necessary, while allowing drivers to better identify pedestrians waiting at the crossing.

Option 3 replaces the existing channelization with a smart channel. The smart channel increases the adjacent road entry angle such that turning speed can be reduced to be more consistent with yield conditions. An apron provides additional turning area for WB-20 trucks and emergency vehicles to maneuver around the channelization if necessary. The reduced viewing angle can improve drivers' visibility of pedestrians crossing the channelization.

It was expressed at the Stakeholder Meeting that wheelchairs have some difficulty when traffic islands are small having to ramp-up and down in a quick succession.²⁰

Any one of these options provides an improvement. Option 3 (a truck apron could be added) provides the best orientation for drivers to see pedestrians and other turning traffic. However, each option has merit for consideration in the redesign of this intersection. A more detailed study is required to finalize the selection of a design for this intersection. It is also noted that a separate study has been undertaken by Metrolinx to implement Bus Rapid Transit (BRT) on Highway 2/Dundas Street corridor. Therefore, the Brock Street/Dundas Street intersection design should be reviewed as part of the Highway 2 BRT Study.

²⁰ At this respect, CIMA+ prepared a White Paper for the Region of Peel discussing the current-state-of practice regarding Right-turn Channelized Islands which recommended that the design of this type of facilities considers the use of a depressed curb channel flush with the adjacent pavement rather than the use of curb ramps.

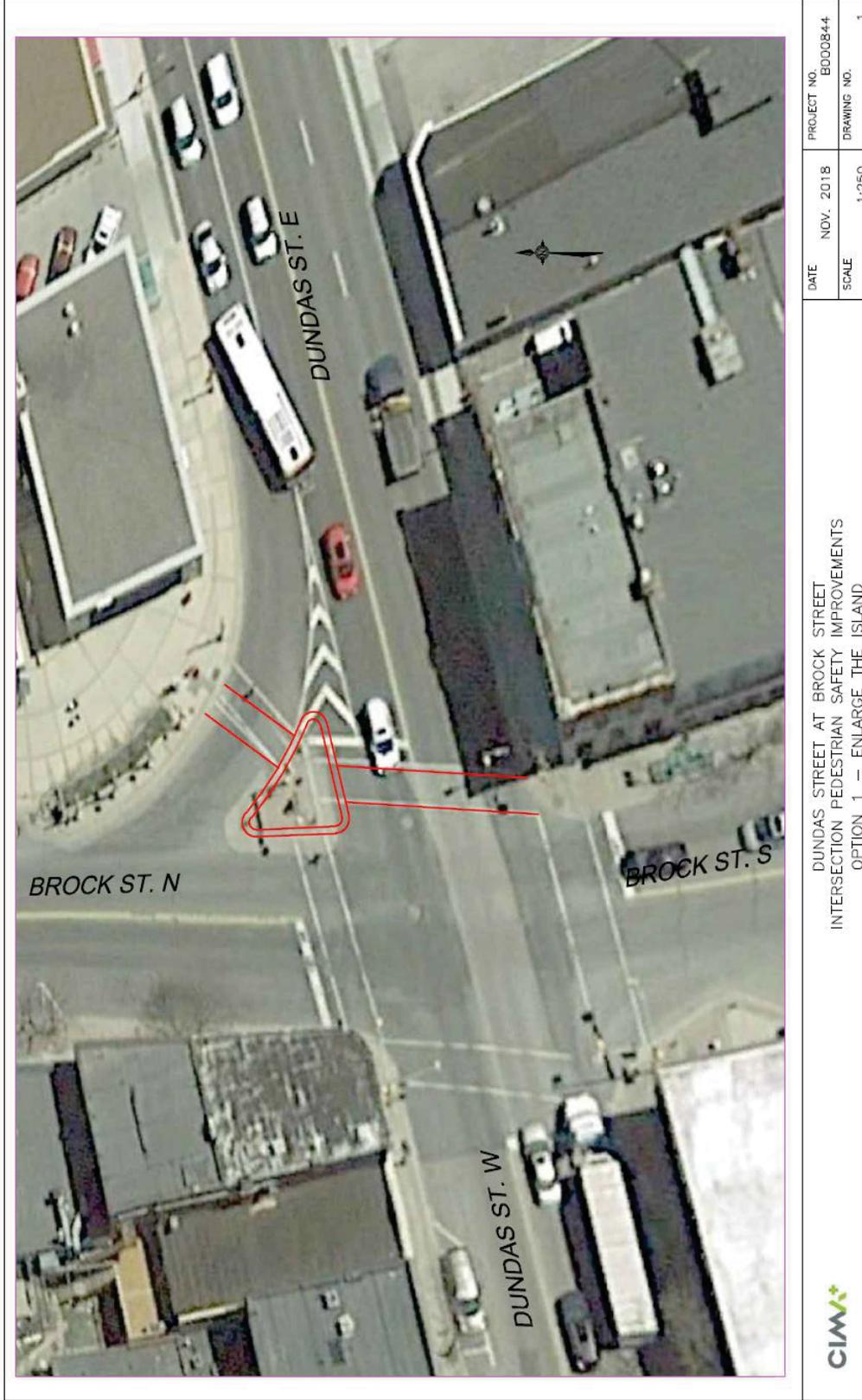


Figure 17: Option 1 - Enlarge the Island

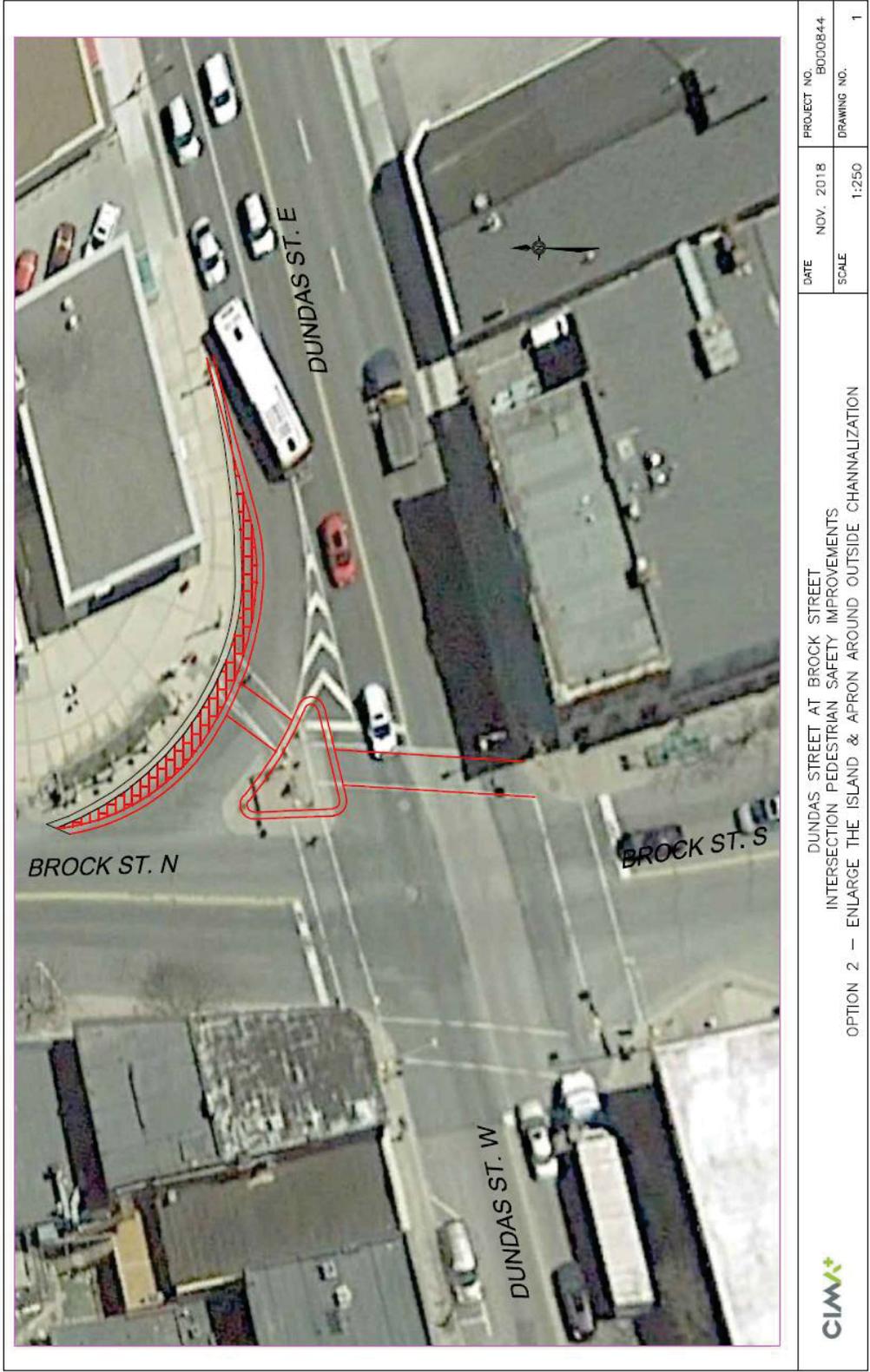


Figure 18: Option 2 - Enlarge the Island and Apron Around Outside Channel

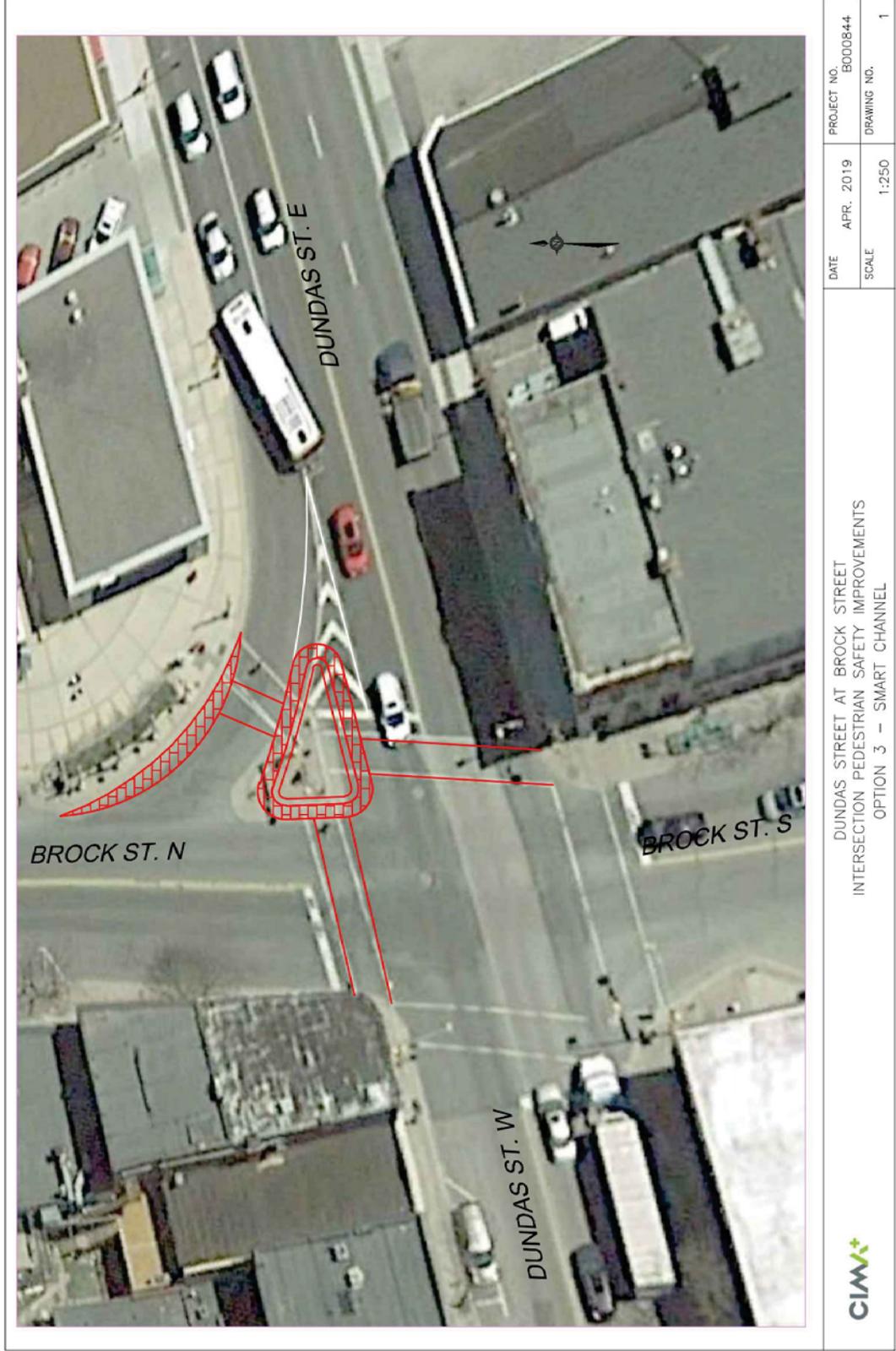


Figure 19: Option 3 - Smart Channel

5.2.2. Traffic Control Elements at Existing Intersections

Traffic control elements at intersections including crosswalk pavement markings, tactile plates, push buttons, locator tone, and countdown timers are essential elements in providing accessible crossings for pedestrians.

This section identifies locations in which accessibility and safety of the pedestrian environment around Downtown Whitby can be enhanced with the additions of these types of traffic control elements.

Crosswalks Pavement Markings

Table 28 identifies the locations in Downtown Whitby that require pavement marking improvements at crosswalks. The existing traffic control is also provided in the table. Where sufficient information was available, traffic control warrants were conducted to determine the preferred traffic control for each location. Based on the warrant analysis of the existing all-way stop controlled locations, most locations are not meeting the warrants. It is suggested that the current all-way stop control at these intersections should be maintained until the Town considers implementation of roundabouts.

In order to promote walking and enhance pedestrian safety at the crosswalk locations, it is recommended that the Town should consider enhancing visual cues at high pedestrian conflict areas through various treatments including textured pavements.

The locations identified in **Table 28** were selected based on the field review findings, however it is recommended that crosswalk pavement markings be considered at all intersections within the residential areas, as required.

Table 28: Missing Pavement Markings

Location	Existing Traffic Control	Observations	Potential Improvements	Preferred Traffic Control (As Per Warrant)
Colborne Street East & Hickory Street South	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crosswalk pavement markings across Colborne Street East 	<ul style="list-style-type: none"> Crosswalk pavement markings across Colborne Street East 	<ul style="list-style-type: none"> Stop Control on Minor Road
Colborne Street East & Athol Street	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crosswalk pavement markings across Colborne Street East 	<ul style="list-style-type: none"> Crosswalk pavement markings across Colborne Street East 	<ul style="list-style-type: none"> Stop Control on Minor Road
Colborne Street East & Green Street	<ul style="list-style-type: none"> All-way Stop Control 	<ul style="list-style-type: none"> No crosswalk pavement markings 	<ul style="list-style-type: none"> Crosswalk pavement markings on all 4 approaches 	<ul style="list-style-type: none"> Stop Control on Minor Road
Colborne Street West & King Street	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crosswalk pavement markings across King Street 	<ul style="list-style-type: none"> Crosswalk pavement markings across King Street 	<ul style="list-style-type: none"> Not Applicable
Colborne Street West & Henry Street	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crosswalk pavement markings across Colborne Street West 	<ul style="list-style-type: none"> Crosswalk pavement markings across Colborne Street West 	<ul style="list-style-type: none"> Not Applicable
Colborne Street West & Frances Street	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crosswalk pavement markings across Colborne Street West 	<ul style="list-style-type: none"> Crosswalk pavement markings across Colborne Street West 	<ul style="list-style-type: none"> Not Applicable

Location	Existing Traffic Control	Observations	Potential Improvements	Preferred Traffic Control (As Per Warrant)
Centre Street & Dunlop Street West	<ul style="list-style-type: none"> All-way Stop Control 	<ul style="list-style-type: none"> No crossing treatments provided across Centre Street and Dunlop Street West 	<ul style="list-style-type: none"> Crosswalk pavement markings across Centre Street and Dunlop Street West 	<ul style="list-style-type: none"> Stop Control on Minor Road
Dunlop Street West & Byron Street South	<ul style="list-style-type: none"> Stop Control on Minor Road 	<ul style="list-style-type: none"> No crossing treatments provided across Byron Street South 	<ul style="list-style-type: none"> Crosswalk pavement markings across Byron Street South 	<ul style="list-style-type: none"> Stop Control on Minor Road

Tactile Plates

Table 29 identifies the locations in Downtown Whitby that require new tactile plates or modifications to tactile plates on the approach to crosswalks to assist pedestrians that are visually impaired.

Table 29: Missing Tactile Plates

Location	Observations	Potential Improvements
Dundas Street & Brock Street	<ul style="list-style-type: none"> No tactile plates present 	<ul style="list-style-type: none"> Tactile plates on all approaches to crosswalks
Dundas Street East & Hickory Street		
Dunlop Street & Brock Street		
Brock Street & Gilbert Street		
Brock Street & Mary Street	<ul style="list-style-type: none"> No tactile plates present on the south corners of the intersection 	

Pedestrian Crossing Indicators

AODA indicates that where a new traffic control signal system with pedestrian control signals are being installed or existing pedestrian control signals are being replaced, the pedestrian control signals must meet the requirements for accessible pedestrian control signals. The requirements include a locator tone that is distinct from a walk indicator tone, manual and automatic activation features and vibro-tactile walk indicators which vibrate to alert pedestrians that the light has changed.

Push Buttons

Table 30 identifies the locations in Downtown Whitby that are missing pedestrian signal push buttons or require modifications to the existing push buttons. AODA requires that push buttons be vibro-tactile walk indicators which are pedestrian crossing signal push button devices that vibrate and can be felt through the sense of touch to communicate pedestrian crossing timing in a non-visual way.

Table 30: Missing Push Buttons

Location	Observations	Potential Improvements
Dundas Street & Brock Street	<ul style="list-style-type: none"> No push buttons present 	<ul style="list-style-type: none"> Vibro-tactile walk indicator push buttons on all crosswalk approaches
Dundas Street West & Euclid Street		
Dundas Street East & Hickory Street	<ul style="list-style-type: none"> Push buttons are not vibro-tactile walk indicators 	
Dunlop Street & Brock Street		

Locator Tone

Table 31 identifies the locations in Downtown Whitby that are missing the pedestrian signal locator tone (AODA requirement).

Table 31: Missing Locator Tone

Location	Observations	Potential Improvements
Dundas Street & Brock Street	<ul style="list-style-type: none"> No locator tones 	<ul style="list-style-type: none"> Locator tone to be implemented on all pedestrian signals
Dundas Street West & Euclid Street		
Dundas Street East & Hickory Street		
Dunlop Street & Brock Street		

Countdown Timer

Table 32 identifies the locations in Downtown Whitby that are missing the pedestrian signal countdown timer. Pedestrian signal countdown timers provide additional indication of the remaining time available for pedestrians to cross the street safely at signalized intersections. Countdown timers should be installed at missing locations for consistency between all intersections to improve pedestrian and driver expectancy.

Table 32: Missing Countdown Timer

Location	Observations	Potential Improvements
Dundas Street & Brock Street	<ul style="list-style-type: none"> No countdown timer 	<ul style="list-style-type: none"> Countdown timer to be implemented on all pedestrian signals
Dundas Street East & Hickory Street		
Dunlop Street & Brock Street		
Dundas Street West & Euclid Street		

As per the Accessibility for Ontarians with Disabilities Act (AODA), at the time of intersection rehabilitation or reconstruction, countdown timers, push buttons and additional accessible pedestrian control signals are required to be installed.

5.3. Sidewalk Improvements

Although the Downtown Whitby Walkability Base map directly links the walkability of the downtown area to distance and time (i.e. 10 minute and 5 minutes walk), a comprehensive review of sidewalk policies established by other municipalities suggested that walkability also depends on sidewalk provision and the type and location of the main generators of pedestrian traffic within a specific radius surrounding the generator.

Implementation of sidewalk policies that support new construction or reconstruction of existing sidewalks promotes a full integration of the pedestrian infrastructure with the consequent increase on connectivity for the entire urban area. A summary of the elements considered for other municipalities as part of the aforementioned sidewalk policies are presented in **Table 33**.

Table 33: Sidewalk Policies in Other Municipalities

Criteria	Requirement
Collector Road	AADT of 2000 vehicles per day
Local Road	AADT of 1600 vehicles per day
New Local Road	All new local roads require sidewalks on at least one side of the road
School	Within 800 meters of an elementary school, high school, or post-secondary school
Downtown Core	Within 800 m of the downtown
Place of Worship	Within 400 m of a place of worship
Public Parks	Within 400m of a community facility or park
Commercial Developments	Within 400m of a mixed use corridor Within 800m of a major employer (>500 employees)
Transit	Within 800m of the proposed multi modal hub and rapid transit station areas
Conservation Areas	Within 400m of a community facility or park
Town Hall	Within 400m of a community facility or park
Cemetery	Within 400m of a place of a cemetery
Hospital	Within 400m of a healthcare facility
Trails	Within 400m of a trail

Sources: Town of Grimsby Official Plan (2012), City of Kitchener Sidewalk Infill Policy (2015)

Following this approach and based on the information collected during the field and desktop review, the following location improvements to the sidewalk network are presented for consideration in **Table 34**. These improvements are consistent with the Town’s current sidewalk policy to provide sidewalks on one side of the road (at a minimum). It is recommended that as part of future implementation, the Town consider opportunities to provide sidewalks on both sides of the road, where feasible.

Table 34: Improvement Opportunities in the Pedestrian Network

Location	Potential Improvements
Trent Street East	<ul style="list-style-type: none"> Install sidewalks on one side of the road east of Athol Street to Peel Street (discontinuous route to Peel Park)
St. John Street East	<ul style="list-style-type: none"> Install a sidewalk on the south side of the road east of Athol Street to Peel Street (discontinuous route to Peel Park)
Ontario Street East	<ul style="list-style-type: none"> Install a sidewalk on the north side of the road east of Athol Street to Peel Street (discontinuous route to Peel Park)
Peel Street	<ul style="list-style-type: none"> Install a sidewalk at least on one side of the road from Ontario Street East to Trent Street East (discontinuous route to Peel Park)

In similar tone, sidewalk segments identified for potential improvements from an accessibility perspective (AODA requires that exterior paths of travel including sidewalks provide a minimum clear width of 1.5 metres free of obstacles) are presented in **Table 35**.

Table 35: Preferred Sidewalk Width

Location	Potential Improvements
St. John Street	<ul style="list-style-type: none"> 1.5 m sidewalks free of obstacles for the locations in Figure 5
Pitt Street	

5.3.1. Curb Extensions

Table 36 identifies the locations in Downtown Whitby that present the opportunity for curb extensions to reduce the crossing distance for pedestrians and to improve visibility at intersections by restricting parking at the intersection.

Table 36: Curb Extensions

Location	Observations	Recommended Improvements
Brock Street & Colborne Street	<ul style="list-style-type: none"> • Curb bump outs provided on Brock Street but not Colborne Street 	<ul style="list-style-type: none"> • Curb bump outs on Colborne Street similar to those on Brock Street at this intersection (Figure 6)
Colborne Street East and Green Street	<ul style="list-style-type: none"> • Curb bump outs not provided 	<ul style="list-style-type: none"> • Curb bump outs on Colborne Street on the west side of the intersection (Figure 6)
Brock Street & Trent Street East	<ul style="list-style-type: none"> • Curb bump outs not provided 	<ul style="list-style-type: none"> • If a road diet is provided on Brock Street and a pedestrian crossing is provided at this location (Section 5.1) curb bump outs can be provided to reduce pedestrian crossing distance (Figure 6)

5.3.2. Parking

Although our field review indicates that opportunities may exist to redistribute right-of-way currently allocated to parking spaces to other elements of the roadway (i.e. wider sidewalks, boulevards and streetscaping) servicing the Downtown, the preliminary findings of the Parking Master Plan suggested that elimination of on-street parking spaces would require the replacement of lost parking in an appropriate location.

Since at the time of the preparation of this report the dimensions and location of a potential parking structure to satisfy current unmet demand is uncertain, the determination of specific locations in which on-street parking space can be relocated to other purposes is not possible.

The long-term recommendation is for the removal of on-street parking on at least one side of Brock Street and reconstruction of the corridor would allow for improved pedestrian environment; however this should be comprehensively reviewed as removal of parking on Brock Street/Dundas Street requires laneway design study for waste collection which may trigger pedestrian safety improvements including improvements to sidewalks on local streets.

Further, to promote active transportation in the study area, it is recommended that the Town consider providing bicycle parking and accessible self cleaning washrooms in the Town parking lots by taking away some parking spaces as part of parking lot reconstruction/rehabilitation projects.

5.3.3. Transit Infrastructure Related Improvements

Table 37 identifies the locations in Downtown Whitby that present the opportunity for improvements to the existing transit supportive infrastructure to enhance the comfort of transit users and connectivity with the pedestrian network.

5.3.4. Street Lighting

Table 37: Transit Infrastructure Related Improvements

Location	Recommended Improvements
Brock Street & Gilbert Street	<ul style="list-style-type: none"> Consider the integration of bus shelters as part of the proposed Gateway Design (see next section) Review and discuss with the private property owners, the provision of a bike trough or ramp for cyclists
Brock Street & Trent Street	<ul style="list-style-type: none"> Consider providing bus shelters as part of the proposed crossing
Dundas Street West and Henry Street/Euclid Street	<ul style="list-style-type: none"> Consider the integration of the existing bus shelters as part of the proposed Gateway Design (see next section)
Brock Street	<ul style="list-style-type: none"> Consider installation of benches and bike parking facility at transit stops, where feasible Discuss with Durham Region Transit the consolidation/relocation of bus stops on Brock Street and Dundas Street, where appropriate and practical Work with Durham Region Transit to provide benches and bike racks at bus stops located on major transit routes, where feasible
Dundas Street	

Street lighting is an essential component to support pedestrian safety and comfort. Our field review indicates that opportunities may exist to enhance current street lighting levels along Brock Street and Dundas Street corridors. Enhanced street lighting is expected to increase pedestrian safety and comfort along these corridors. The Town shall consider reviewing the existing street lighting levels and implement enhanced street lighting, as required, as part of reconstruction/resurfacing projects.

5.3.5. Cycling Facilities

Information collected as part of the field and desktop review of the areas under study was compared against the preliminary findings and recommendations of the Active Transportation Plan Study (ATP) status report (PW 07-19) presented to the Committee of Whole on February 25, 2019.

Based on the material presented and attached to the aforementioned report, the proposed cycling facility types for Downtown Whitby and relevant for the purpose of this assignment are identified in **Table 38**.

Table 38: Active Transportation Plan- Proposed Facility Types for Downtown Whitby

Location	Signed Route	Bike Lane	In-Boulevard Path	Park Path
Mary Street/Giffard Street	West of Cochrane Street	Garden Street to High Street	-	High Street to Cochrane Street
Dundas Street	-	-	Euclid Street to west of Annes Street	-
Dunlop Street	Euclid Street to Anne Street	Garden Street to Euclid Street	-	-
Trent Street	Peel Street to Henry Street	-	-	-
Harriet Street	Euclid Street to Annes Street	-	-	-
Burns Street	-	West of Annes Street to East of Athol Street	-	-
Colborne Street	-	Garden Street to Henry Street.	-	-
Cochrane/Annes Street	South of Burns Street	Burns Street to north of Mary Street	-	-
High Street	Mary Street to Walnut Street	-	-	-

Location	Signed Route	Bike Lane	In-Boulevard Path	Park Path
Euclid Street	Dundas Street to Beech Street West	-	-	-
Henry Street	-	Dundas Street to south of Burns Street	-	-
Byron Street	Mary Street to Maple Street West St. John Street to south of Burns Street	Mary Street to St. John Street	-	-
Brock Street	Mary Street to Highway 401 – facility type/design to be confirmed through future studies and investigations	-	-	-
Brock Street	-	-	North of Mary Street	-
Athol Street	Dunlop Street to south of Burns Street	-	-	-
Ash Street	Mary Street to Maple Street East	-	-	-
Hickory Street	Dundas Street to Dunlop Street	Dundas Street to Regency Crescent	-	Regency Crescent to Regency Crescent

For this assignment, it was assumed that the proposed improvements to the cycling facilities serving the downtown area will (at the design stage) be carried out in

conjunction with consideration to pedestrian movement also, e.g. crossrides, pedestrian crossovers, etc.

- Consideration for improvements at the following intersections to increase the safety of pedestrians and cyclists:
 - Henry Street and Trent Street West
 - Athol Street and Trent Street East
 - Trent Street and Brock Street
 - Henry Street and Dunlop Street West
 - Henry Street and Burns Street West
 - Burns Street West and Byron Street South
 - Brock Street and Burns Street
 - Burns Street East and Athol Street
- Consideration for updating the Town website to provide more information on walking and cycling including downtown walkability and cycling maps.
- Review and analyze the current snow removal program for Downtown Whitby to enhance pedestrian safety, comfort and accessibility.
- Similarly, consideration for pedestrian and cyclists' movements as part of the design of the gateways as described in the following section.

5.4. Gateways

Town staff and representatives of the Downtown Parking Study, the Downtown Whitby Historic Gateways Detailed Conceptual Design, the Active Transportation Study (WSP), and this Transportation and Pedestrian Safety Action Plan, discussed the project to identify potential overlap, and to ensure a consistent and coordinated approach throughout the duration of all the above projects affecting Whitby's Downtown area.

The Town of Whitby retained CIMA+ to complete Detailed Conceptual Design for the Downtown Whitby Historic Gateways (August 2018). Five locations were chosen as strategic "gateways" to Downtown Whitby where streetscape treatments would signal a sense of place and arrival to both vehicular and pedestrian visitors. These locations are intersections along the two main arteries of Downtown Whitby: east and west along Dundas Street, and north and south along Brock Street. The five gateway locations are **(Figure 20)**:

Gateway 1: Brock Street North and Mary Street

Gateway 2: Dundas Street West and Henry Street/Euclid Street

Gateway 3: Brock Street South and Burns Street;

Gateway 4: Dundas Street East and Hickory Street; and

Gateway 5: Brock Street South and Gilbert Street



Figure 20: Map Showing the Five Gateway Locations

The Downtown Whitby Historic Gateway Conceptual Design will create a sense of entry into the Downtown area, using cohesive design elements to promote the identity of the Downtown Whitby Historic Core Area. The Gateway locations will enhance pedestrian safety and aesthetics, with design elements that work together to help create a sense of place and strengthen community pride and ownership. The gateway design concepts include improvements to existing infrastructure, changes to surface treatment, providing space for cyclists, adding street furniture, boulevard planting, and gateway signage or public art. An example design visualization of Gateway 1 at Mary Street and Brock Street is provided in **Figure 21**.



Figure 21: Design visualization of Gateway 1 at Mary Street and Brock Street

While these five gateways represent the main entry point to the downtown area, the area between the gateways can be considered the essential downtown requiring special treatment. Brock Street represented by gateways 1,3 and 5 is going to be the subject of a special design study in the future with the aim of examining a road diet solution. The diamond shaped area between gateways 1, 2, 4 and 5 is an area that could be considered for a superior streetscape design to acknowledge that it is the essential downtown area. While each intersection would not be treated in the same manner as the gateways, some design elements could be carried through to infer continuity in the diamond shaped area. In addition to the street scape design elements included in the gateway design conceptual plans the following design elements may be considered:

- Wayfinding signs
- Bike Shelter/Parking
- Bike Repair Station/Booth
- Information/Bulletin Pedestals
- Murals/Sculptures
- Out-door Speakers/PA system

5.5. Road Diet

As part of discussions sustained with the Town during the completion of this assignment, the possibility of pursuing a road diet on Brock Street and/or Dundas Street in the downtown study area was considered as a potential opportunity. The road diet would consist of converting the existing 4-lane cross sections to 3-lane cross sections with a center two-way (or channelized if possible) left turn lane and one lane in each direction. The additional right-of-way can be reassigned for active transportation uses.

The area considered for a potential road diet or lane diet on Dundas Street extends from Cochrane/Annes Street in the west to Reynolds Street in the east. The potential road diet on Brock Street extends from Dundas Street in the north to Burns Street in the south. The Road Diet Review is discussed in **Appendix C**.

The results of the review show that several movements along the Dundas Street corridor are expected to approach or exceed capacity with the reduction in the number of through lanes. This is expected to be aggravated with future traffic growth. It is also infeasible to implement a reduction in the number of lanes without a loss of on-street parking which is currently utilized to support commercial businesses. Dundas Street is also the main east-west arterial in the Town and is included in long-term transit plans and is a planned BRT route. However, as previously recommended, a reduction in the width of travel lanes may be possible to increase the width of the sidewalk(s).

The results for Brock Street show that only the Burns Street intersection has turning movements approaching or exceeding capacity. Based on this, a road diet along Brock Street between Dunlop Street and Trent Street may be feasible. A more detailed assessment to explore a road diet along Brock Street is recommended.

5.6. Heavy Vehicular Traffic

The study terms of reference noted the need to address concerns that the volume of heavy/commercial vehicles travelling through Downtown Whitby can be significant and does not support the Council's goal nor the desired pedestrian friendly downtown. Heavy goods vehicles along Brock Street was mentioned at the stakeholder meeting held in the early stages of the project.

5.6.1. Network Connectivity

Both Brock Street and Dundas Street are 4-lane arterial roadways (plus turning lanes) in the Town's road network.

Dundas Street provides a continuous east-west route across the Greater Toronto Area and beyond connecting with highways, arterials and collector roads; and was a former Provincial Kings Highway. The roadway is located on the traditional 2 kilometre grid of major roadways with Rossland Road to the north and Highway 401 (varying distance due to the curvature of Lake Ontario) to the south. It is also worth noting that Durham

Region has a long term goal of implementing an (unspecified) higher order transit service/facility along Dundas Street. This could significantly change the role of Dundas Street in the future depending on the type of facility that will be implemented.

Brock Street is similarly a continuous (north-south) roadway between Highway 401 in the south and Toll Highway 407 to the north. Brock Street is a major corridor in the north-south network where continuous major roadways are similarly spaced approximately 2 kms apart; from west to east this includes Highway 412, Brock Street and Thickson Road; each of them providing connectivity with the highway system.

Although Dundas Street and Brock Street are arterial roads, it is not preferred to have heavy vehicles utilize these roadways within the downtown core. Heavy vehicles do not contribute to a safe or comfortable downtown environment for non-auto mobility. The following options can be investigated in more detail in order to limit heavy vehicles through the downtown:

- Remove/Ban/Restrict heavy vehicles
- Redirect/re-route heavy vehicles not destined to downtown
- Time of day operations (i.e. overnight only)
- Locational operation – Depot/drop site from which deliveries can be made using smaller vehicles
- Permit program for local deliveries
- Positive truck signage on alternate routes
- GPS routing

The options above would require a more intense study with involvement of downtown businesses as well as the trucking industry.

In the study area, both Dundas Street and Brock Street are Town of Whitby Type B Arterial roads while further from the downtown area they become Region of Durham roadways. Type B arterial roadways in the Town's Official Plan (OP) are described as:

"Type B arterial roads are designed to move moderate volumes of traffic at moderate speeds from one part of the Region to another. Such roads provide an average level of service relative to other types of arterial roads and occasionally extend beyond the Municipal boundaries. These roads are intended to intersect primarily with other arterial and collector roads"

It is noted in the Official Plan that the ROW of these two roadways will not meet the normal ROW standards due to the historic built-up nature of the downtown.

The more significant Type A Arterials are differentiated based on having a wider right-of-way and are intended to connect with arterials and *highways*.

There is an incompatibility in the roles these two roadways are providing in that they both connect to the highway system and were clearly planned to be that way historically and in that sense act as a Type A Arterial.

The incongruity exists in terms of the fact that they both intersect in a historic downtown that requires a different transportation context while both have been planned to provide a significant arterial role in the overall network.

5.6.2. Heavy Truck Traffic

A first step in quantifying the heavy goods vehicle (HGV) issue was to extract all the HGV data from the collated counts. **Figure 22** illustrates 24 hour HGV volumes within the study area (some counts were extrapolated from peak hour or 8-hour counts). This figure illustrates the key role that Dundas Street plays; it is the heaviest trafficked roadway in the study area and it is also accommodating large volumes of HGVs. Brock Street South has less vehicular and HGV volumes while having the same number of lanes. There are some sections of high HGV volume on Brock Street near the downtown core; however, these higher levels of activity is likely to be associated with deliveries to businesses in the core and are therefore not likely to be candidates for diversion to other routes. The existence of the downtown core will always encourage a certain level of HGV activity via both Brock Street and Dundas Street depending on the origin of the goods being delivered.

HGV volumes on the collector and local road network in the study area are very light by comparison.

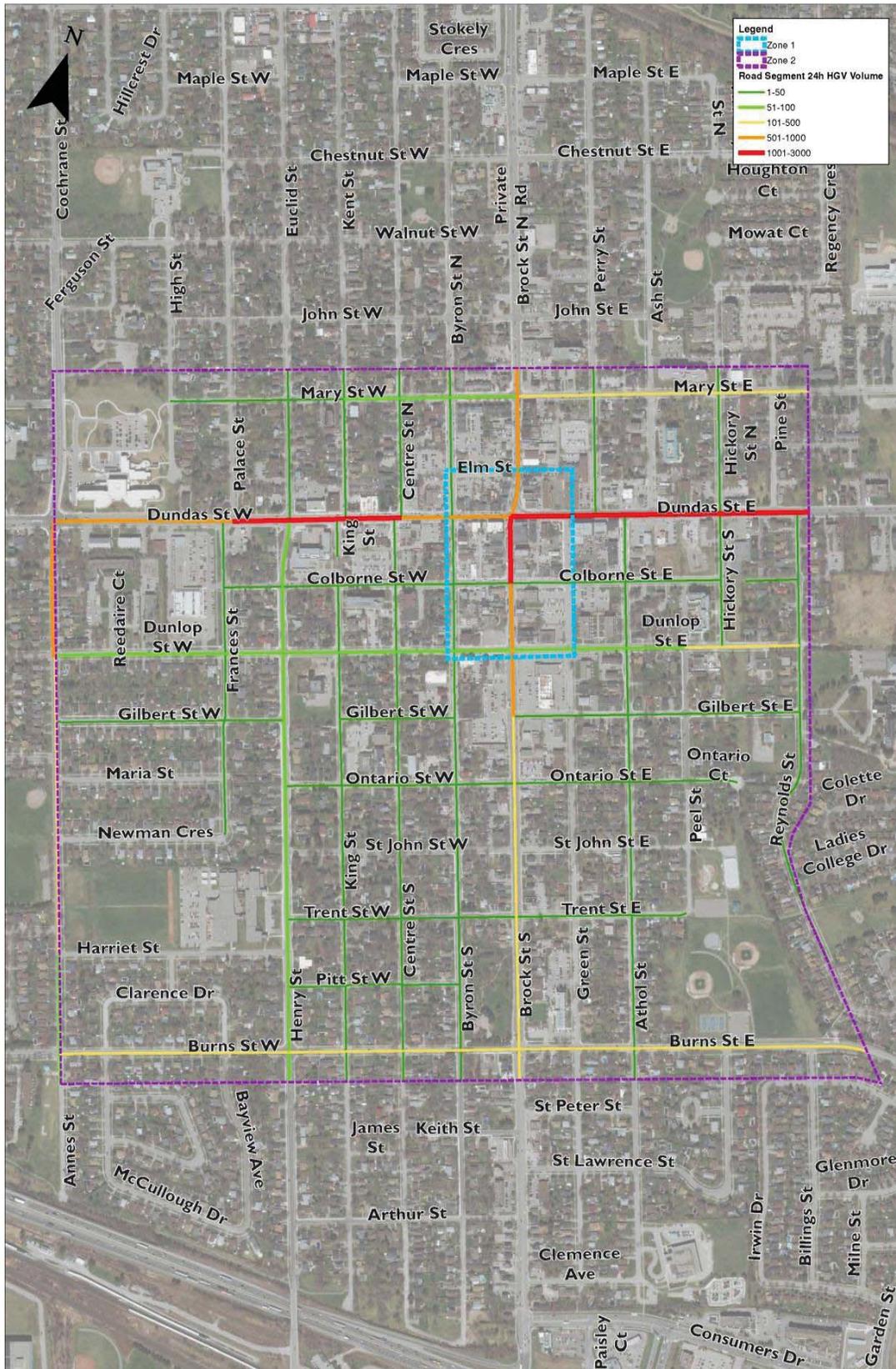


Figure 22: Heavy Truck Traffic

5.6.3. Potential Options

The scope of work for this study asks for the consideration of alternatives to alleviate/redirect heavy vehicle traffic to alternative route(s) within the Town.

Given the built-up nature of Downtown Whitby, there are no obvious options to construct new roads to provide alternative routes, so this discussion will review rerouting of trucks onto existing parallel routes.

Dundas Street

With respect to Dundas Street, the arterial alternatives include Rossland Road to the north (a Type B Arterial) and Victoria Street to the south. These two roadways will already be handling large truck volumes as they are major links in the overall road network. Diversion of traffic from Dundas Street onto nearby parallel collector roads would not be logical as truck traffic would be incompatible with these two-lane collector roads. From the perspective of Dundas Street, there appears to be no reasonable option to divert truck traffic.

Brock Street

With respect to parallel roads to Brock Street, Henry Street and Garden Street are two parallel roadways that provide a continuous route connecting with east-west collector and arterial roads, but not the highway system, and therefore potentially have a role similar to a Type B arterial. Henry Street has 2 lanes and passes through a residential area and heritage district with numerous residential driveways. Garden Street is a 4-lane road and would have the available capacity to accommodate truck traffic; although, it also passes through residential areas, most of the houses rear-lot onto the street. Therefore, there is a potential for the diversion of truck traffic from Brock Street to Garden Street.

There is a study planned to investigate a redesign of Brock Street; it is understood options may include taking away 2 travel lanes between Dunlop Street and Trent Street and improving active transportation facilities. This option was analyzed in this report (**Section 5.5**) with the conclusion that this would be possible while still maintaining adequate traffic flow. This may be the best option to deter some heavy vehicular traffic away from Brock Street by providing more of a pedestrian environment and slowing down traffic through the corridor. In this manner truck traffic is not diverted specifically onto any one route, it is simply discouraged from using Brock Street unless necessary; the net effect would be a slight dispersion throughout the whole network of some trucks that do not need to be on Brock Street without any significant impact on one route. To complement this option, provision of positive truck route signage should be considered on Garden Street.

Local Streets

Although, the HGV volumes on the collector and local road network in the study area are very light in comparison to Dundas Street and Brock Street; in order to promote walkability and to increase pedestrian safety, it is recommended that the Town review heavy vehicular traffic on the downtown local streets and restrict as appropriate.

5.6.4. Heavy Truck Traffic Conclusions

In the foregoing discussion, the following conclusions were derived:

1. There are no opportunities for providing a new road by-pass alignment due to the built-up nature of the area;
2. There is no reasonable option for diverting truck traffic from Dundas Street as it would go against the road function and classification to divert traffic from an arterial road to a collector road;
3. Diversion of Brock Street truck traffic onto Garden Street may be feasible;
4. Review heavy vehicular traffic on downtown local streets and restrict as appropriate and provide positive truck signage/GPS on Garden Street;
5. The best opportunity to direct traffic away from Brock Street is to redesign the corridor by removing two travel lanes between Dunlop Street and Trent Street and improving active transportation facilities. The net result would be a slight decrease in truck volumes dispersed to the overall network, while acknowledging that some trucks will still need to access the downtown core. Additional measures such as truck restrictions and positive truck signage can be provided targeting specific areas.

6. Transportation and Pedestrian Safety Review and Recommendations

The guiding principles listed below (from Section 2.1) were used to develop the set of recommendations included in the next sub-section.

- The pedestrian infrastructure should provide adequate connectivity between origins and destinations.
- The pedestrian infrastructure should be accessible to all.
- The pedestrian infrastructure should be safe and comfortable.
- The pedestrian infrastructure should consider the interaction with other modes of transportation.
- The pedestrian infrastructure should provide a positive environment.

One of the key issues in moving forward with improvements to the safety of pedestrians in Downtown Whitby is the fact that the area is a mature area with roadways having a fixed/limited right-of-way available. A key area of improvement for the Town during the ongoing reconstruction/rehabilitation of roads is the potential to reallocate some of the road/lane width to improve pedestrian facilities, particularly where sidewalks do not meet AODA required widths (Dundas Street in particular); it can also be considered to increase the boulevard width and allow consolidation of street furniture and/or improve bicycle facilities. When a road comes up for reconstruction, a process, known as “routine accommodation”, can assess whether some of the road space can be reallocated for active transportation.

Routine accommodation is the technical term for considering the needs of one mode of travel and accommodating the users of that mode as a routine part of any planning, design, construction, operation and maintenance activities conducted by a road authority (**Figure 23**).

The use of the concept of routine accommodation to consider the needs of pedestrian and cyclists as part of the roadway funding, design and implementation process in a routinely basis is not new. In the late 1990’s, the US Federal Highway Administration (FHWA) started promoting the accommodation of cycling and pedestrian supporting infrastructure in conjunction with all new construction and reconstruction of transportation projects.

Ten years later, on March 2011, the US Department of Transportation (DOT) issued a Policy Statement establishing as a responsibility of each transportation agency the integration of walking and cycling into their implementation processes and to consider the accommodation of pedestrians and cyclists as an integral part of the transportation system.

In 2017, the FHWA guide to Develop a Pedestrian and Bicycle Safety Plan stated that routine accommodation for pedestrian and cyclists in all projects, programs, and maintenance activities is the most cost-effective funding strategy for reducing collisions and encouraging more walking and cycling activities.

With respect of the Province of Ontario, although the term “routine accommodation” is not explicitly indicated as part of provincial legislation, the promotion of the use of active transportation and transit was required in Section 1.8.1. (b) of the Provincial Policy Statement in 2014 and further expanded as part of the Growth Plan for the Greater Golden Horseshoe implemented in 2017 which requires municipalities to ensure that active transportation networks are comprehensive and integrated into transportation planning.

An example of the implementation of routine accommodation of pedestrian and cycling modes of transportation at municipal level is the Pedestrian Mobility Plan (Step Forward) completed by the City of Hamilton in 2012, in which the recommended improvements to the pedestrian infrastructure identified as part of the Plan will be implemented as part of ongoing streetscape and road improvements, including road reconstruction for infrastructure repair, replacement or upgrades.

Although the elements to be considered as part of routine accommodation vary depending on the type of mode of transportation, the following are the examples of the most common elements of the implementation process:

- Identification of the infrastructure improvements for consideration;
- Development of design guidelines or standards supporting the implementation of the infrastructure improvements;
- Training, engagement, and empowerment of staff through the entire organization;
- Development of performance measures and data collection to support the decision-making process;
- Update/modify Capital Plans and Budget and re-evaluate improvement projects prioritization;
- Identify the need for external funding and grants for implementation

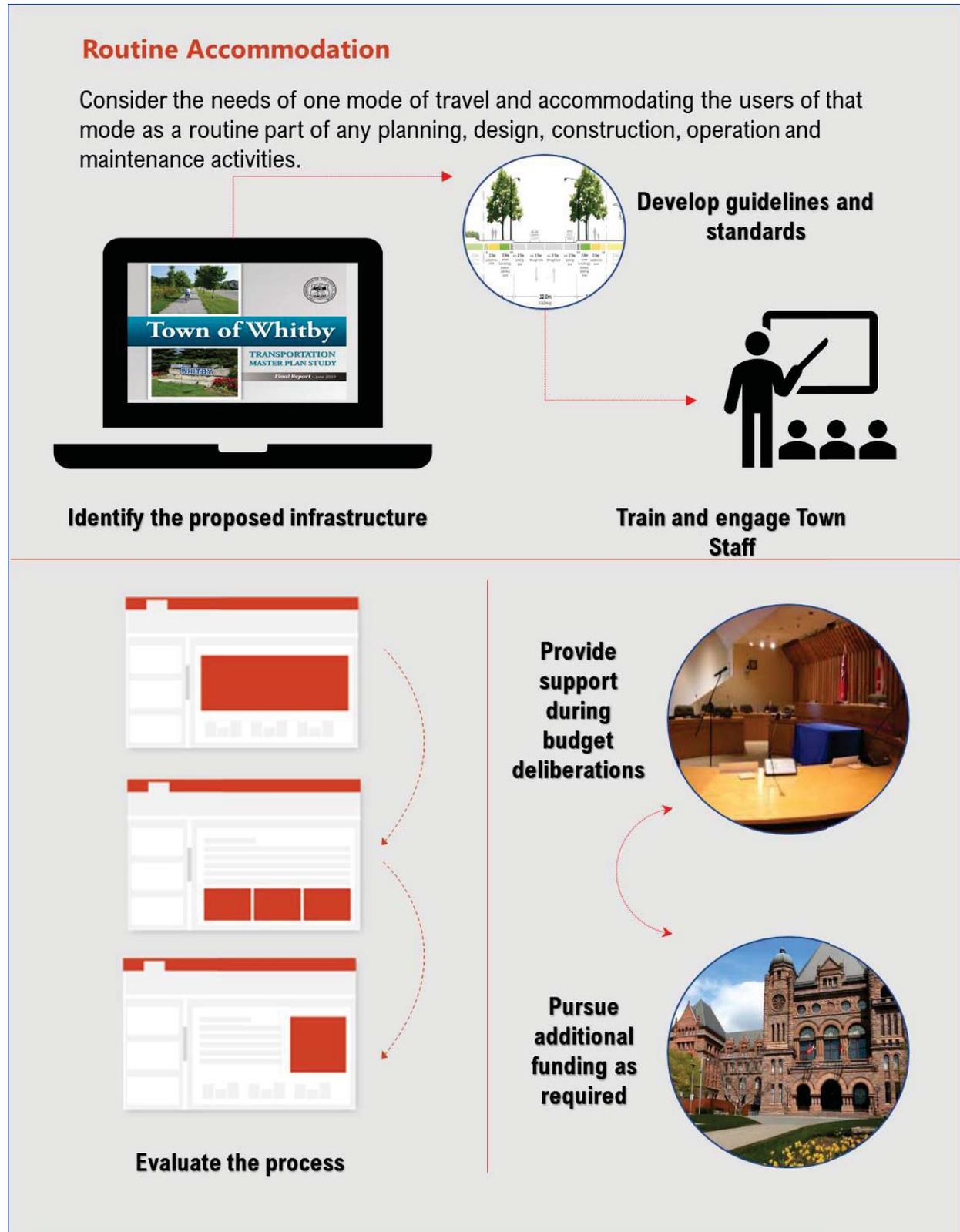


Figure 23: Routine Accommodation

6.1. Recommendations

Based on the preceding information in this present report, the following final recommendations are summarized in **Table 39**. **Figure 24** illustrates the improvements recommended for the study area.

Implementation of the proposed recommendations considers the following:

- The proposed reconstruction of the Dundas Street corridor (to allow widening of the sidewalk(s));
- Implementation of a routine accommodation framework²¹ i.e. as a road comes up for routine reconstruction;
- The proposed Brock Street Corridor Study to be initiated by the Town;
- Compliance with requirements established in Ontario Regulation 413/12: Integrated Accessibility Standards;
- Designs should consider opportunities for placemaking through tree planting, urban art, parkettes when parking is removed, benches at curb bump-outs, bike parking, self cleaning washrooms, way finding signage, information/bulletin pedestals, out-door speakers/PA system etc.

²¹ Routine accommodation is a process where changes to improve pedestrian streetscapes are regularly considered as part of each project conducted by the municipality. Routine accommodation considers that these changes should be included during reconstruction, ongoing maintenance, streetscape enhancements or other capital projects

Table 39: Preliminary Recommendations and Proposed Implementation

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Develop a complete street policy and related guidelines for Downtown Whitby.	0-5 years	Public Works Transportation	Community Advancements Town Clerk and Legislative Services	Minimal
Consider revising current sidewalk policy (sidewalk on one side) to implement sidewalks on both sides of local road in the downtown core, where feasible.	0-5 years	Public Works Transportation	Community Advancements Public Works Engineering Town Clerk and Legislative Services	Minimal
Implementation of reduced speed limit (40km/h) on Brock Street between Mary Street and Gilbert Street and on Dundas Street between Henry Street/Euclid Street and Hickory Street.	2020	Public Works Transportation	Public Works Operations Legal and Enforcement	\$8,000
Update the Town website to provide more information on walking and cycling including downtown walkability and cycling maps.	2020	Public Works Transportation	Corporate Communication Corporate Services	Minimal
Implement Vision Zero countermeasures in the Downtown area, as required and work with the Region of Durham to implement countermeasures at signalized intersections.	0-5 Years	Public Works Transportation	Public Works Engineering Public Works Operations Region of Durham	Varies based on counterme- asures being proposed.

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Review and analyze the current snow removal program for Downtown Whitby to enhance pedestrian safety, comfort and accessibility.	0-5 years	Public Works Operations	Public Works Transportation	Minimal
Review current street lighting levels in the downtown core and consider enhanced street lighting as part of future reconstruction/resurfacing projects.	Beyond 5 Years	Public Works Operations	Public Works Engineering Public Works Transportation	\$ 20,000
Install Intersection Pedestrian Signals (IPS) on Dundas Street W at Centre Street and Dundas Street E at Athol Street, and Brock Street S at Colborne Street.	2020-2021	Public Works Transportation	Public Works Engineering Public Works Operations Region of Durham	\$550,000
Install Pedestrian Crossing on Brock Street at Trent Street (crossing may vary depending on the Brock Street Corridor Review).	Beyond 5 years	Public Works Transportation	Public Works Engineering Public Works Operations Region of Durham	\$200,000
Consider redesign of Dundas Street/Brock Street Intersection.	0-5 Years	Public Works Transportation	Public Works Engineering Public Works Operations Community Advancements Region of Durham	\$20,000

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Brock Street Corridor Review (i.e. consideration of Brock Street road diet between Dunlop Street and Burns Street)	0-5 years	Public Works Transportation	Public Works Engineering Public Works Operations Community Advancements Region of Durham	\$100,000
Dundas Street Corridor Review between Henry Street and Hickory Street	0-5 years	Public Works Transportation	Public Works Engineering Public Works Operations Community Advancements Region of Durham Metrolinx	\$30,000
Consider construction of mini-roundabouts prior to installation of new all-way stop control and explore opportunities to implement mini-roundabouts at existing intersections, where feasible.	Beyond 5 Years	Public Works Transportation	Public Works Engineering Public Works Operations	\$200,000
Improve existing intersections with crosswalk pavement markings, where identified.	2020	Public Works Engineering	Public Works Transportation Public Works Operations	\$10,000
Enhance visual cues at high pedestrian conflict areas through various treatments including textured pavements.	0-5 years	Public Works Engineering	Public Works Transportation Public Works Operations	\$30,000 per location

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Install AODA compliant features such as push buttons, locator tones, countdown timers, and tactile plates at signalized intersections	0-5 years	Public Works Engineering	Public Works Transportation Region of Durham	\$5,000 - \$85,000 per location
Install curb extensions at Brock Street/Colborne Street and Colborne Street E/Green Street intersections.	0-5 years	Public Works Engineering	Public Works Transportation Public Works Operations	\$400,000
Install curb extensions at the intersection of Brock Street and Trent Street (subject to Brock Street Corridor Review and implementation of road diet).	Beyond 5 Years	Public Works Engineering	Public Work Transportation Public Works Operations	\$200,000
Eliminate existing gaps in the sidewalk network including on Trent Street E, St. John Street E, Ontario Street E and Peel Street.	Beyond 5 Years	Public Works Engineering	Public Works Transportation Public Works Operations	\$463.30/m ²
Provide appropriate sidewalk width at deficient locations.	Beyond 5 Years	Public Works Engineering	Public Works Transportation Public Works Operations Heritage Planning	\$240/m ²
Work with Durham Region Transit for the consolidation/relocation of bus stops on Brock Street and Dundas Street, where appropriate and practical.	Beyond 5 Years	Public Works Transportation	Durham Region Transit Community Advancements	To be completed by others

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Consider the integration of bus shelters at Dundas Street Street/Henry Street and Brock Street/Gilbert Street as part of the proposed Gateway Design Project.	Beyond 5 Years	Community Advancements Public Works Transportation	Durham region Transit	To be completed by others
Work with the private property owners to provide a wheel trough for bicycles at the stairs located in the commercial development at Gilbert Street that connects Brock Street and Byron Street S.	0-5 years	Public Works Transportation	Public Works Engineering Community Advancements Corporate Services	To be completed by others
Work with DRT to confirm bus shelters as part of the proposed crossing at Brock Street and Trent Street (subject to Brock Street Corridor Review).	Beyond 5 Years	Public Works Transportation	Public Works Engineering Durham Region Transit	To be completed by others
Work with the Whitby BIA, Downtown Whitby Development Steering Committee, Whitby Chamber of Commerce to identify opportunities for enhanced streetscaping features such as benches, waste receptacles, accessible self cleaning washrooms, information/bulletin pedestals, outdoor speakers, bike racks at strategic locations.	Beyond 5 Years	Public Works Transportation	Community Advancements Public Works Operations Public Works Engineering Durham region Transit	Varies based on features being proposed
Work with Durham Region Transit to provide benches and bike racks at bus stops located on major transit routes, where feasible.	Beyond 5 Years	Public Works Engineering	Public Works Transportation Durham Region Transit	To be completed by others

RECOMMENDATION(S)	PLANNING HORIZON	LEAD DEPARTMENT	SUPPORT DEPARTMENT	COST ESTIMATE
Work with the Whitby BIA, Downtown Whitby Development Steering Committee, Whitby Chamber of Commerce and business owners to identify opportunities for providing murals, sculptures, urban art, patios etc. enhance downtown realm.	0-5 years	Community Advancements	Public Works Transportation Public Works Operations Corporate Communication	Varies based on features being proposed
Review heavy truck traffic on downtown local streets and restrict as appropriate. Provide positive truck route signage on Garden Street.	2020	Public Works Transportation	Legal and Enforcement Public Works Operations	\$10,000
Provide bicycle parking and consider accessible self cleaning washrooms in the Town parking lots by taking away some parking spaces as part of parking lot reconstruction/resurfacing projects.	Beyond 5 Years	Public Works Engineering	Public Works Transportation Public Works Operations	Cost of bike parking is minimal. Some improvements as part of reconstruction.

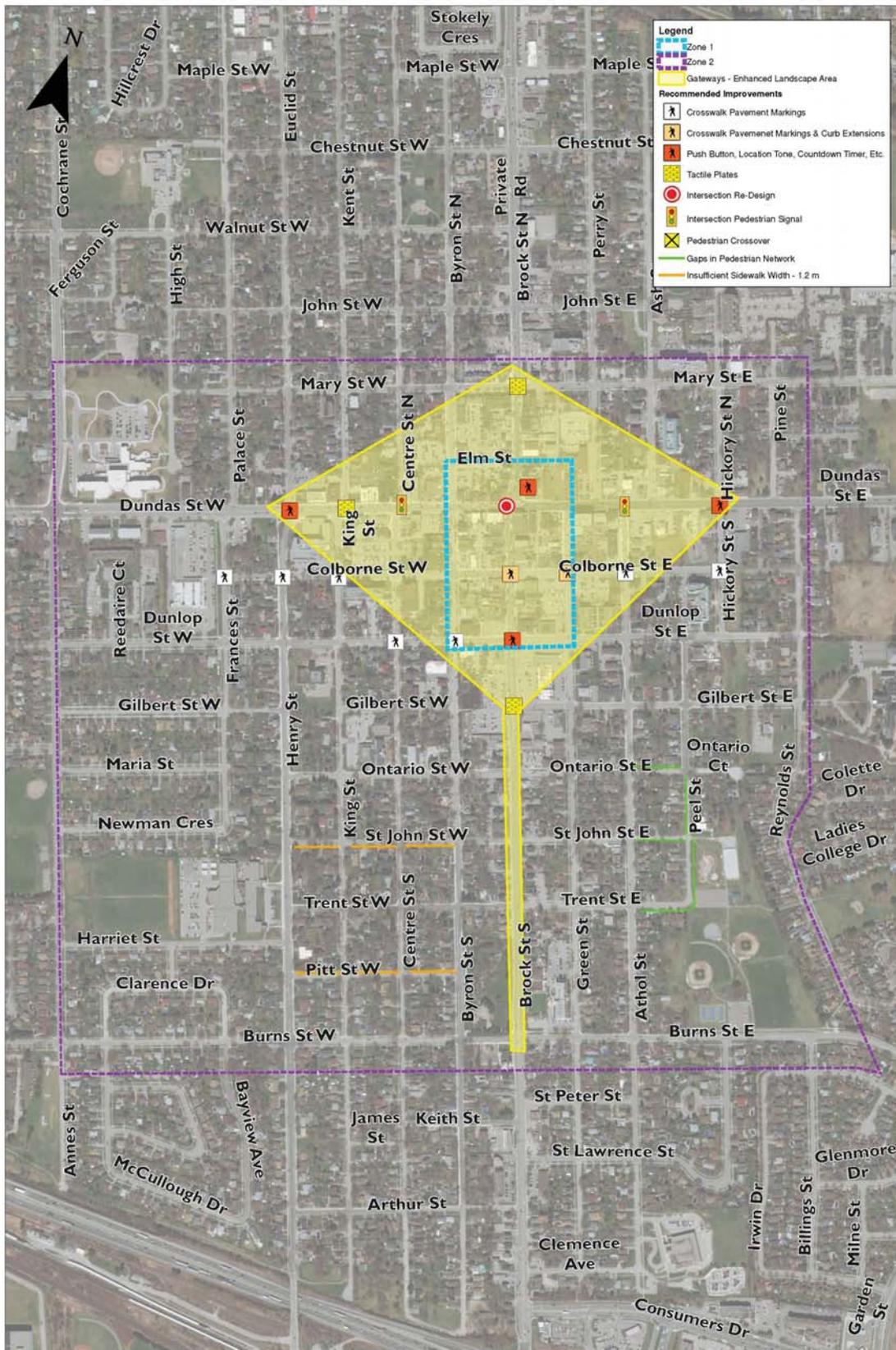
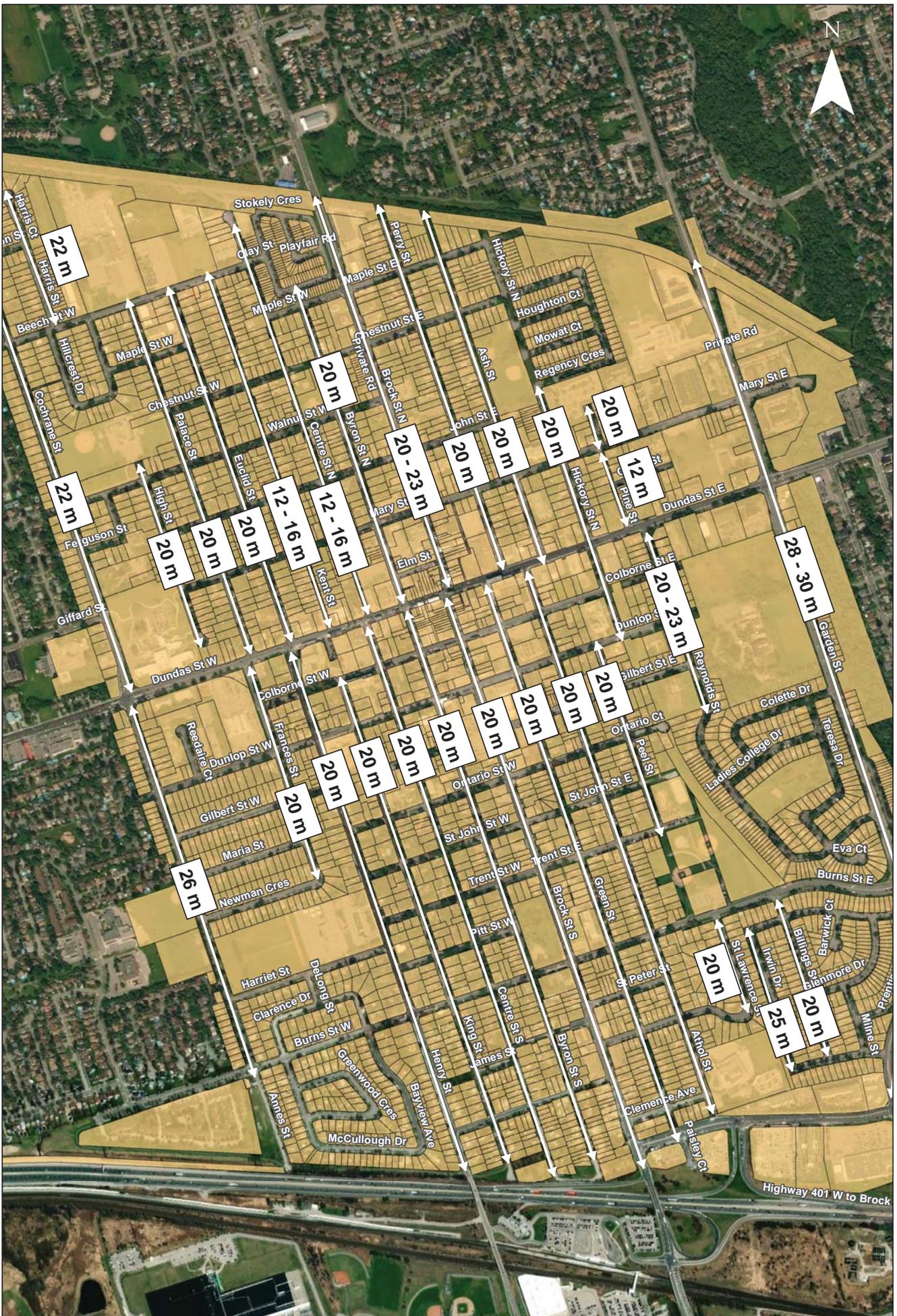


Figure 24: Recommended Improvements

A

Appendix A: Study Area Maps

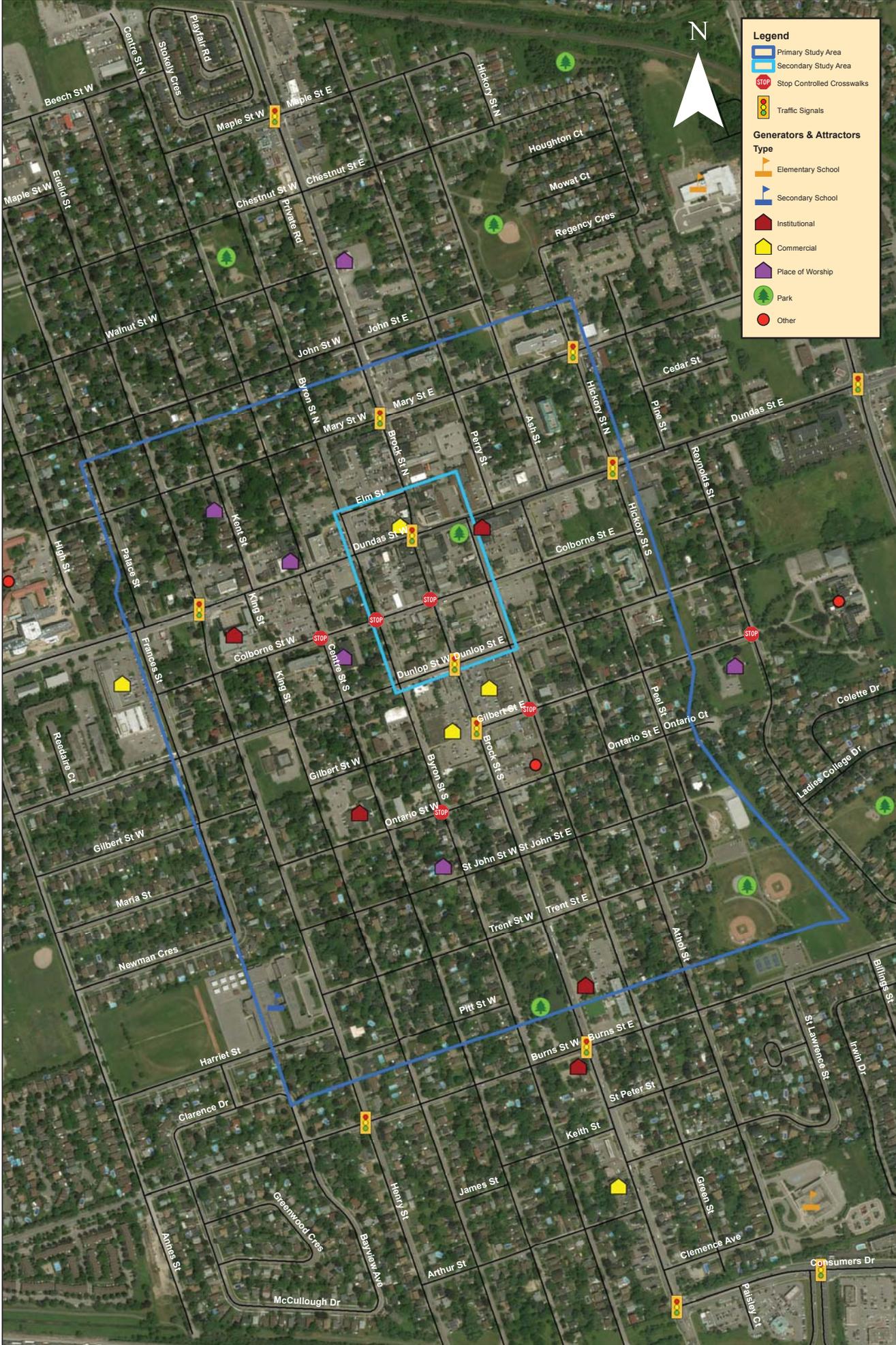




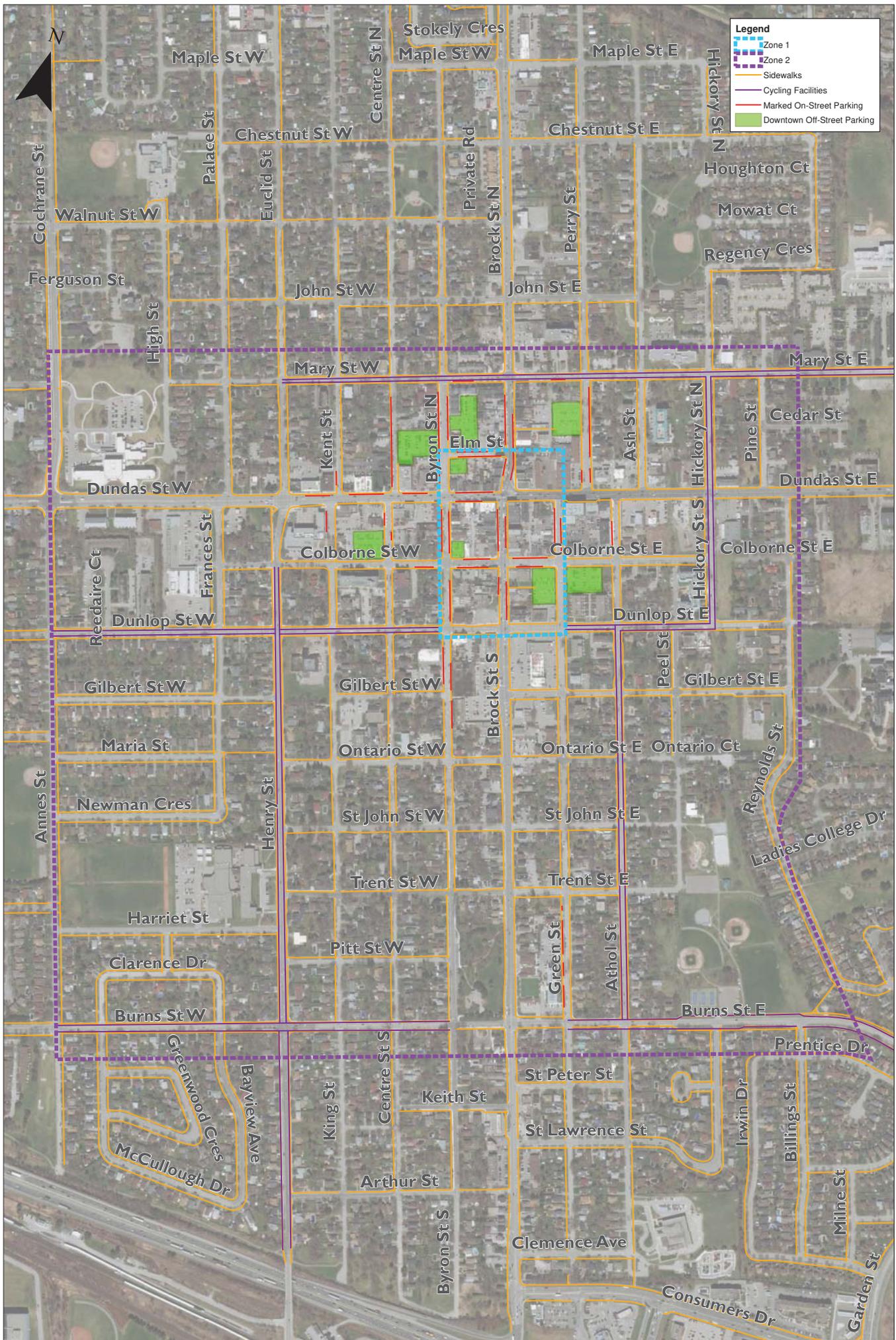
Study Area Map: Right-of-Way Widths (North-South Roads)



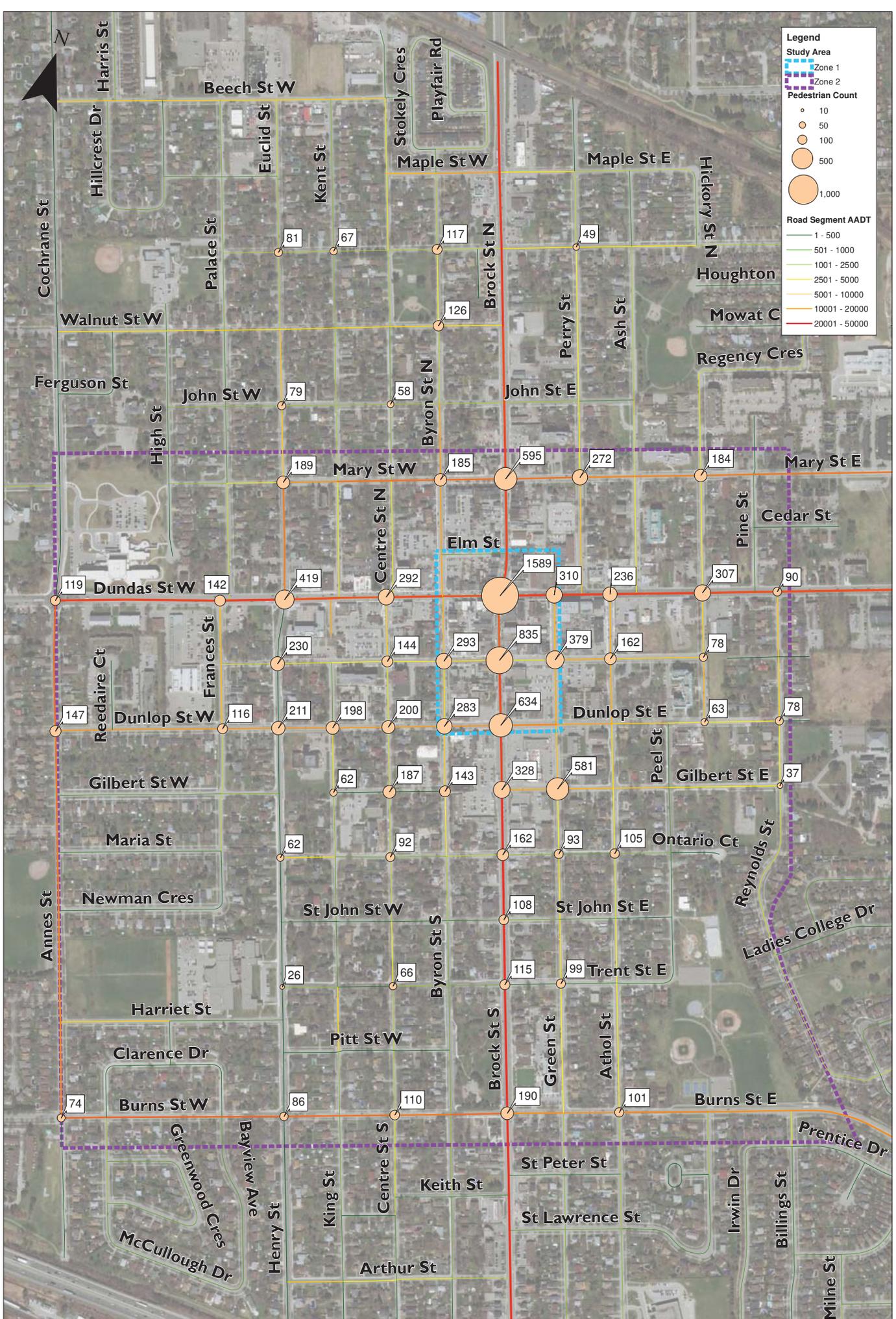
Study Area Map: Vehicle and Pedestrian Volumes



Study Area Map: Intersection Controls and Generators of Pedestrian Activity



Study Area Map: Sidewalks, Cycling Facilities and On/Off Street Parking



Study Area Map: Traffic and Pedestrian Volumes

B

Appendix B: Public Open House and Stakeholder Meeting Materials

TRANSPORTATION AND PEDESTRIAN SAFETY ACTION PLAN DOWNTOWN WHITBY

The Town of Whitby is undertaking a Transportation and Pedestrian Safety (TPS) Action Plan for Downtown Whitby to review and consider all modes of transportation for various user groups with an emphasis on creating and encouraging a walkable Downtown.

We want to hear from you!

Do you have any pedestrian safety concerns for Downtown Whitby?

Please provide your comments on a comment sheet.



Do you think any of the areas in Downtown Whitby are in need of improvements for pedestrian safety?

Please indicate all areas on the roll plan.

MINUTES OF MEETING

CLIENT : Town of Whitby

PROJECT : Transportation and Pedestrian Safety Action Plan

MEETING N° : Stakeholder Meeting #1

DATE OF MEETING : April 5, 2018

LOCATION : Committee Room No. 1 - Town Hall

ATTENDEES : Dhaval Pandya (Town of Whitby)
Ron Lalonde (WATBRAC)
Joe Cafarelli (Region of Durham – Works)
Josh de Boer (Region of Durham – Works)
Chrisly Chrus (Town of Whitby – OH)
Michele Dotton (Town of Whitby – Accessability)
Jason Kittle (Town of Whitby – Operations)
Maria McDonnell (Town of Whitby – Planning)
Josh Schembri (Town of Whitby – Public Works)
Ron Carquez (Durham Region Police Service)
Al McDonald (Durham Region Police Service)
Pavel Zeman (OWNA)
Michael Lahoda (OWNA)
Jason Brunley (Brumley Construction)
Liam Nichols (Downtown Whitby BIA)
Rhonda Jessup (Whitby Public Library)
Stephen Keen (CIMA)
Giovani Bottesini (CIMA)

C.C. TO : People attending and invitees*

1.1 Welcome and Introductions (All)

1.2 Purpose of the Meeting (Town)

- The purpose of this meeting was to present the preliminary findings of the field investigation and potential solutions, and to receive comments from stakeholders on study area issues and potential improvements.

1.3 Presentation of Preliminary Findings (CIMA+)

- S. Keen presented the findings and a preliminary list of possible solutions facilitated with a PowerPoint presentation (electronic version to be forwarded to all attendees).

1.4 Stakeholder Feedback/Comments (All)

- Determination of improvements should take into consideration increased volumes resulting from future Downtown developments (e.g. when calculating warrants for pedestrian crossovers).
- There may be an increase in requirements in areas with large volumes of seniors (north and south of Dundas, crossing Colborne Street around Library)
- There is concern about the potential increase in traffic on Brock Street to the GO Station and 401, as well as potential infiltration on parallel streets.
- Regional Police noted that consideration should be given to reviewing illumination levels for pedestrians at night (including side streets).
- It was noted that the findings of this study should be in line with the Active Transportation plan (currently under review) to ensure a Complete Streets approach.
- Operations prefers not to have curb bump-outs due to factors such as difficulty manoeuvring vehicles (plow blade manoeuvres different from a fire truck), pedestrians not knowing where to stand.
- Bus stop volumes, availability of space for shelters, etc. should be considered. Regional Transit to provide passenger volumes by stop location.
- It was noted that a road diet on Brock Street may not be preferential due to the relatively frequent bus service on Brock Street.
- Recommendations should take into account the potential shift in bus passenger patterns if more

Regional
Transit

protected crossings are provided (to coincide with bus stops).

- Buses may block lanes on Dundas when stopped and other vehicles may swerve to go around. However, Durham Transit does not prefer bus bay due to operational delays.
- Speed limit reductions can be considered, however it was noted that speed limits should be consistent with the physical characteristics of the road to increase compliance (i.e. simply installing speed limit signs may not be sufficient).
- It was noted that there are currently high volumes of heavy vehicles on Brock Street. Scooters also utilize this road.
- The potential reconfiguration of the channelization at Brock Street and Dundas Street may be uncomfortable/unsafe for wheelchair users, even if redesigned to “Smart Channel” if there is too much of a ramp-up or ramp-down situation.
- A commercial traffic bypass of Downtown Whitby should be considered (412 toll encourages trucks to go through Downtown).
- Consideration can be given for calling a pedestrian phase at every cycle at certain locations, without the need to push the button (e.g. Brock Street & Dunlop Street)

1.5 Next Steps

Following this meeting, the project team will:

CIMA

- Review stakeholder comments and incorporate feedback into the study
- Select the most suitable alternatives for each study zone
- Complete the evaluation of alternatives

Schedule:

- Status report to Senior Staff end of April
- Public consultation (#2) May/June
- Stakeholder consultation (#2) June
- Draft Report – end of June

C

Appendix C: Road Diet Review



MEMO

TO : Dhaval Pandya
FROM : Stephen Keen
DATE : January 14, 2018
SUBJECT : **Town of Whitby Transportation and Pedestrian Safety Action Plan - Dundas Street and Brock Street Road Diet Review**

1. INTRODUCTION

As part of discussions sustained with the Town during the completion of this assignment, the possibility of pursuing a road diet on Brock Street and/or Dundas Street in the downtown study area was considered as a potential opportunity. The road diet would consist of converting the existing 4-lane cross sections to 3-lane cross sections with a centre two-way (or channelized if possible) left turn lane and one lane in each direction. The additional right-of-way can be reassigned for active transportation uses.

The area considered for the potential road diet on Dundas Street extends from Cochrane/Annes Street in the west to Reynolds Street in the east. The potential road diet on Brock Street extends from Dundas Street in the north to Burns Street in the south.

2. TRAFFIC OPERATIONS

Traffic operational modelling was completed in Synchro/SimTraffic to evaluate intersection capacity impacts. Provided by the Town of Whitby (the Town) traffic turning movement counts from 2017 were used for the analysis.

The analysis was conducted at a high level to evaluate the potential of the two roads to accommodate a road diet. If the Town decides to move forward, a more comprehensive study should be undertaken, following the appropriate Municipal Class Environmental Assessment Process and considering more carefully the issue of ongoing traffic growth as well as other relevant transportation initiatives and community factors.

The existing conditions analysis included signal cycle and splits optimization to accommodate existing volumes, using a maximum cycle length of 100 seconds. Provided in **Appendix A**, the results indicate that all movements, approaches, and intersections operate with a v/c ratio of 0.79 or lower and at LOS D or better with the exception of the westbound movement at the intersection of Brock Street and Ontario Street. This movement operates at LOS E in the PM peak but is observed to operate smoothly in the SimTraffic simulation. Some 95th percentile queues exceed available storage, however typically by only 1 or 2 car lengths, which can be accommodated by the wider portion of the taper. The exception is Dundas Street & Cochrane Street/Annes Street, where the eastbound left-turn storage is exceeded by almost 60 metres in the PM peak hour. Figure 1 and Figure 2 summarize the results for AM and PM peak hour existing condition analyses.

The analysis considering potential road diets on Dundas Street and Brock Street included the optimization of signal cycles and splits necessary to accommodate the existing turning movement counts, using a maximum cycle length of 120 seconds. Figure 3 and Figure 4 summarize the results for AM and PM peak hour analyses for the potential road diet. **Appendix A** provides detailed results.

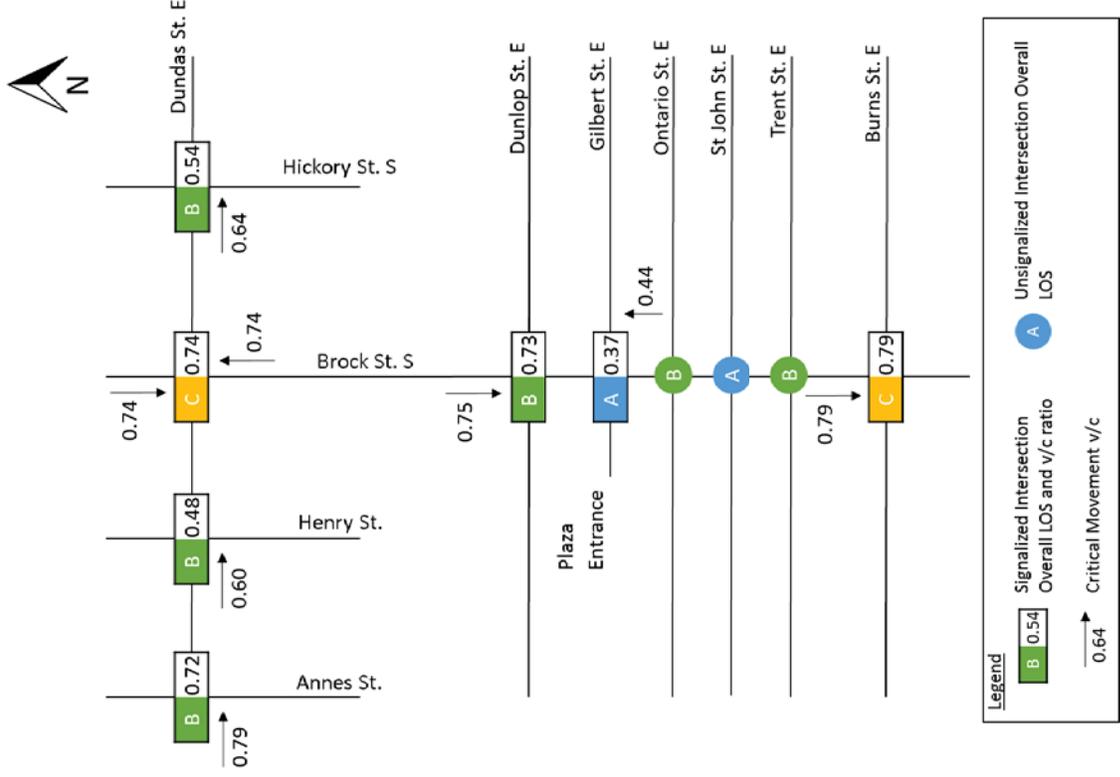


Figure 2: PM Peak Hour Existing Intersection Operations

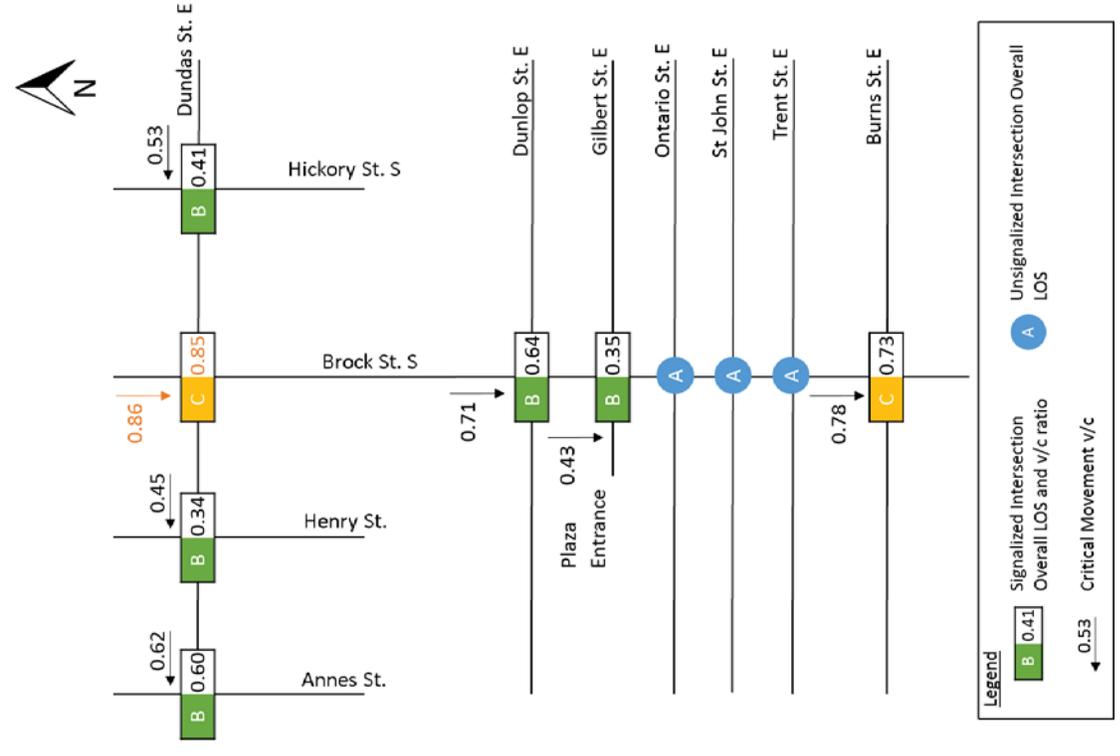


Figure 1: AM Peak Hour Existing Intersection Operations

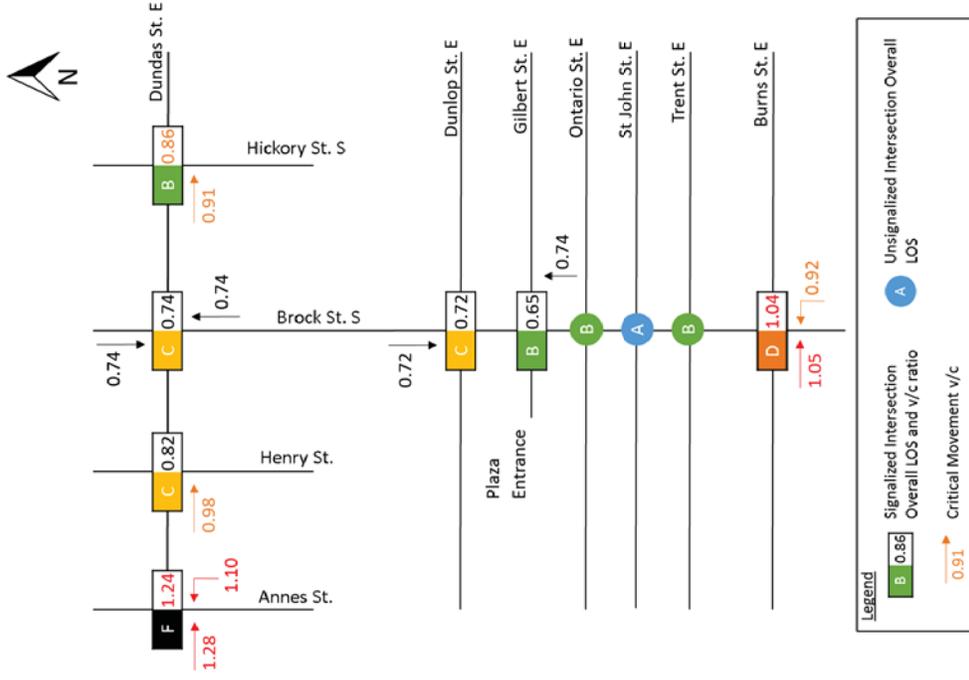


Figure 4: PM Peak Hour Intersection Operations with Road Diet

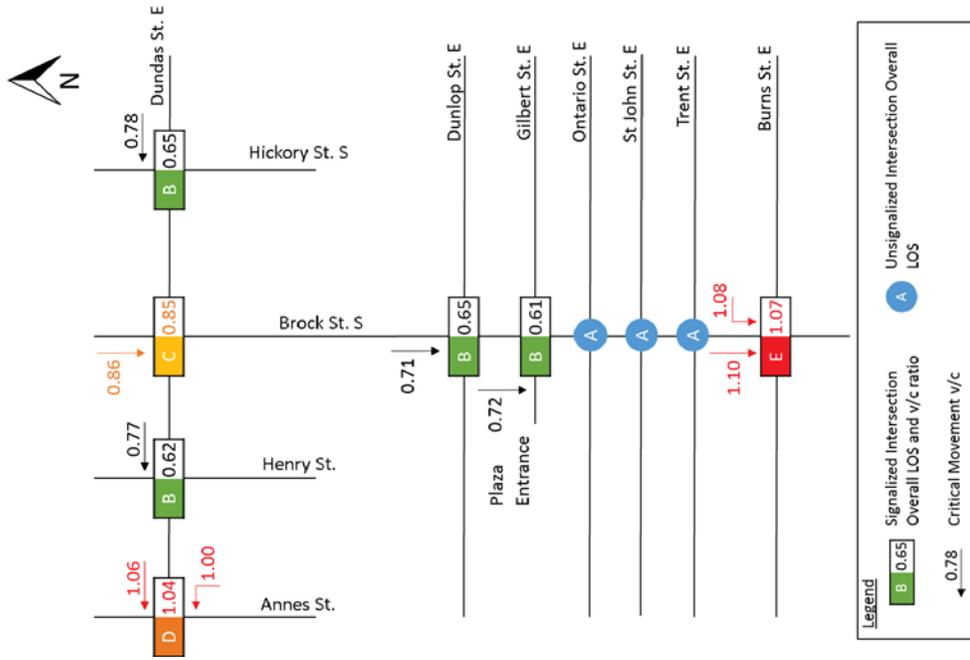


Figure 3: AM Peak Hour Intersection Operations with Road Diet

3. DUNDAS STREET

The results show that several movements along the Dundas Street corridor are expected to approach or exceed capacity with the reduction in the number of through lanes.¹ This is expected to be aggravated with future traffic growth. Therefore, a road diet is not likely desirable on the Dundas Street corridor.

Nevertheless, the potential for a lane diet on Dundas Street was assessed. The existing cross section along Dundas Street between Brock Street and Centre Street was measured from the Town of Whitby Explore Community Geographic Information System (GIS) map viewer to evaluate the dimensions of road aspects within the existing right-of-way (R.O.W) and the potential to increase the width of pedestrian facilities. The existing R.O.W between property lines is approximately 20.0 metres in length and is illustrated in Figure 5 and Figure 6.

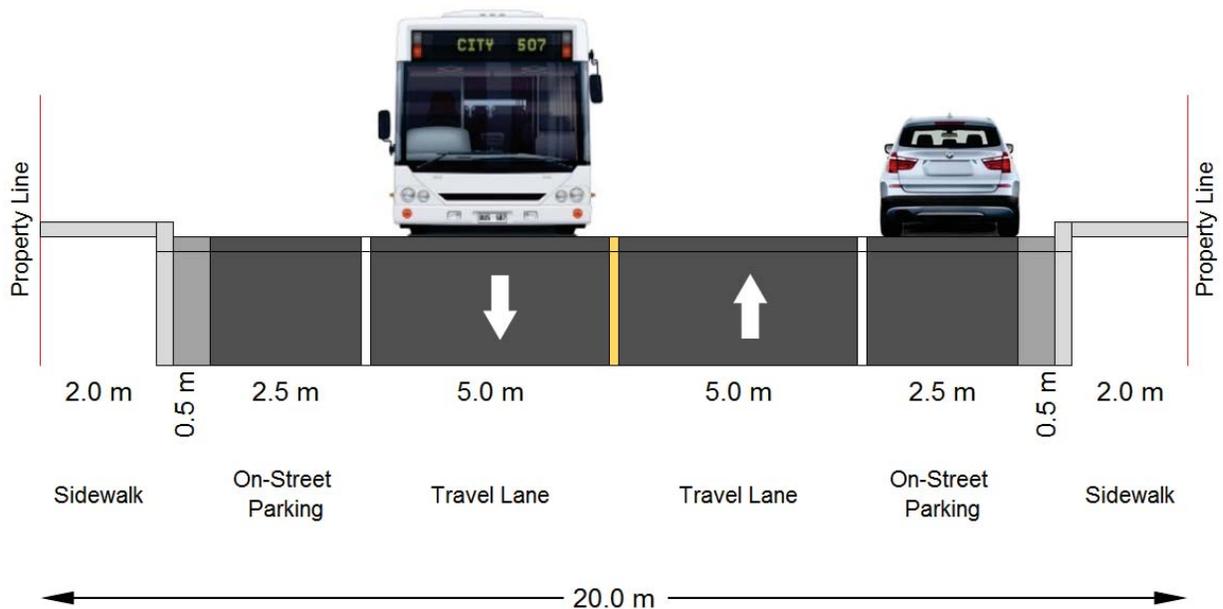


Figure 5: Dundas Street Existing Cross-Section (between Brock Street & Byron Street)

¹ The lane configuration at Dundas Street & Brock Street eastbound remained unchanged due to the geometric limitations, particularly on-street parking.

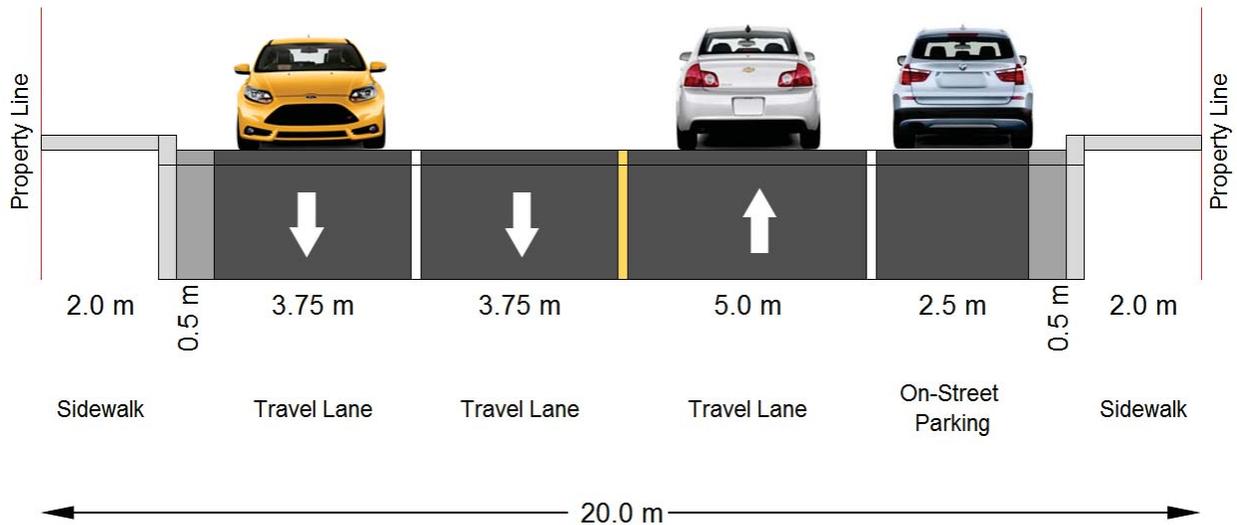


Figure 6: Dundas Street Existing Cross-Section (between Byron Street & Euclid/Henry Street)

Based on the geometric conditions of Dundas Street it is likely infeasible to implement a lane diet without a loss of on-street parking which is currently utilized to support commercial businesses. Dundas Street is also the main east-west arterial in the Town and is included in long-term transit plans and is a planned BRT route. Therefore, a road diet on Dundas Street is not recommended for further consideration.

4. BROCK STREET

The results for Brock Street show that only the Burns Street intersection has turning movements approaching or exceeding capacity. Based on this, a road diet along Brock Street between Dunlop Street and Trent Street (and potentially a few metres further south) may be feasible. It is understood the Town will be undertaking a more detailed assessment of Brock Street in the near future.

The existing cross section along Brock Street between Dunlop Street and Burns Street was measured from the Town of Whitby Explore Community GIS map viewer to evaluate the dimensions of road aspects within the existing right-of-way (ROW) and the suitability of a road diet. Figure 25 and Figure 26 illustrate the available area within the ROW along Brock Street.

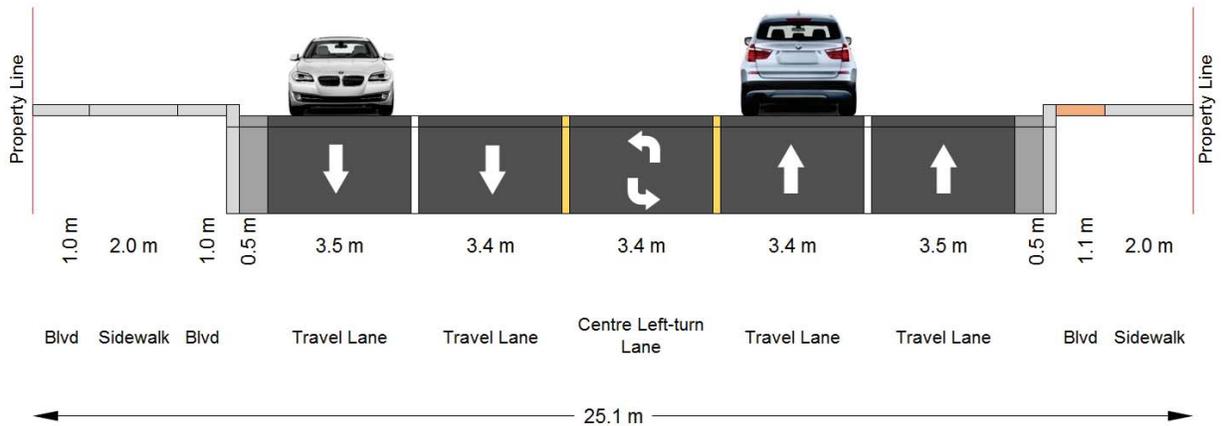


Figure 7: Brock Street Existing Cross-Section (between Dunlop Street & Gilbert Street)

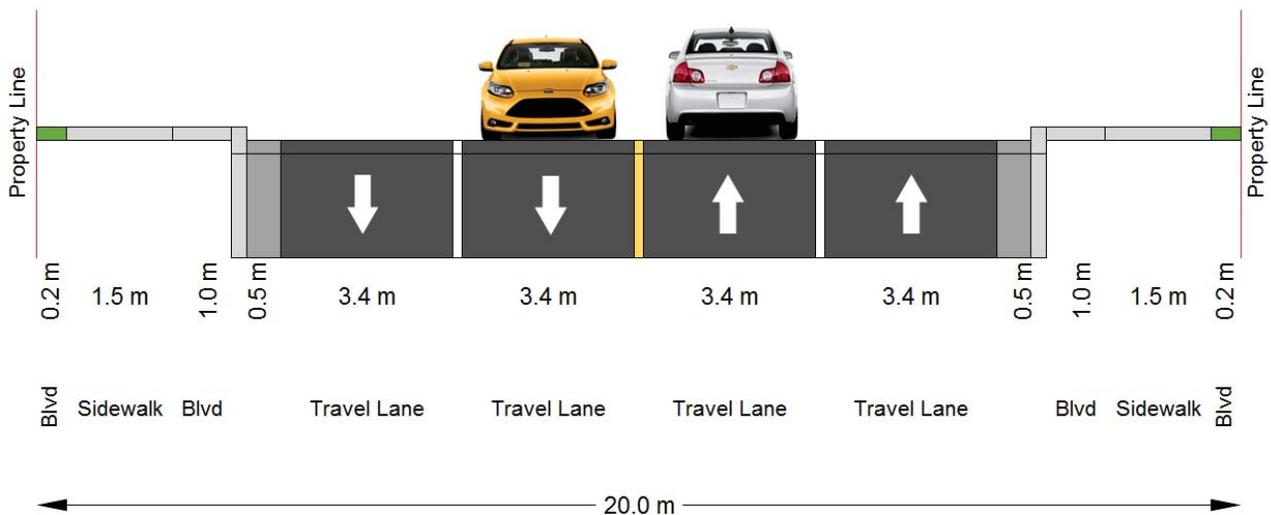


Figure 8: Brock Street Existing Cross-Section (between St John Street & Trent Street)

In order to limit the potential of increased queues along local roads, the lane drop leading to the beginning of the road diet is suitable between Burns Street and Trent Street. An existing Seniors Activity Centre is located on the east side of Brock Street between Burns Street and Trent Street and has been identified as a high priority location. It is suggested that the lane drop taper begin following the driveway to the north. According to the Transportation Association Canada (TAC) 2017 Geometric Design Guide for Canadian Roads, the recommended merging taper length considering a design speed between 60 to 70 km/h is 100 to 115 metres². The distance between Trent Street and the Seniors Activity Centre driveway is approximately 105 metres and

² TAC 2017 Geometric Design Guide for Canadian Roads, Chapter 9 Intersections – Table 9.18.1

falls within the acceptable design range. It should be noted that there will be minor impacts of the diverging taper length which requires 60 to 70 metres of taper considering a design speed between 60 to 70 km/h². An illustration of the proposed lane drop location is provided in Figure 27.

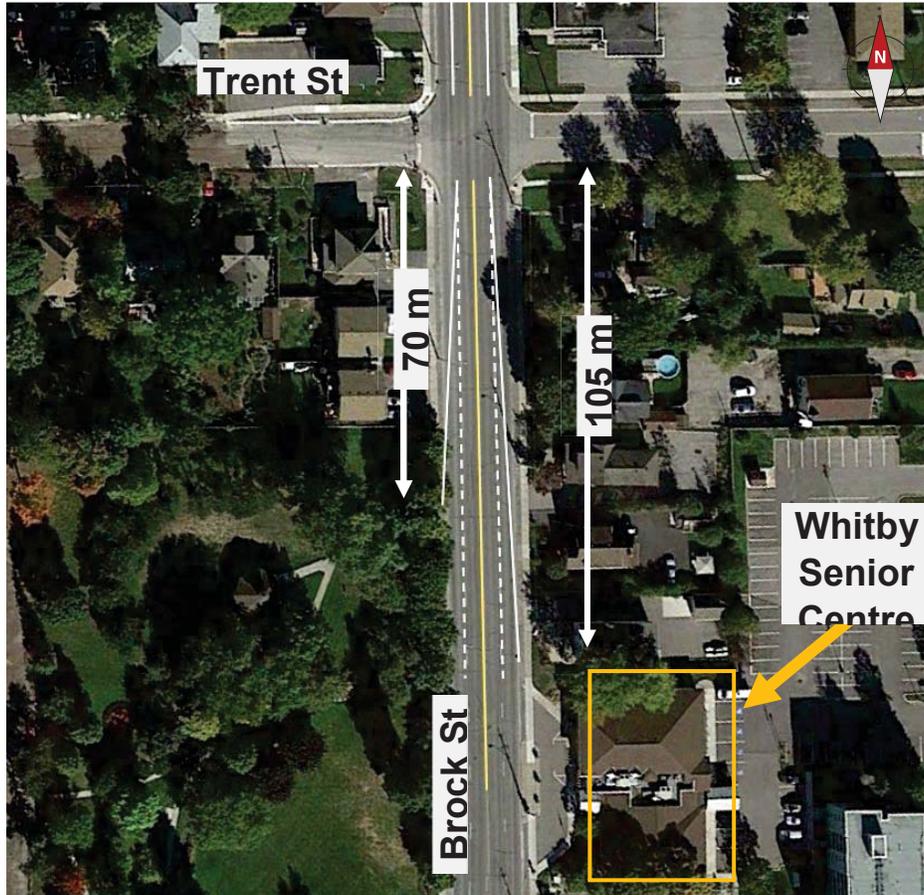


Figure 9: Recommended Brock Street Road Diet Taper Location

It is again noted that the Town intends to study a potential redesign of this roadway more extensively in a forthcoming Brock Street corridor study.

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