The Corporation of the
City of Windsor

Downtown Transportation Strategy

Final Report

October 2016

B000460

CIMA
Partners in excellence

O'Connor Mokrycke CONSULTANTS

environmental planning
McKibbon Wakefield Inc.

The Corporation of the City of Windsor

Final Report

October 2016

B000460

PREPARED BY:

Jaime Garcia
Project Manager

VERIFIED BY:

Stephen Keen
Project Director

Table of Contents

B000460

B000460

Table of Figures

Table of Tables

1. Executive Summary

This report documents the development of a strategy to support the City of Windsor City Council's Vision of Downtown Windsor as a vibrant and inviting place in which people want to work, play, and shop and have the opportunity to use various modes of active transportation. The Council's Vision was shown to have support with the public and stakeholders during the consultation component of this study with the support for additional bicycle lanes (including protected lanes) of particular note during public consultation. However, a strategy to support the Vision must recognize the fact that corridor right-of-ways are limited without any realistic chance of being widened to accommodate improvements in active transportation and / or the urban landscape.

The development of a strategy draws upon key outputs of the study, including:

+ Opportunities for improvement;
+ Roadways with excess road capacity;
+ Identification of context zones / road type classifications and their associated needs with respect to servicing the land uses;
+ Identification of corridors in which vehicular priority is required (e.g., to protect the access to the international tunnel and to facilitate easy access and egress to the downtown parking and destinations);
+ Identification of corridor element requirements – including minimum and recommended standards for different modes; and
+ Development of a toolbox for the development and evaluation of alternative cross-sections for each of the identified corridors.

The resulting strategy is focused around the routine accommodation of improvements to active transportation modes along corridors that have either the greatest need and / or best opportunity for place making and improving active transportation based on the following key elements:

+ Focus on roads that have excess vehicular capacity that could be used for alternative purposes
+ Creating a finer grid for active transportation connecting Areas of Special Interest
+ Maintain existing improvements that favour active transportation and that enhance current BUMP plan

+ Expand opportunities for cyclists including the “share the road” solutions on local streets with limited opportunities for change
+ Consideration of the removal of on-street parking with no change to prime vehicular access points

The City’s 2001 Bicycle Use Master Plan (BUMP) study has identified a proposed skeleton network of bicycle facilities to serve the downtown area. The strategy builds upon the BUMP by developing a finer network of bicycle facilities while improving the pedestrian environment in key areas of high pedestrian activity (e.g. business / commercial areas and areas of special interest). Portions of corridors that have recently been modified (e.g. Wyandotte Street and Ouellette Avenue) were not considered for further revision.

2. Introduction and Background

This report documents the findings of a study to develop a Downtown Transportation Strategy for the City of Windsor.

2.1 Study Purpose

The City of Windsor's City Council is pursuing a Vision of Downtown Windsor as a vibrant and inviting place in which people want to work, play, and shop and have the opportunity to use transit, walking, and cycling modes of transportation rather than only motorized vehicles.

In support of this Vision, this study has been completed to document a recommended sustainable strategy for a transportation system that places a focus on placemaking and improving various active transportation choices.

The strategy has identified places that have either the greatest need and / or best opportunity for placemaking and improving active transportation through the repurposing of existing public right-of-way areas to optimize space for all users and achieve a more balanced transportation network.

2.2 Study Process

Under a Complete Streets approach there is not any one solution or specific design standard that can be universally applied. For that reason, CIMA+ followed a Context Sensitive Design approach that considered not only the type of roadway (e.g. arterial, collector, local), but also the adjacent land use through which it passes.

The study process involved the following main steps:

+ **Review of Background Information and Available Data** – thorough review and assessment of existing conditions and rights-of-way, including traffic and pedestrian counts, field measurements, parking availability, GIS mapping, planning documents, previous Master Plans, and Environmental Assessment studies;
+ **Comparative Review of the City's Sidewalk Café Handbook** against existing practices from comparable communities across the country and the United States;
+ **Literature and Best Practices Review** with a special focus on healthy communities;

- **Overview Assessment of Existing Conditions** for all modes of transportation using the data collected;
- **Identification of Needs and Opportunities** – assessment of corridors that have surplus road capacity, available right-of-way (or lack thereof), safety, active transportation opportunities, and / or environmental constraints;
- **Development of Context Zones** that identify the various urban characteristics of the downtown study area;
- **Identification of Roadway Element Requirements**, including minimum and recommended standards for roadway elements such as: bike lanes, sidewalks, street furniture, boulevards, curb and gutters, and travel / parking lanes, as well as space allocation requirements for utilities, waste management, snow storage, and emergency services;
- **Development of Cross-Section Alternatives** for each of the identified corridors by road type / context zone combination;
- **Evaluation and Selection** of the Most Suitable Concept(s) for each of the identified corridors;
- **Development of an Implementation Strategy** for the recommended cross-section modifications; and
- **Development of a "Toolbox"** of measures that are expected to be most effective for the City's needs and which have demonstrated potential in increasing mobility and connectivity in downtown core areas.

In addition to the above technical steps, a comprehensive engagement with the public and key stakeholders was undertaken, including two Public Information Centres and 2 meetings with the Downtown Business Improvement Association.

2.3 Policy Context

Due to the strategic level of the study, it was appropriate that all proposed recommendations and actions contemplated during the completion of the study would be supported by the planning and transportation policies, guidelines, and standards currently implemented for the City of Windsor (in general) and the City Centre Planning District (in particular).

Similarly, a comprehensive review of recent planning and urban design best practices was conducted to identify those urban design qualities that may influence the quality of the pedestrian realm, both directly and indirectly.

2.3.1 City of Windsor Official Plan

The City of Windsor Official Plan provides a policy framework that guides when, and in what order, Windsor will grow, as well as how existing and future neighbourhoods will be strengthened. For the purpose of this assignment the following Chapters were considered as relevant:

+ Chapter 6: Land Use;
+ Chapter 7: Infrastructure; and
+ Chapter 8: Urban Design.

Due to the fact that all roadway users are directly affected by urban design elements, forms of development, and other planning elements, a comprehensive review of the contents of the City of Windsor Official Plan and relevant Schedules (as per September 2012), Master Plans, Implementation Plans, Class EA Studies, and other related Provincial and municipal design standards were conducted. The following paragraphs provide a summary of key relevant issues.

2.3.1.1 Official Plan, Schedule E: City Centre Planning District

Schedule E of the City of Windsor Official Plan provides details regarding the land use types and development profiles envisioned for the City Centre Planning District.

Under Schedule E, areas intended for Mixed Use are distributed along main corridors (Arterial Class II Arterials and Collector Roads) with Residential Areas evenly distributed around the limits of the City Centre Planning District.

This proposed distribution of land uses provided the basis for the identification of Context Zones (see Section 3.1) used during the completion of this assignment.

2.3.1.2 Official Plan, Section 7.2.6

Section 7.2.6 of the City of Windsor Official Plan identifies the following road classifications:

+ **Class II Arterial Roads**: roads “designed to carry high volumes of passenger and commercial traffic for intra-city travel at moderate speeds”;

+ **Class I Collector Roads**: roads "designed to carry moderate volumes of passenger traffic, except in industrial areas where they may carry passenger and commercial traffic, between Local Roads, Class II Collector Roads and Class I and Class II Arterial Roads at low to moderate speeds";
+ **Class II Collector Roads**: roads "designed to carry passenger traffic in predominately residential areas at low to moderate speeds";
+ **Local Roads**: roads "designed to carry low volumes of passenger traffic short distances at low speeds"; and
+ **Scenic Drives**: roads "designed to carry moderate volumes of predominately passenger traffic adjacent to major scenic areas, areas of historical or environmental significance or along historic routes at low to moderate speeds".

This classification of the roadway network servicing the Downtown Area was used as the basis for the identification and evaluation of existing conditions as well as for the development of alternative cross-sections.

2.3.1.3 Official Plan, Schedule F: Roads and Bikeways

Schedule F of the City of Windsor Official Plan reiterated the recommendations of the City of Windsor's Bicycle Use Master Plan (BUMP) regarding the use of the following corridors for the completion of a Primary Cycling Network of bike lanes, multi-use trails, and signed bicycle routes servicing the City Centre Planning District:

+ Riverside Drive;
+ University Avenue;
+ Wyandotte Street;
+ McDougall Street, and;
+ Erie Street.

These proposed location for bikeways corridors were used as the starting point during the identification of opportunities as well as the evaluation of alternative cross-sections.

2.3.1.4 Official Plan, Schedule G: Civic Image

Chapter 8 of the City of Windsor Official Plan provides a set of urban design goals intended to enhance the physical systems and urban form of the City including the definition of the following Main streets as part of Schedule G of the Official Plan:

- Riverside Drive;
- Pitt Street;
- Chatham Street;
- University Avenue;
- McDougall Street;
- Wyandotte Street;
- Ouellette Avenue;
- Park Street (between Ouellette Avenue and McDougall Street); and
- Erie Street (east of Howard Avenue)

The expectation for using the identified Main streets to encourage pedestrian activity and movement along the streetscape as described in Section 8.11.2.10 of the City of Windsor Official Plan was taken into consideration during the development and evaluation of alternative cross-sections.

2.3.1.5 Official Plan, Schedule X: Right of Way Widths

In addition to general requirements for right-of-way widths as described in Chapter 7 of the City of Windsor Official Plan, the required right-of-way widths presented in Schedule X were taken into consideration during the determination of alternative cross-sections.

2.3.1.6 Traffic By-Law 9148: Truck Route Network

Information provided by the City identifies the following corridors as Truck Routes:

- University Avenue (west of Goyeau Street);
- Goyeau Street;
- Portions of Victoria Avenue and Pelissier Street between University Avenue and Chatham Street;
- McDougall Street;
- Howard Avenue corridor (including Glengarry Avenue and Aylmer Avenue);
- Wyandotte Street;
- Ouellette Avenue south of Wyandotte Street; and
- Erie Street East

2.3.2 Master and Implementation Plans

2.3.2.1 Bicycle Use Master Plan

The City of Windsor's Bicycle Use Master Plan (BUMP), completed in 2001, provides a series of recommended actions for the development of "a visible and connected cycling network that is easily accessible, safe, and actively used by all types of cyclists".

For the purpose of this assignment, and aside of the integration of a Primary Cycling Network servicing the City of Windsor, the most relevant recommendations included as part of the Plan are:

+ Construct every road as a bicycle friendly roadway;
+ Improve bicycle routes to transit centres; and
+ Promote commuter cycling to the University of Windsor, St. Clair College, and all secondary and elementary schools.

The BUMP also provides a Toolbox of general design guidelines for the construction of the recommended cycling network.

Due to the release dates of the BUMP (2001), as well as the key reference manuals included as part of the BUMP toolbox (1996-1999), it was considered appropriate to consult more recent guidelines and best practices – listed below – to supplement the information provided by the BUMP plan / Toolbox during the evaluation of alternative cross-sections:

+ Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 2012;
+ Planning and Design for Pedestrians and Cyclists, Velo Quebec Association, 2010;
+ Bikeways Design Manual, Ontario Ministry of Transportation, 2014; and
+ Ontario Traffic Manual Book 18 Bicycle Facilities: 2014.

Recommendations regarding the use of specific corridors for the provision of cycling facilities, as well as recommended design standards, were used during the determination and evaluation of alternative cross-sections, as well as for the preparation of the Downtown Transportation Strategy Toolbox.

2.3.2.2 Central Riverfront Implementation Plan (initially adopted in 2000)

A comprehensive review of the recommendations contained in the Central Riverfront Implementation Plan (CRIP) was conducted based on the material provided as part of the Public Consultation Process completed by Landmark Engineers on behalf of the City of Windsor in June, 2014.

The following recommendations were considered relevant for the purpose of this assignment:

+ Consideration is given to incorporating improved “at grade” pedestrian crossings to improve pedestrian safety and the connection between the riverfront and south area of Riverside Drive at the following intersections:
  - Bruce Avenue;
  - Church Street;
  - Ferry Street;
  - Ouellette Avenue;
  - Goyeau Street;
  - McDougall Street;
  - Glengarry Avenue; and
  - Aylmer Avenue;
+ Any changes to the width of Riverside Drive should be undertaken with caution and only after a thorough review of traffic patterns; and
+ Consideration be given to the provision of additional pedestrian space and improvements to the pedestrian areas along Riverside Drive.

Recommendations regarding the location of improved at-grade pedestrian crossings were considered as part of the identification of opportunities for North-South pedestrian connectivity. It should be noted that the grade-separated crossings of Riverside Drive recommended by the CRIP were not considered as part of this assignment as a Class Environmental Assessment is being concurrently conducted by the City of Windsor.

2.3.3 Previous Environmental Assessment and Related Policies

2.3.3.1 Downtown Windsor Streetscape Improvements

The Downtown Streetscape work completed by Dillon / ENVision Consultants on behalf of the City of Windsor provides a set of concept plans, streetscape improvements, and utility upgrades for the following roadway segments:

+ Ouellette Avenue (between Pitt Street and Elliott Street);
+ Pelissier Street (between University Avenue and Wyandotte Street West); and
+ Maiden Lane West (between Ouellette Avenue and Pelissier Street).

Due to the fact that these improvements are either fully implemented or currently scheduled for completion, the aforementioned roadway segments were not considered during the development and evaluation of alternative cross-sections.

2.3.3.2 Riverside Drive Vista Improvement Project Class EA

As the study area covered by the Class EA extends from Rosedale Avenue to the border with the Town of Tecumseh, our review of the proposed recommendations including as part of the Environmental Study Report were centered on the recommended Node Type and associated Crossing requirements for the following locations as well as the proposed design concepts for improvements to Riverside Drive at the following intersections in the Downtown Strategy study area:

+ Crawford Avenue;
+ Caron Avenue;
+ Church Street;
+ Ferry Street;
+ Ouellette Avenue;
+ Between Goyeau Street and McDougall Avenue;
+ Glengarry Avenue; and
+ Louis Avenue.

2.3.3.3 City of Windsor Development Manual

Although the City of Windsor Development Manual refers to the City Centre Streetscape Standards for guidelines regarding urban design criteria, it includes the following series of minimum requirements relevant to this study:

+ Section 6.1.1. Minimum Pavement width (face-to-face):
  - Local roads: 8.6 metres
  - Collector roads: 10.4 metres
  - Arterial roads: 14.6 metres
+ Section 6.1.6. Bike Lane:
  - Without on-street parking
    - 1.5 metres (1.2 metres minimum to 1.8 metres maximum)
  - With on-street parking
    - 4.0 metres, allowing a 1.6 metres bike lane and 2.4 metres wide curb side parking stall.
+ Section 7.1.1. Sidewalks Design:
  - Residential
    - Width of 1.2 metres or 1.5 metres if adjacent to curb*

* Superseded by AODA and new Engineering Standard Drawings. As per July 2016, the sidewalk design width is 1.5 metres

Minimum requirements for these roadway elements as well as the recommended design standards were used during the determination and evaluation of alternative cross-sections as well as for the preparation of the study Toolbox.

2.3.3.4 Accessibility for Ontarians with Disabilities Act, 2005

In accordance with the Ontario Regulation 191 / 11, Integrated Accessibility Standards, “all newly constructed and redeveloped exterior paths of travel that are outdoor sidewalks or walkways designed and constructed for pedestrian travel” must have a minimum clear width of 1,500 mm.

This minimum requirement for sidewalks was used during the determination and evaluation of alternative cross-sections as well as for the preparation of the Toolbox.

With respect of on-street parking spaces, Section 80.39 of Regulation 191 / 11 does not provide specific criteria for the design and placement of accessible on-street parking. Instead, municipalities are required to consult with (1) the public, (2) people with disabilities, and (3) their own accessibility advisory committee (if existent) with respect of the need, location, and design of accessible on-street parking spaces.

2.4 Literature and Best Practices Review

CIMA+ undertook a literature search of peer reviewed scientific engineering and planning active transportation articles using search words aimed to retrieve literature specific to the urban built forms and land uses within the City of Windsor study area. We retrieved approximately 25 articles from each of the planning and engineering literatures in 2012 through 2014 and conducted a survey of selected design manuals that take the literature and apply it to practical matters. We also used a previous literature search conducted in 2011 and 2012, as well as literature we have been collecting since 2006. We used this material as a reference point from which to interpret and apply the more recent research.

The result of our review suggested that the enhancement and promotion of active modes of transportation relies heavily on the following set of 5 environmental factors:

2.4.1 Connectivity

The concept of Connectivity refers to the number and location of travel opportunities offered to all roadway users between origin and destination(s). From a connectivity perspective, the choice of mode of transportation depends on the distance required to travel. Examples of opportunities that may increase connectivity are:

+ Continuity of sidewalks and cycling facilities between different urban areas;
+ Intersection and mid-block opportunities for safe crossing; and
+ Links between different modes of transportation (i.e. cycling facilities in connection with transit services).

2.4.2 Accessibility

If the concept of connectivity measures the amount of opportunities offered to the roadway users between origin and destination, the concept of Accessibility evaluates the quality of these opportunities from the user's perspective. From an accessibility perspective, the choice of transportation mode depends on the physical prowess of the roadway user. Examples of opportunities that may enhance accessibility are:

+ Sidewalks wider enough to support adequate access to all type of users; and
+ "Share the road" pavement marking and signs to highlight the multi-use of specific roadways.

B000460

2.4.3 Utilitarian Activities

Each trip has a purpose that mostly depends of the type of urban environment in which the trip takes place. For example, in a Mixed Use type of environment the

potential purpose of the trip could be shopping or dining while for roadway users in a Residential Area it could be walking the dog or going to school. From a utilitarian perspective the choice of transportation mode is time and cost dependant. Examples of opportunities that may enhance utilitarian activities are:

+ Sidewalk width to facilitate other activities (i.e. window shopping), rather than only pedestrian traffic; and
+ Clear paths between different areas (i.e. parking lots to amenities).

2.4.4 Behavioural Factors

A roadway user's response to the particular characteristics of the surrounding environment are individual in nature and are more related to how he / she perceives the environment rather than the quality of these particular characteristics. From a behavioural perspective, it is not possible to identify a single item that defines the potential response of the roadway user. For example, a wider separation between the pedestrian area and the vehicular traffic may be perceived by the general public as a safer environment, but if the separation is accomplished with the use of planters or street furniture along boulevards, these could be perceived as potential obstacles to pedestrian activities.

2.4.5 Spatial Experience

Partially related with behavioural factors, the concept of spatial experience refers to the roadway user's response to enhancements to the urban environment; for example, areas to rest while travelling or trees to provide shade and a sense of enclosure. From a spatial experience perspective the choice of transportation mode will depend of the perceived environment along the trip as a whole rather than individual spots along the route. Examples of opportunities that may enhance spatial experience are:

+ Provision of adequate space for street furniture and landscaping; and
+ Use of boulevards for tree planting.

3. Existing Conditions and Opportunities

3.1 Context Zones

To fully consider the particular characteristics of the different areas comprising Downtown Windsor during the review of existing conditions and identify potential opportunities, a set of Context Zones[1] were selected based on City Centre designations identified in the City of Windsor Official Plan – Schedule E: City Planning District, as well as a series of existing and future development projects that, due to their special characteristics, need to be considered in more detail. The distribution of the selected Context Zones is presented in **Figure 1**.

3.1.1 Core Commercial / Business

This area is roughly limited by Riverside Drive to the north, Elliott Street to the south, Caron Avenue to the west, and Glengarry Avenue to the east. In addition to governmental buildings such as City Hall, Windsor Police Headquarters, and Ontario Court of Justice, the area hosts a diverse collection of cultural and recreational facilities and post-secondary institutional buildings.

The roadway network servicing this type of Context Zone is mostly composed of Class II Arterial and Class 1 Collector Roads which provide direct access to governmental and corporative buildings, as well as both on- and off-street parking locations.

Generally, sidewalks are provided on both sides of the road in varying widths dependent upon the location and nature of the surrounding environment. It should be noted that recent improvements conducted along Ouellette Avenue and Pelissier Street increased the space allocated to sidewalks through the reduction of on-street parking opportunities.

At the time of the present study, the area is not served by bicycle facilities outside of those located on the Riverside Drive off-street path. Transit services are provided along Ouellette Avenue, University Avenue West, Chatham Street, and Pitt Street West.

B000460

[1] From an urban planning perspective, the Context Zone concept is used to identify the type of urban environments that compose a community - from the downtown core to the rural areas surrounding the community.

This page is intentionally left blank

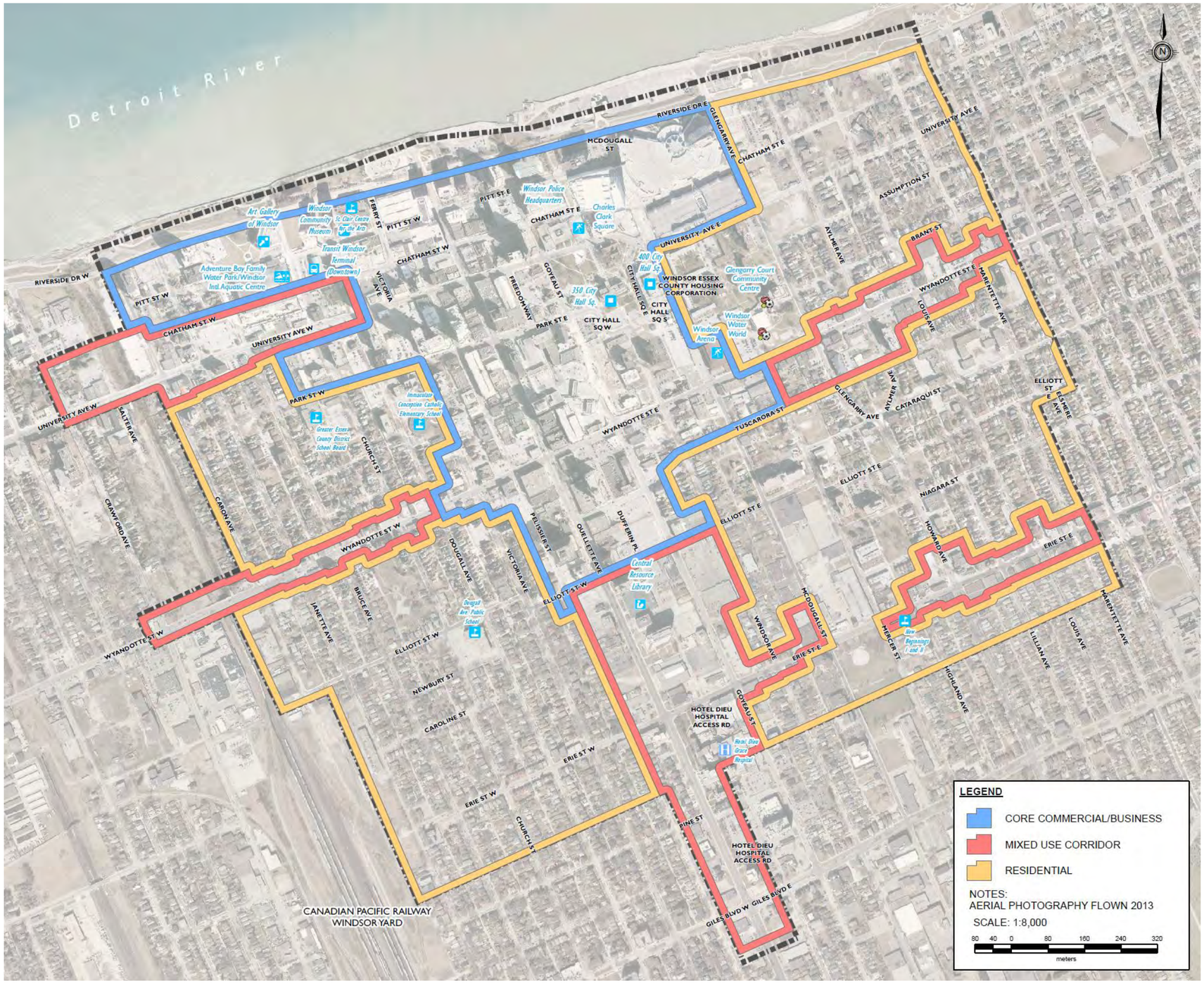


Figure 1 Proposed Context Zones

B000460

3.1.2 Mixed Uses

As illustrated in **Figure 1**, five different corridors in Downtown Windsor were included as part of this Context Zone:

1. University Avenue West from Crawford Avenue to Dougall Avenue;
2. Wyandotte Street West from Crawford Avenue Dougall Avenue;
3. Wyandotte Street East from Mercer Street to Marentette Avenue;
4. Erie Street East from Mercer Street to Marentette Avenue; and
5. Ouellette Avenue from Elliott Street to Giles Boulevard.

These areas are located along Class 2 Arterial Roads (with the exception of Erie Street which is a Class 1 Collector Road) servicing a mix of institutional, small commercial, and residential development.

Similar to the Core Commercial / Business area, wider sidewalks are typically provided to support the retail and entertainment areas along the roadway network (i.e. Erie Street east of Howard Avenue).

Although transit services are provided on all mixed used corridors, bicycle facilities are limited to Wyandotte Street east of Mercer Street. It should be noted that the Bicycle Use Master Plan recommended the implementation of bicycle facilities along the Class 2 Arterials and Class 1 Collector Roads servicing these areas, with the exception of Ouellette Avenue.

3.1.3 Residential

The remaining portions of Downtown Windsor consist of Residential areas surrounding the Core Commercial / Business Context Zone. With the exception of the Howard Avenue and Glengarry / Aylmer Avenue twin corridor, vehicular traffic is serviced by collector and local roads. Transit services are provided along the Howard Avenue and Glengarry / Aylmer Avenue twin corridor as well as Erie Street and the Janette Avenue and Bruce Avenue twin corridor. The latter also allocates a set of one-way on-street bicycle facilities providing north-south connection between Erie Street West and Riverside Drive West.

Although sidewalks are provided on both sides of the road for the entire Context Zone, along most local roads they are narrow and opportunities for expansion are limited by the presence of boulevards, trees, and utility poles.

All institutional and recreational destinations not included as part of the Areas of Special Interest are located in the residential type of context zone.

3.1.4 Proposed Special Interest Areas

Following recommendations provided by the City of Windsor's Planning and Building Services Department, Areas of Special Interest were identified as follows:

+ **Cultural and Recreation** – limited by Riverside Drive West, Church Street, Bruce Street, and south of Chatham Street West contain the Art Gallery of Windsor, a Community Museum, and the Windsor International Aquatic and Training Centre. These areas are connected to the rest of the downtown by Class 1 Collector and Local roads. Off-street parking is available at the Art Gallery of Windsor as well as the Windsor International Aquatic and Training Centre. With respect of cycling facilities and transit services, both locations have direct access to the Transit Windsor terminal as well as the Bruce Avenue bicycle lane. Connections to cycling facilities along the Waterfront are provided at signalized intersections (Bruce Avenue and Church Street).
+ **Post-Secondary Institutional Buildings** – localized east and west of Downtown Windsor, these areas include the St. Clair Centre for the Arts, St. Clair College TD Student Centre, St. Clair College Media Plex, Former Windsor Star east of Ferry Street, and the future University of Windsor Downtown Campus properties west of Ouellette Avenue. All locations are connected to the rest of the Downtown Area by Class 2 Arterial and Class 1 Collector Roads with the exception of the St. Clair Centre for the Arts which is served by a Scenic Drive. Although all locations are near to a transit stop, at the time of this study no cycling facilities provide direct access to these facilities. Provision of off-street parking for these facilities is still unclear (since some of them are still under design), but it can be assumed that Pitt Street and Chatham Street will provide opportunities for on-street parking.
+ **Civic Government Resources** – this area, which includes City Hall, 400 City Hall Sq, Senator Croll Park, Charles Clark Square, Civic Esplanade, Court House, and Police Station is currently served by Class 2 Arterials and Class 1 Collector roads with internal movements served by Local roads. Off-street parking is provided in several locations near the area but no cycling facilities are provided at the present time. A nearby transit route is located along Wyandotte Street.
+ **Areas surrounding the Windsor-Detroit Tunnel Plaza and Caesars Windsor Hotel and Casino.** Although these areas are considered as part of the Core

Commercial / Business Context Zone, the following particularities were taken into consideration as part of the identification of existing conditions and development of potential alternatives:

- Restricted access along Park Street between Ouellette Avenue and Freedom Way to facilitate Tunnel Plaza operations; and
- Interaction between off-street parking and the Caesars Windsor operations along Chatham Street and University Avenue between McDougall Street and Glengarry Avenue.

The distribution of the selected Areas of Special Interest around Downtown Windsor is presented in **Figure 2**.

The described relationship between the proposed context zones and the current roadway infrastructure is schematically presented in **Tables 1 to 6**.

Figure 2 Proposed Special Interest Areas

CULTURAL AND RECREATION
1. Art Gallery of Windsor
2. Windsor's Community Museum
3. Windsor International Aquatic and Training Centre
POST SECONDARY INSTITUTIONAL BUILDINGS
5. St. Clair Centre for the Arts
6. St. Clair College TD Student Centre
7. St. Clair College Media Plex
8. University of Windsor (Former Windsor Star)
9. University of Windsor (Downtown Campus Properties)
CIVIC AND GOVERNMENT RESOURCES
4. Transit Windsor Terminal
10. City Hall, 400 City Hall Sq., Senator Croll Park, Charles Clark Square, Civic Esplanade, Court House and Police Station
AREAS SURROUNDING THE WINDSOR-DETROIT TUNNEL PLAZA AND CAESARS WINDSOR HOTEL AND CASINO
11. Windsor-Detroit Tunnel Plaza
12. Caesar's Windsor Hotel and Casino

B000460

Table 1 Downtown Windsor Existing Roadway Matrix

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	✓	**NS**	✓	✓	Riverside Drive
CLASS II ARTERIAL	✓	✓	✓	✓	University Avenue, Ouellette Avenue, Wyandotte Street, Glengarry Avenue, Aylmer Avenue, Howard Avenue
CLASS I COLLECTOR	✓	✓	✓	✓	Janette Avenue, Bruce Avenue, Pitt Street, Chatham Street, Park Street, Goyeau Street, McDougall Avenue, Erie Street
CLASS II COLLECTOR	✓	**NS**	✓	**NS**	Victoria Avenue, Pelissier Street
LOCAL	✓	**NS**	✓	**NS**	(Numerous)

NS: Not served by this class of road

As schematically presented in **Table 1**, access to all context zones is adequately balanced between arterial, collector and local roads. It should be noted that, due to its specific activities, Mixed Use areas are only served by Class II arterials and Class I Collector roads.

B000460

Table 2 Downtown Windsor Existing Provision of Pedestrian Facilities

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	✓	**NS**	✓	✓	Riverside Drive
CLASS II ARTERIAL	✓	✓	✓	✓	University Avenue, Ouellette Avenue, Wyandotte Street, Glengarry Avenue, Aylmer Avenue, Howard Avenue
CLASS I COLLECTOR	✓	✓	✓	✓	Janette Avenue, Bruce Avenue, Pitt Street, Chatham Street, Park Street, Goyeau Street, McDougall Avenue, Erie Street
CLASS II COLLECTOR	✓	**NS**	✓	**NS**	Victoria Avenue, Pelissier Street
LOCAL	✓	**NS**	✓	**NS**	(Numerous)

NS: Not served by this class of road

As schematically presented in **Table 2**, pedestrian facilities are provided along all the different roads servicing the context zones composing Downtown Windsor.

B000460

Table 3 Downtown Windsor Existing Provision of Cycling Infrastructure

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	✓	**NS**	✓	✓	Riverside Drive (off-road)
CLASS II ARTERIAL	Proposed	✓	**NA**	**NA**	University Avenue, Wyandotte Street,
CLASS I COLLECTOR	**NA**	Proposed	✓	✓	Janette Avenue, Bruce Avenue, Erie Street, McDougall Street
CLASS II COLLECTOR	**NA**	**NS**	**NA**	**NS**	
LOCAL	**NA**	**NS**	**NA**	**NS**	

NS: Not served by this class of road

NA: No dedicated cycling infrastructure

Although under the current legislation, a bicycle is a vehicle that can rightfully circulate in any time of roadway, at the time of the present report, no dedicated cycling infrastructure is provided along Class II collectors and Local roads.

B000460

Table 4 Downtown Windsor Existing Provision of Transit Services*

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	✓	**NS**	✓	✓	Riverside Drive
CLASS II ARTERIAL	✓	✓	✓	✓	University Avenue, Ouellette Avenue, Wyandotte Street, Glengarry Avenue, Aylmer Avenue, Howard Avenue
CLASS I COLLECTOR	✓	✓	✓	✓	Janette Avenue, Bruce Avenue, Pitt Street, Chatham Street, Erie Street
CLASS II COLLECTOR	**NA**	**NS**	**NA**	**NS**	
LOCAL	✓	**NS**	**NA**	**NS**	Victoria Avenue

NS: Not served by this class of road

NA: No transit service

* For clarity purposes the Tunnel Bus route and the portion of Transit Routes servicing the Civic Government Area are not included in **Figure 9**.

B000460

Table 5 Downtown Windsor Existing Provision of Municipal Parking (Off-Street)*

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	✓	**NS**	**NA**	✓	Riverside Drive
CLASS II ARTERIAL	✓	✓	**NA**	✓	University Avenue, Wyandotte Street, Howard Avenue
CLASS I COLLECTOR	✓	✓	**NA**	✓	Janette Avenue, Bruce Avenue, Pitt Street, Chatham Street, Erie Street
CLASS II COLLECTOR	✓	**NS**	**NA**	**NS**	Pelissier Street
LOCAL	✓	**NS**	**NA**	**NS**	Dufferin Pl.

NS: Not served by this class of road

NA: No municipal parking facilities

Although no specific numbers for the Downtown Area were available at the time of the present document, the City's current parking inventory consists of:

+ 1,456 on street, parking-meter locations
+ 28 off street parking lots comprising, 1,533 parking spaces, and
+ 3 municipal garages providing 1,540 parking spaces.

Location and estimated area of influence of Municipal Parking Lots and Garages inside the Study Area are schematically presented in **Figure 3**.

B000460

This page is intentionally left blank

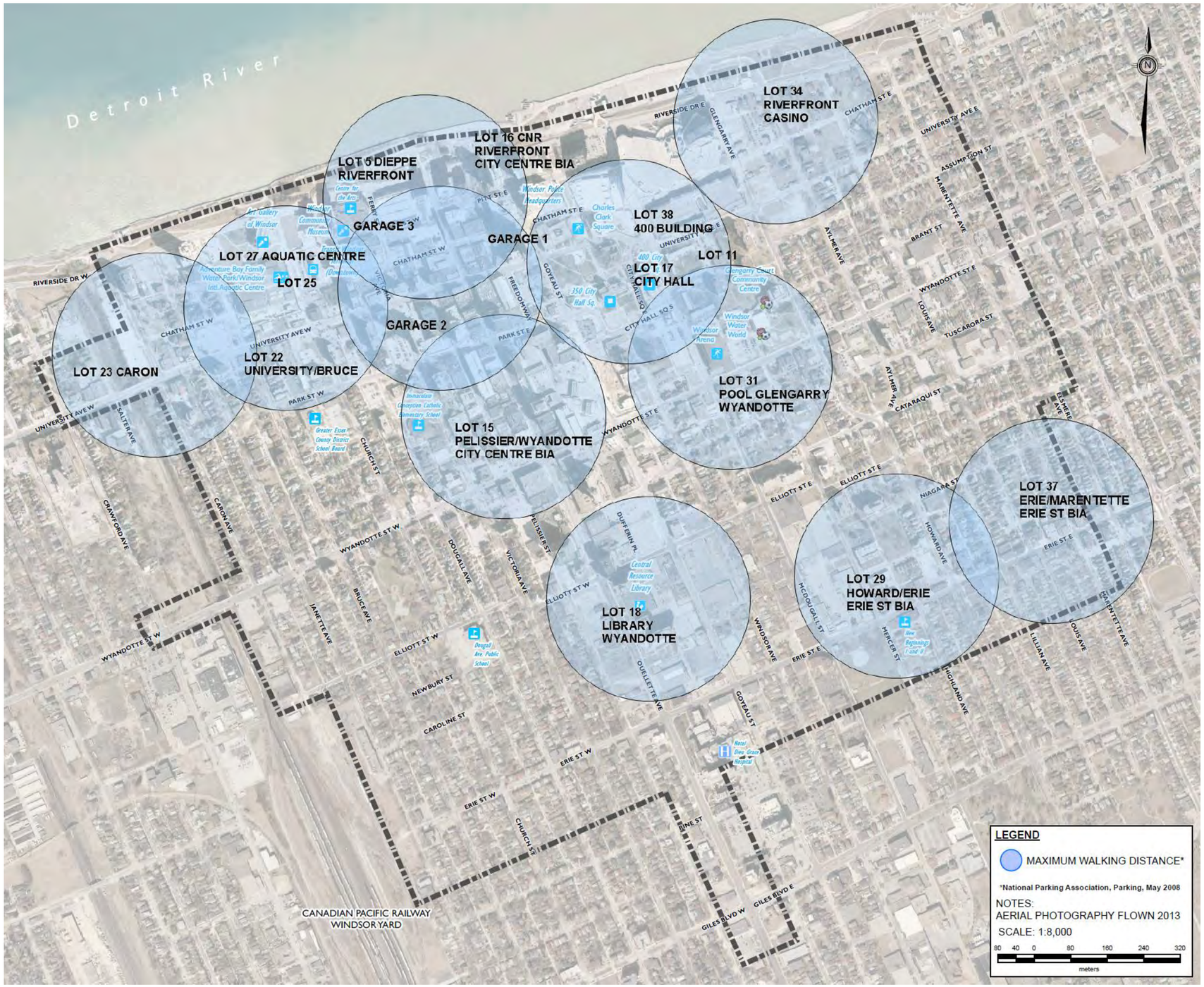


Figure 3 Municipal Parking Lots and Garages

B000460

This page is intentionally left blank

Table 6 Downtown Windsor Existing Provision of Municipal Parking (On-Street)

ROAD CLASSIFICATION	TYPE OF CONTEXT ZONE				STREETS
	Core Commercial / Business	Mixed Use	Residential	Areas of Special Interest	
SCENIC DRIVE	**NA**	**NA**	**NA**	**NA**	
CLASS II ARTERIAL	✓	✓	✓	✓	University Avenue, Wyandotte Street, Glengarry Avenue, Aylmer Avenue, Howard Avenue
CLASS I COLLECTOR	✓	✓	✓	✓	Janette Avenue, Bruce Avenue, Pitt Street, Chatham Street, Park Street, Goyeau Street, Erie Street
CLASS II COLLECTOR	✓	**NS**	✓	**NS**	Victoria Avenue, Pelissier Street
LOCAL	✓	**NS**	✓	**NS**	Including Residential Permit Parking

NS: Not served by these class of roads

NA: On-street parking prohibited

B000460

3.2 Existing Conditions

Information provided by City Staff regarding traffic and pedestrian data, transit services, and digital mapping was complemented with information collected during a series of site visits to the area under study. The collected data was compiled to facilitate its review and use for the identification of existing conditions as well as the basis for development of potential opportunities.

3.2.1 Vehicular Traffic

Analysis of traffic counts periodically conducted by the City of Windsor since 2004 provided the following insight about the vehicular traffic experienced along the roadway network servicing the area under study.

3.2.1.1 Historical Trends

As described in **Table 7,** in the last 10 years, vehicular traffic along the roadway network servicing the area under study is experiencing a minimal increase, or in some portions of the network a decline on traffic volumes.

3.2.1.2 Current Traffic

Class II Arterial Roads such as Wyandotte Street and Ouellette Avenue are used as the main corridors for traffic movements (> 6000 vehicles / 12 hours) in and out of the study area. Although University Avenue is also classified as a Class II arterial road, traffic along the corridor (3000 to 6000 / 12 hour day) is much lower than is observed along Wyandotte Street or Ouellette Avenue. Moreover, and although the information available for Howard Avenue was limited, traffic counts available for Aylmer Avenue and Glengarry Avenue suggested average 12-hour traffic volumes under 3,000 vehicles.

Class I Collector Roads such as Erie Street, Goyeau Street, and McDougall Avenue present a vehicular traffic between 2,000 and 6,000 vehicles during the day which suggest that most vehicular traffic uses Arterial Roads for east-west (Wyandotte Street) and north-south (Ouellette Avenue) destinations. With respect to the one-way corridor pair composed of Pitt Street and Chatham Street, the collected data showed even lower traffic with average 12-hour traffic volumes under 2,000 vehicles.

Class II Collector Roads servicing the study area are limited to Victoria Avenue and Pelissier Street. Traffic volumes observed along the one-way corridor are similar in range to those observed along Pitt Street and Chatham Street with 12-hour traffic volumes averaging fewer than 2,000 vehicles with even lower traffic volumes along

residential areas near Erie Street. This information is schematically presented in **Figure 4**.

Table 7 Vehicular Traffic – Historical Counts (2007-2014)

Location		2007	2008	2013	2014	% Growth (annualized)
		12 hour – Total Traffic*				
Bruce Avenue	North of Wyandotte Street	1488		1215		-3.1%
Wyandotte Street West	West of Victoria Avenue	9085		8445		-1.2%
University Avenue West	East of Victoria Avenue	5120		4156		-3.1%
Ouellette Avenue	North of Elliot Street	7733			8048	0.6%
Wyandotte Street East	East of Windsor Avenue	9399			9678	0.4%
McDougall Street	North of Elliot Street	4440		3385		-4.0%
Goyeau Street	North of Erie Street		5233	5112		-0.5%
Glengarry Avenue	North of Chatham Street		2127		2633	4.0%
Glengarry Avenue	South of University Avenue		1850	1867		0.2%
Aylmer Avenue	North of Wyandotte Street	1821		1631		-1.7%
Park Street West	East of Victoria Avenue	1712		1471		-2.3%

* Traffic volumes per link in both directions

B000460

Although information regarding traffic volumes along local roads was limited, observations conducted during the site visits suggested that – potential traffic infiltration aside – traffic along local roads may be considered under 2,000 vehicles (average 12-hour traffic volumes).

A comparison between average link traffic volumes (based on traffic counts periodically conducted by the City of Windsor since 2004) and available roadway capacity (based on 600 vehicles per hour per lane), schematically presented in **Figure 5**, was used to determine potential areas of opportunity for enhancement of alternative modes of transportation.

3.2.1.2.1 One-Way Corridors

The roadway network servicing the study area includes the following set of one-way collector road pairs (see **Figure 6**):

+ Pitt Street and Chatham Street;
+ Victoria Avenue and Pelissier Street;
+ Glengarry Avenue and Aylmer Avenue; and
+ Janette Avenue and Bruce Avenue.

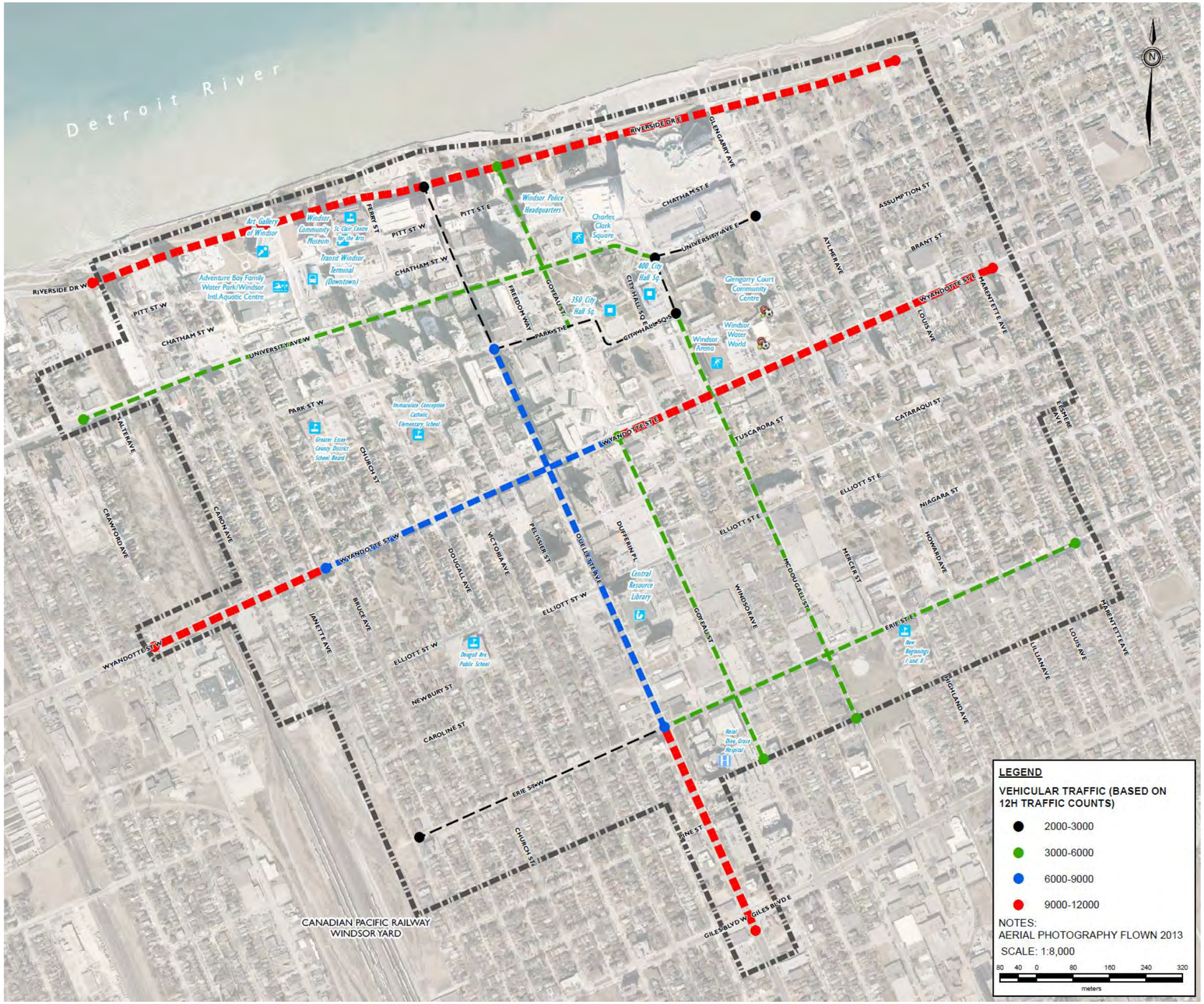
It should be noted that one-way local roads were not considered as part of this review with the exception of Victoria Avenue north of University Avenue because most of these roads have a narrow right of way and limited scope for overall improvement.

Pitt Street and Chatham Street

Pitt Street between Church Street and Goyeau Street currently provides (depending on section) between 2 and 3 lanes of traffic (eastbound) as well as 1 to 2 lanes of on-street parking. It should be noted that traffic operations from Goyeau Street to McDougall Street changes from one-way to two-way with some restrictions near the Caesars Windsor access at McDougall Street.

In a similar way, Chatham Street between Glengarry Avenue and McDougall Street operates as a two-way road with two lanes of traffic (one per direction) as well as dedicated auxiliary lanes and parking lanes fronting Caesars Windsor. West of McDougall Street, Chatham Street operates in one direction (westbound) with two lanes of traffic and parking lanes in both sides of the road. Parking bays and curb extension are currently provided around the intersection with Pelissier Street.

This page is intentionally left blank



B000460

Figure 4 Motor Vehicle Movements

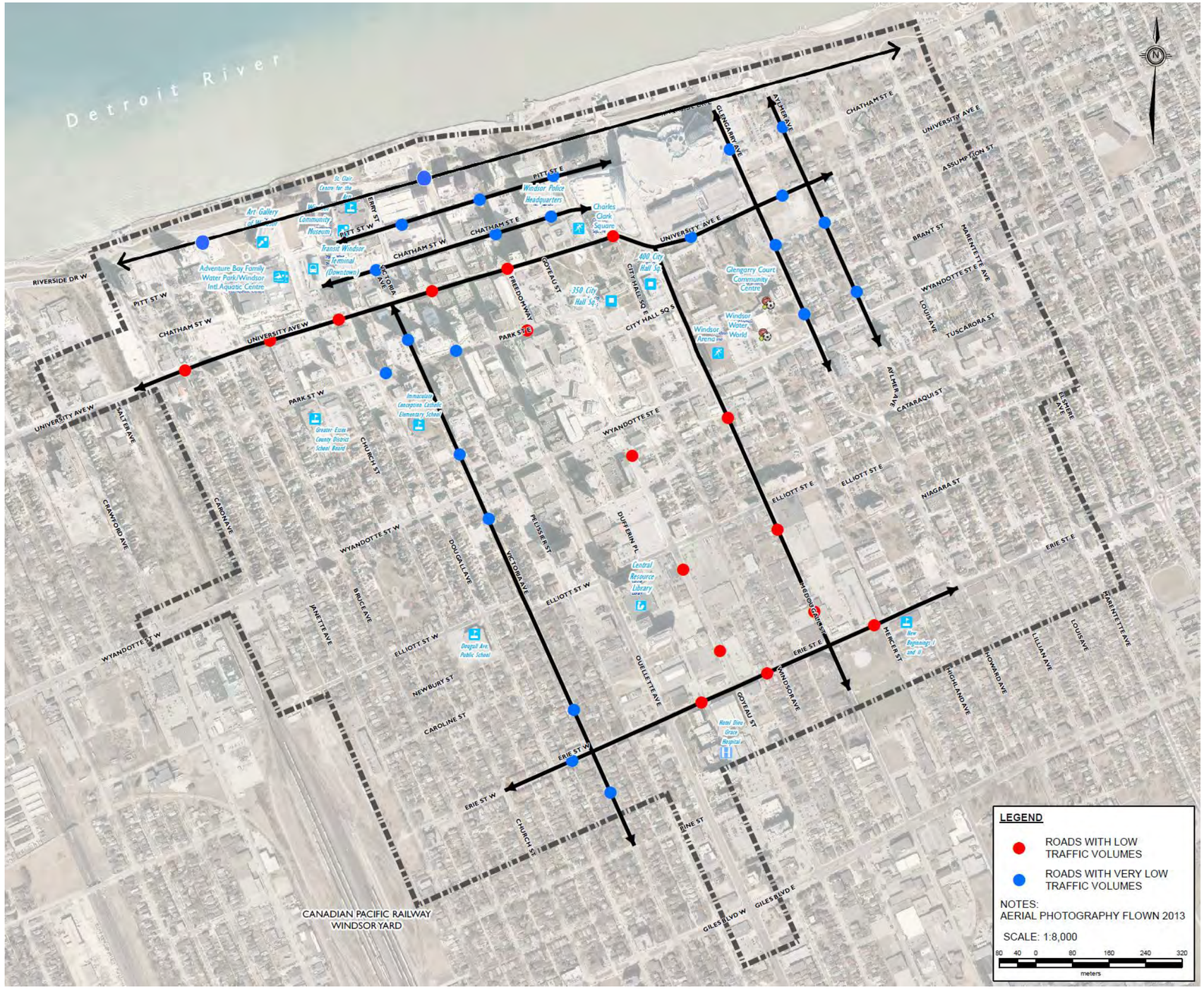
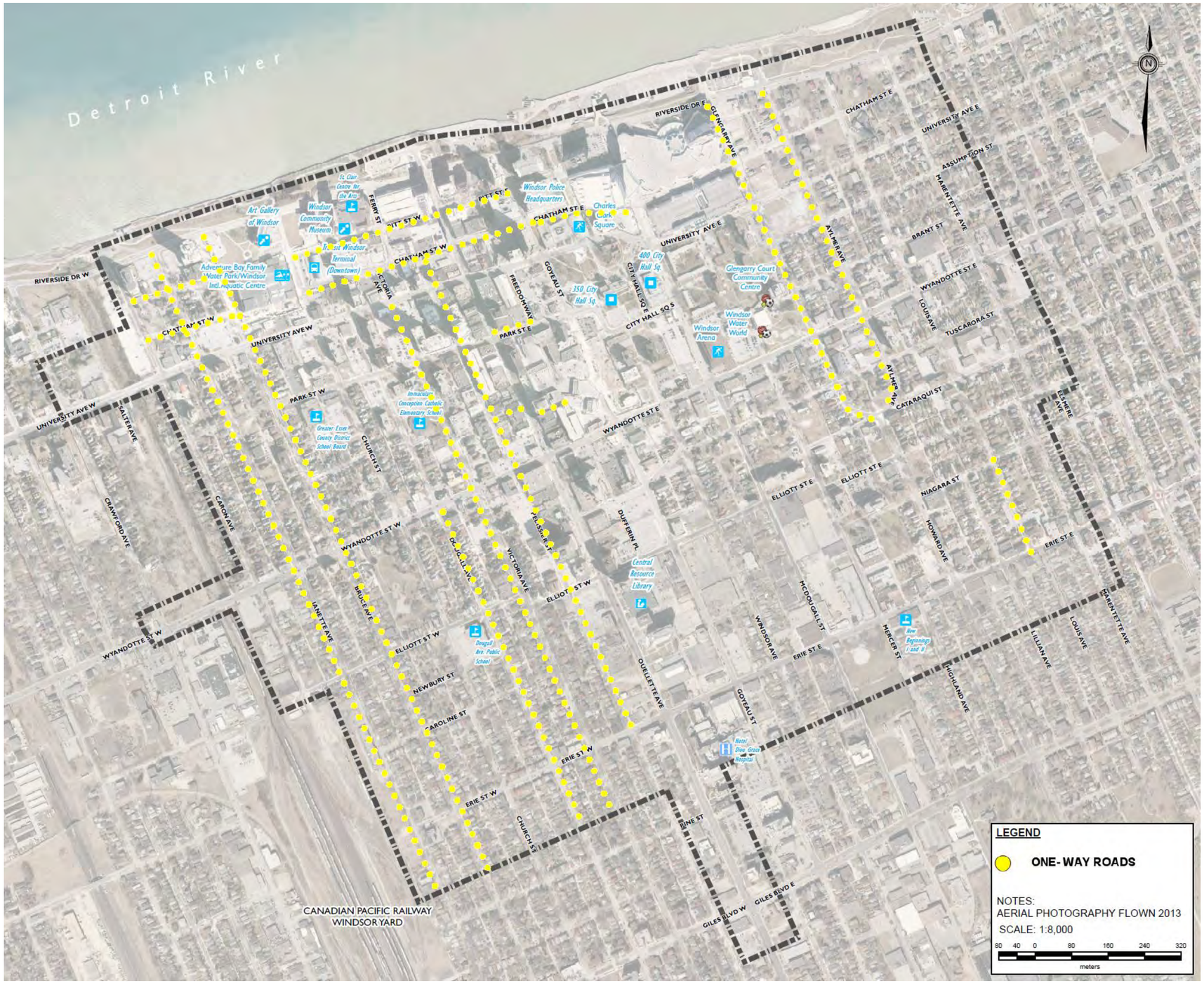


Figure 5 Existing Link traffic Volumes against Existing Roadway Capacity

B000460



B000460

Figure 6 One-Way Roads

Information contained in the traffic counts provided by the City of Windsor for several intersections along Pitt Street and Chatham Street is summarized in **Table 8**. An average roadway capacity of 600 vehicles per hour per lane is presented for comparison purposes.

Table 8 Pitt Street and Chatham Street - Maximum Peak Hour Volume

Traffic Count Location	Date	Maximum Peak Hour Volume	Roadway Capacity (vehicles per hour)
Chatham (at Ouellette)	27-Sep-12	161	
Chatham (at Goyeau)	29-Oct-08	219	
Chatham (at McDougall)	8-Dec-08	186	
Pitt (at Goyeau)	5-Dec-12	370	
Pitt (at Ouellette)	26-Sep-12	172	
Pitt (at McDougall)	22-Jun-05	227	
Chatham Street			1200
Pitt Street			1200

Victoria Avenue and Pelissier Street

The portion of Pelissier Street between Chatham Street and Wyandotte Street provides two lanes of traffic in a northbound direction with parking bays on both sides of the road and wider sidewalks with curb extensions and boulevards providing space for street furniture and trees. South of Wyandotte Street the cross-section of the road changes to two lanes of dedicated on-street parking, but maintains the two traffic lanes up to the intersection of Elliott Street in which a narrow roadway section is shared between traffic and on-street parking. The one-way traffic operation along Pelissier Street is terminated south of Erie Street. The portion of Victoria Avenue between Chatham Street and University Avenue operates as a two-way local road with diagonal on-street parking on both sides of the road. The road classification, cross-section, and the direction of traffic of Victoria Avenue changes to a Class 2

Collector with three lanes of southbound traffic and two lanes of parking (parallel and diagonal) from University Avenue to Park Street. From Park Street to Wyandotte Street, the cross-section changes to two lanes of southbound traffic plus parallel parking at both sides of the road. South of Wyandotte Street the two lanes of southbound traffic are maintained while only one lane of parallel parking is offered along the road.

Information contained in the traffic counts provided by the City of Windsor for several intersections along Victoria Avenue and Pelissier Street are summarized in **Table 9**. A typical roadway capacity of 600 vehicles per hour per lane is presented for comparison purposes.

Table 9 Victoria Avenue and Pelissier Street – Maximum Peak Hour Volume

Traffic Count Location	Date	Maximum Peak Hour Volume	Roadway Capacity (vehicles per hour)
Victoria (at Wyandotte)	08-May-14	338	
Victoria (at Park)	11-Dec-12	203	
Victoria (at University)	10-Dec-12	158	
Victoria (at Erie)	17-Sep-12	217	
Pelissier (at Park)	12-Dec-12	281	
Pelissier (at University)	28-Sep-12	186	
Pelissier (at Wyandotte)	23-Nov-06	246	
Victoria Avenue			1200
Pelissier Street			1200

Glengarry Avenue and Aylmer Avenue

B000460

The portion of Glengarry Avenue between Riverside Drive and University Avenue provides three lanes of traffic in a southbound direction with no on-street parking and a wider sidewalk servicing the Caesars Windsor facilities with curb extensions and boulevards providing space for street furniture and trees. South of University Avenue the cross-section of the road changes to one lane of dedicated on-street parking while

maintaining the two traffic lanes up to the intersection of Howard Avenue in which the one-way traffic operation along Glengarry Avenue is terminated.

The portion of Aylmer Avenue between Howard Avenue and Riverside Drive provides two lanes of traffic and one lane of dedicated on-street parking as well as narrow sidewalks on both sides of the roadway with boulevards providing space for trees and utility poles.

Information contained in the traffic counts provided by the City of Windsor for several intersections along Glengarry Avenue and Aylmer Avenue is summarized in **Table 10**. An average roadway capacity of 600 vehicles per hour per lane is presented for comparison purposes.

Table 10 Aylmer Avenue and Glengarry Avenue – Maximum Peak Hour Volume

Traffic Count Location	Date	Maximum Peak Hour Volume	Roadway Capacity (vehicles per hour)
Aylmer (at Chatham)	08-May-14	380	
Aylmer (at Riverside Drive)	07-May-14	213	
Aylmer (at Wyandotte)	26-Nov-13	340	
Glengarry (at Chatham)	29-May-14	405	
Glengarry (at Riverside Drive)	5-May-14	335	
Glengarry (at Wyandotte)	25-Nov-13	387	
Aylmer Avenue			1200
Glengarry Avenue			1200

Janette Avenue and Bruce Avenue

Bruce Avenue is a Class 1 Collector road that provides connectivity between the Residential areas west of Ouellette Avenue and the northern portion of Downtown Windsor with one lane of traffic (northbound), on-street parking (one side of the road), and a dedicated bicycle lane between Erie Street and University Avenue. North of

University Avenue the cross-section changes to two lanes of traffic with no on-street parking, but maintains the dedicated bicycle lane along the east side of the roadway.

Janette Avenue is a Class 1 Collector road that provided the southbound connection between Riverside Road and Erie Street with a cross-section composed by one lane of traffic, one lane of parking, and a dedicated bicycle lane.

Information contained in the traffic counts provided by the City of Windsor for several intersections along Bruce Avenue and Janette Avenue is summarized in **Table 11**. An average roadway capacity of 600 vehicles per hour per lane is presented for comparison purposes.

Table 11 Bruce Avenue and Janette Avenue – Maximum Peak Hour Volume

Traffic Count Location	Date	Maximum Peak Hour Volume	Roadway Capacity (vehicles per hour)
Bruce (at Wyandotte)	30-Oct-13	285	
Bruce (at University)	14-Oct-09	167	
Janette (at Wyandotte)	31-Oct-13	286	
Bruce Avenue			600
Janette Avenue			600

3.2.1.3 Scenic Drive – Riverside Drive

Riverside Drive from Crawford Avenue to just west of Janette Avenue is a Scenic Drive with a two-lane cross-section (one lane per direction of traffic). From Janette Avenue to Marentette Avenue the cross-section is expanded to two lanes per direction with no auxiliary lanes at intersections with the exception of a right turn and left turn lanes between Aylmer Avenue and Goyeau Street which provide access to the Waterfront.

Information contained in the traffic counts provided by the City of Windsor for several intersections along Riverside Drive is summarized in **Table 12**. A conservative roadway capacity of 600 vehicles per hour per lane is presented for comparison purposes. Results of a 7-day traffic count conducted by the City of Windsor between

May 24 and May 30, 2015 at Riverside Drive west of Ouellette (eastbound) provided a more recent insight about current traffic conditions:

+ Maximum Peak Hour Volume: 906 vehicles
+ Average Peak Hour Volume (weekday): 687 vehicles
+ Average Peak Hour Volume (weekend): 276 vehicles

Table 12 Riverside Drive – Maximum Peak Hour Volume

Traffic Count Location	Date	Maximum Peak Hour Volume	Roadway Capacity (vehicles per hour)
Riverside (at Glengarry)	05-May-14	1213*	
Riverside (at Aylmer)	07-May-14	1067	
Riverside (at Ouellette)	24-Sep-12	907	
Riverside (at Goyeau)	25-Sep-12	1353*	
Riverside (at McDougall)	08-Dec-08	1189	
Riverside (at Bruce)	12-Jun-07	806	
Riverside Drive			1200

*Over capacity

3.2.2 Pedestrian Movements

Analysis of pedestrian counts periodically conducted by the City of Windsor since 2004 provided the following insight about the current pedestrian traffic experienced along the roadway network servicing the area under study. This information is schematically presented in **Figure 7**.

+ The highest number of pedestrian movements was identified along the Ouellette Avenue corridor from just south of Riverside Drive to Erie Street, especially at the intersections with University Avenue and Wyandotte Street.
+ Pedestrian movements tend to diminish proportionally with respect of how far from the Ouellette Avenue Corridor are located (east and westerly).

B000460

+ The lack of pedestrian movements is also noticeable between the north side of Riverside Drive and Downtown Windsor outside of the Ouellette Avenue Corridor.

3.2.3 Cycling Infrastructure

Cycling movements in Downtown Windsor are currently served by a set of on- and off-street bicycle facilities located along Janette Avenue (one-way southbound), Bruce Avenue (one-way northbound), Wyandotte Street (east of Glengarry Avenue), and Riverside Drive multipurpose trail (See **Figure 8**)

It should be noted that the traffic counts conducted by the City of Windsor do not segregate bicycles.

With respect of future improvements and / or expansion of existing facilities, as part of the approved Bicycle Use Master Plan (BUMP) the development of a Primary Cycling Network composed by the following bicycle facilities was recommended for future implementation:

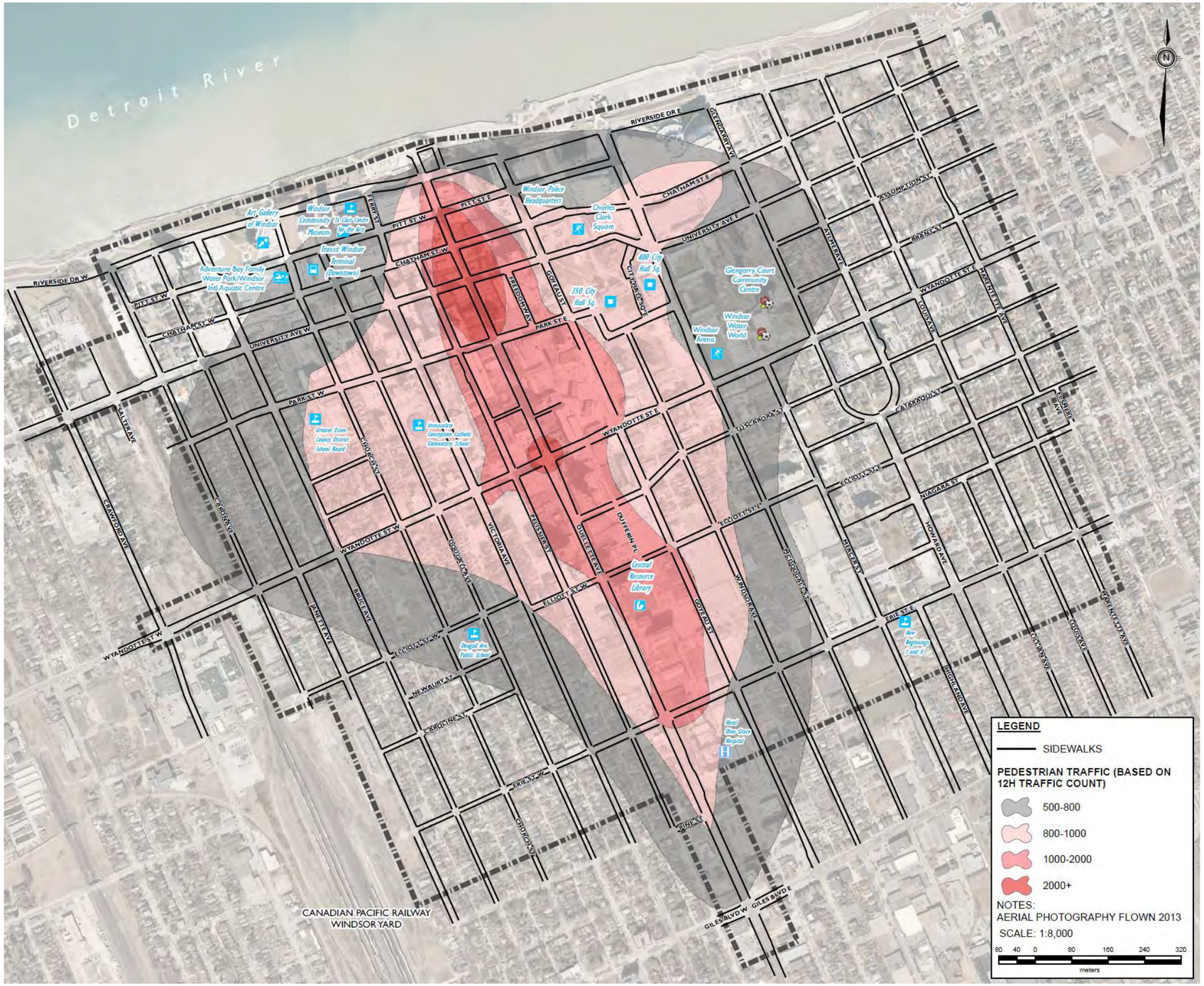
+ Bike lanes along the entire length of Riverside Drive[2]; and
+ Bike lanes along University Avenue west of McDougall Street;
+ Wyandotte Street west of Glengarry Avenue[3]; and
+ Erie Street east of Janette Avenue[4].

[2]The Riverside Drive Vista Improvement Project Environmental Study Report confirmed the use of exclusive on-road marked bike lanes as the most appropriate type of bikeway for Riverside Drive.

[3] Discussions with City Staff during the completion of this assignment highlighted the potential lack of space for dedicated bicycle lanes at the intersections with McDougall Street and Ouellette Avenue, as well as potential restriction along the access to the Windsor-Detroit Tunnel Plaza

[4] Information provided by City Staff during the completion of this assignment indicates that improvements along Erie Street east of Howard Avenue did not consider the introduction of bicycle lanes.

This page is intentionally left blank



B000460

Figure 7 Pedestrian Movements

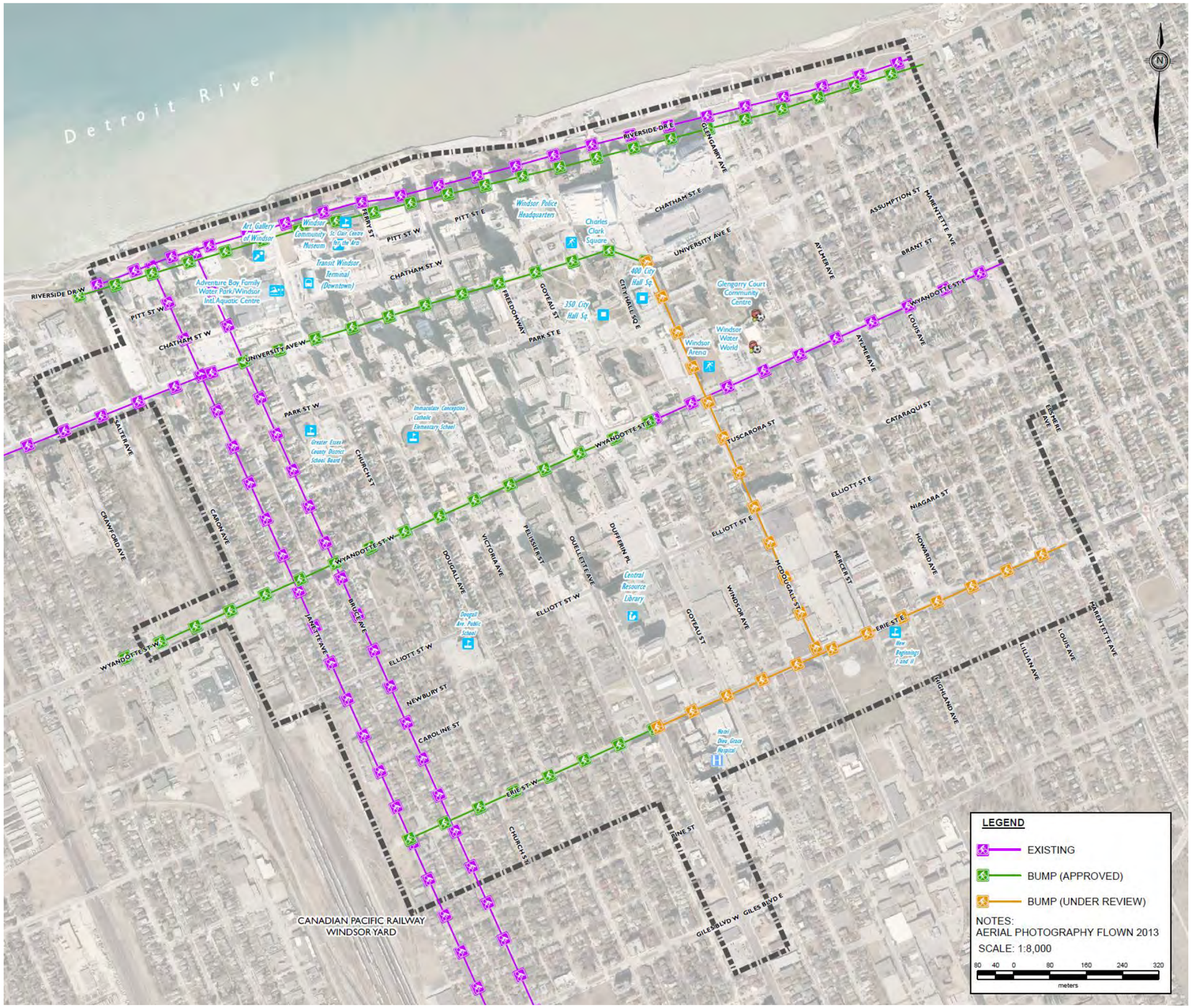


Figure 8 Cycling Routes

B000460

This page is intentionally left blank

3.2.4 Transit Services

The area under study is served by Transit Windsor using the routes described in **Table 13** and schematically presented in **Figure 9**.

As would be expected, Commercial and Mixed Use Areas are provided with more frequent and closer access to transit services than the Residential areas. This is a natural consequence of the areas having higher passenger generation. Areas outside of the Study Area are directly connected via transit along major roadways to amenities and attractions with only indirect connections to the residential areas surrounding the downtown core. With respect to those areas identified as Special Interest, of all them, are served by one or more transit routes.

Comments provided by Transit Windsor during the completion of this assignment highlighted the need for preserving the following corridors for transit related purposes:

+ Riverside Drive
+ Wyandotte Street
+ Erie Street
+ Bruce Avenue
+ Janette Avenue
+ Pitt Street (Church to Ouellette)
+ Chatham Street (Church to Aylmer)
+ Aylmer Avenue (Church to Erie)
+ Glengarry Avenue (Riverside to Erie)
+ Victoria Street (Chatham to Wyandotte)
+ Elliott Street (Pelissier to Chatham)
+ McDougall Street (Wyandotte to Chatham)

3.2.5 Rear Lanes and Alleyways

As an integral part of the network grid servicing the Downtown Area, a set of rear lanes and alleyways – mostly north-south oriented, act as service corridors between residences, commercial properties, and buildings, as illustrated in **Figure 10**.

Although not generally intended for long distance connectivity between different portions of urban areas, these types of service corridors are used in other jurisdictions

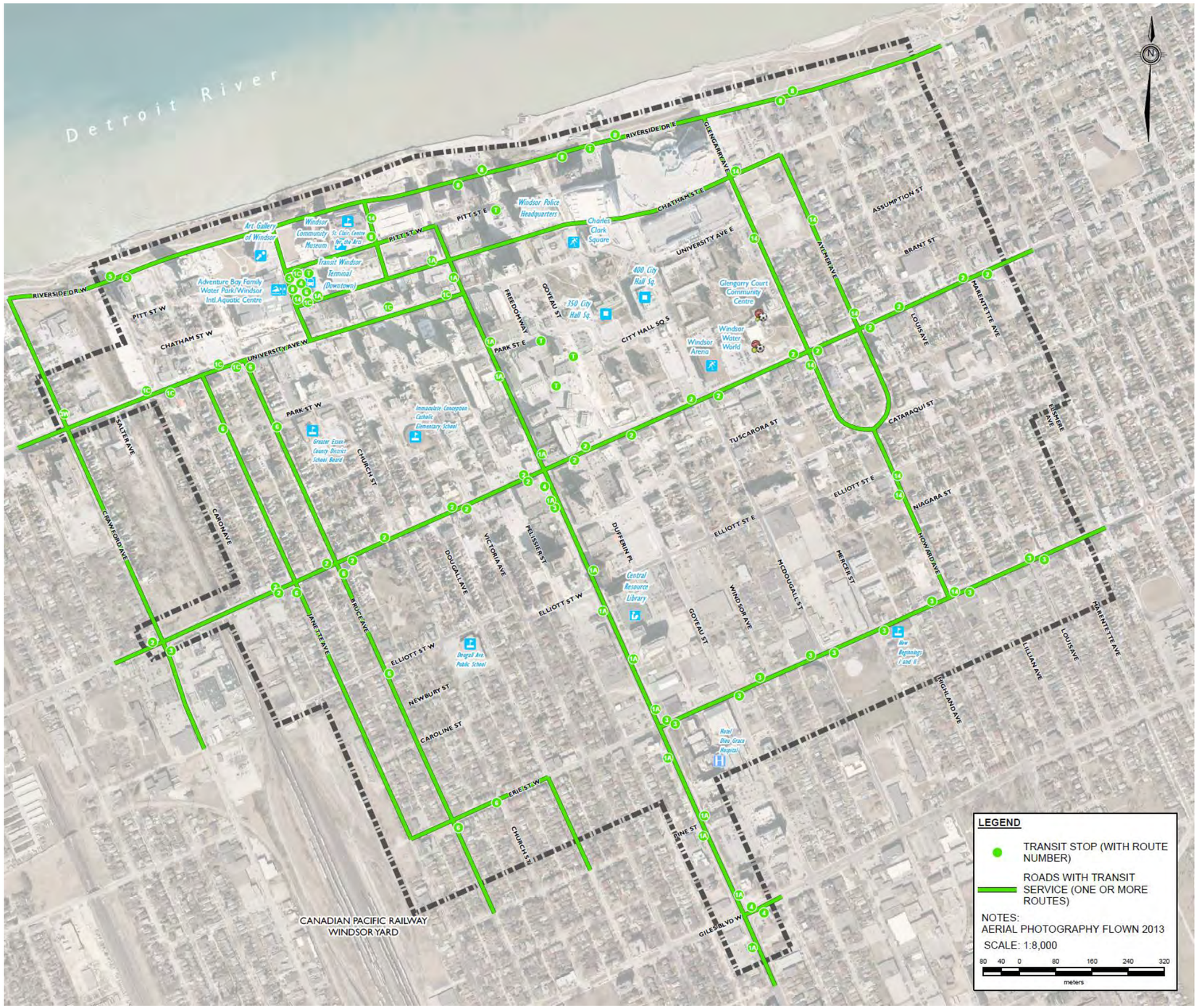
to support pedestrian and cycling activities. It should be noted that if an alley is no longer used for garbage pickup, residential use or utility access, it may no longer be required for municipal purposes and can be legally closed for a nominal fee after receiving approval from the City, added to a private property, and fenced.

Table 13 Transit Routes (as per September 2015 Transit Windsor schedule)

Name	Route	Frequency (weekdays)
Crosstown (2)	Along Wyandotte Street from Marentette Avenue to Crawford Avenue	10 – 15 minutes
Dougall (6)	Along Bruce Avenue (northbound) from Erie Street to the Transit Windsor Terminal and along Janette Avenue (southbound) to Dougall Avenue via Erie Street	35 – 70 minutes
Transway (1C)	Along University Avenue from Crawford Avenue to Ouellette Avenue up to Giles Boulevard	10 – 30 minutes
Transway (1A)	From Giles Boulevard to Transit Windsor Terminal via Ouellette Avenue and Chatham – Pitt Street	20 – 30 minutes
Walkerville (8)	Along Riverside Drive from Windsor Transit Terminal to Marentette Avenue	30 – 40 minutes
Dominion (5)	Along Riverside Drive from Windsor Transit Terminal to Crawford Avenue	25 – 60 minutes
West (3)	From Crawford Avenue to Windsor Transit Terminal via Riverside Drive and Chatham – Pitt Street	60 minutes
Parent (4)	From Windsor Transit Terminal to Erie Street via Pitt Street-Riverside Drive- Glengarry Avenue (southbound) and Aylmer Avenue-Chatham Avenue (northbound).	40 – 60 minutes
Tunnel Bus	Windsor International Transit Terminal	30 minutes

B000460

This page is intentionally left blank



B000460

Figure 9 Transit Routes

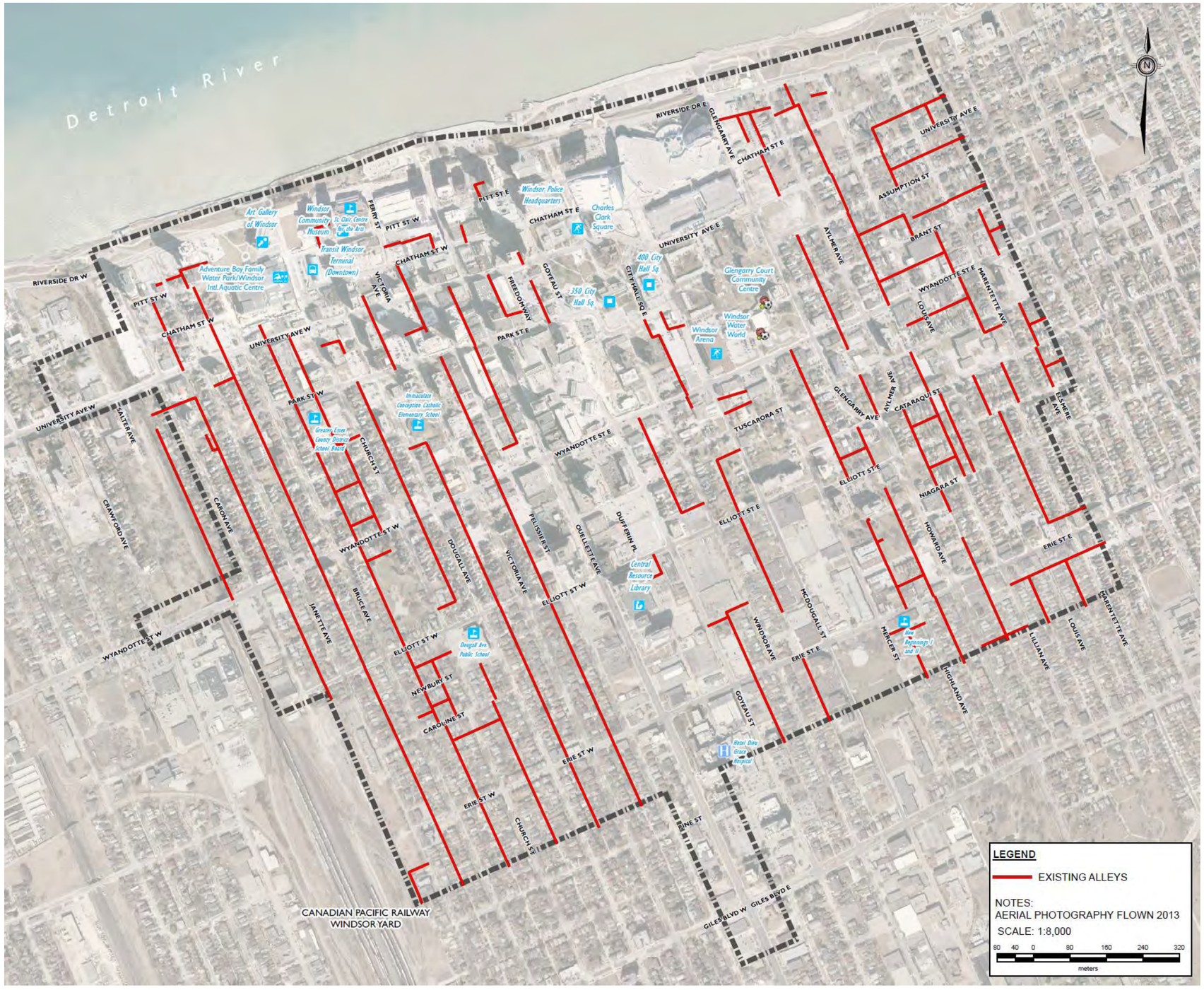


Figure 10 Existing Alleys

B000460

This page is intentionally left blank

3.3 Projected Future Conditions

The Downtown Windsor Transportation Master Plan completed in August 2007 and revised in January 2008, discussed the potential for future developments in Downtown Windsor at the locations highlighted in **Figure 11**.

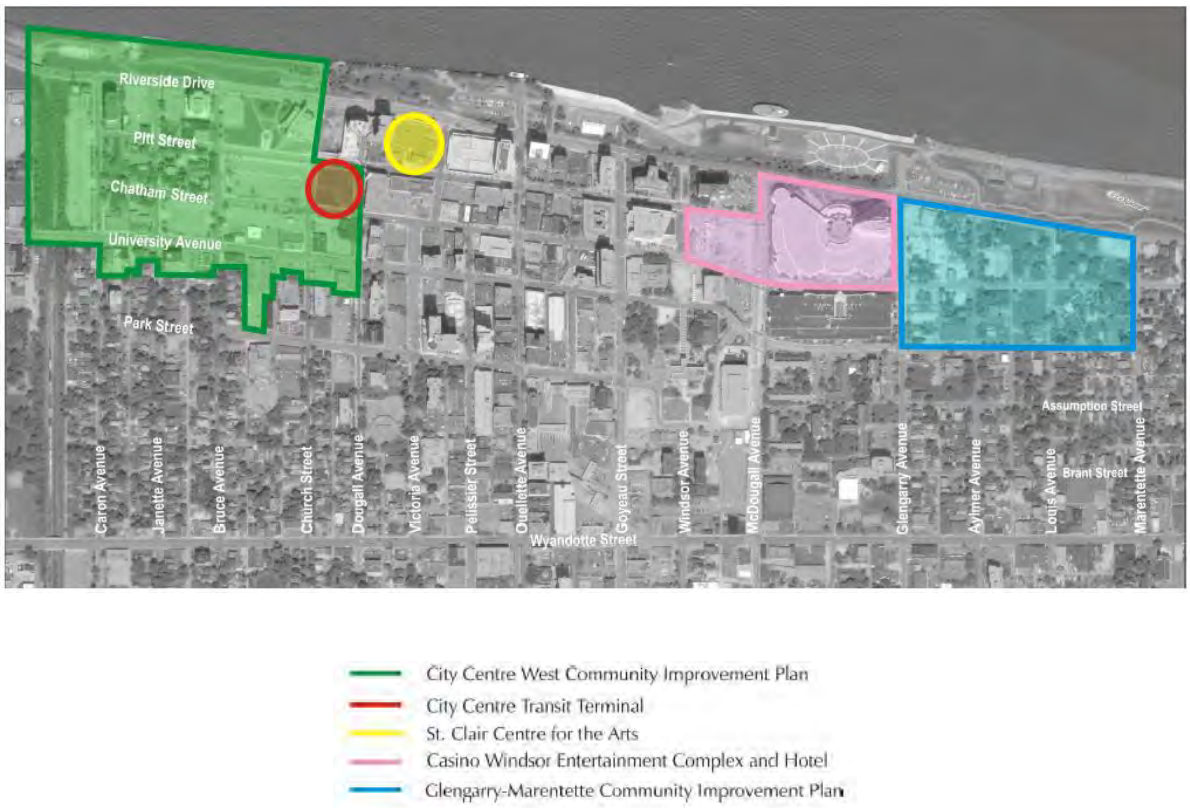


Figure 11 Proposed Developments with the Downtown Windsor Study Area (Source: Transportation Master Plan, Downtown Windsor, January 2008)

Aside of the City Centre Transit Terminal, the St. Clair Centre for the Arts and the then Casino Windsor Complex, the Master Plan describes the characteristics of two Community Improvement Plans (CIP) as follow:

+ The City Centre West CIP – redevelopment of existing areas into mixed use development, residential development and arena-based multi-use facilities.
+ The Glengarry-Marentette CIP – conversion of largely underutilized and vacant lands in the Glengarry-Marentette area to several hundred residential units in buildings ranging from three to fourteen storeys.

B000460

However, at the time of the present document, with the exception of the Windsor International Aquatic Centre, none of the proposed redevelopment of conversion of existing land use has occurred.

It should be noted that the proposed redevelopment of the CIPs identified by the Downtown Transportation Master Plan was revisited as part of the City of Ottawa Official Plan – Schedule E, in which the land use of both areas is now classified as Entertainment/Hospitality with a very high profile area.

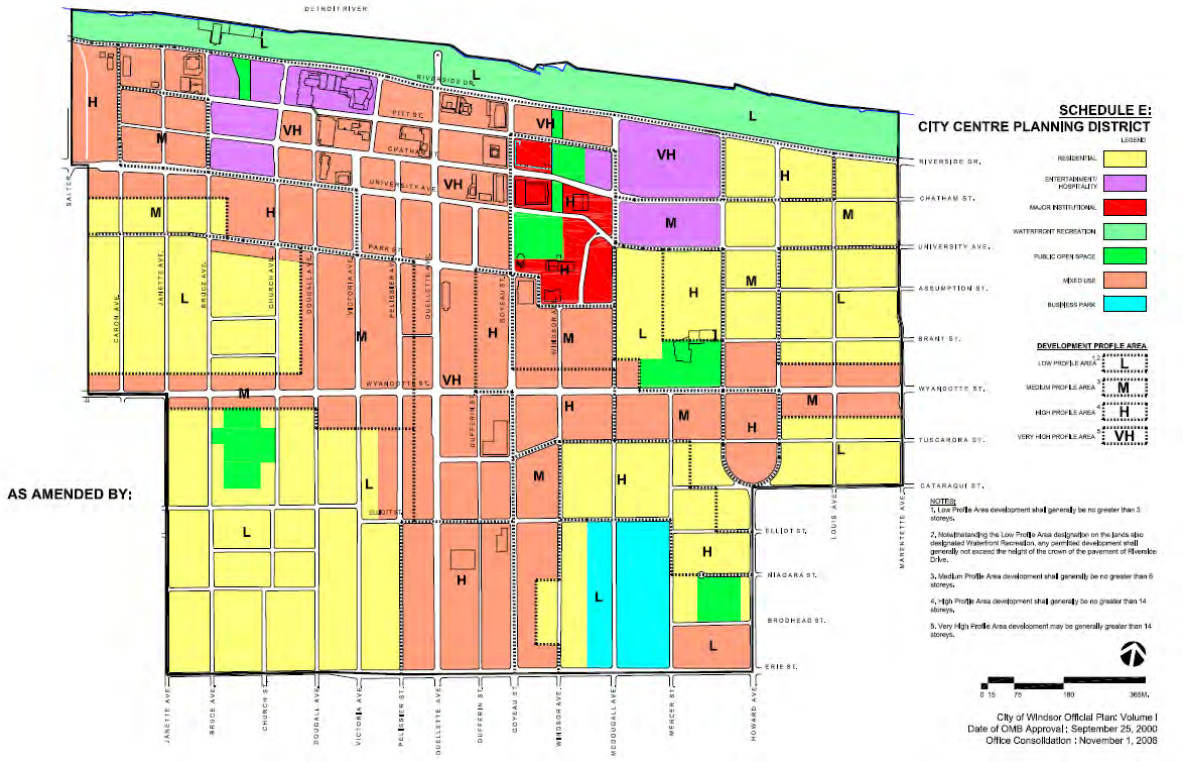


Figure 12 City of Ottawa Official Plan – Schedule E City Centre Planning District (Source: City of Windsor website, as per July 2016)

Although the information presented in **Figure 12** was under review as part of the Downtown Windsor Planning Study (currently in progress), the following assumptions were more for the short, medium and long term scenarios:

B000460

3.3.1 Immediate and Short Term Scenario

No changes in the amount or type of land use inside the Study Area. It should be noted that traffic generated by the Windsor International Aquatic Centre, the City

Centre Transit Terminal, the St. Clair Centre for the Arts, and the now Caesar's Windsor Hotel and Casino can be considered as registered by the traffic counts conducted by the City in 2014 (as described in Section 3.2).

3.3.2 Medium Term Scenario

Redevelopment of areas classified Institutional such as University of Windsor Downtown facilities and City Hall. It is expected that the location of this institutions along corridors very well served by transit will (1) increase pedestrian activities, (2) reduce the amount of vehicular traffic and (3) the consequent reduction on parking needs.

3.3.3 Long Term Scenario

Reconversion of the City Centre West and the Glengarry-Marentette to Entertainment/Hospitality will require adequate connections in and out of the Downtown Area but it can be expected that the locations of this new areas on the opposite sides of Downtown Windsor will increase the pedestrian movements along east-west corridors.

Based on these assumptions it can be expected that portions of the following streets will continue servicing the Downtown Area as main access/egress corridors (see **Figure 13**):

+ Riverside Drive;
+ Glengarry Avenue;
+ Ouellette Avenue;
+ Goyeau Street;
+ Park Street;
+ Wyandotte Street

This page is intentionally left blank

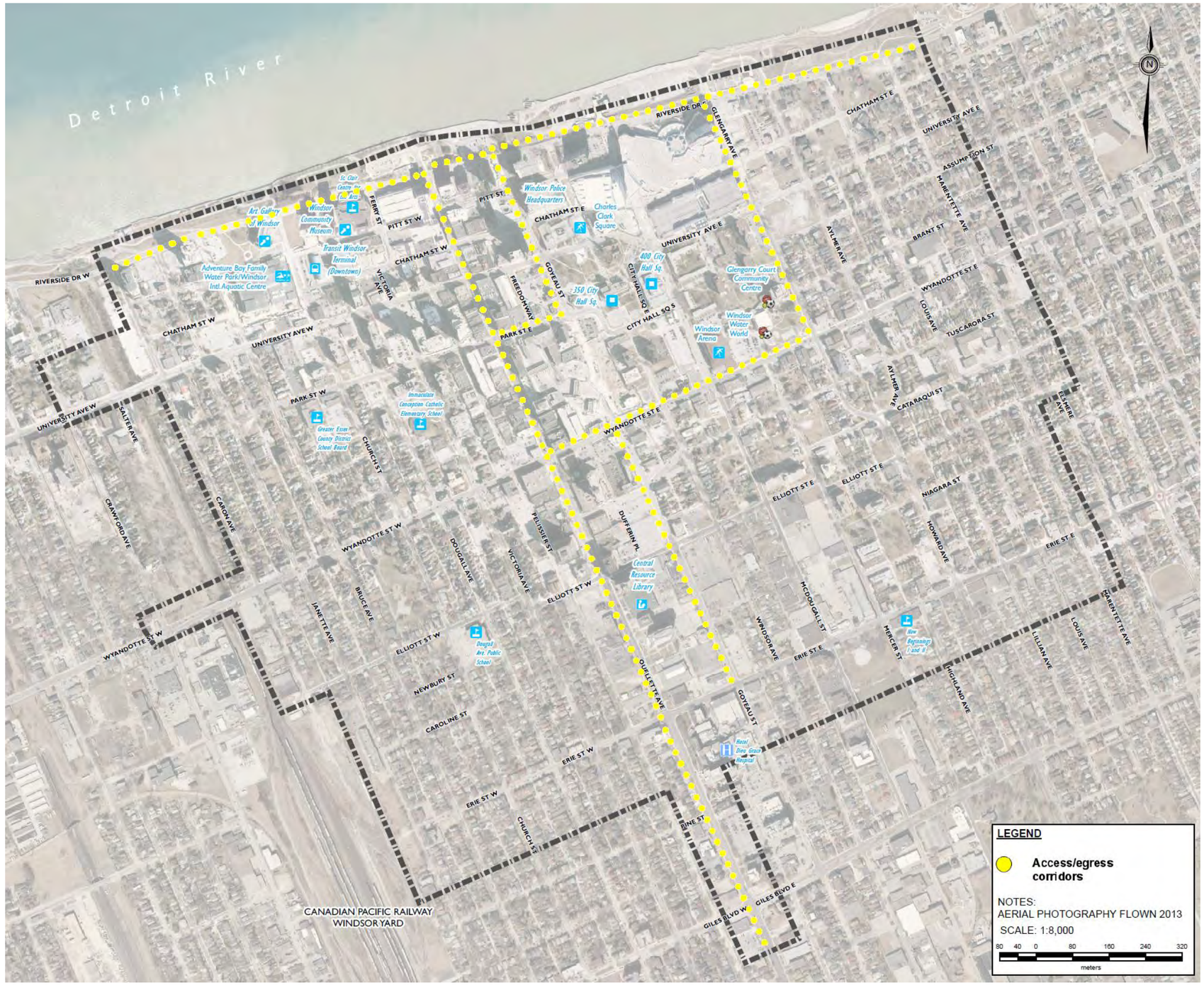


Figure 13 Main Access/Egress Corridors

This page is intentionally left blank

3.4 Potential Areas of Opportunities

Determination of potential areas of opportunities that may contribute to the development of a more vibrant and inviting Downtown in which people will have the opportunity to choose between a diverse selection of modes of transportation was based on the following three elements:

+ The urban design qualities identified as part of our literature and best practices review:
  - **Connectivity**. That considers those alternatives that introduce or enhance opportunities for integration of other modes of transportation – aside of vehicular traffic, in and between the different context zones composing Downtown Windsor as well as the identified Areas of Special Interest.
  - **Accessibility.** That considers those alternatives that introduce or enhance opportunities for complying or surpassing the AODA requirements as well as to consider the needs of different roadway users. It should be noted that the scope of this study is limited to the urban realm with no specific consideration for institutional and/or commercial installations compliance with accessibility requirements.
  - **Utilitarian Activities.** That considers those alternatives that provides additional space for other activities rather than only for transportation (i.e. shopping, bicycle parking, etc.)
  - **Behavioural Factors.** That considers those alternatives that supports the way in which roadways user perceives the surrounding environment (i.e. provision of safer opportunities to cross the road for pedestrians); and
  - **Spatial Experience.** That considers those alternatives that introduce or enhance opportunities for street furniture, landscaping and other urban design amenities.
+ Existing and projected capacity demands for vehicular traffic and on-street parking along the roadway network servicing Downtown Windsor; and
+ The potential pedestrian and cycling traffic generated by the current and proposed cultural and academic institutions included as part of the Areas of Special Interest.

Although the determination of potential areas of opportunities followed a holistic approach, in which the entire Downtown Area was considered, roadways with the following characteristics were not considered for further evaluation:

+ Local roads with limited or no connectivity (East-West or North-South)
+ Roadways already improved or as part of approved improvement plans (i.e. Downtown Windsor Streetscape Improvements)
+ Roadways serving as main access to the Windsor-Detroit International Tunnel as identified during the completion of this assignment:
    - Riverside Drive
    - Glengarry Avenue – Riverside to Wyandotte
    - Wyandotte Street East
    - Goyeau Street – Erie to Wyandotte
    - Park Street – Ouellette to McDougall
    - Ouellette Avenue – Erie to Wyandotte

3.4.1 Urban Design Qualities

The potential of future areas of opportunities is not only related to the Context Zone in which opportunities may be developed, but also – from an active transportation perspective - to the type of activities served or expected to be served in each Context Zone.

Based on the findings of the literature research conducted in the initial stages of this study, the desirability of the selected urban design qualities was subjectively assigned to each type of Context Zone as follow:

+ For **Core Commercial / Business** areas, which demonstrate a higher presence of business, employment, and institutional facilities that have the capability to generate / attract higher volumes of non-motorized traffic, Connectivity and Accessibility were considered to be the most desirable urban design qualities to be included as part of the development of opportunities. Additionally, Spatial Experience was also considered to be of high value due to the potential use of available space along the roadway network servicing this area.
+ For **Mixed Use** areas the type of business (retail and entertainment) and the restricted availability of space (in comparison with the Core Commercial /

Business areas) suggested that Spatial Experience and Accessibility will be of higher value for this type of Context Zone.

+ Finally, the current level of infrastructure servicing alternative modes of transportation within the **Residential** areas (including a potential lack of controlled pedestrian crossings) indicates a higher consideration for Connectivity and Behavioural Factors (i.e. perceived safety) among the proposed urban design qualities.

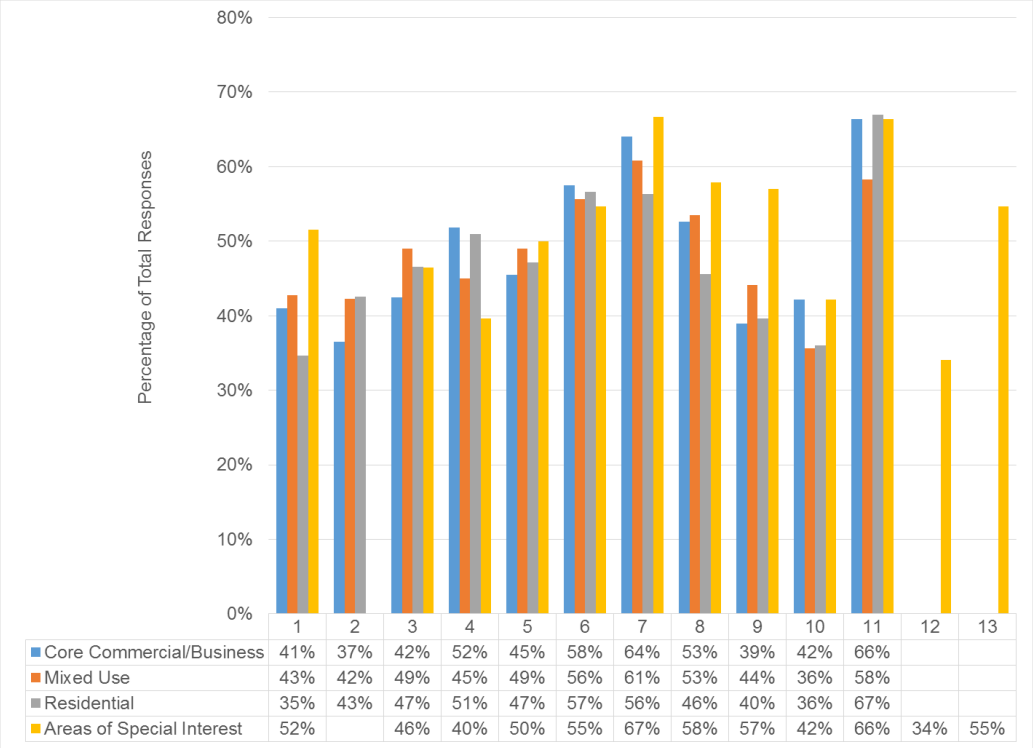
To corroborate these assumptions a questionnaire was developed and presented to the general public with a double purpose:

1. To identify how important are these factors from the public perspective, and
2. To confirm that the factors and roadways elements proposed for each type of context zone are relevant.

The questionnaire included the following question tailored to each type of proposed context zone:

+ Imagine yourself in the Commercial / Business area and answer on a scale of 1-5 which of the following make it more likely that you would choose to walk or cycle in this setting?
  - Wider sidewalks on both sides of the road
  - Shady trees alongside sidewalks
  - Better illumination on sidewalks
  - Better quality or condition of sidewalks
  - Additional opportunities for safe pedestrian crossings
  - More on-street bicycle lanes
  - Protected bicycle lanes
  - Additional cycling facilities in this area (i.e. bicycle racks)
  - Install benches, planters and street furniture
  - Design streetscape for forms of accessibility
  - Improved removal of snow and ice
  - Extensive use of wayfinding elements
  - Conversion of street segments to pedestrian-only use

The results of this exercise summarized in a graphical form in **Figure 14** indicates that, from the perspective of the public responding the survey, the suggested factors are important for the selection of active modes of transportation on a regular basis, which provide us with a strong foundation for the evaluation of potential areas of opportunities for each one of the previously identified Context Zones.



	1	2	3	4	5	6	7	8	9	10	11	12	13
Core Commercial/Business	41%	37%	42%	52%	45%	58%	64%	53%	39%	42%	66%		
Mixed Use	43%	42%	49%	45%	49%	56%	61%	53%	44%	36%	58%		
Residential	35%	43%	47%	51%	47%	57%	56%	46%	40%	36%	67%		
Areas of Special Interest	52%		46%	40%	50%	55%	67%	58%	57%	42%	66%	34%	55%

Figure 14 Public Survey Summary of Results

Table 14 summarizes the subjective desired value for each type of urban design quality and context zone classified as High (H), Moderate (M) or Low (L) value.

B000460

Table 14 Urban Design Qualities

BUILT AND SOCIAL ENVIRONMENTAL FACTORS	TYPE OF CONTEXT ZONE		
	CORE COMMERCIAL / BUSINESS	MIXED USE	RESIDENTIAL
CONNECTIVITY	H	M	H
ACCESSIBILITY	H	H	L
UTILITARIAN ACTIVITIES	M	M	L
BEHAVIOURAL FACTORS	M	M	H
SPATIAL EXPERIENCE	H	H	L

3.4.2 Excess Road Capacity

In Section 3.2 of this document, a comparison was made of typical peak hour traffic volumes (based on traffic counts periodically conducted by the City of Windsor since 2004) and available roadway capacity (based on 600 vehicles per hour per lane). This analysis indicated that the following roads have an excess of roadway capacity meaning that one general purpose traffic lane can be removed without a significant reduction in level of service:

+ Pitt Street;
+ Chatham Street;
+ Victoria Avenue;
+ Glengarry Avenue; and
+ Aylmer Avenue.

It should be noted that, although Glengarry Avenue was identified as one of the roadway corridors with an excess of roadway capacity, this road operates as one of the main access to Caesars Windsor facilities via Chatham Street and University

B000460

Avenue (as well as the Windsor-Detroit International Tunnel) which limits the amount of opportunities for potential roadway reconfiguration.

3.4.3 Parking and Roadway Capacity

All of the above noted streets have an additional parking lane(s) that would not be affected by the removal of a travel lane. If the on-street parking was found to be unnecessary (under-used), then an additional lane could be removed from each of these streets and replaced with active transportation related infrastructure (i.e., wider sidewalks, boulevards and dedicated bicycle lanes).

There are other roads that also appear to have an excess of roadway capacity but this excess capacity is typically used for on-street parking. These streets included:

+ University Avenue;
+ Howard Avenue;
+ Janette Avenue; and
+ Bruce Avenue.

Consideration for removal of parking may require the weighting of competing demands during the design and implementation process such as parking utilization, and availability of alternative off-street parking locations.

In this respect, studies and economic analysis recently conducted by other jurisdictions regarding the effects and interaction between active transportation infrastructure and parking facilities suggested that a trade-off exists between competing demands. On one side, the need to allocate parking for patrons using motorized modes of transportation, and on the other, a perceived shift toward utilitarian activities in which driving is only one mode of transportation[5].

This trade-off was studied in more detail by a research team of the University of Toronto and presented as part of a report titled Cyclists, Bike Lanes and On-Street Parking: Economic Impacts[6].

B000460

[5]Cobourg Downtown Parking Study, September 2013

[6]Toronto Cycling Think & Do Tank, School of the Environment, University of Toronto, November 2013

The report focuses on the economic impacts of cycling infrastructure and participation on local retailers and business in urban areas in North America, highlights the following questions:

+ Are cyclists good for business?
+ How does bicycle infrastructure affect business? How does removal of on-street parking affect businesses?; and
+ Can bike lanes and on-street parking coexist?
+ Since cycling is most suitable for medium and short distances, utilitarian cyclists are more attracted to buy from “local” merchants.

Although the findings of the report reflect the particular characteristics of the areas under study (downtown neighbourhoods of Toronto and Vancouver), it highlights a potential trend regarding cyclists as a bracket of urban societies:

+ Utilitarian cyclists are high per-capita spenders that are likely to live in or visit dense urban areas;
+ Utilitarian cyclists tend to make more trips over the course of a month than drivers of motorized vehicles; and

The report concluded that implementation of bicycle lanes in downtown areas does not preclude the demise of on-street parking, in fact it suggest that – depending of the availability of space as well as the real need for parking allocation both types of urban infrastructure can coexist (in different configurations) and support the immediate business community.

If the findings and conclusions of these types of studies can be transferred to Downtown Windsor it may be possible to consider during the implementation of this Strategy, the partial or total removal of under-utilized parking space to be used for additional active transportation and / or urban design improvements.

3.4.4 One-Way versus Two-Way Traffic Operations

There are arguments for and against one-way and two-way streets – safety, capacity, ability to cater to active transportation, speed, etc. Upon reviewing one-way streets in the Downtown Windsor study area, neither option was a clear winner from the perspective of improving active transportation.

For example, in a situation where there is a two lane one-way street, there is an opportunity (if volume is low) to remove a lane and use it for a bicycle lane / track. If it is converted to two-way operation, this possibility is gone.

In summary, every case has to be studied on its own merits; for this study, one way and two way options were considered for a number of streets and the most appropriate recommendation made on its merits.

Although the perceived low levels of traffic along one-way roadway corridors such as Pitt Street, Chatham Street, and Victoria Avenue may suggest that a conversion to a two-way traffic operation along such roads may be feasible. A change of this type was found to limit the opportunities for the provision and / or enhancement of infrastructure for other modes of transportation.

3.4.5 Special Interest Areas

Although the totality of the areas identified as Special Interest are located inside the Core Commercial / Business area (see **Figure 15**), their location and purposes provided a framework for the geographical identification of potential opportunities.

The framework has two main axes: (1) an East-West Corridor connecting the Windsor International Aquatic and Training Centre with the St. Clair College TD Student Centre, the former Windsor Star east of Ferry Street, and the future University of Windsor Downtown Campus properties west of Ouellette Avenue. This corridor is extended along University Avenue to the western limits of the study area and the City Hall east of the study area, and (2) a North-South Corridor connecting the St. Clair Centre for the Arts, the St. Clair College Media Plex, the former Windsor Star east of Ferry Street with the Residential areas south of the Core Commercial / Business area.

Specific elements of this framework include:

+ Use of available roadway capacity along the Pitt Street – Chatham Street corridor to increase connectivity and accessibility for alternative modes of transportation between the Windsor International Aquatic Centre, Transit Windsor Terminal, and the University of Windsor Downtown Campus Facilities;
+ Increase connectivity and accessibility between the St. Clair Centre of the Arts, the University of Windsor Downtown Campus (former Windsor Star), and the St. Clair College Media Plex using the recently enhanced portion of Ferry Street and the available roadway capacity at Victoria Avenue between University Avenue and Chatham Street;

- Provide opportunities for utilitarian activities and enhancement of the spatial experience repurposing the existing available roadway capacity at Victoria Avenue between University Avenue and Chatham Street;
- Use available roadway capacity along University Avenue between Victoria Avenue and Freedom Way to increase connectivity and accessibility for alternative modes of transportation between the St. Clair College Media Plex and the University of Windsor Downtown Campus (former Armouries); and
- Integrate the proposed redesign of the University Avenue intersection at Freedom Way, as well as the potential modifications to Freedom Way to improve accessibility, utilitarian activities, and the spatial experience along University Avenue between the University of Windsor Downtown Campus (former Armouries), the Charles Clark Square and City Hall.

This page is intentionally left blank

Figure 15 Areas of Special Interest (Framework)

This page is intentionally left blank

3.4.6 Core Commercial / Business

Opportunities were explored to increase accessibility and connectivity from alternatives modes of transportation:

+ Maintain the existing one-way traffic operations along Victoria Avenue and use the available roadway capacity to increase connectivity and accessibility for alternative modes of transportation between Park Street and Wyandotte Street.
+ Implement the redesign of Ouellette Avenue as proposed by the Downtown Windsor Streetscape Improvements from Wyandotte Street to Elliott Street.

3.4.7 Mixed Use

Due to the particular characteristics of the Mixed Use areas, utilitarian activities and spatial experience were considered as a priority during the identification of potential opportunities:

+ Implement the proposed dedicated bicycle lanes along University Avenue to increase connectivity and accessibility for alternative modes of transportation between Victoria Avenue and the west portion of the study area;
+ Consider the viability of the proposed dedicated bicycle lanes along Wyandotte Avenue to increase connectivity and accessibility for alternative modes of transportation; and
+ Use of available roadway capacity along Ouellette Avenue between Elliott Street and Pine Street to increase opportunities for implementing a number of safe central refuge pedestrian crossing areas.

3.4.8 Residential

Due to the limited right-of-way widths in these areas opportunities are focused to expand connectivity for cycling:

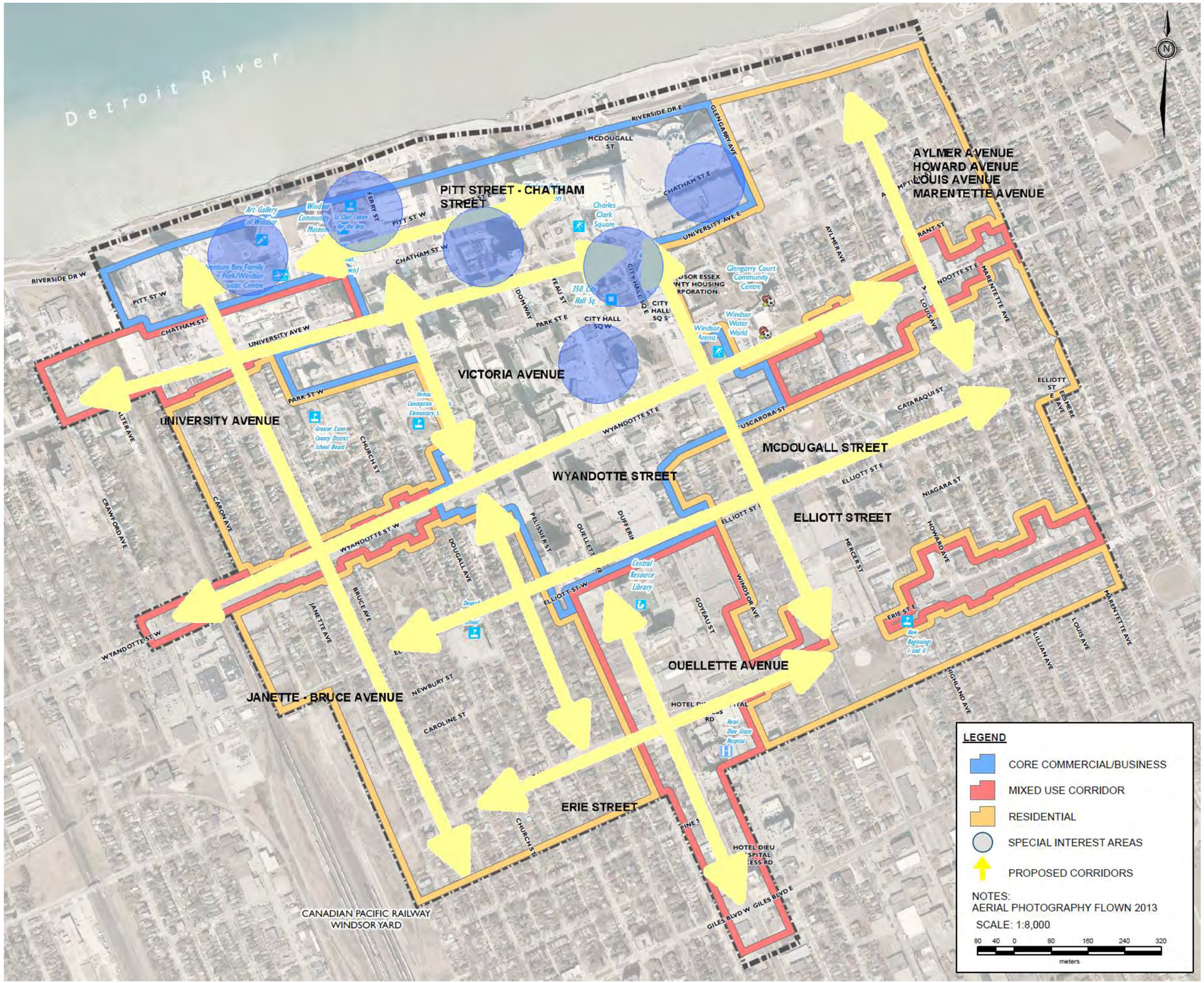
+ Use of available roadway capacity along the Aylmer Avenue – Howard Avenue corridor to increase connectivity and accessibility for alternative modes of transportation between the Waterfront and the Residential areas east of Ouellette Avenue;
+ Use of shared roadways and signed bicycle routes opportunities along local roads to increase connectivity and accessibility for alternative modes of transportation between the Waterfront and the Residential areas east of Ouellette Avenue;

- Use of shared roadways and signed bicycle routes opportunities along local roads to increase connectivity and accessibility for alternative modes of transportation between the Residential areas east and west of Ouellette Avenue;
- Maintain existing one-way traffic operations along Victoria Avenue and use the available roadway capacity to increase connectivity and accessibility for alternative modes of transportation between Wyandotte Street and Erie Street; and
- Implement the proposed dedicated bicycle lanes along Erie Street to increase connectivity and accessibility for alternative modes of transportation between Janette Avenue and Victoria Avenue.

3.4.9 Summary of Areas of Opportunities

Potential areas of opportunities identified in **Table 15** are schematically presented for each type of Context Zone and proposed corridor in **Figure 16**.

This page is intentionally left blank



B000460

Figure 16 Potential Areas of Opportunities per Context Zone and Proposed Corridors

Table 15 List of Potential Areas of Opportunities per Context Zone

CONTEXT ZONES			
Corridor	**Core Commercial / Business**	**Mixed Use**	**Residential**
Wyandotte Street	✓	✓	
Ouellette Avenue		✓	
University Avenue		✓	
Pitt Street	✓		
Chatham Street	✓		
Victoria Avenue	✓		✓
McDougall Street	✓		✓
Janette – Bruce Avenue			✓
Aylmer Avenue			✓
Howard Avenue			✓
Erie Street		✓	
Local Roads			✓

B000460

4. Evaluating Potential Areas of Opportunities

4.1 Multiple Account Evaluation (MAE) Framework

To evaluate the potential of the different areas of opportunities identified in Section 3 of this document, a Multiple Account Evaluation (MAE) Framework was (1) devised and (2) applied to various streets within the subject area to confirm the adequacy of the selected accounts.

A Multiple Account Evaluation (MAE) Framework can be defined as a process developed for a systematic evaluation of project and policy alternatives. Rather than focusing on an evaluation of the monetary cost and benefits generated by potential alternatives, an MAE provides a framework in which the advantages and disadvantages of project alternatives can be identified and assessed from the perspective of different "accounts" such as social / community, financial, design, etc.

Quantitative and qualitative measures related to each of the selected criteria are used to determine the overall impact of each proposed alternative. The end result of this process is a matrix summary of consequences describing the advantages and disadvantages of the proposed alternatives.

For the purpose of evaluating different alternatives, the following accounts were considered.

4.1.1 Urban Design Factors*

+ **Connectivity**.
+ **Accessibility.**
+ **Utilitarian Activities.**
+ **Behavioural Factors.**
+ **Spatial Experience.**

* As defined in Section 3.4

4.1.2 Parking Opportunities

Following City of Windsor Planning Department's comments regarding parking requirements, this study considered alternatives in which on-street parking is provided as preferred.

4.1.3 Public Opinion

Comments and suggestion received from general public, agencies and stakeholders during and after the Public Information Centres described in **Table 16** were summarized and integrated in two parts: (1) preference for a specific roadway element (i.e. dedicated bicycle lanes) where presented, and (2) preference for one of the proposed alternatives. The evaluation considered alternatives that were specifically identified or that integrate a specific roadway element as preferred.

Table 16 Public Opinion

Public Information Centre	Location	Attendance and Comments
No. 1 - June 18, 2015 from 4:00 pm to 8:00 pm	Windsor International Aquatic and Training Centre.	Forty-three (43) people signed in to the PIC. Participants were asked to review information on display boards, ask questions and share comments.
	Market Event – June 20 from 9 :00 to 11 :00 am	Downtown Market
No. 2 - October 14, 2015 from 4:00 pm to 8:00 pm	Windsor International Aquatic and Training Centre.	Fifteen (15) comment sheets were submitted at the PIC in addition to comments and responses received during the PIC and by email including comments provided by Downtown Transportation / Parking Steering Committee and Windsor Bicycling Committee

B000460

The comments received during and after the PIC's and Market Event are presented in **Appendix A**

4.1.4 Cost

Due to the strategic level of the current study, a qualitative estimation of the cost of each proposed alternative based on the following criteria was used for evaluation purposes:

+ Alternatives that can be implemented with minimal changes to the current roadway configuration (i.e. through the use of pavement markings and signs) were considered as low cost ($);
+ Alternatives that require minor reconstruction of the current roadway elements (i.e. curb extension, raised median island) were considered as medium cost ($$); and
+ Alternatives that require major reconstruction or removal of current roadway elements (i.e. modifications of roadway drainage and construction of central boulevards) were considered as high cost ($$$).

The form in which each account was integrated into the evaluation process, presented in **Table 17,** was based on the results of the literature review, the discussions sustained with City Staff and other stakeholders regarding the requirements for parking availability, as well as comments and suggestions provided by the general public during the Public Information Centre and Downtown Market events.

Table 17 Multiple Account Evaluation Framework – Weighting Factors

CONTEXT ZONE	TYPE OF URBAN DESIGN QUALITIES							
	Connectivity	Accessibility	Utilitarian Activities	Behavioural Factors	Spatial Experience	Parking Availability	Public Comments	Cost
CORE / COMMERCIAL BUSINESS (CCB)	10	10	5	5	10	10	10	0 to 10
MIXED USE (MU)	5	10	5	5	10	10	10	0 to 10
RESIDENTIAL (R)	10	2	2	10	2	10	10	0 to 10

The above table describes the weighting determined to be appropriate for each of the given context zones and will assist in the cross-section design by aligning a facility type within the right-of-way with one of these assigned scores will be further described in Section 6.

4.2 Evaluation of Potential Corridors

To confirm the applicability of the Multiple Account Evaluation Framework, a set of conceptual cross-sections describing the potential arrangement and dimensions of each roadway element composing the roadway corridors identified in Section 3 of this document was developed.

To this purpose, minimum and / or desired width standards were used for each one of the following roadway elements based on the characteristics of the Context Zones, roadway classification and right-of-way availability:

+ **Sidewalks**. Aside of complying with the requirements of the Accessibility for Ontarians with Disabilities Act (AODA) policy guidelines for the design of public spaces, proposed sidewalk width recognizes the nature of the surrounding area and the potential purpose of the trip;
+ **Boulevards**. As defined in Section 3.3. space allocated to boulevards provides opportunities for utilitarian activities and enhancement of the spatial experience through the introduction of street furniture and landscaping;
+ **Curb and Gutters.** Ontario Standard OPSD 600.04 (Concrete Barrier Curb with Standard Gutter for Flexible Pavement) was considered as a general guideline for all proposed alternative cross-sections;
+ **Parking.** Space allocated to on-street parking considered the interaction with other roadway elements such as: bicycle lanes, transit facilities and bulb-outs;
    - Preference expressed by City Staff that provision for parking is preferred;
+ **Traffic Lanes.** Number and space allocated to traffic lanes considered the interaction vehicles vehicular traffic, bicycles and transit buses as appropriate for each corridor; and
+ **Bicycle lanes**. Aside of the dimensions provided by the City of Windsor Development Manual, the following documents were taken into consideration for the determination of type and dimensions of bicycle lanes:
    - Bikeways Design Manual, Ontario Ministry of Transportation, 2014; and

- Ontario Traffic Manual Book 18 Bicycle Facilities: 2014.

It should be noted that although each one of the proposed street cross-sections were developed to enhance and / or expand the opportunities for active modes of transportation along the different context zones composing Downtown Windsor, none of them are intended to work in isolation.

The result of this exercise presented in **Appendix B** confirmed the applicability of the evaluation process.

5. The Strategy

This document represents the strategy required to support the City of Windsor Council's Vision in which Downtown Windsor becomes a vibrant and inviting place in which people want to work, play, and shop while having the opportunity to use active transportation modes.

The Council's Vision was shown to have support with the public and stakeholders during the consultation component of this study with the support for additional bicycle lanes (including protected lanes) of particular note during public consultation. However, a strategy to support the Vision must recognize the fact that corridor rights-of-way are limited without any realistic chance of being widened to accommodate improvements in active transportation and / or the urban landscape.

The development of this strategy sets out a means to evaluate options for consideration drawing upon key outputs of the study, including:

+ Opportunities for improvement;
+ Roadways with excess road capacity;
+ Identification of context zones / road type classifications and their associated needs with respect to servicing the land uses;
+ Identification of corridors in which vehicular priority is required (e.g., to protect the access to the international tunnel and to facilitate easy access and egress to the downtown parking and destinations);
+ Identification of corridor element requirements – including minimum and recommended standards for different modes; and
+ Development and evaluation of alternative cross-sections for each of the identified corridors.

Essentially, this process reveals a strategy that is focused around improvements to active transportation modes along corridors that have either the greatest need and / or best opportunity for place making and improving active transportation. The City's 2001 BUMP study has identified a proposed skeleton network of bicycle lanes to serve the downtown area; the strategy builds upon the BUMP by developing a finer network of bicycle facilities while improving the pedestrian environment in key areas of high pedestrian activity (e.g. business / commercial areas and areas of special

interest). Portions of corridors that have recently been modified (e.g. Wyandotte Street and Ouellette Avenue) were not considered for further revision.

5.1 Key Elements of the Strategy

1. ***Focus on roads that have excess vehicular capacity that could be used for alternative purposes.***

Of particular note are the roadways that have been identified as having excess road capacity (i.e. a lane of traffic can be taken away without any change in level of service provided to autos):

+ Pitt Street;
+ Chatham Street;
+ Victoria Avenue; and
+ Aylmer Avenue.

The removal of a lane can be utilized for improved bicycle facilities and / or boulevards for improving the pedestrian environment.

2. ***Creating a finer grid for active transportation connecting Areas of Special Interest***

There is already the beginning of two main axes of institutional and cultural activities in the downtown with ongoing university and college development soon to add to them. The east-west axis connects the Windsor International Aquatic and Training Centre in the west to City Hall in the east with several college and university buildings along the way; similarly, an opportunity exists to connect these areas with the residential areas south of the Core Commercial / Business area via Victoria Avenue due to the availability of space that is not available in Ouellette Avenue.

To recognize the importance of these axes as important people places and improve the facilities for active transportation, enhancements are recommended for:

+ Multimodal corridors along Chatham Street, Pitt Street and University Avenue and Victoria Avenue.

3. *Maintain existing improvements that favour active transportation and that enhance current BUMP plan*

The strategy around the "Special Interest Areas" above also includes parts of the Core Commercial / Business Area. An additional measure includes the already planned implementation of the redesign of Ouellette Avenue as proposed by the Downtown Windsor Streetscape Improvements from Wyandotte Street to Elliott Street, as well as considerations for the existing configuration of the Windsor-Detroit Tunnel Plaza along Park Street.

Utilitarian activities and spatial experience were considered for Mixed-Use Corridors with recommendations for:

+ Implementing the BUMP recommendations for University Avenue and Wyandotte Avenue to increase connectivity and accessibility for alternative modes of transportation without restricting roadway capacity for vehicular traffic along Wyandotte Avenue;
+ Reallocating available roadway capacity (centre lane) along Ouellette Avenue between Elliott Street and Pine Street to increase opportunities for safe pedestrian crossing via a number of central pedestrian refuges (in-between centre left-turn requirements) without restricting roadway capacity for vehicular traffic along Ouellette Avenue;

  Riverside Drive (Scenic Drive) has been studied through an Environmental Assessment Study which has recommended widening to accommodate bicycle facilities.
+ An initial analysis carried out during this study has suggested that one of the through lanes (both directions) in the downtown area could be taken out without a significant reduction in level of service for autos. However, at intersections the four lane cross-section would have to be maintained for left and right turning lanes to ensure that a good level of service is maintained for autos; and
+ Although more detailed analysis would be required to confirm the feasibility of such a plan, the provision of additional opportunities for controlled pedestrian crossings is recommended to increase connectivity and accessibility for alternatives modes of transportation along Riverside Drive between Marentette Avenue and Bruce Avenue.

4. *Expand opportunities for cyclists including the "share the road" solutions on local streets with limited opportunities for change*

Residential Areas – Due to the limited right-of-way widths in these areas opportunities were focused to expand connectivity for cycling:

+ If on-street parking can be removed from the Aylmer Avenue – Howard Avenue corridor, bicycle lanes can be implemented to increase connectivity and accessibility between the Waterfront and the Residential areas east of Ouellette Avenue;
+ If on-street parking cannot be removed, use of "share-the-road" pavement markings along local roads can be used to increase the connectivity and accessibility:
  - Between the Waterfront and the Residential areas east of Ouellette Avenue; and
  - Between the residential areas east and west of Ouellette Avenue;
+ Maintain existing one-way traffic operations along Victoria Avenue and re-designate the excess roadway capacity to increase connectivity and accessibility for alternative modes of transportation between Wyandotte Street and Erie Street; and
+ Implement the proposed dedicated bicycle lanes along Erie Street to increase connectivity and accessibility for alternative modes of transportation between Janette Avenue and Victoria Avenue.

5. *Consideration of the removal of on-street parking with no change to prime vehicular access points*

All four streets noted in Point 1 as having excess capacity also have additional parking lane(s). If on-street parking can be removed (under-used due to lack of demand or availability of adjacent off-street parking spaces), then a further lane could be removed from each of these streets and the opportunities for further improvements could be entertained.

There are other roads that also appear to have an excess of roadway capacity, however this excess capacity is typically used for on-street parking and is therefore not easily removed. These streets include:

- University Avenue;
- Howard Avenue;
- Janette Avenue; and
- Bruce Avenue.

It should be noted that although Glengarry Avenue was identified as one of the roadway corridors with an excess of roadway capacity, this road operates as one of the main access to Caesars Windsor facilities via Chatham Street and University Avenue which limits the amount of opportunities for potential roadway reconfiguration.

Furthermore, as implementation proceeds, the need for maintaining on-street parking along these streets will also need to be assessed as part of the design phase. Although a parking assessment study was outside the bounds of this strategic study, the following activities may be considered as part of the assessment process:

- **Identify opportunities to optimize on-street and off-street parking in terms of location.** Although supply and demand for parking studies are usually conducted to identify all parking spaces in the study area and highlight those locations where parking is currently under-utilized and / or where further capacity exists, for the purpose of this Strategy, it is also recommended that, in addition to overall capacity, other indicators such as proximity, rate, and availability be considered;
- **Identify opportunities to optimize on-street and off-street parking in terms of time limits and parking fees**. Use the results of the parking utilization study to confirm which type of management plan is more adequate to support the implementation of this Strategy:
  - Activities that provides additional space for parking;
  - Activities that provides a more efficient use of existing parking availability; and
  - Activities that provides a reduction on demand for parking.

A schematic representation of the proposed strategy is presented in **Figures 17 to 19** for each main mode of transportation and summarized in **Figure 20**.

B000460

This page is intentionally left blank

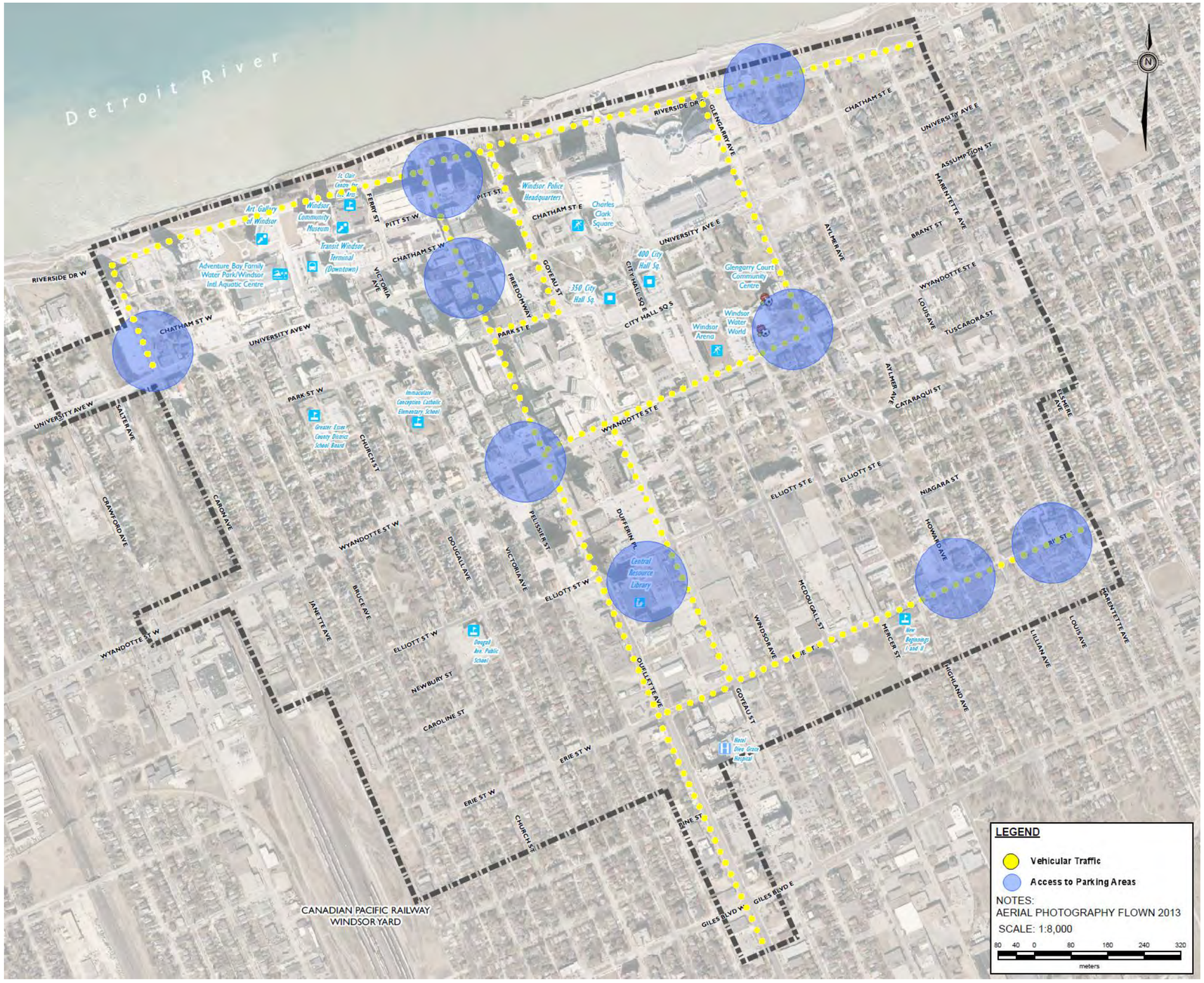
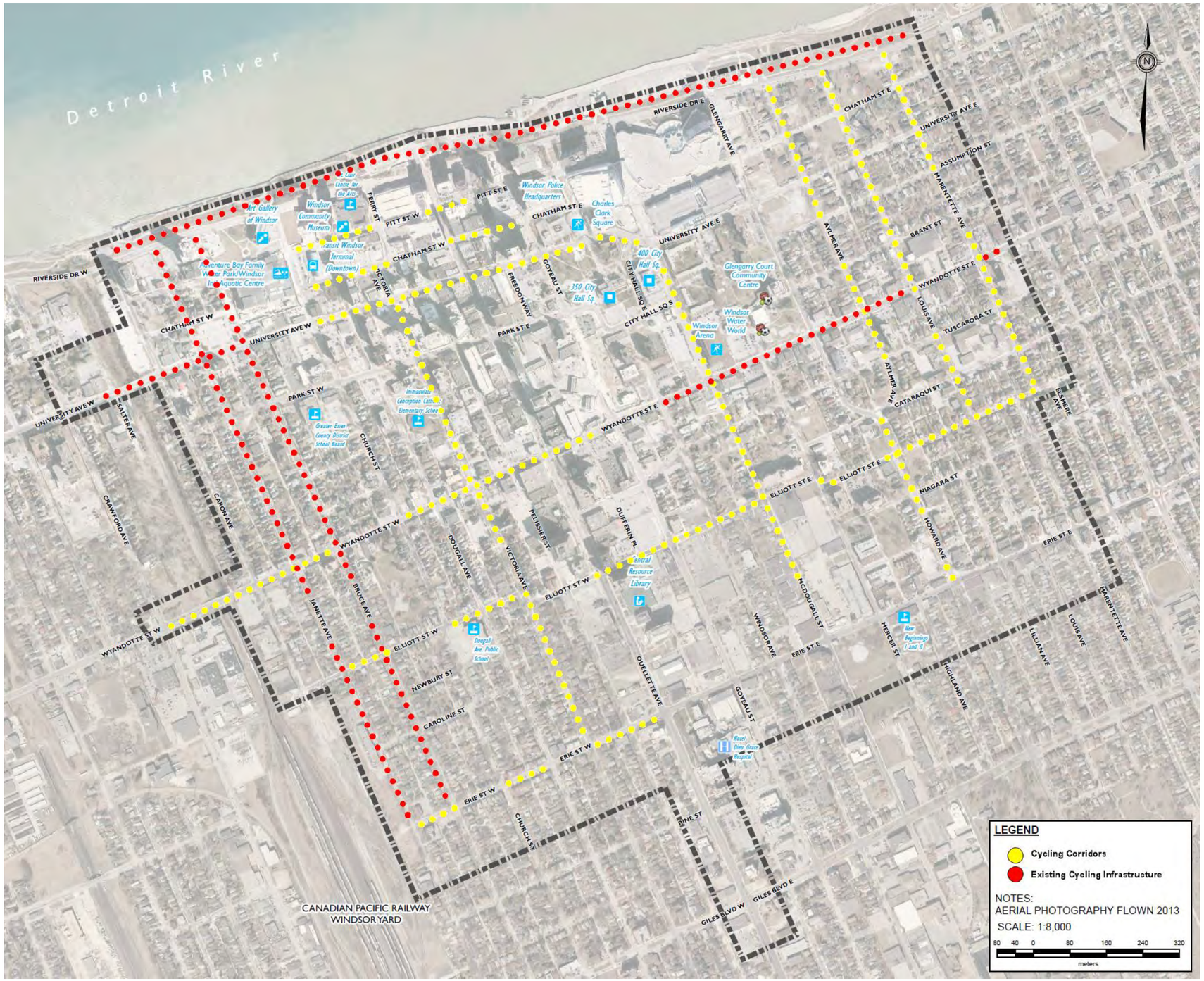


Figure 17 Supported Transportation Mode – Vehicular Traffic

B000460



B000460

Figure 18 Supported Transportation Mode - Cycling

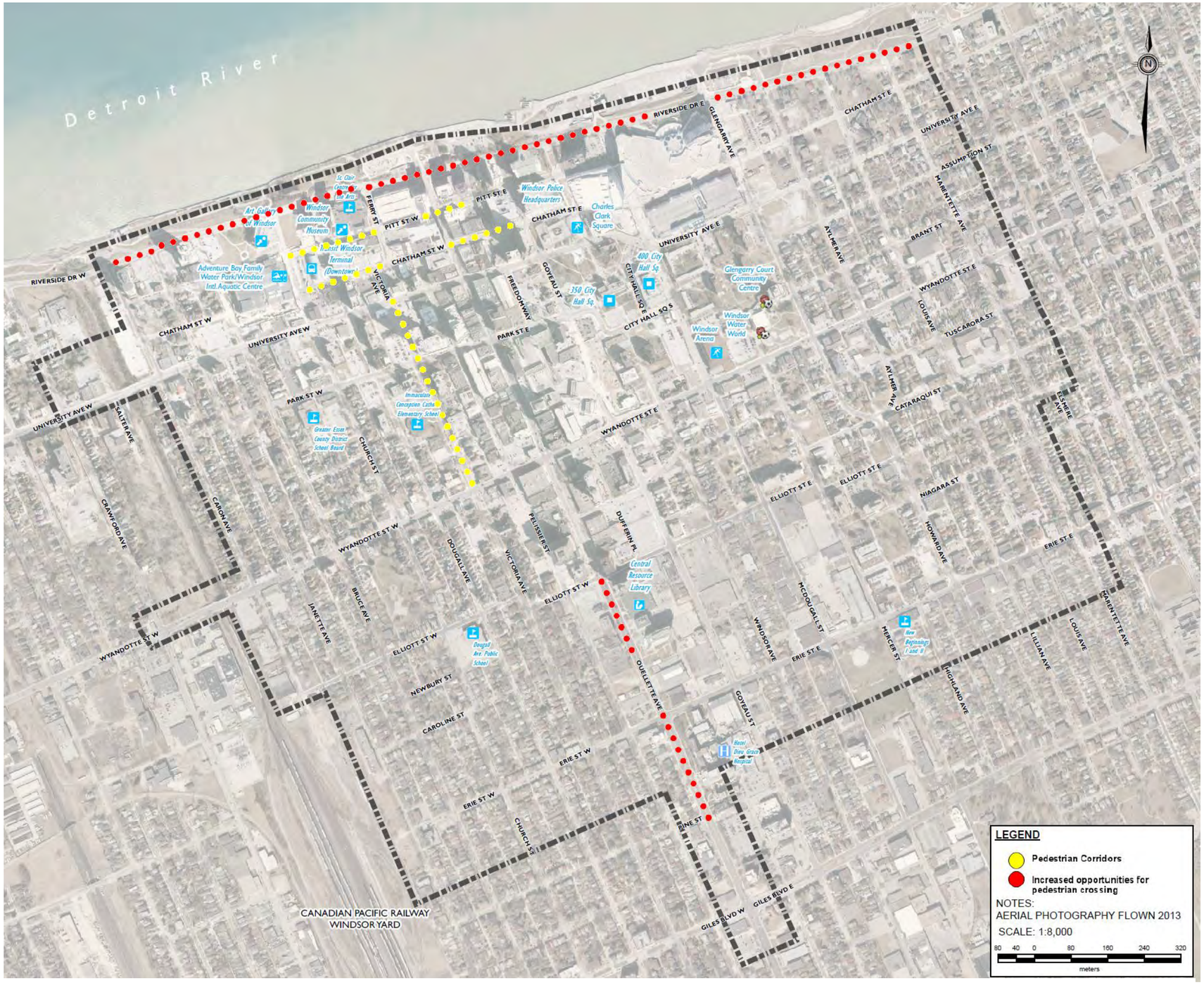
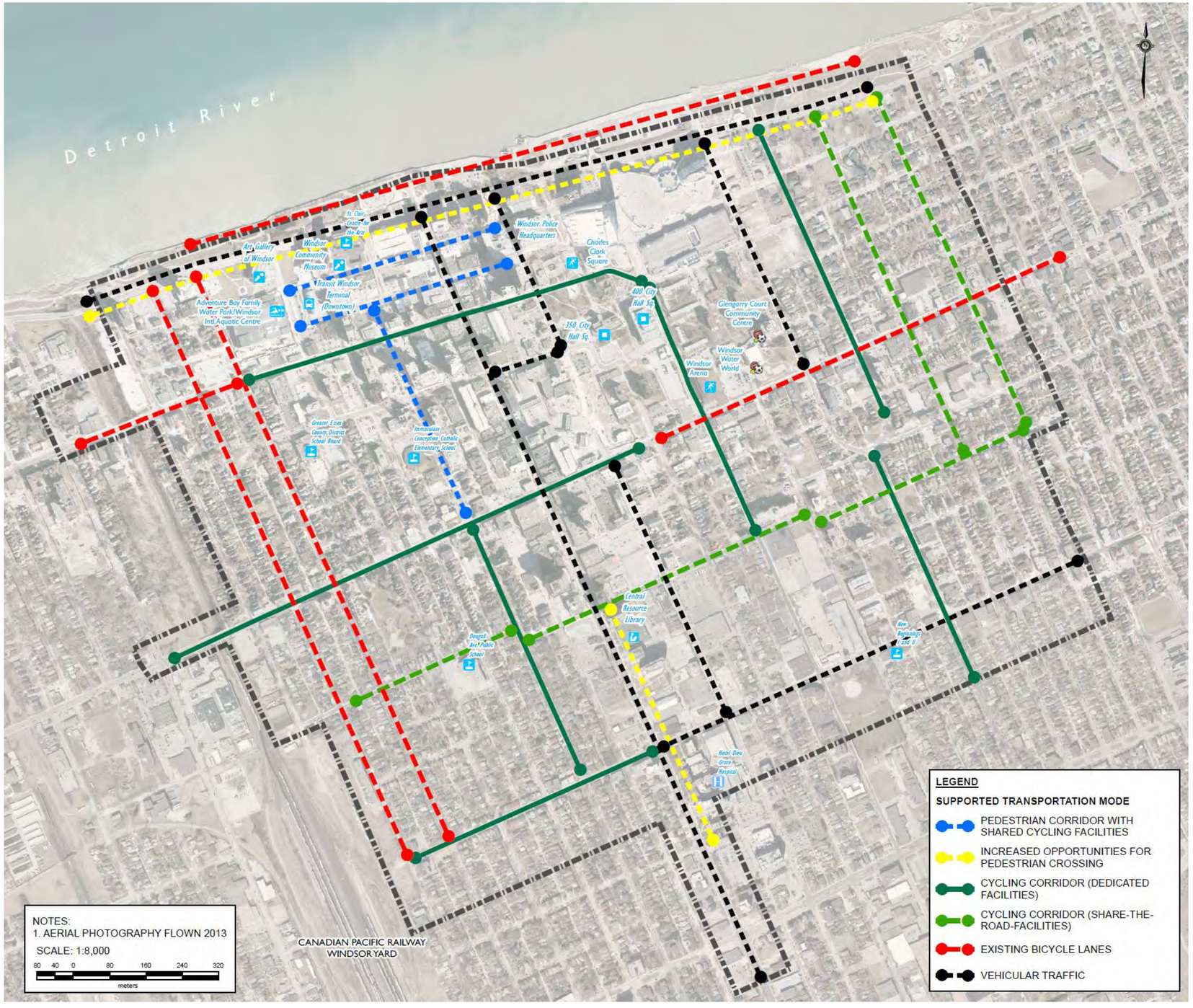


Figure 19 Supported Mode of Transportation - Pedestrians

B000460



B000460

Figure 20 Potential Multimodal Transportation Corridors

5.2 Implementation of the Strategy

The basis of the implementation plan is a decision-making process called “Routine Accommodation” which 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.

Routine accommodation of active modes of transportation will be implemented in a systematic manner across the proposed context zones, in order to provide people with the opportunity to use other modes of transportation rather than only motorized vehicles.

It is expected that every time that a new design and/or operation project is initiated, the practitioner in charge will follow a routine accommodation process, composed of the following elements:

+ Checklist
+ Design Toolbox
+ Evaluation Toolbox

Prior to finalizing the detailed project design, concepts for the length of the considered road segment should be confirmed along with expected phasing (i.e. implementation in the immediate, short, medium or long term).

5.2.1 Checklist

The checklist presented in **Table 18** identifies the different stages of the decision-making process and is composed by three different elements:

+ The sequence of the implementation process
+ The actions that the practitioner need to complete as part of each step of the implementation process; and
+ The material that can be used as reference during the completion of each action.

5.2.2 Design Toolbox

The content of the design toolbox provides the practitioner with a quick reference to the applicable standards and recommended practices identified in Section 2 and 4 of this report. This material is not intended to replace applicable design standards but to facilitate the identification of alternative cross-sections and determination of available right-of-way.

The information is integrated by five different sections:

+ **Parking** – It should be noted that a Sustainable Parking Model was in progress at the time of the present report.
+ **Pedestrian Infrastructure** – that includes recommendations for pedestrian infrastructure including sidewalk cafes and pedestrian crossing treatments;
+ **Cycling Infrastructure** – that includes recommendations for cycling infrastructure mostly based on the Ontario Traffic Manual Book 18 and international best practices;
+ **Multiple Account Evaluation Factors** – that provides with an estimate of the effects on the accounts described in Section 4.0 for several pedestrian and cycling alternative configurations; and
+ **Site Furnishing and Urban Forestry** recommended practices.

5.2.3 Evaluation Toolbox

As presented in Section 4.1 of this report, the weighting factors determined to be appropriate for each of the given context zones will be used as comparison against the results of each of the alternatives considered by the practitioners.

In is expected that proposed roadway cross-sections that achieve the sought after scores in each category can be put forward for consideration.

This page is intentionally left blank

Table 18 Implementation Plan – Checklist

IMPLEMENTATION PROCESS			ACTIONS					REFERENCES
1	MODE OF TRANSPORTATION	Determine what mode of transportation(s) is(are) favoured for this street	Pedestrian	Cycling	Transit	Vehicles		Figures 17 to 20
2	CONTEXT ZONE	Identify the type of neighbourhood (context zone) in which the project will be conducted	Core Commercial/Business	Mixed Use	Residential	Area of Special Interest		Section 3.0
3	ROADWAY CLASSIFICATION	Identify the class of roadway in which the project will be conducted	Scenic Drive	Arterial	Class I Collector	Class II Collector	Local	Section 2.3.1.2 [Official Plan, Section 7.2.6]
4	TRUCK AND TRANSIT ROUTES	Is the selected roadway a designated truck or transit route?	If YES, a minimum 3.5 m wide motorized vehicle lane or minimum 4.0 m shared lane width should be considered		If NO, a 3.3 m lane should be protected			Section 3.2 and Traffic By-law 9148
5	ON-STREET PARKING	Identify the need for on-street parking as described in Figure 21	If on-street parking is required consider other alternatives	If on-street parking can be removed proceed with point 5				Toolbox Section 6.1
6	PEDESTRIAN INFRASTRUCTURE	Determine the space that should be allocated for pedestrians	Consider the desired width of the off-street facilities based on the context zone	Consider the use of sidewalk and boulevard width in accordance with the context zone	Determine if there is potential for sidewalk cafe request in the future			Toolbox Section 6.2
7	CYCLING INFRASTRUCTURE	Determine the space that should be allocated for bicycle facilities	Suitability for Conventional Bicycle Lanes	Suitability for Separated Bicycle Lanes	Suitability for Shared Roadways			Toolbox Section 6.3
8	MULTIPLE ACCOUNT EVALUATION	Evaluate the adequacy of the selected cross-section	Connectivity	Accessibility	Utilitarian Activities	Behavioural Factors	Spatial Experience	Parking Availability	Public Comments	Cost	Toolbox Section 6.4
		Compare the overall scoring with the scoring required for the selected Context Zone									Section 4.0
9	CONFIRMATION	Confirm that the overall selected design features accommodates:	Required vehicular lane widths (Step 3)	Required pedestrian space (Step 5)	Required cycling space (Step 6)						
10	ADDITIONAL FEATURES	Select additional right-of-way features including:	Site furniture	Urban forestry							Toolbox Section 6.5
11	**PROPOSED ROADWAY CROSS-SECTIONS THAT ACHIEVE THE SOUGHT AFTER SCORES IN EACH CATEGORY CAN BE PUT FORWARD FOR CONSIDERATION**										

6. Design Toolbox

Urban streets are complex places with competing interests that share finite space. High quality streets are not designed in isolation; rather they are part of a complex matrix of urban elements that include architecture, land use, heritage resources, public spaces, transportation systems, road classification, population density, and urban forestry. These features, when artfully designed, create the following ideal urban qualities: imageability, legibility, enclosure, linkage, human scale, transparency, complexity, and coherence[7].

The toolbox elements described in this section reflect the Context Sensitive approach and subsequent street cross sections that were developed by this study and will assist in the evolution of a complete streets approach in the City's downtown core.

To provide a quicker reference for members of the public and for road designers to consult the different toolbox elements, two different sets of information are included as part of the Toolbox:

1. Recommended practices and references to relevant guidelines and standards for the different roadway elements considered as part of the conceptual cross-sections; and

2. A set of tables illustrating the application of the MAE framework for the considered pedestrian and cycling infrastructure.

6.1 Parking

Vehicular Parking within the limits of the City of Windsor on municipal streets, parking lots and private properties is regulated by By-Law 9023. Although the by-law provides details regarding the allocation, requirements, prohibitions and payment of parking fees, it does not explicitly indicate the allocated space and the current demand for parking in Downtown Windsor.

In this respect, the Downtown Windsor Transportation Master Plan completed in August 2007 refers to a review of Municipal parking lot utilization conducted by the City of Windsor outside the area surrounding the then Casino Windsor indicating that – at the time of the study, the supply of Municipal parking meets the current needs.

B000460

[7]Pedestrian and Transit-Oriented Design by R. Ewing and K. Bartholomew 2013

From the financial perspective, a Staff Report submitted by the Office of the City Engineer to the Environment, Transportation and Public Safety Standing Committee in October 27, 2015, recommended an increase in on-off street parking rates by a total of 25 cents and acknowledged a deficit position of $1,897,702 on the On/Off Street Parking Reserve Fund.

The aforementioned Staff Report recommended that a report detailing different payment options available for on and off street parking and the cost associated with each option be prepared for future capital budget considerations.

A Staff Report dated November 17, 2015 presented to the Mayor and Members of Council by the Office of the City Engineer, stated the need for a “sustainable parking model” capable of fully funding annual operations, annual maintenance and required capital programs.

The Staff Report suggested that ”Planning department studies possible parking solutions and puts in place a new set of parking policies aimed at balancing the needs of business owners and customers, surrounding residents, pedestrians and motorists”.

It is expected that the completion of the Sustainable Parking Model will provide clarification and guidance regarding:

+ Impact on self-funding of parking;
+ Parking policies that may be applicable and practicable under the particular characteristics of Downtown Windsor;
+ Potential effects on annual operations, annual maintenance and required capital programs.

At the moment that the Sustainable Parking Model is completed, the parking assessment process schematically presented in **Figure 21** and described below may be followed to assess the potential relocation of current on-street parking space infrastructure to active modes of transportation:

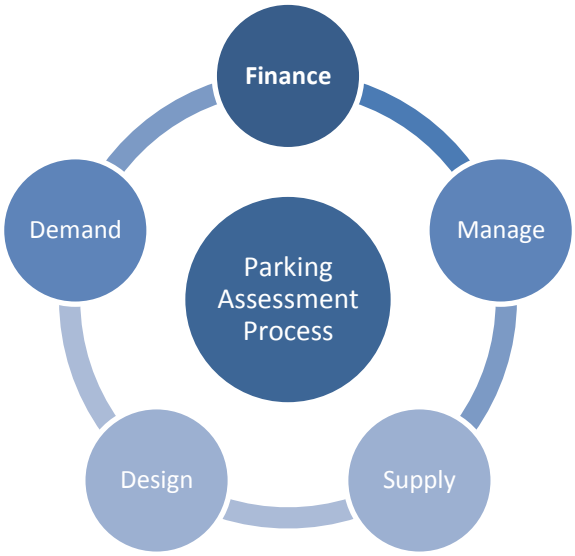


Figure 21 Parking Assessment Process

+ **Finance** – If the findings and recommendations of the Sustainable Parking Model indicate that revenue generated by on-street parking at the selected location cannot be eliminated, stop the assessment process and consider other alternatives.
+ **Manage** – If the findings and recommendations of the Sustainable Parking Model suggest that revenue generated by on-street parking at the selected location is not required, identify policies that can support parking management, including:
    - **Supply** - Identify type and location of parking spaces that can be reduced, for example: areas near to intersections that can be integrated as pedestrian space while maintaining parking allocation at mid-block locations
    - **Design** – Identify changes to design guidelines that can optimize space allocated to parking, for example: narrow parking slots or shared use of boulevards; and
    - **Demand** – Identify actions that can reduce or relocate demand for parking, for example: interconnectivity between transit service and cycling infrastructure, provision of wayfinding signs to direct patrons from parking locations to main locations.

The procedures for implementation of the Parking Assessment Process should be created by Administration (and any recommendation for an existing basis).

B000460

At this respect, a study of the impact of parking supply and demand management on Central Business Districts (CBD) conducted by the Florida Department of Transportation in 2012, evaluated the potential effects of several best practices related to parking supply and demand management on parameters related to location, cost and policies. A summary of the results of this evaluation is presented in **Table 19**.

Table 19 Impact of Parking Supply and Demand Management on CBD

BEST PRACTICE STRATEGIES	EVALUATION OF EFFECTS				
	Decrease Demand for Car Trips	Increase Supply of Alternative Modes of Transportation	Cost Efficiency	Revenue Generation	Political Acceptability and Legality
Modify parking rates to increase and/or reduce parking demand	H	L	M	H	M
Increase Fines	H	L	H	M	H
Revenue stream to directly finance, or leverage additional budget for district improvements (Benefit Districts)	M	H	H	L	H
Taxes to Commercial Parking	H	L	H	H	L
Rate Regulations/Collection of Taxes and Fees	M	L	M	H	L
Optimize the availability of parking exemptions	M	L	H	M	M
Negotiation of Parking Requirements	M	L	M	L	H
Reduce the amount of allocated parking	M	H	H	L	H
Promotion of transit oriented development (TOD)	H	H	M	H	H

B000460

BEST PRACTICE STRATEGIES	EVALUATION OF EFFECTS				
	Decrease Demand for Car Trips	Increase Supply of Alternative Modes of Transportation	Cost Efficiency	Revenue Generation	Political Acceptability and Legality
Mass Transit Services	H	H	L	L	H
Park and Ride	M	M	M	L	M
Car-Sharing	H	H	H	L	H
Bicycle Facilities Planning	H	H	M	L	H
Commuter Incentives	M	H	H	L	M
Signage and Wayfinding	H	L	M	L	H
Electronic Systems	L	L	H	H	H
Sensors, Real Time-Data and Pricing Applications	M	L	H	H	H
Institutional Coordination	M	H	M	L	H
Improving Public Education Through Marketing	H	L	M	L	M

* High (H), Medium (M) and Low (L) effects – Source: Impact of Parking Supply and Demand Management on Central Business District (CBD) Traffic Congestion, Transit Performance and Sustainable Land Use, Florida Department of Transportation, July 2012

Based on these information, **Table 20** present a set of opportunities to optimize on-street and off-street parking, in terms of factors such as location, time limits, and parking fees that may be considered as part of the parking assessment process.

Table 20 Potential Opportunities for Optimization of On-Street and Off-Street Parking

Special Interest Areas and Near Corridors	Parking Strategy Assessment Elements				
	Supply	**Design**	**Demand**	**Finance**	**Manage**
Art Galley of Windsor, Windsor International Aquatic and Training Centre, Transit Windsor Terminal	Park and Ride Parking Reductions	Signage and Wayfinding Promotion of TOD	Improving Public Education Through Marketing	Pricing to Manage Demand	Institutional Coordination
Windsor's Community Museum, St. Clair Centre for the Arts, University of Windsor (former Windsor Star)	Park and Ride Parking Reductions	Signage and Wayfinding Promotion of TOD	Improving Public Education Through Marketing	Pricing to Manage Demand	Institutional Coordination
St. Clair College Media Plex, St. Clair College TD Student Centre	Park and Ride	Signage and Wayfinding	Improving Public Education Through Marketing	Pricing to Manage Demand	Institutional Coordination
University of Windsor (Downtown Campus properties)	Park and Ride Parking Reductions	Signage and Wayfinding Promotion of TOD	Improving Public Education Through Marketing	Pricing to Manage Demand	Institutional Coordination
Civic Government Resources	Park and Ride Parking Reductions	Promotion of TOD	Improving Public Education Through Marketing		Institutional Coordination
Caesar's Windsor Hotel and Casino					Institutional Coordination

B000460

6.2 Pedestrian Infrastructure

6.2.1 Widths

Sidewalk width is determined by various factors that may include:

+ Applicable standards;
+ Pedestrian volume;
+ Available space;
+ The nature of adjacent businesses or land uses;
+ Nearby institutional facilities;
+ Transit systems;
+ Road character; and
+ Considerations for curb extensions and bump-outs.

A clear width in excess of the 1500mm AODA minimum is achievable through the use of adjacent ROW space for site furnishings, tree planting, wayfinding, and outdoor commercial features like sidewalk cafes. It should be noted that, at the detailed design stage, lighting and other utilities must be placed away from the curb edge and not be contained within the sidewalk: particularly for sidewalks of 1500mm and 1800mm width.

In this respect, the Transportation Association of Canada's Design Guide for Canadian Roads recommends that 1.5 metres should be the minimum width of grass boulevards to avoid maintenance difficulties, but also suggests that narrow hard surface boulevards can be implemented as part of retrofitting projects.

If the boulevard is not used for streetscaping purposes, but to locate utility and street light poles, trash pickup, and street signs, a separation of no less than 0.30 metres from the edge of the curb may be considered as recommended by Ontario Traffic Manual Book 1 Appendix B – Sign Design Principles.

In the cross-sections within this report, there are examples of sidewalks adjacent to boulevards which are wide enough to accommodate infrastructure elements such as: street lights, parking meters, fire hydrants, traffic control, and traffic signal lights.

Recommended widths for sidewalks and boulevards per corridor and type of context zones are presenting in **Table 21 and 22** respectively. These recommendations are based on the enhancement of the pedestrian activities along the roadway network

servicing the different context zones. If the available right-of-way is restricted, the minimal clear width shall be 1.5 metres to comply with AODA requirements.

Table 21 Recommended Pedestrian Space Dimensions by Context Zone

CONTEXT ZONES			
Corridor	**Core Commercial / Business**	**Mixed Use**	**Residential**
Wyandotte Street	2.0 m	2.0 m	
Ouellette Avenue		2.0 m	
University Avenue	2.0 m	2.0 m	
Pitt Street	2.00 – 3.00 m		
Chatham Street	2.00 – 3.00 m		
Victoria Avenue	3.00 m		1.50 – 2.00 m
McDougall Street	2.00 – 2.50 m		2.00 – 2.50 m
Janette – Bruce Avenue			1.50 m
Aylmer Avenue			2.0 m
Howard Avenue			2.0 m
Erie Street		1.50 m	
Local Roads			1.50 – 2.00 m

B000460

Table 22 Recommended Boulevard widths by Context Zone

CONTEXT ZONES			
Corridor	**Core Commercial / Business**	**Mixed Use**	**Residential**
Ouellette Avenue		3.0 m	
University Avenue	2.0 m	2.0 m	
Pitt Street	1.00 – 3.00 m		
Chatham Street	1.00 – 3.00 m		
Victoria Avenue	2.0 m		
McDougall Street	1.00 – 3.00 m		1.00 – 3.00 m
Howard Avenue			3.00 – 4.50 m

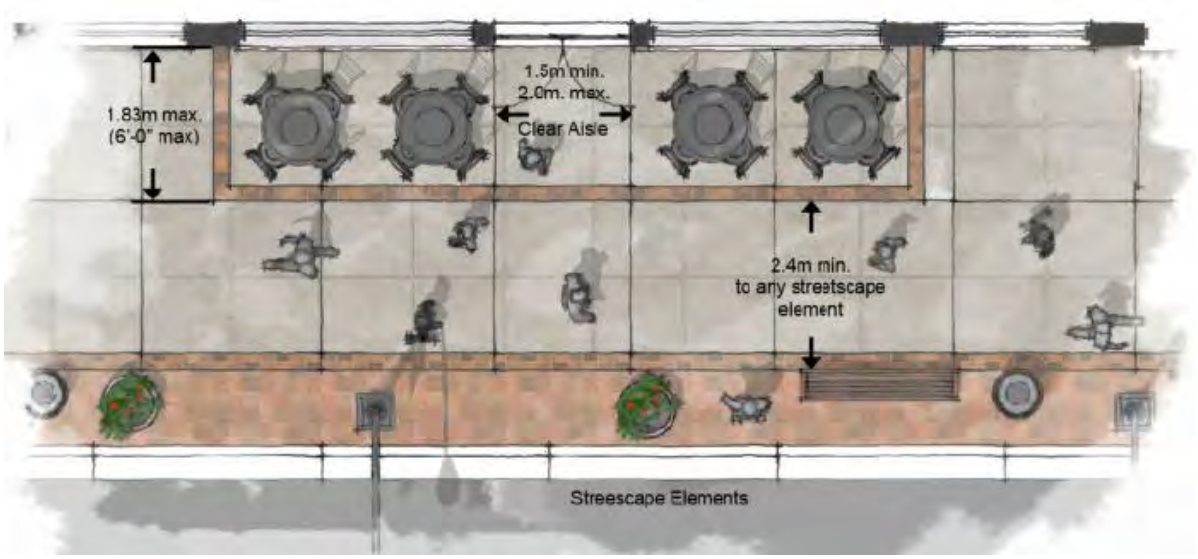
6.2.2 Sidewalk Cafes and Sidewalk Width

In the City of Windsor a sidewalk café is defined as "*a public seating area located within a public right of way pursuant to a valid Sidewalk Café permit, which functions as an outdoor seasonal extension of the primary business of food and / or beverage service and may include other outdoor seating areas as approved by City Council"*

The City of Windsor Sidewalk Café Handbook indicates the following layout for sidewalk café locations immediately abutting the restaurant frontage:

+ A minimum 2.4m (8') clear pedestrian aisle sidewalk clearance must be maintained with little variation in alignment from streetscape furniture, utilities, etc.;
+ Minimum 1.8m (6'0) clear pedestrian aisle must be maintained with no variation in alignment from streetscape furniture, etc. for Sidewalk Cafes located on the flankage (residential) side of corner lots; and
+ The public sidewalk in front of the building must be at least 3.8m (12') wide before the location will be considered for a sidewalk café.

B000460



Sidewalk Café – Not Enclosed (Source: Sidewalk Café Handbook, Appendix D)

6.2.3 Treatments at Intersections and Midblock Crossings

To increase pedestrian connectivity and enhance the perceived safety of pedestrians crossing in other locations aside of existing signalized intersections equipped with pedestrian signals, the use of the following pedestrian crossing treatments may be considered as recommended by the OTM Book 15, Pedestrian Crossing Treatments[8]:

+ Intersection Pedestrian Signals (IPS);
+ Midblock Pedestrian Signals (MPS);
+ Pedestrian Crossovers (PXO), Level 1 and 2;
+ Stop or Yield Control;

It is expected that the updated version of OTM Book 15 will assist practitioners to:

+ Identify which type of controlled pedestrian crossing treatment system is warranted at a site; and
+ Identify which treatment system is applicable to the site based on traffic and geometric characteristics of the site.

B000460

[8]Expected to be released mid 2016.

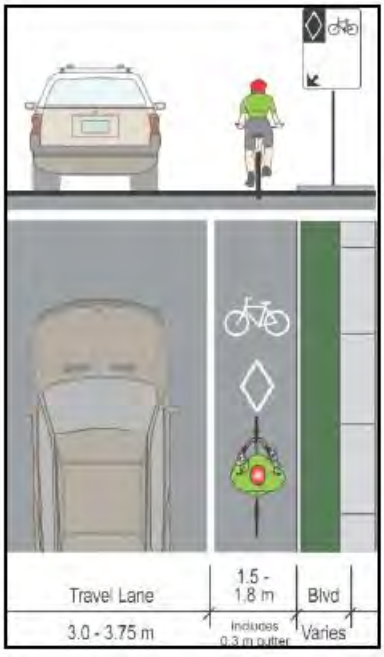
6.3 Cycling Infrastructue

Although the Province of Ontario's Highway Traffic Act defines a bicycle as a vehicle that can be operated on most roadways in Ontario, an adequate design of cycling facilities should considered several factors such as[9]:

+ Facility function;
+ Available right-of-way;
+ Traffic volume;
+ Posted and observed speed;
+ Perceived user comfort and safety level;
+ Actual collision risk; and
+ Cost.

6.3.1 Conventional Bicycle Lanes

For a conventional bicycle lane, as defined by OTM Book 18, the bicycle lane width is usually 1.5 metres on streets where parking is not permitted. The width can be increased to 1.8 metres on streets with higher traffic volumes or speeds beyond 50 km / h.



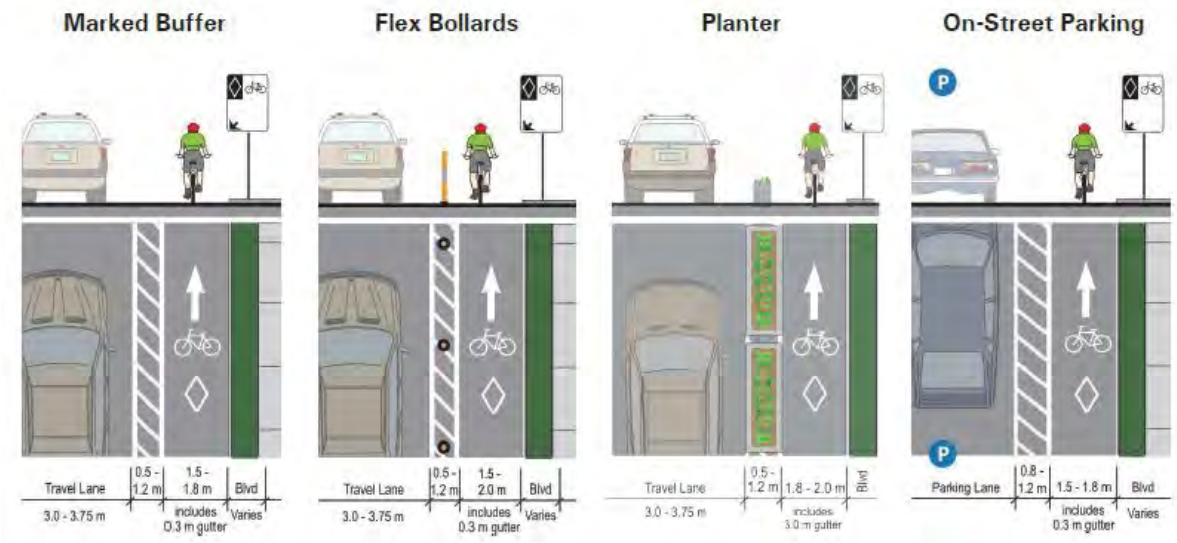
Conventional Bicycle Lane (Source: OTM Book 18)

Bicyle Lane Adjacent to On-Street Parking (OTM Book 18)

B000460

6.3.2 Separated Bicycle Lanes

For a separated bicycle lane, as defined by OTM Book 1 and in which a portion of roadway is delineated for preferential or exclusive use of cyclist by pavement markings or a physical barrier and signage, the suggested minimum lane width is 1.5 metres. For two-way bicycle lanes, the same minimum lane width applies per lane.



Cross-Sections of Separated Bicycle Lanes with Buffers as Indicated (Source: OTM Book 18)

Since the proposed in-boulevard and separated bike lanes may generated potential conflicts between vehicular traffic and cyclists (not existing in the present configuration of the roadways considered as part of this study), implementation of these types of facilities should consider the recommended mitigation measures described by OTM Book 18 Section 5.4.1.2

B000460

[9]Ontario Traffic Manual (OTM), Book 18, Cycling Facilities

City of Boston Two-way Separated Bike Lane on Causeway Street – Design Overview (Source: Federal Highway Administration, Separated Bike Lane and Design Guide, 2015

6.3.3 Shared Roadways

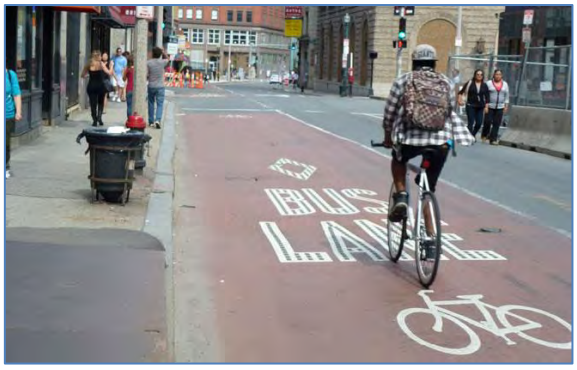
As indicated in OTM Book 18, unless cycling is specifically restricted, all roadways are considered to be Shared Roadways. However if these type of facilities are (or planned to be) included as part of a bikeway network, the installation of adequate signage is required.

In addition, pavement markings (sharrow symbol) as well as a minimum width of the curbside lane of the shared roadway of 4.0 metres are suggested to be used to (1) alert the drivers about the shared use of the roadway, and (2) to facilitate a side-by-side travelling along the roadway.

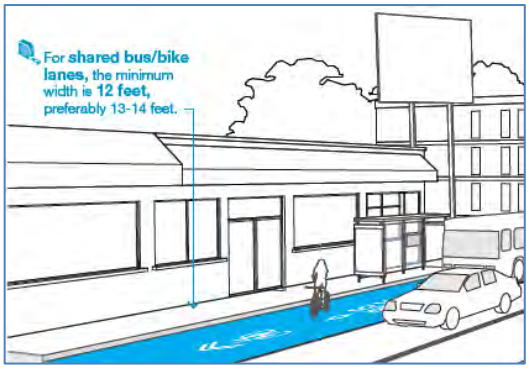
Cross-Sections of Shared Roadways – Wide Signed Bicycle Route with optional sharrow (Source:OTM Book 18)

Cross-Sections of Shared Roadways – Narrow Signed Bicycle Route with optional sharrow (Source:OTM Book 18)

Although the use of bus lanes as shared roadways is not explicitly described in OTM Book 18, recommended practices from other jurisdictions indicates that the legitimate use of bicycles in bus lanes reflects their priority importance in a more sustainable transport system[10] and suggested a desired minimum width of 4.5 metres for a shared bus / bike lane which corresponds with the desired width of a wide shared roadway recommended by OTM Book 18.



City of Boston – Essex Street, Bus-Bike Shared Lane (https: / / www.asla.org / guide / site.aspx?id=41045, accessed February 18, 2016)



Curbside Bus-Bike Lane Design (Source: City of Boston Complete Streets Guideline)

B000460

6.3.4 Treatments at Intersections

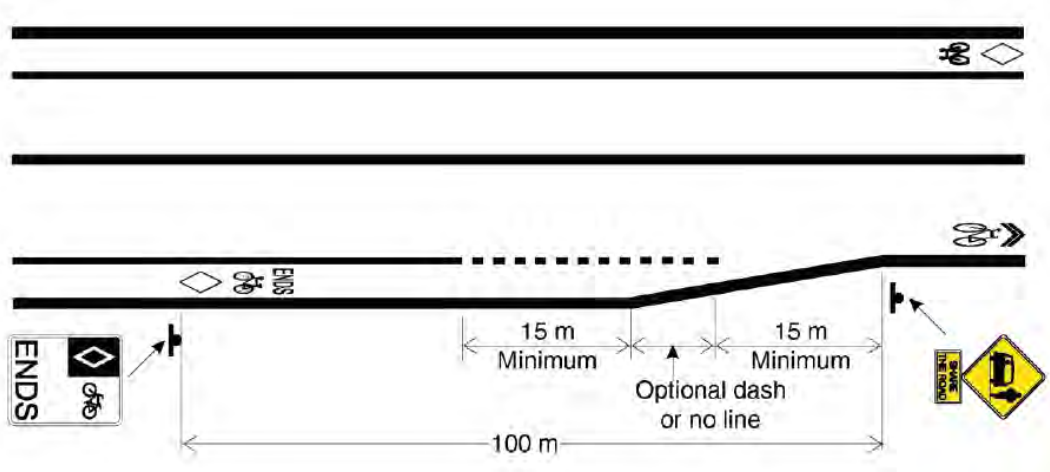
Due to the restricted right-of-way at some of the intersections considered as part of the study area, it is recommended that the series of design applications presented by the OTM Book 18, as well as the Ministry of Transportation's Bikeways Design Manual, be reviewed for an adequate transition and / or termination of bicycles lanes at the following locations:

Discontinued Midblock Bicycle Lane where Roadway Narrows

+ Wyandotte Street near the access to Windsor-Detroit Tunnel Plaza;
+ McDougall Street north of Wyandotte Street;
+ Erie Street west of the intersection with Ouellette Avenue

Bicycle lane transition to shared right-turn lane

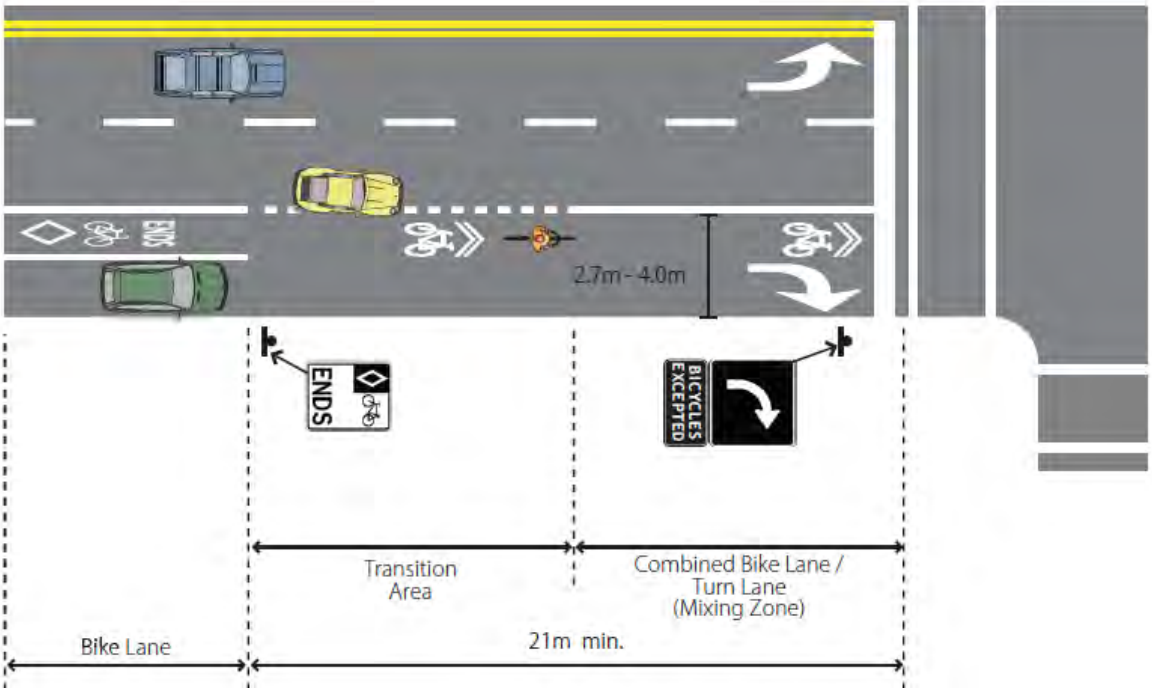
+ Wyandotte Street at the intersection with Ouellette Avenue
+ McDougall Street at the intersection with Wyandotte Street
+ Erie Street at the intersection with Ouellette Avenue



Discontinued Midblock Bicycle Lane where Roadway Narrows (Source: OTM Book 18, Figure 4-30)

B000460

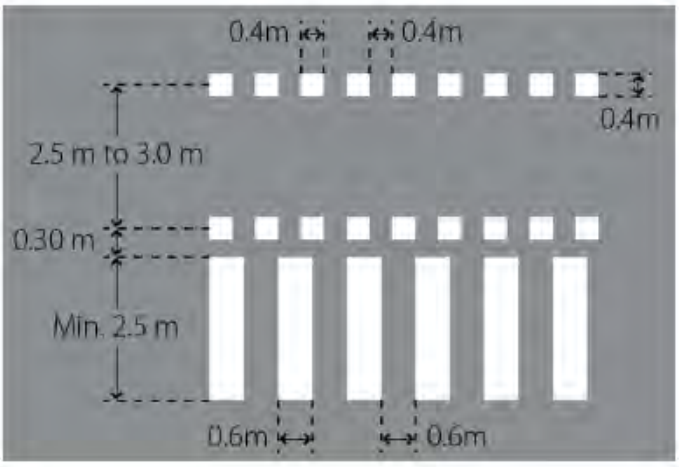
[10] Queensland Government, Department of Transport and Main Roads, "Cycling and Bus Lanes", June 2006



Bicycle Lane Transition to Shared Right-Turn (Except Bicycles) Lane on Road with On-Street Parking (Source: OTM Book 18, Figure 4-34)

Crossrides

+ At the intersection of Riverside Drive with Bruce Avenue

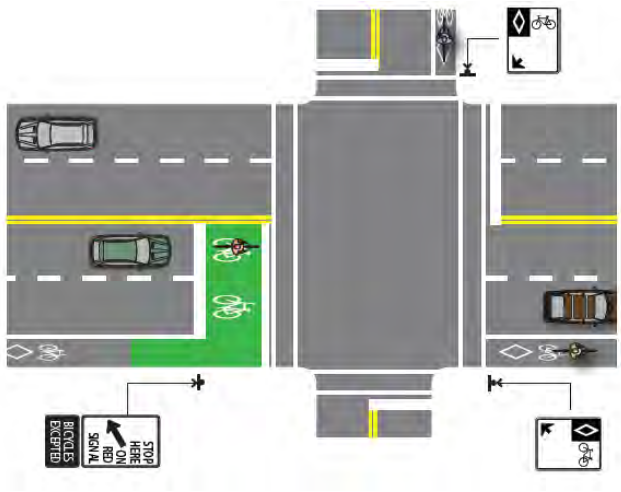


Separate Crossride (Source: OTM Book 18, Figure 5-35)

B000460

Bike Box

+ University Avenue, Wyandotte Street, and Erie Street at the intersection with Janette Avenue;
+ Erie Street, Wyandotte Street and University Avenue at the intersection with Bruce Avenue; and
+ Erie Street at the intersection with Victoria Avenue



Bike Box Design (Source: OTM Book 15, Figure4.50)

Recommended widths for bicycle facilities per corridor and type of context zones are presenting in **Table 23 to 25**.

B000460

Table 23 Recommended Widths for Conventional Bicycle Lanes

CONTEXT ZONES			
Corridor	Core Commercial / Business	Mixed Use	Residential
Wyandotte Street	1.50 m	1.50 m	
McDougall Street	1.50 m		1.50 m
Janette – Bruce Avenue			1.50 m
Erie Street		1.90 m	

Table 24 Recommended Widths for Separated Bicycle Lanes

CONTEXT ZONES			
Corridor	**Core Commercial / Business**	**Mixed Use**	**Residential**
University Avenue	3.0 m	3.0 m	
Victoria Avenue	3.00 m		3.0 m
Aylmer Avenue Alternative 1			3.0 m
Howard Avenue			3.0 m

B000460

Table 25 Recommended Widths for Shared Roadways

CONTEXT ZONES			
Corridor	**Core Commercial / Business**	**Mixed Use**	**Residential**
Pitt Street	4.50 m		
Chatham Street	4.50 m		
Victoria Avenue	4.00 m		4.00 m
Local Roads			4.00 m

6.4 MAE Factors

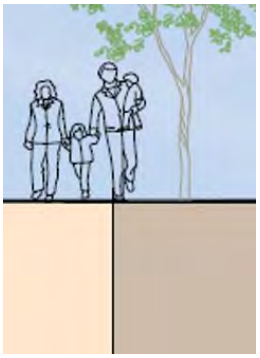
To facilitate the identification of roadway elements and alternative options for allocation of pedestrian space, a set of Pedestrian and Cycling Facilities in conjunction with its estimated effects on the Multiple Account Evaluation Framework developed for this assignment is presented in **Table 26 and Table 27** respectively.

These dimensions will vary depending on location and adjacent uses, particularly in commercial areas with the presence of sidewalk cafes, or businesses that place portable signage, planters, or seasonally display and sell goods outdoors adjacent to their facades.

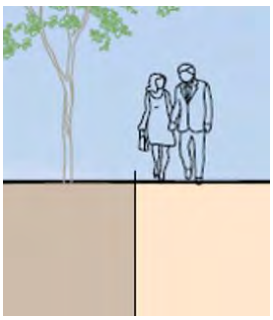
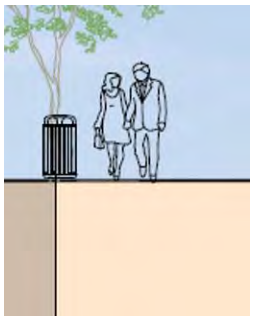
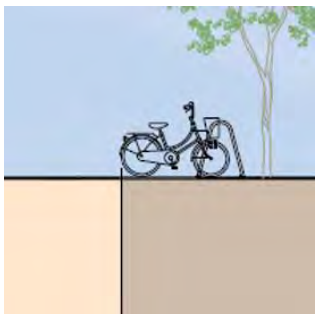
Table 26 Recommended MAE Factors for the selection of Pedestrian Space Facilities

MULTIPLE ACCOUNT EVALUATION FRAMEWORK				
ACCOUNTS	Sidewalk 1.5 m	Sidewalk 1.8 m	Sidewalk 2.0 m	Sidewalk 3.0 m
Connectivity	10	10	10	10
Accesibility	5	10	10	10
Utilitarian Activities	2	2	5	10
Behavioural Factors	2	2	5	10
Spatial Experience	2	2	5	10
Parking	10	10	5	2
Cost	10	10	10	5

B000460

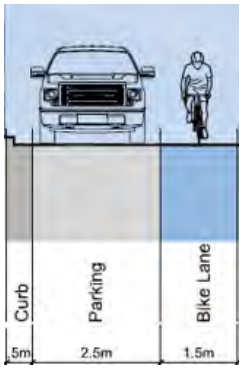
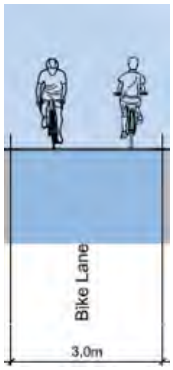
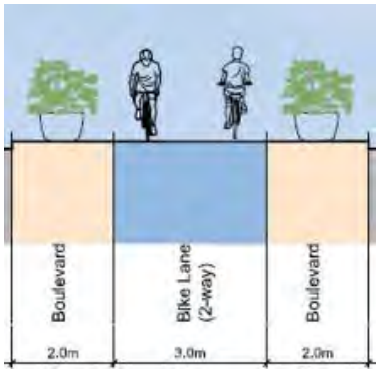
MULTIPLE ACCOUNT EVALUATION FRAMEWORK				
ACCOUNTS	Boulevard (0.5 m) / Sidewalk (1.5 m)	Boulevard (0.5 m) / Sidewalk (1.8 m)	Sidewalk (3.0 m) / Boulevard (0.5 m)	Sidewalk (1.5 m) / Boulevard (2.0 m)
Connectivity	10	10	10	10
Accesibility	5	10	10	10
Utilitarian Activities	2	2	10	5
Behavioural Factors	2	2	10	10
Spatial Experience	2	2	10	10
Parking	10	10	2	2
Cost	10	10	5	5

B000460

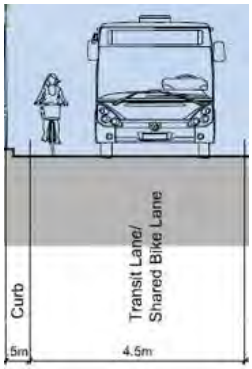
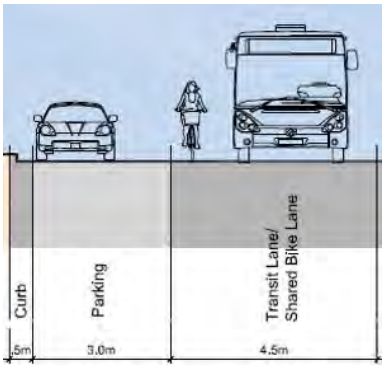
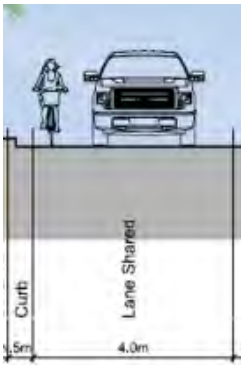
MULTIPLE ACCOUNT EVALUATION FRAMEWORK			
ACCOUNTS	Boulevard (2.0 m) / Sidewalk (2.0 m)	Sidewalk (3.0 m) / Boulevard (1.0 m)	Sidewalk (1.8 m) Boulevard (3.0 m)
Connectivity	10	10	10
Accesibility	10	10	10
Utilitarian Activities	5	10	10
Behavioural Factors	10	10	10
Spatial Experience	10	10	10
Parking	2	2	2
Cost	5	5	5

B000460

Table 27 Recommended MAE Factors for the selection of Cycling Facilities

MULTIPLE ACCOUNT EVALUATION FRAMEWORK				
ACCOUNTS	Conventional Bike Lane (1.5 m)	Conventional Bike Lane (2.0 m)	Separated Bike Lane (3.0 m)	Separated Bike Lane 3.0 m / Boulevard (2.0 m)
Connectivity	10	10	10	10
Accesibility	10	10	10	10
Utilitarian Activities	n/a	n/a	n/a	n/a
Behavioural Factors	5	10	10	10
Spatial Experience	2	5	5	10
Parking	10	0	0	0
Cost	10	10	10	5

B000460

MULTIPLE ACCOUNT EVALUATION FRAMEWORK			
ACCOUNTS	Shared Bike/Bus Lane (4.5 m)	Shared Bike/Bus Lane (4.5 m)	Shared Bike Lane (4.5 m)
Connectivity	10	10	10
Accesibility	5	5	5
Utilitarian Activities	n/a	n/a	n/a
Behavioural Factors	2	2	2
Spatial Experience	2	2	2
Parking	0	10	0
Cost	10	10	10

B000460

6.5 Site Furnishing

6.5.1 Placement Guidelines

The placement and design of a street furniture system is accomplished during the detailed design phase of a project, since the approach to site furnishings and lighting will vary, depending on location and adjacent uses. Care must be taken so that site furnishings are not located within a clear path of pedestrian travel; where they might impede or disrupt pedestrian movement.

At minimum site furnishings should be durable and of high quality suitable for a street environment. Site furnishing elements may include:

+ Benches or other seating elements;
+ Litter containers;
+ Planters;
+ Banner arms and banners;
+ Hanging planters;
+ Flags;
+ Bollards;
+ Bicycle parking;
+ Pedestrian lighting;
+ Tables and chairs;
+ Tree grates;
+ Drinking fountains;
+ Shade structures;
+ Low barrier fencing at street trees; and
+ Specialty fencing.

Municipalities may prefer standard models of site furnishings in the interests of continuity and visual coherence, branding, ease of replacement, and maintenance. There is merit in considering the development of specialty sub-types of site furnishings, depending on adjacent land uses. For example, a standard park bench in a traditional style might not be suitable for a streetscape adjacent to a highly contemporary building. A BIA district might wish to identify itself as unique in terms

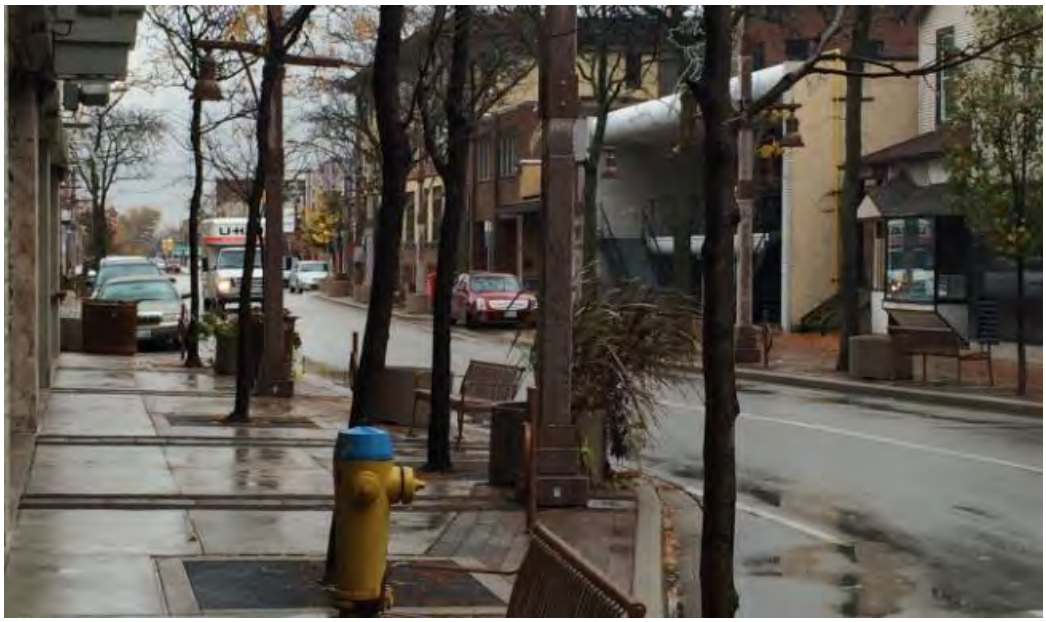
of colour and style of street furniture. In these circumstances the challenge is in transitioning from one style to another, often along the same street.

Bank Street Reconstruction Project (Source: City of Ottawa Integrated Street Furniture Policy and Design Guidelines, August 12, 2009)

During public consultation, members of the community expressed interest in a shared bicycle system for the City of Windsor. These bicycles will differ in design, colour, and branding from the street furniture / site furnishings system in any given area. A small bicycle station with racks and signage might accommodate up to twelve bicycles and adequate space will be required to accommodate this facility. In downtown locations they may be accommodated in a parking lane, or in the boulevard where space permits.

Placement of pedestrian amenities, such as benches, will vary depending on location. A neighbourhood or street with a higher than average population of senior citizens, or areas near a hospital, might need benches to be placed at shorter intervals in key locations. Streets near the St. Clair College or University of Windsor sites might require a higher number of clustered seating elements, particularly if the street contributes to the outdoor social space of the campus.

In the appropriate context, bump-outs (curb extensions) may also be utilized to accommodate street furnishings and ground level planting beds or planters with trees, shrubs or annual plants.



Street Furniture at Bump-outs, Pelissier St – City of Windsor

Effective lighting can enhance the image of the city, improve downtown commercial areas, improve pedestrian safety, and increase night usage by the public in the downtown areas. Often the only pedestrian lighting on sidewalks is spill-over from street lights illuminating adjacent roads. Consideration should be given to adding lighting at a pedestrian scale where applicable.

General Guidelines for placement of Site Furnishings

+ Strictly maintain sight lines as per City standards or recommended practices such as ITE Streetside Design Guidelines;
+ Place all site furnishings outside of the clear path of pedestrian travel;
+ Banner arms and brackets for hanging planters should be kept a minimum of 200mm from the curb edge; and
+ Consider maintenance when placing site furnishings, and consult with municipal operations and maintenance staff with respect to size and type of equipment used for snow clearing and sidewalk cleaning operations.

Source: sfbetterstreets.org

Source:www.upbeat.com

+ Place benches so that users feel comfortable and safe with respect to adjacent vehicular traffic.
+ Set back benches to provide clearance from clear path of travel, when benches are in use. Consider that some wheelchair or walker users prefer to sit at a 90 degree angle to a bench, and that space in front of the bench may be used as "sitting space".
+ Consider seated views when placing benches.
+ Ensure that there is adequate space (minimum 900mm width) for wheelchair / stroller parking adjacent to benches.
+ Place litter containers so that they are easily accessible, but not immediately adjacent to seating areas (they are a source of odours, insects).

6.5.2 Urban Forestry

6.5.2.1 Tree Planting Guidelines

The inclusion of trees in the urban environment is desirable for reasons that include modification of microclimate, increase of the urban tree canopy, filtering of pollutants, aesthetics, and provision of shade to combat the urban heat island effect. Trees are an investment, and are considered to be municipal assets.

Constraints that may affect the inclusion of trees:

+ Underground and above ground utilities;
+ Municipal maintenance budget allocations ;
+ Concerns from business owners that signage will be blocked ;

+ Urban environments that can be detrimental to tree health;
+ Lack of soil volume (constrained space); and
+ Concerns from adjacent property owners with respect to leaf litter, fruit and seed droppings.

In the case of central medians, as indicated on the cross sections in this report, the above noted concerns can be mitigated through the use of raised planters, or walkways intended to direct pedestrian traffic.

Some streets are of sufficient size (2.1m minimum clearway required, more width required on busy streets) to accommodate large ground level planting beds or raised planters. Protection of the root zone is essential in these types of planters, and is often accomplished through the use of raised curbs or low fences.

Planter Top Typical Options (Source: Toronto Street Trees, 2010)

In paved areas typically found in many downtown neighbourhoods, adequate soil volumes are difficult to achieve without the use of suspended pavements. A suspended pavement system provides underground support for adjacent sidewalks and roadways and accommodates utilities while providing appropriate soil volumes for optimal tree growth.

Suspended pavement systems provide greater opportunities for native tree species to thrive in urban environments. However, the unit cost for each tree, which includes irrigation, drainage, and may include special soil mixes is more costly than conventional tree “pits” and tree grates. The benefit is in tree health and appropriate canopy development, as opposed to conventional planting techniques that result in trees which fail to thrive and require replacement in a few years. The cost of these systems should be factored into capital budget forecasting whenever a street redevelopment is anticipated.

Suspended Pavement for Urban Tree Growth (Source: blog.greenblue.com)

Nursery pruning of large canopy trees (for street tree planting) is required in order to achieve a minimum of 2200mm from ground level to the first branches at time of planting. Nursery pruning is essential for street trees that are structurally sound, resulting in lower long-term maintenance costs.

General Guidelines for Tree Planting

+ If tree guards are used, they should be adequately sized to accommodate trunk growth.
+ Tree grates should be adequately sized with respect to the center diameter so that the root crown can be accommodated with growth.
+ Large ground level planting areas can accommodate trees where space permits. If trees are planted with shrubs or perennials the root ball area must be avoided.
+ Planting of annuals (digging and turning soil) may be detrimental to the development of tree roots, therefore planters must be carefully planned to accommodate the cultural requirements of all plants.
+ Care must be taken to ensure that raised curbs or low fences are of sufficient height and colour contrast so that they do not create tripping hazards.

Typical Plan View Planting Between Sidewalk and Property Line (Source: Toronto Street Trees, 2010)

+ Contemporary urban forestry recommendations include the provision of adequate soil, in the amount of 30m3 per tree for a single tree, and 15m3 per tree if the growing environment is adjacent / shared with other soft landscaped areas.
+ This is achievable in municipal road allowances and medians through the provision of continuous tree trenches filled with planting soil vs. the typical tree pits of the past.
+ It should be noted that in soft landscaped boulevards soil compaction due to human foot traffic is detrimental to tree health.
+ Street tree placement and setback from the curb is a challenge in many urban areas, since a balance is often difficult to achieve between the accommodation of vehicles and pedestrians, while ensuring sufficient space for tree growth.
+ Ideally trees should be set back a minimum 900mm from the curb edge so that adequate soil volume, and an adequate balance of root development can be achieved
+ Space trees at approximately 10.0m along the street, however this will vary with site conditions
+ 60mm minimum caliper size (70mm is preferable) for street tree planting.
+ Maintain adequate sight lines when locating trees and other plants in ROW.
+ Selection of appropriate tree species that can tolerate urban conditions. The City of Windsor Street Tree Species List is included in this report as an appendix.

B000460

- Drought and salt tolerance, tolerance of urban conditions and minimum pruning requirements.
- Set planting beds back from edges of roadways to accommodate snow removal.
- Annual plants can be effective at curb level, as long as irrigation systems are in place that will assist in flushing contaminants from planting soils.
- Planting design on urban streets should consider the speed and distance that the viewer is travelling.
- Planting near pedestrian areas may be more detailed in terms of texture and colour vs. road median plantings that are better suited to large groupings of similar plants. As the distance from pedestrians increases, plant material groupings may become larger.

It is also important to consider that increased temperatures and extreme heat events have proven to be a threat to human health. The impacts of extreme heat are especially damaging to vulnerable populations living in urban areas, such as the elderly, young children and people living in poverty. The phenomenon known as the urban heat island effect occurs when City temperatures are much higher than rural surroundings. This is caused by increased urban development and the loss of vegetation seen in urban areas in Windsor.

To protect and enhance the enjoyment of individuals in the downtown core, consideration shall be given to design elements that improve thermal comfort, including the potential use of bus shelters to create artificial shade and protection from rain/snow.

3027 Harvester Road, Suite 400
Burlington, ON L7N 3G7
CANADA
T. 289.288.0287
F. 289.288.0285

www.cima.ca