

City of Windsor

Municipal Class Environmental Assessment Study University Avenue & Victoria Avenue

Environmental Study Report

August 2022

B000917

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1. Introduction and Study Background

1.1. Introduction and Study Area

The City of Windsor has undertaken a Municipal Class Environmental Assessment for the University Avenue and Victoria Avenue corridors to review the existing roadway elements along the University Avenue and Victoria Street corridors and consider opportunities within the right-of-way to provide a pleasant experience for all roadway users.

The study corridors are illustrated in Exhibit 1-1 and include University Avenue West/East between Huron Church Road and McDougall Street and Victoria Avenue from Chatham Street West to Park Street West. The study considered opportunities to optimize the right-of-way to achieve safe, efficient, comfortable and convenient travel for roadway users of all ages, abilities and modes within the study corridors for a 20 year study horizon.



Exhibit 1-1: Study Area

Within the EA study area, the 3.5-kilometre section of University Avenue between Huron Church Road and McDougall Street has a varying cross-section including:

- 2-lane urban cross-section from Huron Church Road to Partington Avenue;
- 4-lane urban cross-section from Partington Avenue to Crawford Avenue; and
- 2-lane urban cross-section from Crawford Avenue to McDougall Street.

Victoria Avenue is a one-way street (southbound) south of University Avenue with 3 lanes of traffic. North of University Avenue, Victoria Avenue presents 2 traffic lanes (one per direction).

The land use surrounding the study area varies from residential (between California Avenue and Bruce Avenue) to commercial (between Pelissier Street and McDougall Street). The land use along Victoria Avenue is mixed commercial/high-rise residential, as well as several parking lots.

The current statutory speed limit on University Avenue and Victoria Avenue within the study area is 50 km/h.

1.2. Municipal Class Environmental Assessment Process

This study follows the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment process for a Schedule C project (October 2000, as amended in 2007, 2011 and 2015).

The Ontario Environmental Assessment Act (2010) guides the process for reviewing the environmental impact of proposed activities. The Act applies to government agencies, conservation authorities, and municipalities. The City of Windsor is the proponent in this study and the Municipal Class Environmental Assessment for University Avenue and Victoria Avenue Improvements has been completed in accordance with the Ontario Environmental Assessment Act (2010).

Municipal projects that affect the purpose, capacity or function of a roadway, or propose new roadways are subject to the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). The Municipal Class Environmental Assessment (Class EA) is a planning and design process for transportation/transit and water/wastewater infrastructure projects which have a predictable range of impacts that can be mitigated. The Municipal Class EA process is approved by the Ministry of Environment, Conservation and Parks to meet the requirements of the Environmental Assessment Act (2010).

Based on their potential range of impacts, projects are classified under the Municipal Class EA by Schedules:

- Schedule A** Activities have minimal environmental effects. Projects are pre-approved.
- Schedule A+** Activities have minimal environmental effects. Projects are pre-approved so long as the public is advised prior to implementation.
- Schedule B** Activities have some adverse environmental effects. Projects typically involve improvements and minor expansions to existing facilities. These projects proceed through a screening process (Phases 1 and 2 of the Class EA), including consultation with the potentially affected public.
- Schedule C** Activities have some adverse environmental effects. Projects typically involve the construction of new facilities and major expansions to existing facilities. These projects proceed through the full Class EA planning and design process (Phases 1 through 5).

In particular, road widening or extensions with an estimated construction cost of \$2.4M or more are classified as a Schedule C project under the Municipal Class EA. As noted above, Schedule C projects must follow Phases 1 through 5 of the Class EA process:

- Phase 1** Identify the problem or opportunity.
- Phase 2** Identify alternative solutions to address the problem or opportunity.

This Phase will identify and assess the positive and negative effects of alternative planning solutions for the identified problem and/or opportunity, taking into account the natural, social, cultural, and economic environment and input from all agencies and the public.
- Phase 3** Examine alternative methods of implementing the preferred solution.

Phase 3 will identify and assess the positive and negative effects of alternative design concepts for the preferred solution, taking into account the natural, social, cultural, and economic environment and input from all agencies and the public.

Phase 4 Document the rationale for the preferred solution and design concept, and the planning, design and consultation process in an Environmental Study Report for public and agency review.

The Environmental Study Report is placed on the public record for at least 30 calendar days. If any outstanding issues raised by the public or agencies cannot be resolved during this review period, the public and agencies have the right to request the Minister of Environment and Climate Change to order an Individual Environmental Assessment as per Part II of the Ontario Environmental Assessment Act. If no requests for a Part II order are received during the review period, the project will proceed to Phase 5 for implementation.

Phase 5 Complete contract drawings and documents, and proceed to construction, operation and environmental monitoring.

1.2.1. Notice of Study Completion

This Environmental Study Report (ESR) is available for a 30-calendar day public review during which comment/concerns can be submitted. The review period was announced with the publication of the Notice of Study Completion. As detailed in the Notice, interested persons may provide written comments to the project team. All comments and concerns should be sent directly to City Project Lead **Jeff Hagan** at the City of Windsor in writing by mail or email.

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jhagan@citywindsor.ca

The Municipal Class EA process includes an appeal provision. The Minister of the Environment, Conservation and Parks has the authority and discretion to make an Order under Section 16 of the *Environmental Assessment Act*.

A Section 16 Order may require that the proponent of a project going through a Class Environmental Assessment (Class EA) process:

- Submit an application for approval of the project before they proceed. This is generally referred to as an Individual Environmental Assessment (individual EA).
- Meet further conditions in addition to the conditions in the Class EA. This could include conditions for: further study, monitoring and/or consultation.

The minister can also refer a matter in relation to a Section 16(6) Order request to mediation.

Before making an Order, the minister must consider the factors set out in section 16(5) of the *Environmental Assessment Act*. If a Section 16 Order request is made, the project proponent cannot proceed with the project until the minister makes a decision on the request. If the minister

makes a Section 16 Order, the proponent may only proceed with the project if they follow the conditions in the Order.

Note, Section 16 Order requests were previously known as Part II Order requests.

Reasons for Requesting an Order

A concerned party may ask the minister to make a Section 16(6) Order if:

- They have outstanding concerns that a project going through a Class EA process may have a potential adverse impact on constitutionally protected Aboriginal and treaty rights;
- They believe that an Order may prevent, mitigate or remedy this impact.

A Section 16(6) Order request cannot be made to simply delay or stop the planning and implementation of a project that is going through a Class EA process. Prior to making a Section 16(6) Order request, the concerned party should first try to resolve any concerns directly with the project proponent, in this case, the City of Windsor.

Timing for an Order Request

During the 30-day public comment period, anyone can review the documentation, submit any comments or concerns to the proponent, and request a Section 16(6) Order,

To request a Section 16 Order for a project, on the grounds that an Order may prevent, mitigate or remedy potential adverse impacts on constitutionally protected, Aboriginal and treaty rights, a concerned party must make the request before the public comment period is complete.

How to make a request

To submit a Section 16(6) Order request, the following information must be provided:

- name, address and email address;
- project name;
- proponent name;
- what kind of Order is being requested i.e., a request for additional conditions or a request for an individual environmental assessment;
- details about the concerns about potential adverse impacts on constitutionally protected Aboriginal or treaty rights and how the proposed Order may prevent, mitigate or remedy the identified adverse impacts;
- whether the concerned party belongs to, represents or has spoken with an Indigenous community whose constitutionally protected Aboriginal or treaty rights may be adversely impacted by the proposed project;
- whether the concerned party has raised their concerns with the proponent, the proponent's response (if any) and why the concerns could not be resolved with the proponent;
- any other information to support the request.

Section 16 Order requests are made to the Minister of Environment, Conservation and Parks and the Director of Environmental Assessment Branch. The request may be submitted in writing by mail or email to:

Minister of Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Avenue W., 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

A copy of the written request should also be sent to the proponent of the project, Jeff Hagan at the City of Windsor.

There is no appeal of the minister's decision with respect to a Section 16 Order. If the request for a Section 16(6) Order is denied by the minister, the proponent can proceed with the project. If the minister makes an Order, the proponent may only proceed with the project if they follow the conditions in the Order.

The above discussion is intended as an overview of the process only. For more information and specific instruction, please visit:

<https://www.ontario.ca/page/class-environmental-assessments-section-16-order>.

1.3. Study Approach and Organization

Exhibit 1-2 demonstrates the process for a Schedule C project under the Municipal Class EA. This study approach begins with a thorough understanding of the problem being addressed followed by assessing the alternative solutions and alternative design concepts. The approach is organized around study phases, including Public Information Centres (PICs), stakeholder engagement and participation of technical review/regulatory agencies at study milestones.

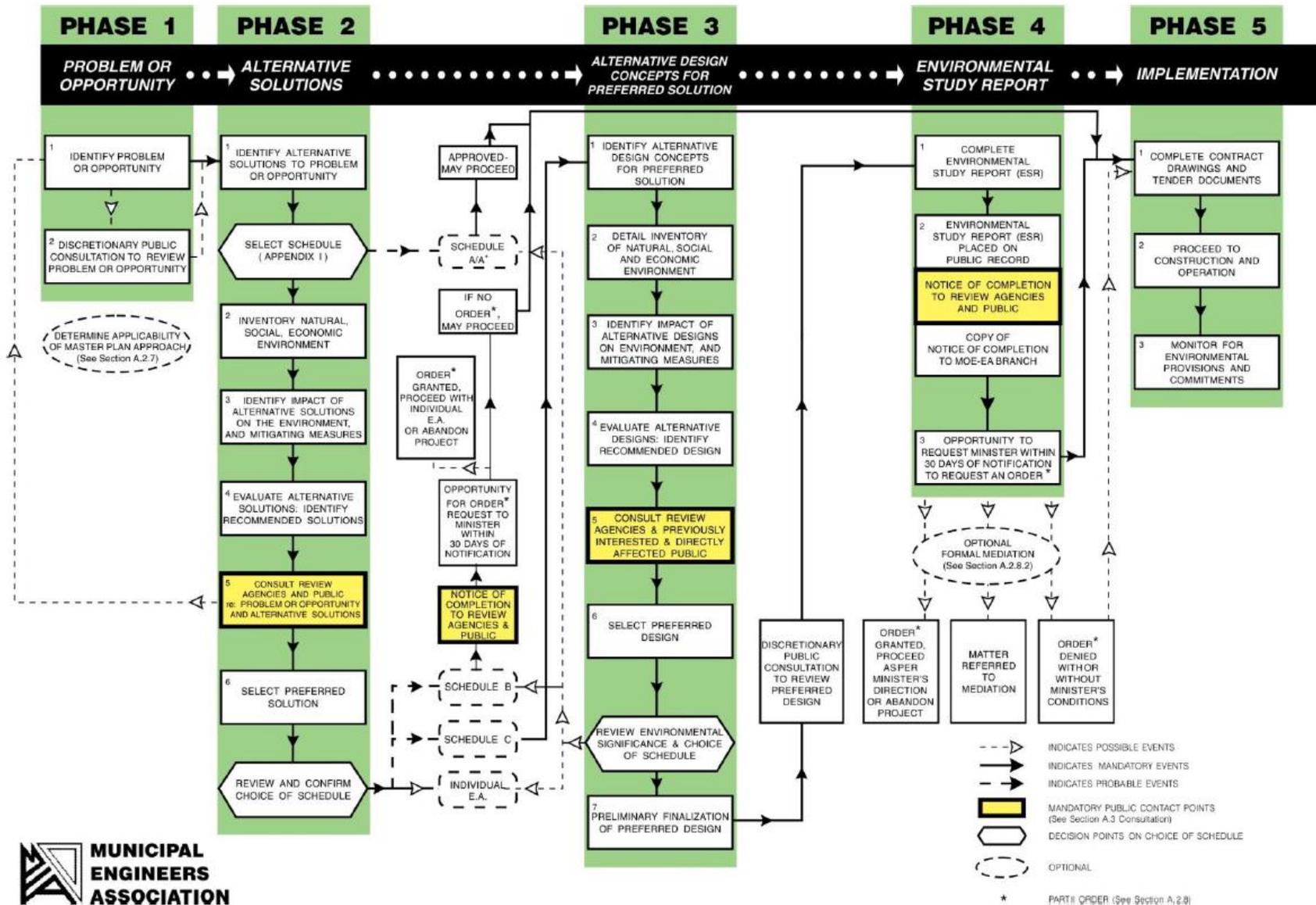


Exhibit 1-2: Municipal Class EA Flow Chart

The study was organized to ensure meaningful input was gathered from internal and external stakeholders, including review agencies. Exhibit 1-3 illustrates the key stakeholders included in the study.

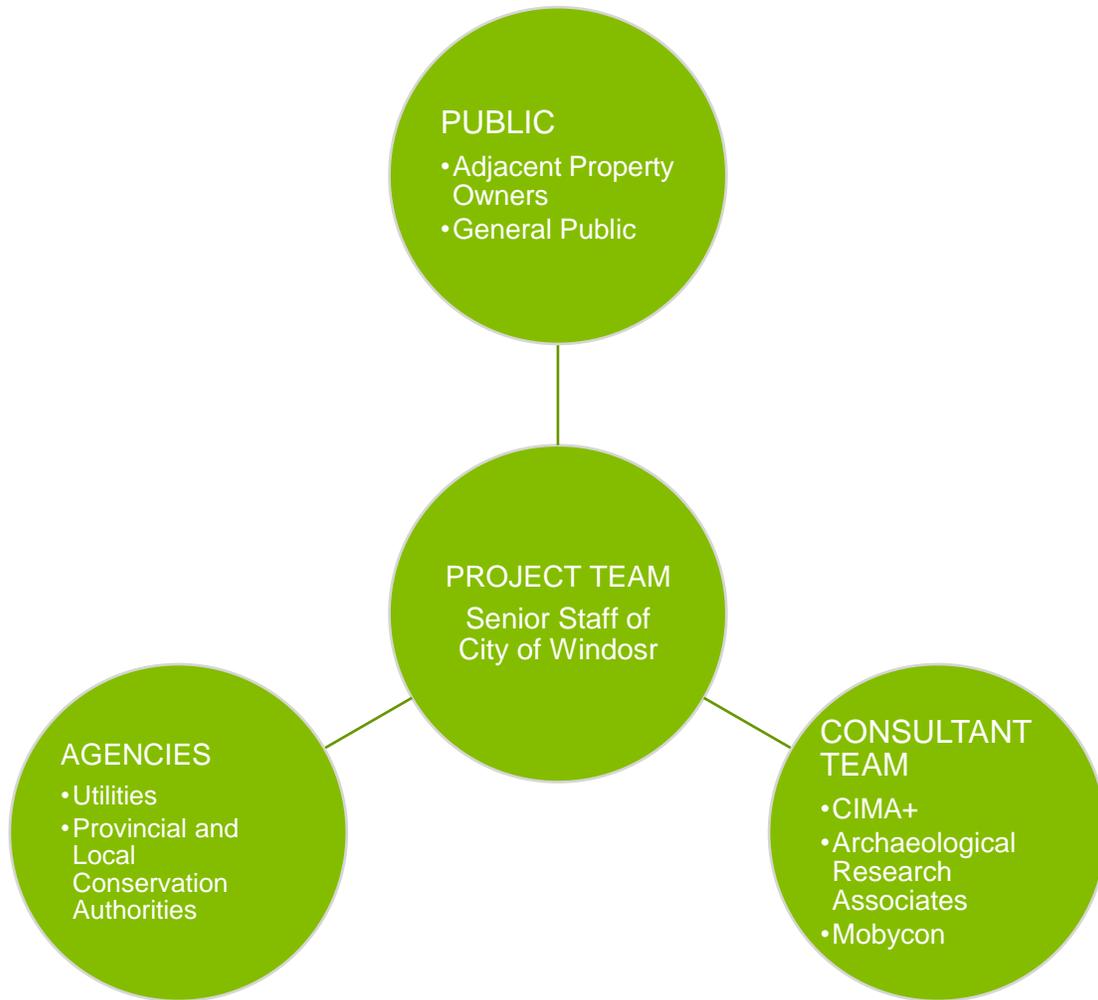


Exhibit 1-3: Project Stakeholders

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2. Needs and Justification

2.1. Planning and Policy Context

Phase 1 of the Municipal Class EA process involves the identification of the problems and opportunities to be addressed by the study. For this study, this included a review of the following City of Windsor planning policies:

- City of Windsor Official Plan and Schedules
- Bicycle Use Master Plan (BUMP)
- Downtown Windsor Enhancement Strategy and Community Improvement Plan
- Central Riverfront Implementation Plan
- University of Windsor, Campus Vision Master Plan
- Downtown Windsor Transportation Strategy
- Transit Windsor
- Active Transportation Master Plan
- Campbell/University Storm Water Master Plan
- Sanitary and Storm Sewer Master Plan Study

2.1.1. Growth and Transportation

City of Windsor Official Plan

In the Official Plan, the City of Windsor has defined goals, objectives and policies for each of the land use designations. Land use designations in the City of Windsor were identified in Schedule D: Land Use and Schedule E: City Centre Planning District, excerpts from which are shown in the figures below. Some of the key objectives from the Official Plan are as follows:

- Residential
 - To promote compact neighbourhoods which encourage a balanced transportation system;
 - To promote selective residential redevelopment, infill and intensification initiatives; and
 - To provide complementary services and amenities which enhance the quality of residential areas.
- Open Space
 - To satisfy the year-round recreation and leisure needs of Windsor residents;
 - To protect and enhance Windsor's existing Open Space, while planning for future recreation and leisure needs; and
 - To ensure that new Open Space complements and, where possible, is linked to other components of the Greenway System.
- Institutional
 - To recognize institutional uses as an important component of Windsor, its neighbourhoods and economic base;

- To recognize the increasing complexity and diversity of institutions as these facilities evolve to provide a wider range of functions; and
- To encourage institutional uses to be complementary to the open space needs of residents.
- **Mixed Use**
 - To provide public places for strolling, recreation, conversation and entertainment;
 - To increase the use of walking, cycling and public transportation within the designated Mixed-Use area by fostering a strong live-work-shopping-recreation relationship; and
 - To identify strategic locations which are highly visible and accessible for mixed use development.
- **City Centre Planning District:**
 - To encourage a concentration of government institutions, entertainment and retail uses, cultural venues, residences, business headquarters and related offices in the City Centre;
 - To foster livable residential neighbourhoods that are close to employment, shopping and entertainment opportunities;
 - To designate key streets as pedestrian oriented theme streets and provide appropriate streetscaping; and to enhance pedestrian, cycling and public transportation access to and within the City Centre.

From these objectives, there is a clear desire to improve the transportation network and make transit and active transportation a more viable option in Windsor, as well as making it a more attractive place to live and work. When looking specifically at the study area corridor, University Avenue has a mix of land uses, as seen below in Exhibit 2-1 and Exhibit 2-2.

In Exhibit 2-1, which is an excerpt from Schedule D of the City of Windsor Official Plan, shows the University Planning Area, from the west there is “Institutional”, which refers to the University of Windsor, and “Open Space”. To the east, there is “Residential”, “Open Space” and “Mixed Use”, adjacent to the city centre planning area (red dashed line represents the border of the city planning area which was covered in Schedule E).

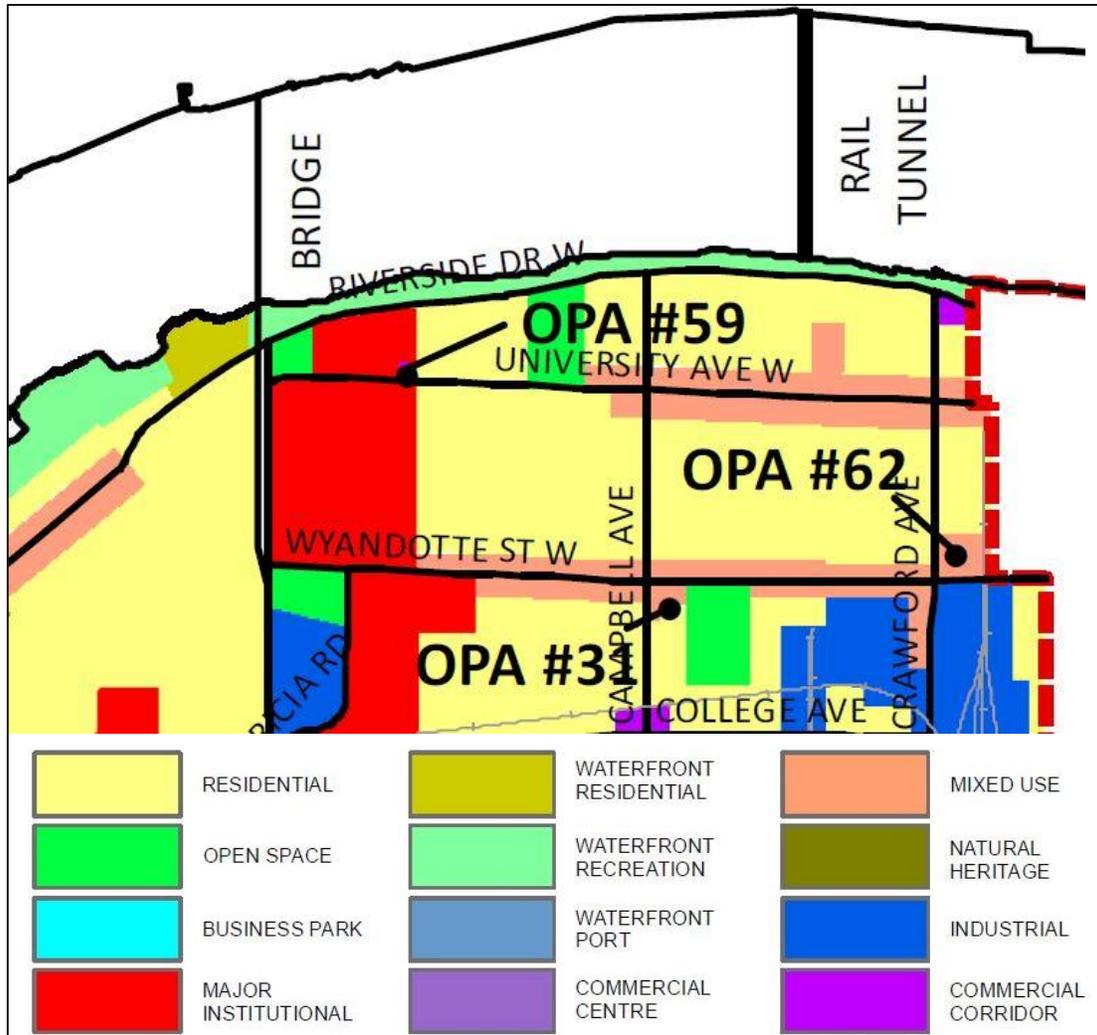


Exhibit 2-1: Excerpt from Schedule D Land Use (Official Plan 2016)

In Exhibit 2-2, which is an excerpt from Schedule E, the City Centre Planning Area is made up of mainly “Mixed Use”, “Open Space”, “Major Institutional” and one block of “Entertainment/Hospitality”. The Major Institutional land use in this case is referring to City Hall. In the City Centre Planning Area there is additional details on the skyline profile indicated by the letters “L”, “M”, “H” and “VH”. University Ave has profiles “M”, “H” and “VH” which are:

- “M” refers to Medium profile which outlines that development in this area can be no greater than 6 storeys high.
- “H” refers to High profile which outlines that development in this area can be no greater than 14 storeys high.

“VH” refers to Very High profile which outlines that development in this area can be greater than 14 storeys high (no height restrictions in these areas) Victoria Avenue in this case shows the profiles of H and VH indicating that high density developments are allowable in this area.

From these figures, it is clear that University Ave is a key corridor that connects residents to two main employment areas: the University of Windsor and the City Centre.

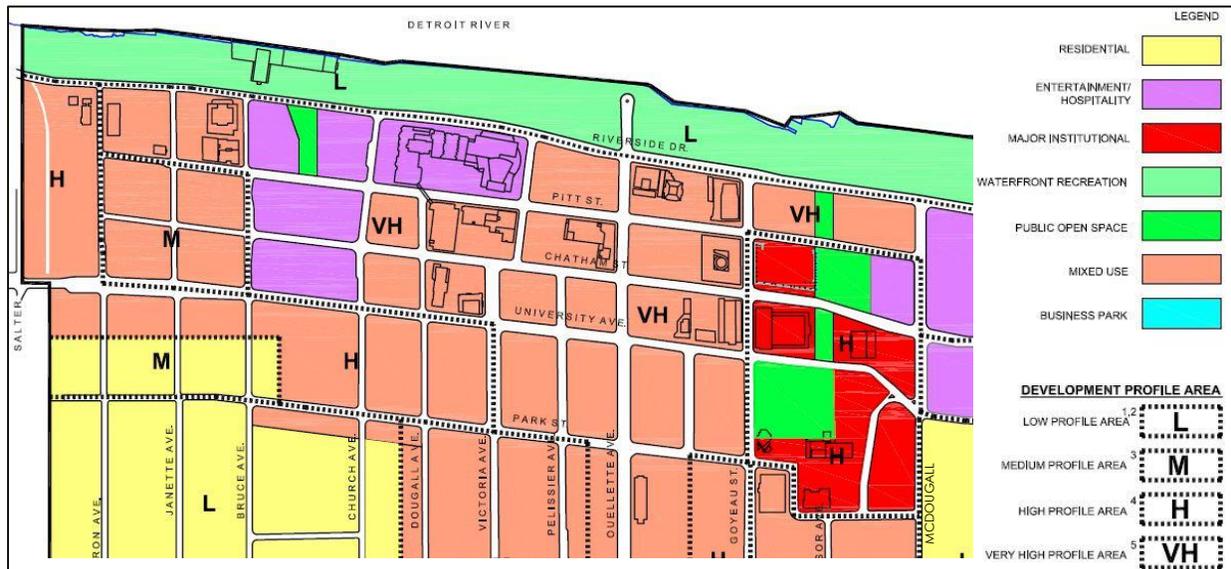


Exhibit 2-2: Excerpt from Schedule E: City Centre Land Use (Official Plan 2016)

Downtown Windsor Enhancement Strategy and Community Improvement Plan

The Downtown Windsor Enhancement Strategy and Community Improvement Plan, prepared by the Windsor Planning Department, utilized input from the public, and community groups to understand the local characteristics of Downtown Windsor to come up with individual plans for 10 different districts / neighbourhoods in the downtown core. An excerpt of these neighbourhoods/districts is shown below in Exhibit 2-3, showing the five which fall into the study area of this EA:

- Old Town District (1);
- Destination District (2);
- University Park Neighbourhood (3);
- Retail/Commercial Core District (4) and
- Civic Square District (5).

The core plan of these neighbourhoods is to create a “sense of place” and to give each neighbourhood a distinct character for each neighbourhood to be individually recognizable. Therefore, there is a focus on the “public realm” as this is the area with the most impact, defined as the “Publicly owned places and spaces that belong to and area accessible by everyone”.

It is these places and spaces, when designed correctly, that make up the character of a neighbourhood and give the public the opportunity to enjoy their neighbourhood and place of work.

The following outlines the five neighbourhoods/districts which fall within the study area of the EA and summarize the biggest concerns and recommendations for improvement.

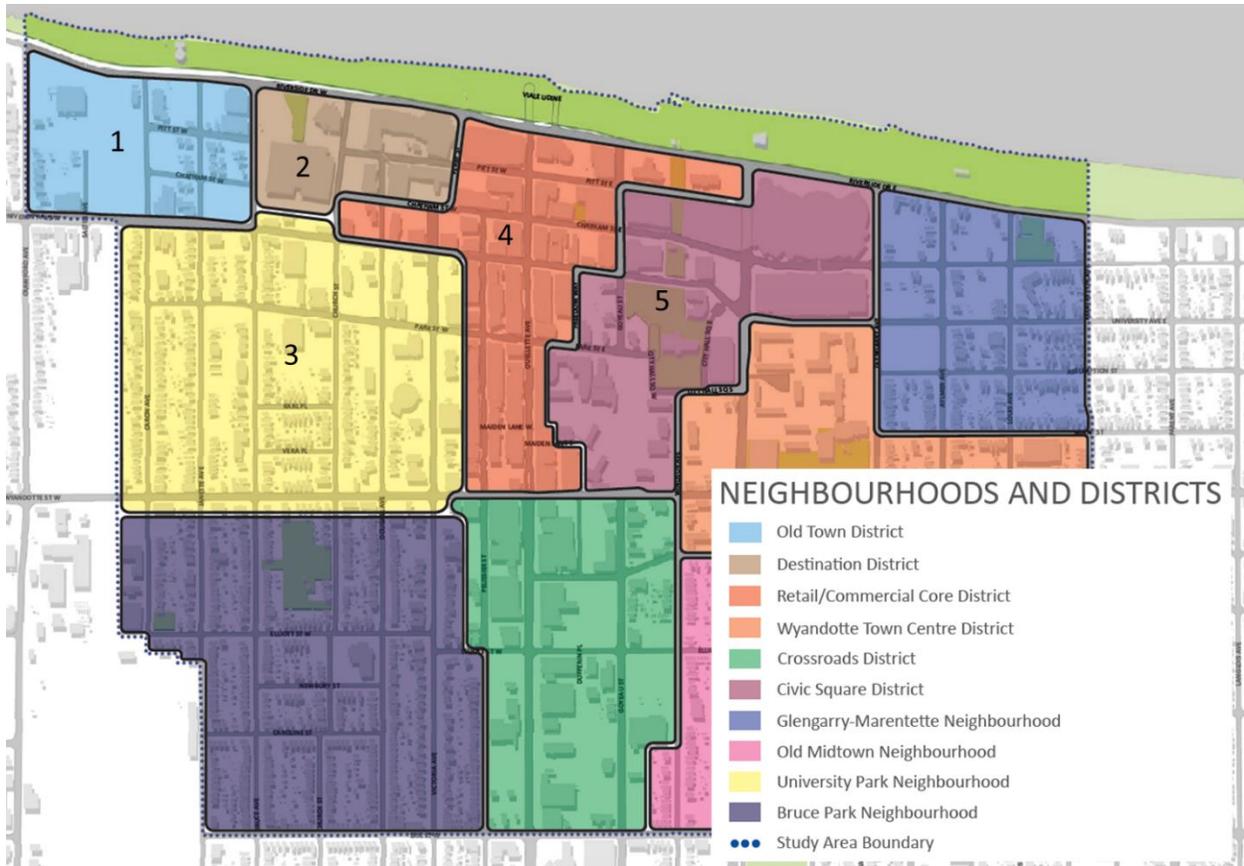


Exhibit 2-3: Excerpt from the Neighbourhoods and Districts Map from the Downtown Windsor Enhancement Strategy and Community Improvement Plan (2017)

University of Windsor, Campus Vision Master Plan

Although the Campus Vision Master Plan released by the University of Windsor in 2013 cannot be considered as a municipal policy, it provides a layout for new residences, gateways and themed areas as well as how they will connect with each other.

Of interest for this assignment is the series of urban elements envisioned by the Master Plan in and around the University Avenue corridor. As described in the Master Plan and shown in Exhibit 2-4, the Campus Vision considers University Avenue as a “street of resources and possibilities” and suggest that the corridor can be improved to support not only a more adequate connectivity between the Main and Downtown Campus both also to promote a more intensified urban activity with the integration of enhanced pedestrian and cycling facilities, streetscaping, and transit services.

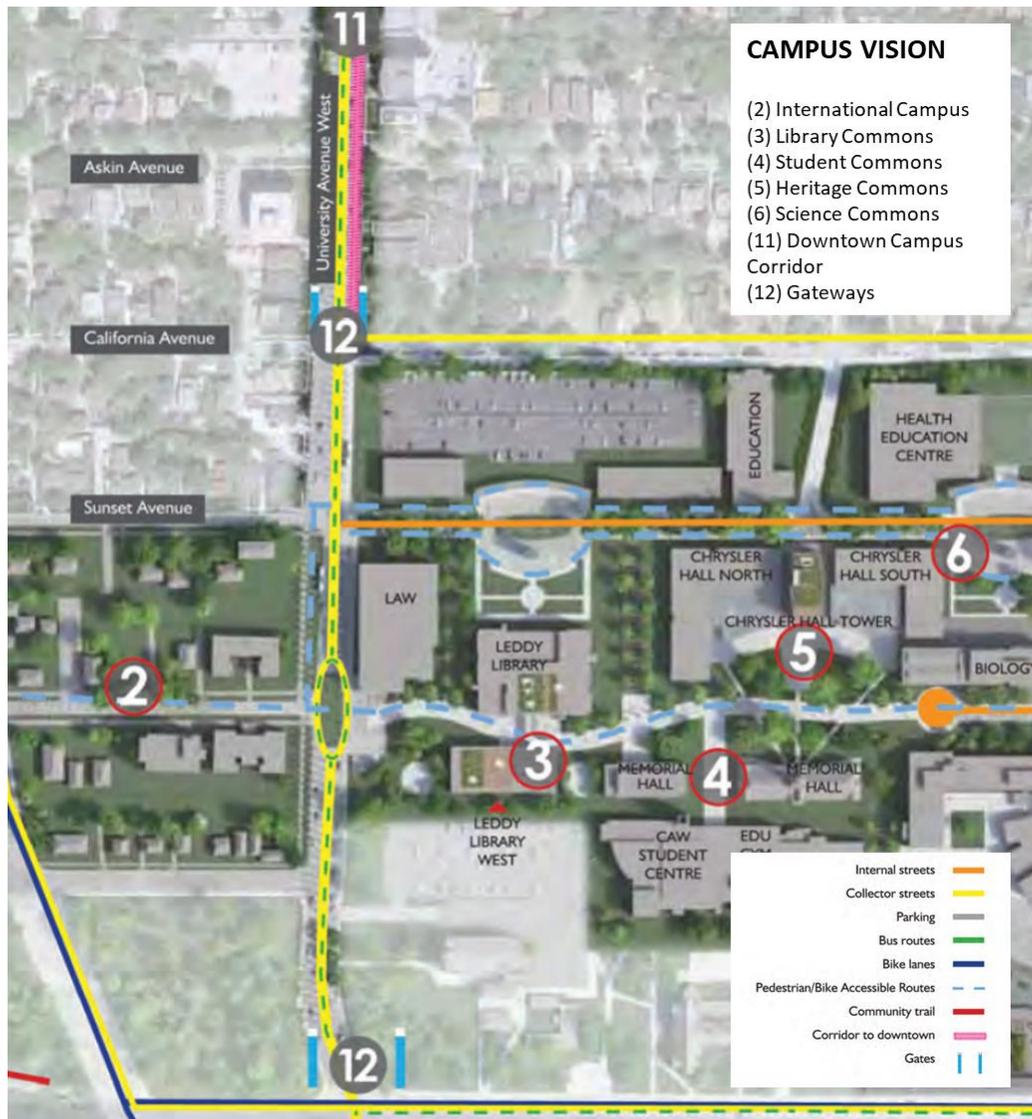


Exhibit 2-4: Excerpt from the University of Windsor Campus Vision Master Plan (Source: +VG Architects)

Downtown Windsor Transportation Strategy

The Downtown Transportation Strategy completed in August 2016 made use of the Context Zone concept to identify the particular characteristics of the different areas composing the downtown corridors under study.

Following a similar approach, the Context Zones were selected for the identification of the subsections of University Avenue and Victoria Avenue. Details regarding the context zones for the study corridors are discussed in Section 3.2.

2.1.2. Cycling

Bicycle Use Master Plan (BUMP)

Findings and recommendations included as part of the City of Windsor's Bicycle Use Master Plan (2001) are currently under review as part of the City's Active Transportation Master Plan – Walk Wheel Windsor. (Completed on May 2019)

The following themes, strategies and actions relevant to the areas under study were identified as part of information provided in advance of the completion of the Master Plan (Workbook presented to the public in November 2018).

- Goals:
 - Support effective land use planning to build an environment that makes walking, cycling and transit convenient and enjoyable
- Strategies and Actions
 - Enhance the Sidewalk Network
 - Continue to seek opportunities to implement new or improved sidewalks in conjunction with other projects, plans, or developments;
 - Complete the Bicycle Network
 - Develop an access management policy to minimize driveways and access point on major streets, particularly those that are part of the bicycle network, to facilitate the development of all ages and abilities bicycle facilities;
 - Improve Integration Between Walking and Cycling and Transit
 - Continue to prioritize amenities at bus stops such as benches, shelters, and customer information;
 - Improve Intersections, Crossing, and Conflict Points
 - Where warranted, provide improvements to bicycle crossings where bicycle facilities intersect with major streets.
 - Land Use and Site Design
 - Support higher density, mixed use infill development in regional centres identified in the Official Plan that promote and encourage active transportation
 - Improve Year-Round Maintenance
 - Review and update current maintenance and ice/snow removal requirements for active transportation infrastructure including sidewalks, bicycle lanes and pathways.

A preliminary version of the proposed bicycle network including the proposed Downtown Grid, Regional Spine and Connector routes is shown in Exhibit 2-5.



Exhibit 2-5: Excerpt from the Proposed Bicycle Network Classification (Source: Nov 20 Workbook)

2.2. Problems and Opportunities

Taking into consideration background growth rate and planned developments, the future vehicular traffic expected along the corridors under study will require the following for the 20-year study horizon;

- For University Avenue
 - 2 lanes, 1 per direction
- For Victoria Avenue
 - North of University Avenue; 2 lanes, 1 per direction
 - South of University Avenue; 1 lane, southbound only.
 - Auxiliary lanes will be maintained at intersections as required.

This creates the opportunity to optimize roadway elements in the balance of the right-of-way to create a pleasant mobility experience for pedestrians, cyclists, and transit operations as well as increase green areas and pervious surface for the mitigation of urban heat island effects. There is also opportunity to incorporate street furniture and amenities within the right-of-way.

3. Existing Conditions

3.1. Transportation and Traffic Assessment

A Transportation and Traffic Assessment was conducted for the study area to review existing transportation and traffic conditions and opportunities for future improvement. The findings of this report can be found in Appendix A.

3.1.1. Traffic Volumes

The existing Annual Average Daily Traffic (AADT) for University Avenue and Victoria Avenue, are provided in Exhibit 3-1. The AADT values provided by the City were from different years, therefore the most representative volumes were taken based on the most recent data (up to 5 years old). The AADT for the west and east sections is approximately 8,800 and 7,700, respectively.

Turning Movement Counts (TMC) were provided by the City, as summarized in Exhibit 3-2. The weekday peak hour volumes for each intersection are illustrated in Appendix A, including individual turning movements.

As seen in Exhibit 3-2, AM and PM peak hours vary for different intersections within the study area. In order to select the most representative peak time for the corridor the volumes per intersection for each possible peak hour were first identified (3 possible times for AM peak and 6 for PM peak). Then, minimum and maximum volumes were selected to recognize the peak time at which the most representative volume was present.

After reviewing all the possible weekday peak hours for the corridor, an AM Peak Hour between 8:15 and 9:15 and a PM Peak Hour between 16:45 and 17:45 were selected as the corridor peak hours to complete the traffic analysis.

Some imbalances, which could not be explained by the surrounding intersections and/or the traffic generators, were identified along corridor. Thus, volume balancing was performed along the corridor by using a conservative approach of always increasing the volumes. These new volumes for the selected peak hours are summarized in Appendix A.

Exhibit 3-1: Annual Average Daily Traffic for the Study Area

Section	Location	AADT	Year
West Section	University Avenue between Huron Church Road and Josephine Avenue	9000	2006
	University Avenue between Campbell Avenue and McKay Avenue	8700	2013
	University Avenue between Cameron Avenue and Oak Street	8800	2015
	University Avenue between Crawford Avenue and Caron Avenue	8500	2015
	University Avenue between Janette Avenue and Church Street	11200	2007
East Section	University Avenue between Dougall Avenue and Victoria Avenue	7500	2008
	University Avenue between Victoria Avenue and Pelissier Street	7700	2015
	University Avenue between Ouellette Avenue and McDougall Street	7200	2008
Victoria Avenue	Victoria Avenue between Chatham Street West and Park Street East	2900	2008

Exhibit 3-2: Traffic Movement Counts

Intersection	Count Date	AM Peak Hour	PM Peak Hour
University Avenue & Huron Church Road	November 21, 2016	7:45 to 8:45	16:45 to 17:45
University Avenue & Sunset Avenue	April 10, 2018	7:45 to 8:45	16:00 to 17:00
University Avenue & California Avenue	October 4, 2017	8:00 to 9:00	17:00 to 18:00
University Avenue & Campbell Avenue	October 2, 2017	8:15 to 9:15	17:00 to 18:00
University Avenue & McKay Avenue	April 9, 2018	8:00 to 9:00	16:45 to 17:45
University Avenue & Crawford Avenue	October 3, 2017	8:15 to 9:15	16:30 to 17:30
University Avenue & Bruce Avenue	September 25, 2017	8:15 to 9:15	16:30 to 17:30
University Avenue & Church Street	September 28, 2017	8:15 to 9:15	17:00 to 18:00
University Avenue & Victoria Avenue	September 26, 2017	8:15 to 9:15	15:45 to 16:45
University Avenue & Pelissier Street	September 28, 2017	8:00 to 9:00	16:15 to 17:15
University Avenue & Ouellette Avenue	September 27, 2017	8:15 to 9:15	16:00 to 17:00
University Avenue & Goyeau Street	September 26, 2017	8:15 to 9:15	16:30 to 17:30
University Avenue & McDougall Street	September 27, 2017	8:00 to 9:00	16:00 to 17:00
Victoria Avenue & Park Street West	September 25, 2017	8:30 to 9:30	15:00 to 16:00

3.1.2. Intersection Operations

There are twelve (12) signalized intersections within the study area, in addition to two (2) intersection pedestrian signals (IPS), as illustrated in Exhibit 3-3.



Exhibit 3-3: Study Area Intersections

Intersection capacity analysis was undertaken using Trafficware’s Synchro Version 9.0 software and following procedures described in the Highway Capacity Manual (HCM). The analysis primarily focuses on performance measures such as level-of-service (LOS), volume to capacity (v/c) ratio, and 95th percentile queues.

LOS is a qualitative measure of operational performance and is based on control delay. The LOS criteria for signalized intersections are shown in Exhibit 3-4.

Exhibit 3-4: LOS Criteria for Signalized and Unsignalized Intersections

LOS	Control Delay (seconds/vehicle)	Traffic Flow Characteristics
A	0 – 10	Very Good
B	> 10 – 20	Good
C	> 20 – 35	Typically preferred planning objective
D	> 35 – 55	Typically acceptable
E	> 55 – 80	Undesirable; potentially unstable traffic flow
F	> 80	Failing movements may impede traffic flow

The v/c ratio is the ratio between traffic volumes and the capacity of an intersection movement. A v/c ratio greater than 1.0 indicates that the movement is operating over capacity.

The 95th Percentile Queue is the queue length that has only a 5 percent probability of being exceeded during the analysis period. It is industry practice and accepted methodology to use the 95th percentile queue length for design and operational analysis purposes.

Existing intersection operations were reviewed using Synchro software, and the results are summarized in Exhibit 3-5. Detailed Synchro Reports can be found in Appendix A.

Exhibit 3-5: Existing Intersection Operations

Intersection	Control	Peak Hour	LOS	Average Delay (s/veh)	Movement with Highest v/c ratio	95 th percentile Queues > Storage Length
University Avenue & Huron Church Road	Traffic Signal	AM	B	13.8 s	0.30 (EB L/T)	None
		PM	B	17.0 s	0.33 (WB L)	46 m > 45 m (WB L)
University Avenue & Sunset Avenue	IPS	AM	A	2.2 s	0.11 (NB L/T/R)	None
		PM	A	2.5 s	0.16 (NB L/T/R)	None
University Avenue & California Avenue	Traffic Signal	AM	B	14.4 s	0.47 (WB L/T/R)	None
		PM	B	13.9 s	0.58 (WB L/T/R)	None
University Avenue & Campbell Avenue	Traffic Signal	AM	B	14.4 s	0.28 (EB T/R)	None
		PM	B	12.9 s	0.47 (WB L)	None

Intersection	Control	Peak Hour	LOS	Average Delay (s/veh)	Movement with Highest v/c ratio	95 th percentile Queues > Storage Length
University Avenue & McKay Avenue	IPS	AM	A	0.4 s	0.09 (WB T/R)	None
		PM	A	0.7 s	0.14 (WB T/R)	None
University Avenue & Crawford Avenue	Traffic Signal	AM	B	13.3 s	0.43 (NB L/T/R)	None
		PM	B	11.6 s	0.34 (NB L/T/R)	None
University Avenue & Bruce Avenue	Traffic Signal	AM	B	13.0 s	0.46 (EB T)	None
		PM	B	14.6 s	0.54 (WB T/R)	None
University Avenue & Church Street	Traffic Signal	AM	B	12.0 s	0.53 (EB L/T/R)	None
		PM	B	11.6 s	0.42 (EB L/T/R)	None
University Avenue & Victoria Avenue	Traffic Signal	AM	A	8.6 s	0.49 (SB L/T/R)	None
		PM	A	9.8 s	0.55 (SB L/T/R)	None
University Avenue & Pelissier Street	Traffic Signal	AM	B	13.3 s	0.38 (EB L/T)	None
		PM	B	11.7 s	0.37 (WB T/R)	None
University Avenue & Ouellette Avenue	Traffic Signal	AM	B	15.4 s	0.35 (WB L/T/R)	None
		PM	B	14.2 s	0.54 (WB L/T/R)	None
University Avenue & Goyeau Street	Traffic Signal	AM	B	12.8 s	0.45 (EB L/T/R)	None
		PM	B	15.8 s	0.53 (EB L/T/R)	None
University Avenue & McDougall Street	Traffic Signal	AM	B	16.9 s	0.32 (NB L)	None
		PM	B	17.9 s	0.39 (EB T/R)	None
Victoria Avenue & Park Street West	Traffic Signal	AM	B	15.0 s	0.48 (WB L/T)	None
		PM	B	18.4 s	0.74 (WB L/T)	92 m > 70 m (WB L/T)

Based on the results summarized above, all signalized intersections in the study area operate well under existing conditions, as v/c ratios for all individual movements are below the 0.85 threshold. In addition, all intersections operate with LOS A or B (i.e. ‘Very Good’ or ‘Good’ according to the criteria in Exhibit 3-5).

Only two intersections present 95th percentile queues that exceed the existing storage length capacity: westbound left-turn movement at University Avenue and Huron Church Road and westbound through/left-turn movement at Victoria Avenue and Park Street West. However, this issue only occurs during the PM peak hour, and it is not expected to decrease the performance of the corridor.

CIMA+ conducted a site visit on Wednesday June 20th and Thursday June 21st, 2018 and was able to observe traffic operations during the AM and PM peak hours. The results from the Synchro software were consistent with the field observations.

3.1.3. Mid-Block Operations

Existing traffic volumes along the corridors under study were used to estimate the traffic volume per hour per lane and compare against the estimated capacity of the corridors under existing conditions. An average capacity of 900 vehicles per hour per lane was estimated for the corridors under study based on the directional number of through lanes, based saturation flow and the type of urban corridors.

The results of volume over capacity ratios estimated for the different segments of the corridors under study are presented in Exhibit 3-6 and 3-7.

Exhibit 3-6: Estimated V/C for Existing Conditions – University Avenue

Study Context Zones	Existing Link Volume (2-way)	Number of Lanes	Existing V/C Ratio
Huron Church Road to California Avenue	620	2	0.34
California Avenue to Salter Avenue	864	4	0.24
Salter Avenue to Victoria Avenue	780	2	0.43
Victoria Avenue to Freedom Way	604	2	0.34
Freedom Way to McDougall Street	566	2	0.31

Exhibit 3-7: Estimated V/C for Existing Conditions – Victoria Avenue

Study Context Zones	Existing Link Volume	Number of Lanes	Existing V/C Ratio
Chatham Street to University Avenue	225	2	0.13
University Avenue to Park Street	239	3	0.09

A comparison of the exiting v/c ratios against the following ranges of traffic conditions indicates that all segments of the University Avenue and Victoria Avenue corridors currently operates under capacity.

- $v/c < 0.85$: under capacity
- $0.5 \leq v/c < 1.0$: approaching or at capacity
- $v/c \geq 1.0$: over capacity

3.1.4. On-Street Parking

The University Avenue corridor generally allows on-street parking along the study area, on both north and south side, with more prominent restrictions on the east section. On-street parking is also present along Victoria Avenue on both west and east sides. The majority of parking spaces along University Avenue have a minimum width of 2.3-metre, which is in compliance with specifications of OTM Book 11 – Pavement, Hazard and Delineation Markings.

However, parking spaces at the following locations were observed to have widths between 1.8 and 2.1 metres, narrower than the minimum described in OTM Book 11:

- University Avenue and Bruce Avenue: 2.1-metre width on north side;
- University Avenue and Church Street: 1.8 and 2.1-metre width on north and south side, respectively; and
- University Avenue and Campbell Avenue: 2.1 and 2.2-metre width on south and north side, respectively.

On-street parking spaces along Victoria Avenue – east and west side north of University and west side south of University – are angled with a width of approximately 3.1-metres and a length between 6 to 8 metres, which is compliant with the specifications of OTM Book 11.

Exhibit 3-8 and Exhibit 3-9 respectively, shows different types of parking regulations available along University Avenue and Victoria Avenue within the study area.

Exhibit 3-8: Parking Regulations along University Avenue

Location	Regulations	
	Eastbound	Westbound
Huron Church Road to Bridge Avenue	<ul style="list-style-type: none"> No parking between 4AM and 6AM 	<ul style="list-style-type: none"> No parking between 4AM and 6AM No stopping Commercial vehicle 1 hour (Mon to Sat)
Bridge Avenue to Wellington Avenue	<ul style="list-style-type: none"> Time limit 2 hours 9AM – 6PM (Mon to Sat) Time limit 2 hours 9AM – 6PM (Mon to Sat) Holidays excepted Commercial vehicle 1 hour (Mon to Sat) Time limit 2 hours 4AM – 6PM (Mon to Fri) No parking between 4AM and 6AM 	<ul style="list-style-type: none"> Time limit 2 hours 9AM – 6PM (Mon to Sat) Time limit 2 hours 9AM – 6PM (Mon to Sat) Holidays excepted Commercial vehicle 1 hour (Mon to Sat) Time limit 2 hours 4AM – 6PM (Mon to Fri) No parking between 4AM and 6AM
Wellington Avenue to Crawford Avenue	<ul style="list-style-type: none"> Time limit 2 hours 9AM – 6PM (Mon to Sat) Holidays excepted Time limit 30 minutes 8AM to 6PM Time limit 5 minutes Any day No stopping Time limit 20 minutes (Mon to Sat) No parking between 4AM and 6AM 	<ul style="list-style-type: none"> Time limit 2 hours 9AM – 6PM (Mon to Sat) Holidays excepted No parking between 4AM and 6AM Time limit 40 minutes 8AM – 6PM (Mon to Sat) No stopping
Crawford Avenue to Victoria Avenue	<ul style="list-style-type: none"> Wheelchair 4 hours limit Commercial vehicles 15 minutes time limit No parking between 4AM and 6AM 	<ul style="list-style-type: none"> Time limit 1 hour 6AM to 12Am (Mon to Sat) Time limit 15 minutes Any day Commercial vehicles 15 minutes time limit No parking between 4AM and 6AM

Location	Regulations	
	Eastbound	Westbound
Victoria Avenue to Ouellette Avenue	<ul style="list-style-type: none"> No Parking No Stopping Time limit 1-hour Commercial vehicles only 9AM to 6PM (Mon to Sat) 	<ul style="list-style-type: none"> No Stopping No parking between 4AM and 6AM Time limit 1-hour Commercial vehicles only 9AM to 6PM (Mon to Sat)
Ouellette Avenue to McDougall Street	<ul style="list-style-type: none"> No Parking 	<ul style="list-style-type: none"> No Parking Wheelchair parking only 4-hour limit Time limit 1 hour 6PM to 4AM (Mon to Sat) Time limit 5 minutes 9AM to 6PM (Mon to Sat)

Exhibit 3-9: Parking Regulations along Victoria Avenue

Location	Regulations	
	Northbound	Southbound
Park Street West to University Avenue	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No parking between 4AM and 6AM (east and west side) Time limit 4 hours
University Avenue to Chatham Street West	<ul style="list-style-type: none"> No parking between 4AM and 6AM 	<ul style="list-style-type: none"> No parking between 4AM and 6AM

From the tables presented above, it can be observed that there are different parking regulations across the study area but with a common “No Parking between 4AM and 6AM” along several blocks.

On-street parking within the study area is currently regulated by parking meters at the following locations:

- Victoria Avenue: From Park Street West to Chatham Street West;
- University Avenue: From Huron Church Road to Bridge Avenue; and
- University Avenue: From Caron Avenue to Bruce Avenue.

Paid parking is enforceable Monday to Saturday from 9:00 AM to 6:00 PM .

CIMA+ conducted a site visit on Thursday June 21st, 2018 and based on a visual inspection along the study area observed that on-street parking usage is low (30%) during the morning time (starting around 9:30 AM), increasing to approximately 40% to 50% during the off peak hours (2:00 PM) and evening/night hours (10:00 PM). Parking usage was also observed to be higher at the west section along University Avenue and along Victoria Avenue.

A parking occupancy survey was conducted on October 9, 2018 for the entire length of the corridors under study to identify the number of available on-street parking spaces on both sides of the road and the percentage of utilization between 9:00 am to 8:00 pm.

The results of the survey showed that although the average percentage of occupancy for both corridors under study is less than 50 percent (48%), most of the blocks servicing the Downtown area shown higher levels of occupancy during the day (between 75 to 100%).

However, it should be noted that the number of parking spaces available at those locations along University Avenue is very low, which may explain the increased occupancy.

3.1.5. Cycling and Pedestrian Operations

Sidewalks are present on both north and south sides of University Avenue and east and west sides of Victoria Avenue within the study area. The majority of the sidewalks are at least 1.5-metre wide, which conforms to AODA requirements for new construction or redeveloped exteriors paths of travel.

However, it was observed that the width of some sidewalks along University Avenue (e.g., near Bridge Avenue, Crawford Avenue, Dougall Avenue and Freedom Way) is less than 1.5 metres due to obstructions such as hydro poles or trees (See Exhibit 3-10)

Each signalized intersection within the study area has crosswalks on all four approaches except for the following intersections (due to the location of the IPS):

- University Avenue and Sunset Avenue (IPS): north-south crosswalk on east side only; and
- University Avenue and McKay Avenue (IPS): north-south crosswalk on west side only.

These are standard crosswalks (i.e. marked with two parallel white lines) that range between 2.5 and 3.0 metres in width, which is in compliance with OTM Book 11 (crosswalks must be at least 2.5 metres wide).

Pedestrian signal heads are provided at all intersections in the study area, including the two intersection pedestrian signals. The pedestrian push buttons at each of the intersection within the study area do not comply with the requirements outlined in the Accessibility of Ontarians with Disabilities Act (AODA).

An example of the existing pedestrian push buttons at intersection is shown in Exhibit 3-11. For example, there is no locator tone or audible and vibro-tactile walk indicators. In addition, it was observed at some intersections that the pedestrian push button was not located on the side of the pole that corresponds to the natural path of pedestrians.

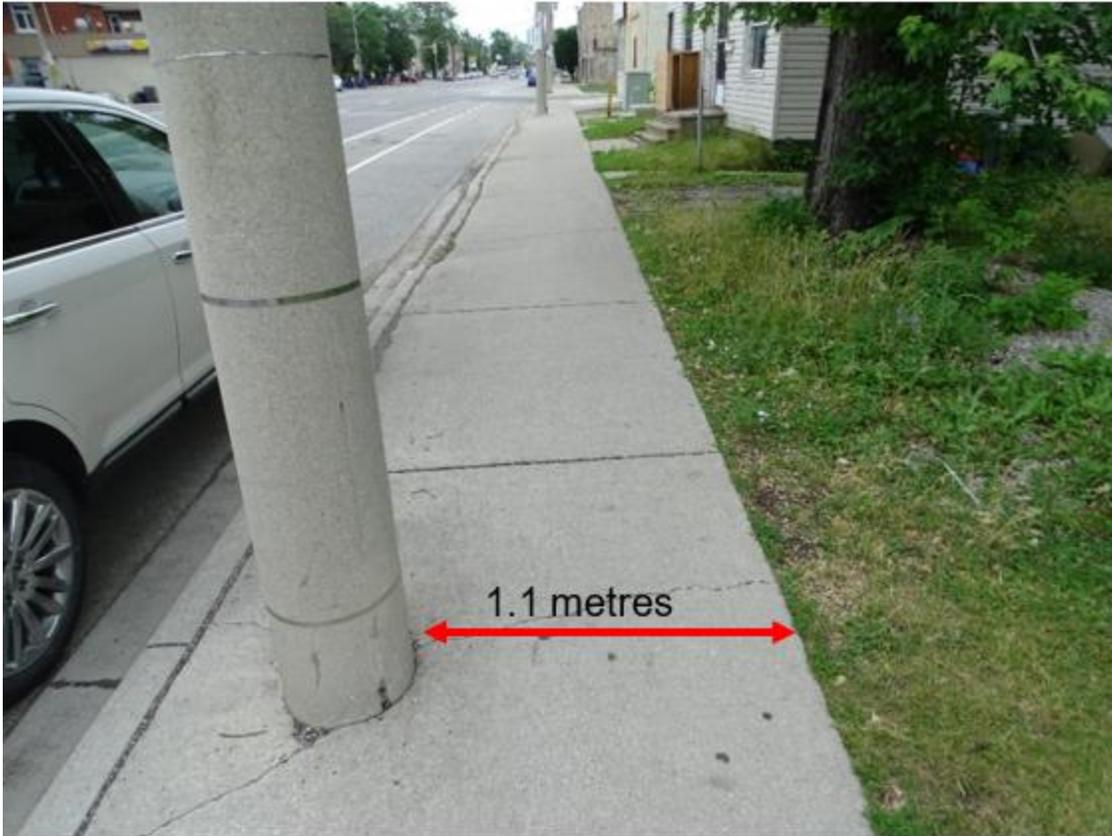


Exhibit 3-10: Sidewalk Width Reduced by Hydro Pole



Exhibit 3-11: Non-AODA Compliant Pedestrian Push Button

Pedestrian volumes at signalized intersections along the corridor vary from the west section to the east section. The higher number of pedestrian volumes on the west section are at the intersection of University Avenue and California Avenue due to its proximity to University of Windsor facilities. Similarly, the highest pedestrian volumes for the east section are the intersection of University Avenue and Ouellette Avenue, due to its location in the central business area. These are the two busiest intersections in the study area regarding pedestrian volumes, with up to 405 and 667 peak hour crossings, respectively. The highest number of pedestrian crossings during the AM peak hour is 483 at the intersection of University Avenue and Ouellette Avenue.

Exhibit 3-12 provides a summary of pedestrians crossing at locations with the highest pedestrian volumes along the east and west sections of University Avenue, as well as locations with intersection pedestrian signals (IPS).

The pedestrian performance along the corridor was evaluated using the following level-of-service (LOS) criteria from York Region’s Transportation Mobility Plan Guidelines in Exhibit 3-13. These guidelines provide a simplified method for evaluating pedestrian LOS compared to the methodology outlined in the Highway Capacity Manual (which require an extensive amount of data). A target LOS C was assumed for both Segment and Intersection categories. Based on the existing characteristics described above, Exhibit 3-14 summarizes the existing LOS throughout the study area.

Exhibit 3-12: Pedestrian Volumes along University Avenue

Location	Peak Hour	Pedestrian Volumes	
		Total Number of Crossings	Individual Crossing with Highest Number of Crossings
University Ave & California Ave (Residential Area)	Off Peak (12:15 – 13:15)	405	South Crossing / 136
University Ave & Ouellette Ave (Commercial Area)	PM Peak (16:00 – 17:00)	667	East Crossing / 252
University Ave & Sunset Ave (IPS)	Off Peak (11:15 – 12:15)	123	South Crossing / 58
University Ave & McKay Ave (IPS)	PM Peak (16:45 – 17:45)	31	South Crossing / 14

Exhibit 3-13: Pedestrian Level of Service Criteria

LOS	Segment	Intersection
A	<ul style="list-style-type: none"> ≥ 2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥ 3.0 m multi-use path 	<ul style="list-style-type: none"> ≥ 2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥ 3.0 m multi-use path Pedestrian signal head with sufficient pedestrian clearance time¹ Clearly delineated crosswalk
B	<ul style="list-style-type: none"> ≥ 1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or < 3.0 m multi-use path 	<ul style="list-style-type: none"> ≥ 1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or < 3.0 m multi-use path Pedestrian signal head with sufficient pedestrian clearance time Clearly delineated crosswalk
C	<ul style="list-style-type: none"> ≥ 1.5 m curb-faced sidewalk (no buffer) 	<ul style="list-style-type: none"> ≥ 1.5 m curb-faced sidewalk (no buffer) Pedestrian signal head with sufficient pedestrian clearance time Clearly delineated crosswalk
D	<ul style="list-style-type: none"> < 1.5 m sidewalk 	<ul style="list-style-type: none"> < 1.5 m sidewalk Pedestrian signal head sufficient pedestrian clearance time No clearly delineated crosswalk
E	<ul style="list-style-type: none"> Paved shoulder or no sidewalk provision 	<ul style="list-style-type: none"> Paved shoulder or no sidewalk provision No pedestrian signal heads No clearly delineated crosswalk
F	<ul style="list-style-type: none"> No sidewalk provision 	<ul style="list-style-type: none"> No sidewalk provisions No pedestrian signal heads No clearly delineated crosswalk

¹ 1.2m per second walking speed

Exhibit 3-14: Pedestrian Level of Service in the Study Area

Location	Level of Service	
	Intersection	Segment (east of intersection)
University Avenue & Huron Church Road	C	D
University Avenue & Sunset Avenue	B	C
University Avenue & California Avenue	B	C
University Avenue & Campbell Avenue	C	C
University Avenue & McKay Avenue	C	C
University Avenue & Crawford Avenue	D	C
University Avenue & Bruce Avenue	D	D
University Avenue & Church Street	C	C
University Avenue & Victoria Avenue	C	C
Victoria Avenue & Park Street West	C	C
University Avenue & Pelissier Street	C	C
University Avenue & Ouellette Avenue	C	D
University Avenue & Goyeau Street	C	C
University Avenue & McDougall Street	C	C

Two intersections and three segments within the study area present LOS lower than the target of C, both due to the reduced effective sidewalk width. As mentioned before, the existing sidewalks at these locations are obstructed by hydro poles, trees and sometimes by the parking bay. To achieve this target LOS for the intersections and segments, the sidewalk can be widened to a minimum of 1.5-metres.

Dedicated bicycle facilities are provided along University Avenue from Huron Church Road to Bruce Avenue. East of this intersection, bicyclists share the road with vehicular traffic. No dedicated bicycle facilities are provided along Victoria Avenue within the study area. The bicycle facilities within the study area were assessed following the processes described in OTM Book 18 – Bicycle Facilities, which considers AADT and 85th percentile speeds. It is important to mention that the evaluation used – Desirable Cycling Facility Pre-Selection Nomograph – considers only two-lane roads, which is applicable for the east section of the study area. However, the assessment presented below assumes this process to be applicable to four-lane road cross-section as well.

The 85th percentile speeds obtained from speed studies completed on June 26, 2018 are summarized in Exhibit 3-15.

Exhibit 3-15: 85th Percentile Speeds along University Avenue

Location	85th Percentile Speed	Direction
University Ave between Vista Pl and Patricia Rd	62 km/h	EB/WB
University Ave between Bridge Ave and Josephine Ave	59 km/h	EB/WB
University Ave between Wellington Ave and Elm Ave	63 km/h	EB/WB
University Ave between Salter Ave and Caron Ave	55 km/h	EB/WB
University Ave east of Dougall Ave	48 km/h	EB
University Ave east of Freedom Way	44 km/h	WB

The 85th percentile speeds can be grouped in the following ranges based on west and east sections along University Avenue:

- West Section: 55 – 63 km/h; and
- East Section: 44 – 48 km/h.

Using these speeds and the AADT values presented in Section 3.1.1, based on OTM Book 18 – Desirable Cycling Facility Pre-Selection Nomograph, both west and east sections should provide a designated cycling operating space such as paved shoulders and/or exclusive bicycle lanes. These facilities are already in place along University Avenue from Huron Church Road to Bruce Avenue but cycling infrastructure is not provided east of Bruce Avenue.

The bicycle performance along the corridor was evaluated using the following LOS criteria from York Region’s Transportation Mobility Plan Guidelines in Exhibit 3-16. It should be noted that the Guidelines considers the desired width of 1.8m as well as the suggested minimum of 1.5m as described in the OTM Book 18 Cycling Facilities to estimate the LOS.

A target LOS “C” was assumed for both Segment and Intersection categories. Based on the existing characteristics described above, Exhibit 3-17 summarizes the LOS throughout the study area.

Exhibit 3-16: Bicycle Level of Service Criteria

Level of Service	Segment	Intersection
A	<ul style="list-style-type: none"> Separated cycling facilities (e.g. cycle tracks, multi-use path) 	<ul style="list-style-type: none"> Separated cycling facilities Bicycle box or clearly delineated bicycle treatment or bicycle signal head
B	<ul style="list-style-type: none"> ≥ 1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer) 	<ul style="list-style-type: none"> > 1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer), Bicycle box, clearly delineated bicycle treatment or bicycle signal head
C	<ul style="list-style-type: none"> < 1.8 m dedicated cycling facilities with no buffer 	<ul style="list-style-type: none"> < 1.8 m dedicated cycling facilities with no buffer, Bicycle box, clearly delineated bicycle treatment or bicycle signal head
D	<ul style="list-style-type: none"> ≤ 1.5 m bicycle lane with no buffer 	<ul style="list-style-type: none"> ≤ 1.5 m bicycle lane and no buffer Bicycle treatment
E	<ul style="list-style-type: none"> Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area) 	<ul style="list-style-type: none"> Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area) No clearly delineated bicycle treatment
F	<ul style="list-style-type: none"> No bicycle provision 	<ul style="list-style-type: none"> No bicycle provision

Exhibit 3-17: Bicycle Level of Service in the Study Area

Location	Level of Service	
	Intersection	Segment (east of intersection)
University Avenue & Huron Church Road	D	D
University Avenue & Sunset Avenue	D	D
University Avenue & California Avenue	D	D
University Avenue & Campbell Avenue	D	D
University Avenue & McKay Avenue	D	D
University Avenue & Crawford Avenue	D	D
University Avenue & Bruce Avenue	F	F
University Avenue & Church Street	F	F
University Avenue & Victoria Avenue	F	F

Location	Level of Service	
	Intersection	Segment (east of intersection)
Victoria Avenue & Park Street West	F	F
University Avenue & Pelissier Street	F	F
University Avenue & Ouellette Avenue	F	F
University Avenue & Goyeau Street	F	F
University Avenue & McDougall Street	F	F

As seen in Exhibit 3-17, all locations present LOS lower than the target of C due to the reduced width or the absence of bicycle provisions, resulting in LOS of D or F.

In order to improve LOS to C, consideration may be given to extending the bicycle lanes to the east section of the study area, if feasible, as well as increasing the width of the bicycle lanes to 1.8 m for the west section. At intersections, treatments such as bike boxes or bicycle signals can be considered.

3.1.6. Transit Operations

Based on Windsor Transit information, bus Route 1C – Transway is the only east-west transit line serving the University Avenue Corridor. The following north-south transit lines cross University Avenue within the study area:

- Route 5 Dominion: Campbell Avenue;
- Route 3 Central: Crawford Avenue;
- Route 6 Dougall: Bruce Avenue and Janette Avenue; and
- Routes 4 Ottawa, 1A Transway and Tunnel (Windsor-Detroit route): Ouellette Avenue.

All these routes converge at the bus terminal located at Church Street & Chatham Street West. The bus routes near the study area are illustrated in Exhibit 3-18. There are no bus routes along Victoria Avenue.



Exhibit 3-18: Downtown Windsor Transit Routes

Route 1C – Transway operates east-west along University Avenue, approximately every 15 minutes on weekdays and weekends from 5:30 AM until 1 AM. The locations of existing bus stops along University Avenue within the study area are illustrated in Exhibit 3-19. The distance between bus stops ranges between 200 and 270 metres for most stops, with the exception of the first two stops in the westbound direction, which are spaced by approximately 345 metres.

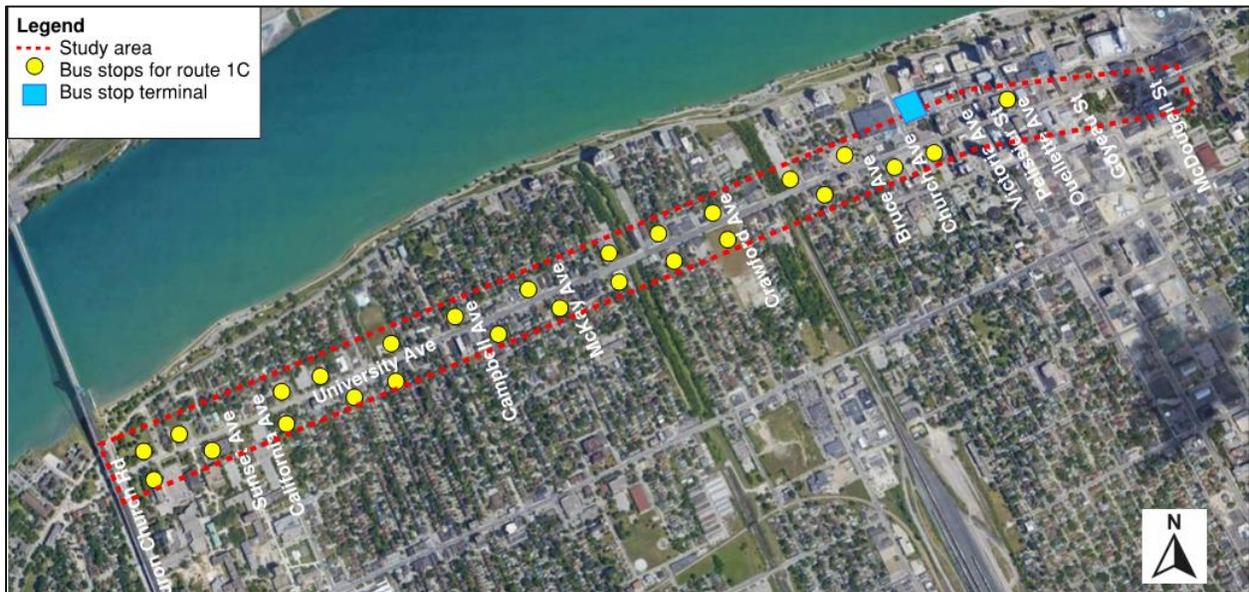


Exhibit 3-19: Existing Route 1C Bus Stops in the Study Area

The transit performance along the corridor was evaluated using the LOS criteria from York Region’s Transportation Mobility Plan Guidelines in Exhibit 3-20. A target LOS of C or better was

assumed for Access to Transit Stops and Transit Headways, and a LOS of D or better for Intersection Approach (typical for general traffic operations).

Exhibit 3-20: Transit Level of Service Criteria

Level of Service	Access to Transit Stops	Transit Headways	Intersection Approach (transit or curb lanes)	
			Delay (seconds/veh)	v/c ratio
A	90% within ≤ 200 m	≤ 5 minutes	≤ 10	0 to 0.60
B	90% within ≤ 500 m and 70% within ≤ 200 m	> 5-10 minutes	> 10-20	0.61 to 0.70
C	90% within ≤ 500 m and 50% within ≤ 200 m	> 10-15 minutes	> 20-35	0.71 to 0.80
D	100% within ≤ 600 m	> 15-20 minutes	> 35-55	0.81 to 0.90
E	100% within ≤ 800 m	> 20-30 minutes	> 55-80	0.91 to 1.00
F	100% > 800 m	> 30 minutes	> 80	> 1.00

The transit level of service was evaluated considering the access points to University Avenue from the surrounding neighbourhoods (i.e. intersections with cross streets). Since the minimum radio used by the LOS criteria is 200m, the only intersections evaluated are those with bus stops for Route 1C as this is the main transit line along University Avenue.

Exhibit 3-21: Transit Level of Service within the Study Area

Location	Direction	Access to Transit Stops	Transit Headways	Intersections Approach (transit or curb lanes)
		LOS	LOS	LOS
University Avenue & Huron Church Road	Eastbound	A	C	B (B)
	Westbound	A		B (C)
University Avenue & Sunset Avenue	Eastbound	A		A (A)
	Westbound	A		A (A)

Location	Direction	Access to Transit Stops	Transit Headways	Intersections Approach (transit or curb lanes)
		LOS	LOS	LOS
University Avenue & California Avenue	Eastbound	A		B (A)
	Westbound	A		B (A)
University Avenue & Campbell Avenue	Eastbound	A		B (B)
	Westbound	A		B (A)
University Avenue & McKay Avenue	Eastbound	A		A (A)
	Westbound	A		A (A)
University Avenue & Crawford Avenue	Eastbound	A		B (B)
	Westbound	A		A (A)
University Avenue & Bruce Avenue	Eastbound	A		B (B)
	Westbound	A		B (B)
University Avenue & Church Street	Eastbound	A		B (A)
	Westbound	A		A (A)
University Avenue & Victoria Avenue	Eastbound	A		A (A)
	Westbound	A		A (A)

Based on the information provided above, all the locations present an acceptable LOS for the evaluated criteria. Therefore, no further improvements are needed for the transit service within the study area (Exhibit 3-21).

3.2. Socio-Economic Environment

As discussed in Section 2.1, the Downtown Transportation Strategy completed in August 2016 made use of the Context Zone concept to identify the characteristics of the different areas composing the downtown corridors under study.

Following a similar approach, the following Context Zones were selected for the identification of the subsections of University Avenue (Exhibit 3-22) within the study areas:

- University Avenue:
 - Riverwest – University Campus Area (Huron Church Road to California Avenue)
 - Riverwest – Residential Urban Area (California Avenue to Salter Avenue)
 - Downtown Transitional Area (Salter Avenue to Victoria Avenue)
 - Downtown Core (Victoria Avenue to Freedom Way); and
 - University – Institutional Area (Freedom Way to McDougall Street)
- Victoria Avenue:

- Victoria – Gateway Area (Chatham Street to University Avenue); and
- Victoria – Transition Area (University Avenue W to Park Street W)



Exhibit 3-22: University Avenue and Victoria Avenue corridors – Context Zones

The following sections will discuss the characteristics of these context zones relevant to this assignment such as: number of driveways, the current land uses and the existing streetscaping along University Avenue and Victoria Avenue.

3.2.1. Context Zone 1: Riverwest – University Campus Area

This context zone includes the University Avenue corridor from Rd Church Huron to California Avenue as presented in Exhibit 3-23.

Along this corridor there are 4 driveways in the north side of the road (1 residential and 3 commercial) and 1 commercial driveway in the south side. There is on-street parking on either side of the road and a bike lane between the on-street parking and the live traffic lanes. There are two parking lots, one with over 100 spots (Assumption Church parking lot) and a public parking lot with over 200 parking spots.

Currently there is not much streetscaping features, mainly benches, found at bus stops. Areas for improvement include light poles and garbage bins found in the middle of sidewalks, making the width of the sidewalks less than AODA standard (where two-way pedestrian traffic is expected a minimum of 1.525m).



Exhibit 3-23: Context Zone 1: Riverwest – University Campus Area

Other pedestrian improvement areas include unsignalized intersections which currently do not have pedestrian marked crosswalk adjacent to University Ave (on the minor street). The major land use in this focus area is mainly Major Institutional (which refers to the University of Windsor) with some Residential and some Open Space.

3.2.2. Context Zone 2: Riverwest – Residential Urban Area (California Avenue to Salter Avenue)

This context zone includes the University Avenue corridor from California Avenue to Salter Avenue as seen in Exhibit 3-24. Along this corridor there are 20 commercial driveways and 13 residential driveways, 18 on the north side and 15 on the south side of University Ave. There is on-street parking on either side of the road and a bike lane between the on-street parking and the live traffic lanes.

Currently there are no streetscaping features. There is an opportunity for connectivity to Open/Green Space where this corridor crosses a walking trail, between Cameron Ave and Wellington Ave, that leads to the International Gardens

The major land use in this focus area is mainly Residential and Mixed Use. This area is identified as attractive for residential development. From the Official Plan: “Residential development shall be located where:

- there is access to a collector or arterial road;
- full municipal physical services can be provided;
- adequate community services and open spaces are available or are planned; and
- public transportation service can be provided.”

This makes University Ave a key area for residential development as it is a key connector to downtown employment areas as well as the University of Windsor, there is local amenities such as convenience stores for residents, open space is accessible within the corridor and there are existing transit services on this roadway.



Exhibit 3-24: Context Zone 2: Riverwest – Residential Urban Area (California Avenue to Salter Avenue)

3.2.3. Context Zone 3: Downtown Transitional Area (Salter Avenue to Victoria Avenue)

This context zone includes the University Avenue corridor from Salter Avenue to Victoria Avenue as seen in Exhibit 3-25. This portion of the corridor includes not only the transition between the existing 4-5 lanes cross-sector to 2 lanes but also the transition between mixed-use to more downtown related land uses.

Along this corridor there are 5 commercial driveways (1 on the north side and 4 on the south side of University Ave). There is on-street parking on either side of the road but no bike lanes are provided. There is only one parking lot of note, with approximately 45 parking spots.

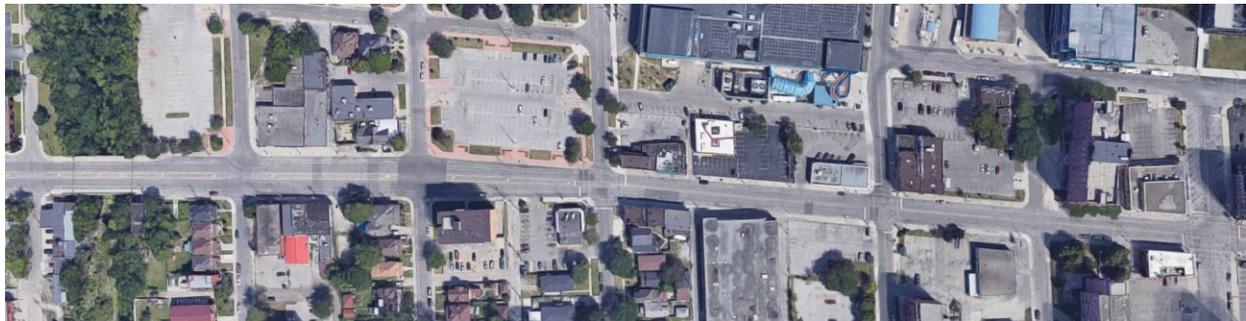


Exhibit 3-25: Context Zone 3: Downtown Transitional Area (Salter Avenue to Victoria Avenue)

3.2.4. Context Zone 4: Downtown Core (Victoria Avenue to Freedom Way)

This context zone includes the University Avenue corridor from Victoria Avenue to Freedom Way seen in Exhibit 3-26. Along this corridor there are 15 commercial driveways and 1 residential driveway, 8 on the north side and 8 on the south side of University Ave.

There is on-street parking on either side of the road. There is only one parking lot, with approximately 40 parking spots. Pedestrian streetscaping includes pedestrian lighting and trees found between Victoria Avenue and Oullette Ave. The major land use commercial businesses along the corridor with some hospitality uses (hotel and conference centre).



Exhibit 3-26: Context Zone 4: Downtown Core (Victoria Avenue to Freedom Way)

3.2.5. Context Zone 5: University – Institutional Area (Freedom Way to McDougall Street)

This context zone includes the University Avenue corridor from Freedom Way to McDougall Ave seen in Exhibit 3-27. Along this corridor there are 5 commercial driveways, 4 are on the north side and 1 is on the south side of University Ave. There is on-street parking on either side of the road.

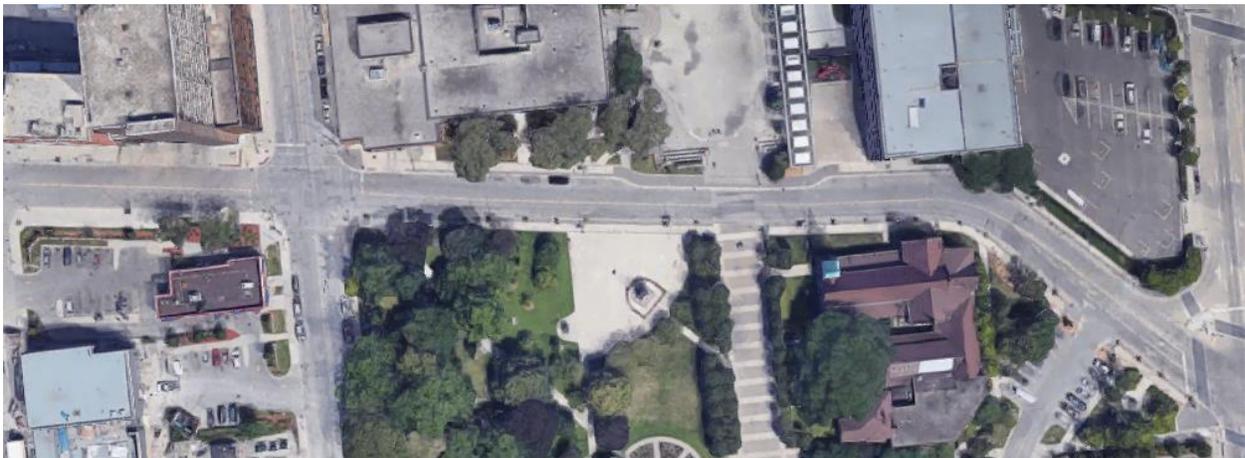


Exhibit 3-27: Context Zone 5: University – Institutional Area (Freedom Way to McDougall Street)

This focus area appears to have good streetscaping with pedestrian lighting, benches and planters between Goyeau Ave to McDougall Ave. The major land use in this focus area is Open Space, Mixed Use (mainly commercial) and Major Institutional (which in this focus area refers to City Hall).

3.2.6. Context Zone 6 and 7: Victoria – Gateway Area and Transitional Area

These context zones include the Victoria Avenue corridor from Chatham St to University Avenue (Gateway) and University Avenue to Park Street (Transition) as seen in Exhibit 3-28. Along this corridor there are 5 commercial driveways, 2 on the west side and 3 on the east side of Victoria Ave. There is on-street parking (some angled spots) on either side of the road. There are 4 parking lots of note in this short street with approximately 150 parking spots between the 4 lots.

This focus area has some planters and benches between University Ave and Chatham St along Victoria Ave, with no streetscaping south of University Ave. The major land use in this focus area is Mixed Use (mainly commercial).



Exhibit 3-28: Context Zone 6 and 7: Victoria – Gateway Area and Transitional Area

3.1. Development Potential

Approved, proposed and expected institutional, commercial and residential development adjacent to the corridors under study were provided by the City's Planning Department and is presented in detail as part of the Traffic Operations Report completed as part of the Environmental Assessment Process.

Exhibit 3-29 summarizes the development potential for the area surrounding the corridors under study².

² During the development of the future conditions' scenarios, the City's Planning Department requires the following changes and/or modifications to the projected amount and type of development:

- Removal of the Law School proposed development;
- Removal of the residential component of the Fish Market;
- Addition of a residential development at the corner of Wyandotte and Crawford; and
- Addition of residential units at 531 Pelissier Street.

Exhibit 3-29: Approved, Proposed and Expected Development

Development	Location	Amount of Proposed Development
Canterbury College Residence	<ul style="list-style-type: none"> Patricia Road between Riverside and University Avenue 	<ul style="list-style-type: none"> 30 residential units - 113 residents
Fish Market	<ul style="list-style-type: none"> 156 Chatham 	<ul style="list-style-type: none"> Mixed Use – 11 apartments plus commercial use on ground floor
Former Grace Hospital Site	<ul style="list-style-type: none"> University Avenue and Crawford Avenue 	<ul style="list-style-type: none"> Future Urgent Care site
Science Research Center	<ul style="list-style-type: none"> University of Windsor Main Campus 	<ul style="list-style-type: none"> 46,000 square feet
Lancer Sports Complex	<ul style="list-style-type: none"> College Avenue and California Avenue 	
Residential/student housing	<ul style="list-style-type: none"> 666-669 Chatham 	<ul style="list-style-type: none"> 60 residents
Residential Proposal	<ul style="list-style-type: none"> Victoria Avenue and Park Avenue 	<ul style="list-style-type: none"> 120 Condominiums
Metropolitan Building	<ul style="list-style-type: none"> 156 University Avenue 	<ul style="list-style-type: none"> 5 stories converted to residential
University of Windsor	<ul style="list-style-type: none"> Law School – Paul Martin Building, Corner of Chatham Street and Ouellette Avenue 	<ul style="list-style-type: none"> 600 students
	<ul style="list-style-type: none"> Armouries – Centre for the Arts 	
	<ul style="list-style-type: none"> Windsor Star Building – School of Social Work 	
	<ul style="list-style-type: none"> 360 Freedom Way – SoCA 	
St. Clair College	<ul style="list-style-type: none"> St. Clair College Centre for the Arts 	
	<ul style="list-style-type: none"> MediaPlex on University Avenue and Victoria Avenue 	
	<ul style="list-style-type: none"> TD Student Success Centre – University Avenue 	
	<ul style="list-style-type: none"> One Riverside Drive – Business School 	<ul style="list-style-type: none"> 1,000 students

3.2. Natural Environment

A Natural Environment Assessment was completed to document existing conditions, assess potential impacts to any natural heritage features present within the Study Area and provide recommendations and supporting documentation for the study. The Natural Environment Report is included in Appendix B.

Available background information was reviewed to evaluate the landscape context for the Study Area and identify natural heritage features that require further site-specific assessment. CIMA+ conducted field investigations on July 5, and July 6, 2018 to evaluate existing ecological conditions within the Study Area. The field program included the following surveys:

- Full vascular plant inventories
- Existing habitat assessments, including ecological community characterization completed in general accordance with MNRF Ecological Land Classification (ELC) for Southern Ontario standard procedures and protocols
- Breeding bird survey in general accordance with Ontario Breeding Bird Atlas (OBBA) standard procedures and protocols
- Incidental wildlife and wildlife habitat observations (auditory, visual, tracks, scat, burrows, nests, etc.) throughout the Study Area
- Technical evaluation of ecological features within the Study Area which may be impacted by the Project

The results of the background review did not identify the presence of watercourses, or other surficial drainage features in the Study Area.

Greenspace throughout the Study Area was observed to include the following features:

- Ornamental trees, manicured lawn, and cultural landscaping features (e.g. garden beds, shrub hedgerows or otherwise streetscaping features) are present within the University Avenue East/West and Victoria Avenue right-of-way (ROW).
- Ornamental trees, manicured lawn, and cultural landscaping features associated with properties directly adjacent to the ROW. These built environments include urban developments on public and private lands associated with residential, commercial, institutional and recreational developments.
- Four municipally managed parks span the Study Area: (1) Assumption Park; (2) Barron Memorial Skateboard Park; (3) Gateway Public Park, and; (4) Senator David A. Croll Park. These parks include cultural landscaping features and areas of actively managed Kentucky Blue Grass (*Poa pratensis*) groundcover, as well as un-managed naturalized components.
- Undeveloped deciduous forested lands located between Salter Avenue and Caron Avenue.

The Ecological Land Classification Map is shown on Exhibit 3-30 through Exhibit 3-33.



Exhibit 3-30: Ecological Land Classification Map A

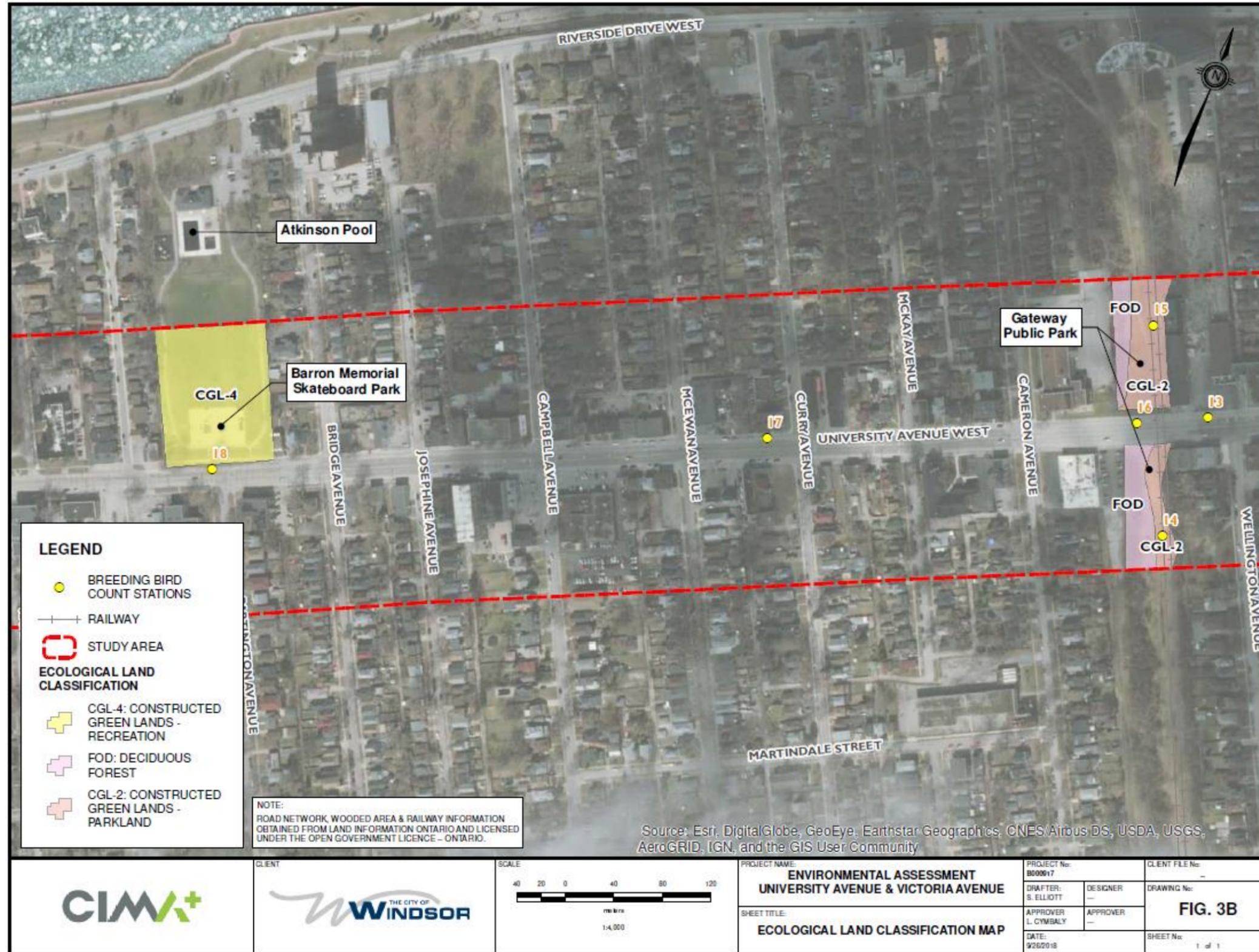


Exhibit 3-31: Ecological Land Classification Map B

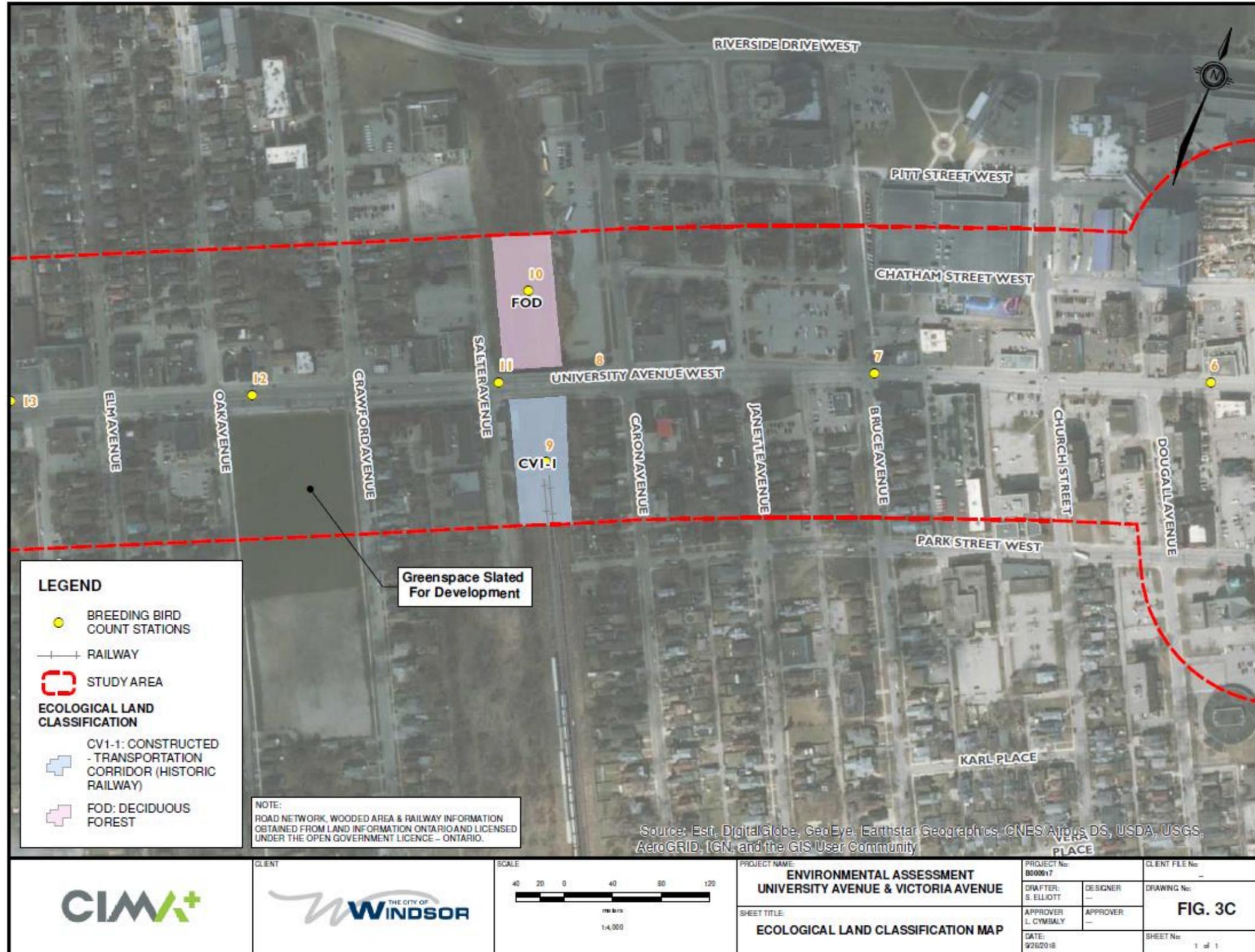


Exhibit 3-32: Ecological Land Classification Map C

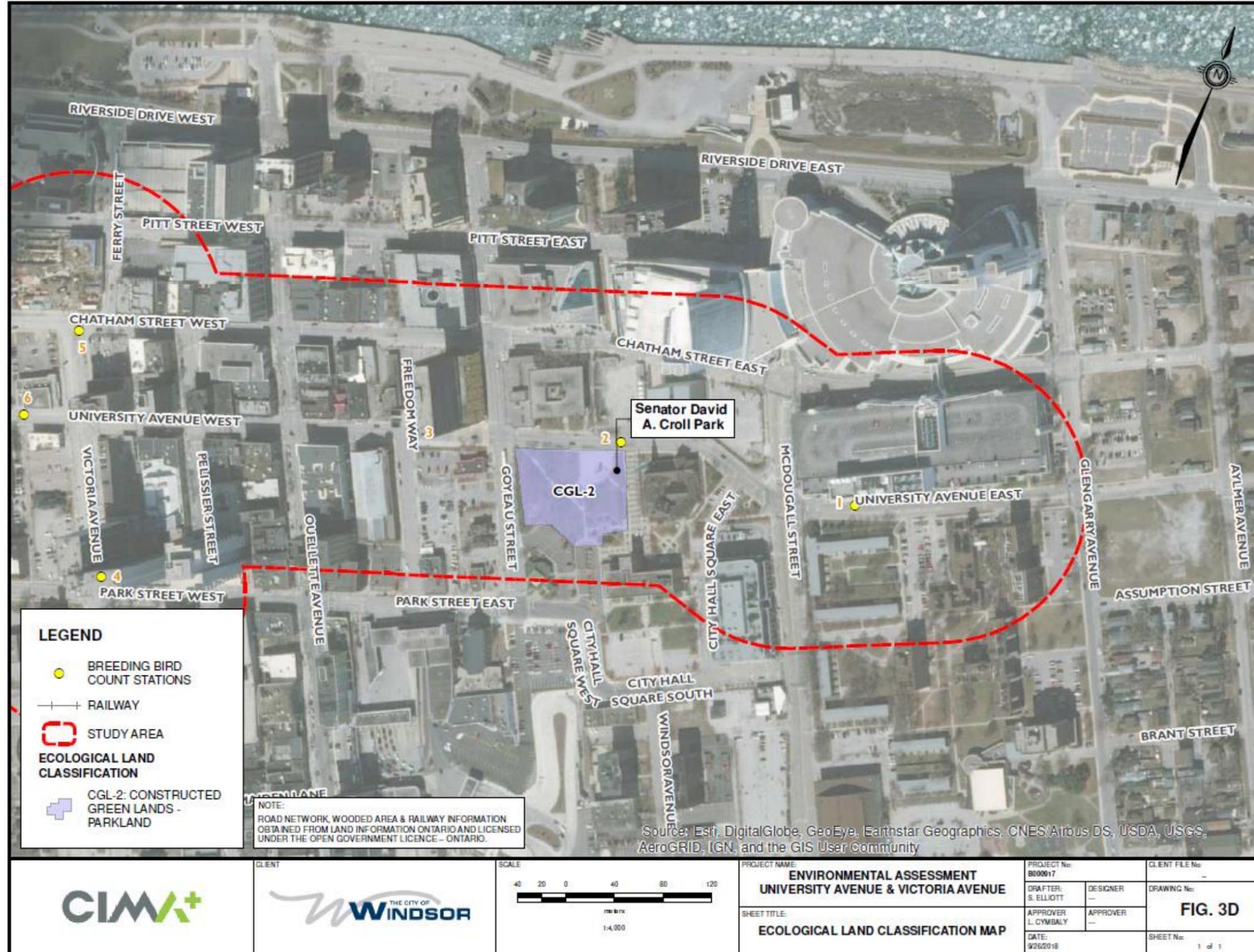


Exhibit 3-33: Ecological Land Classification Map D

The Study Area falls within Ecoregion 7E (Lake Simcoe-Rideau) and is part of the Deciduous Forest Region characterized by diverse vegetation. Representative mammalian fauna in this region include White-tailed Deer (*Odocoileus virginianus*), Northern Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*), Virginia Opossum (*Didelphis virginiana*), and Woodchuck (*Marmota monax*). Eastern Cottontail (*Sylvilagus floridanus*), and Grey Squirrel (*Sciurus carolinensis*) were observed in the Study Area. No other mammals were observed at the time of the site investigations.

CIMA+ observed 32 bird species throughout the duration of the field investigations. No Species at Risk (SAR) were observed (visual or auditory) within or adjacent to the Study Area at the time of the investigations.

3.3. Tree Inventory

A Tree Inventory was completed by an ISA Certified Arborist on July 5 and 6, 2018. A copy of the Arborist Report is provided in Appendix C. A total of 267 trees and tree groups were surveyed along University and Victoria Avenues. This total is comprised of 226 individual trees and 41 individual shrubs and vegetation groups.

The size class of trees is an important metric for managing urban tree populations, as they indicate the relative age of trees as well as tree maintenance requirements. The ideal distribution is skewed left, with the greatest number of trees in the smallest DBH class decreasing to the least number of trees in the largest DBH class. This adds longevity and resiliency to the flow of functional benefits provided by the urban tree population, including aesthetic and ecological benefits.

Exhibit 3-34 below illustrates that the tree size distribution for University Avenue is generally skewed to the left, with a significant drop in tree counts beyond the 40 cm DBH threshold. Trees less than 40 cm DBH make up almost 75% of all trees surveyed. Generally, the graph below shows a healthy tree size distribution. The relative disparity in numbers between trees less than 40 cm DBH and those above 40 cm DBH indicates that the future forest is promising. It is possible that the difference in size class at the 40 cm DBH threshold may indicate that municipal urban forestry management practices may favour removing larger trees as their hazard potential and their maintenance cost increases over time.

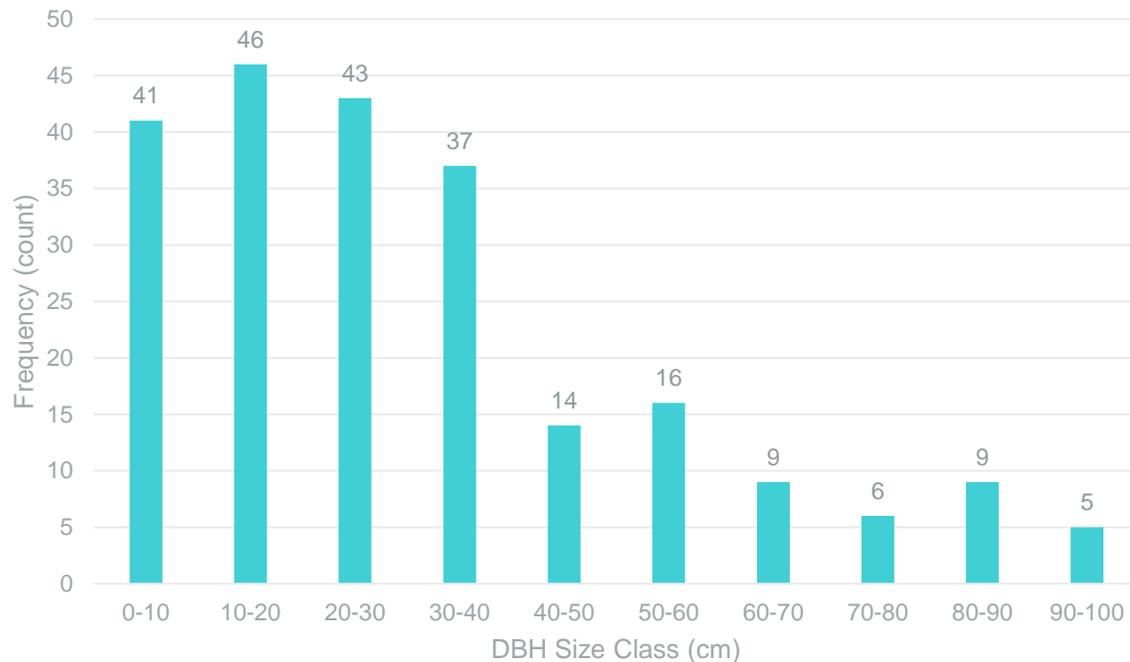


Exhibit 3-34: Tree Size distribution in the Study Area

A Kentucky coffeetree (*Gymnocladus dioicus*) was found as a specimen tree on property of the University of Windsor adjacent to the right-of-way (Tree 145). Kentucky coffeetree is a protected species under the Ontario Endangered Species Act, 2007, however, as a specimen tree in the landscape, it is assumed to be commercially cultivated and exempt from protection under Section 12 of O. Reg. 242/08. No other species at risk were found.

3.4. Cultural Environment

3.4.1. Stage 1 Archaeological Assessment

A Stage 1 Archaeological Assessment was completed to review background research and presents conclusions and recommendations pertaining to archaeological concerns within the assessed lands. A copy of the Stage 1 Archaeological Assessment Report is provided in Appendix D.

The Stage 1 assessment was conducted in August 2018 and was carried out in order to:

- Provide information concerning the geography, history and current land condition of the study area;
- Determine the presence of known archaeological sites in the study area;
- Present strategies to mitigate project impacts to such sites, if they are located;
- Evaluate in detail the archaeological potential of the study area; and
- Recommend appropriate strategies for Stage 2 archaeological assessment, if some or all of the study area has archaeological potential.

The Stage 1 assessment resulted in the identification of numerous features of archaeological potential in the vicinity of the study area (Map 25). The closest and most relevant indicators of archaeological potential (i.e., those that would directly affect survey interval requirements) include 1 primary water source (the Detroit River), 20 historic roadways (e.g., Huron Church Road, Indian Road, University Avenue, etc.), 4 historic railways (the Canadian Pacific Railway, Great Western Railway, Michigan Central Railway and Sandwich & Windsor Passenger Railway), more than 150 historic structure localities, 1 historic community (Windsor), 16 designated heritage properties, 99 listed heritage properties and 9 previously identified archaeological sites (AbHs-13, AbHs-15, AbHs-27, AbHs-28, AbHs-30, AbHs-31, AbHs-32, AbHs-33 and AbHs-34). Background research identified a wide variety of features indicating that parts of the study area have potential for deeply buried archaeological resources.

The areas of archaeological potential can be broken down into four distinct categories:

- 1) Areas of surficial archaeological potential (i.e., the grassed areas southeast of the intersection of University Avenue East and Goyeau Street) that were determined to be suitable for test pit survey under PIF #P348-0020-2014 (AFW 2015:22–23);
- 2) Areas that have potential for both deeply buried archeological resources and for archaeological resources to be present near the surface (i.e., the grassed areas between Huron Church Road and Sunset Avenue in the vicinity of Assumption Park);
- 3) Areas of deeply buried archaeological potential (i.e., the roadways between Huron Church Road and Sunset Avenue in the vicinity of Assumption Park, as well as various developed areas that possess disturbed upper layers that could be sealing over archaeological resources in the lower layers); and
- 4) Areas that were likely disturbed during past development activities but must be empirically evaluated to determine the integrity of the soils and the depth of any past disturbances (i.e., landscaped areas that are suitable for test pit survey).

The Stage 1 assessment determined that the study area comprised a mixture of areas of archaeological potential and areas of no archaeological potential. All identified areas of archaeological potential that could be impacted by the project be subject to a Stage 2 property assessment. Given that the areas of archaeological potential consist of both upper layers and lower layers, it is recommended that both test pit survey and deeply buried survey methods be utilized to complete the assessment

3.4.2. Built Heritage and Cultural Landscapes

A Built Heritage and Cultural Landscape Assessment was completed for structures and landscapes within the study area with the potential to be impacted by the study. The Built Heritage and Cultural Landscape Assessment Report is provided in Appendix E.

The approach for the Built Heritage and Cultural Heritage Landscape Assessment included the following:

- Background research concerning the project context and historical context of the study Areas
- Consultation with the City of Windsor planners responsible for heritage matters
- Identification of any designated or recognized properties within the limits of the study areas

- On site inspection and creation of an inventory of all properties with potential Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL) (within and adjacent to the project location)
- A description of the location and nature of potential cultural heritage resources;
- Evaluation of each potential cultural heritage resource against the criteria set out in Ontario Regulation 9/06 and 10/06 where applicable for determining cultural heritage value or interest (CHVI)
- Evaluation of potential project impacts; and
- Provision of suggested strategies for the future conservation of identified cultural heritage resources.

A windshield survey of the study area was conducted, and all potential cultural heritage resources noted were evaluated against the criteria of Ontario Regulation 9/06. In total, 49 built heritage resources (BHR Nos. 1-49) were identified within the study area as having potential cultural heritage value or interest (CHVI).

Seven CHLs were identified in the study area; Assumption Park (CHL 1), Assumption Church; Rosary Chapel & Sanctuary (CHL 2), University of Windsor (CHL Gateway Public Park (CHL 4 Canadian Pacific Rail Line (CPR) (CHL 5)), Essex County Court House (CHL 6)), and City Hall Square (CHL 7). Mapping and a full list of the BHRs and CHLS is provided in the Built Heritage and Cultural Landscape Assessment Report in Appendix E.

Preliminary potential negative impacts were identified including: redesigning of the road way involving development on the front portion of properties with cultural heritage resources that have minor or no setbacks (BHRs 5, 6, 15, 18-22, 24-29, 31, 32, 35, 36 and 39-40) or removal of mature trees/landscape features that are heritage at tributes of cultural heritage resources (BHRs 5, 15, 17, 24 26 and CHLs 1, 2, 6, and 7); installation of above grade infrastructure impacting views that are part of CHL 1 (Assumption Park) or CHL 7 (City Hall Square)); above ground features may also cast shadows and/or isolate heritage attributes of cultural heritage resources from their surrounding environment or context; and construction activities have the potential to create vibrations that could impact built cultural heritage resources with minor or no setbacks (BHRs 5, 6, 15, 18 22, 24 29, 31, 32, 35, 36 and 39 40).

Potential positive impacts of this EA include the installation of bike lanes and/or transit stops tree planting as streetscaping and to mitigate heat islands traffic calming measures and streetscaping /placemaking measures, all of which could enhance the character of the area and allow for the interpretation of cultural heritage resources (i.e., installation of plaques).

Mitigation strategies to address the identified potential adverse impacts are provided in Section 7.

3.5. Drainage and Stormwater Management

A Drainage and Stormwater Management assessment was conducted to document the existing conditions of the study area. The Drainage and Stormwater Management report is included in Appendix F.

Generally, University Avenue and Victoria Avenue have defined and organized drainage patterns which are directed towards the urbanized roadways and subsequently to existing sewer systems. Impervious areas covering a range of 63% to 100% on multiple zones.

During the preliminary stages of the assessment, it was assumed – based on the intent and purpose of the EA, that University Avenue and Victoria Avenue right-of-ways will be re-organized by road dieting or widening to achieve systemic improvements to incorporate active transportation facilities for all users of a variety of ages, abilities and modes.

As such, the following is a summary of the stormwater/drainage related issues/opportunities associated with re-organizing the right-of-ways.

- It is understood all roadways will be re-urbanized with new curb and gutter to suit the new roadway and active transportation facilities. Relocation or replacement of catchbasins will be required throughout the corridor to suit the revised curb locations and elevations. Curb and Gutter provides organized, defined and low maintenance roadway drainage patterns.
- Re-urbanization with implementation of perforated subdrains provides an organized means of providing sub drainage to roadway granular base/subbase.
- The new horizontal alignment of curbs should consider the existing and proposed underground storm sewers/utilities to avoid conflicts.
- The new vertical alignment of curbs are anticipated to largely resemble the existing condition. Low points should be avoided wherever possible and curb profiles should maintain a minimum of 0.5% slope gradient and maintain major system patterns.
- Roadway narrowing without re-profiling the roadway will likely result in slightly flattened boulevards, which may require boulevard area drains at specific/isolated areas.
- At localized areas, the flat gradient of the existing boulevards on the north side of University Avenue will pose challenges to establish positive overland drainage to the roadway and will likely require localized inlets. These inlets will be shallow and at low slope to ensure drainage to the existing sewer if feasible.

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4. Alternative Solutions

For consistency with previous studies, the evaluation criteria developed for the Downtown Windsor Transportation Strategy was used as the basis for the preliminary evaluation of alternatives. The evaluation factors are outlined in Exhibit 4-1.

Exhibit 4-1: Evaluation Factors

Urban Qualities	Description	Evaluation Factors
Connectivity	Introduce or enhance opportunities for integration of other modes of transportation	<ul style="list-style-type: none"> • Vehicular capacity • Level of Service Input from related projects
Accessibility	Meet or surpass the AODA requirements.	Sidewalk design elements (i.e. width, clearance, intersection treatments)
Behavioral Factors	Create a physical environment that encourages safe roadway user behaviour and minimizes conflict between different modes of transport.	Safety of all roadway users
Spatial Experience	Introduce or enhance opportunities for street furniture, landscaping and other urban design amenities	<ul style="list-style-type: none"> • Urban heat island reduction • Improvements to the pedestrian realm
Parking Availability	On-street parking provision	Number of parking spaces

4.1. Evaluation of Alternative Solutions

The Study considered the following alternative solutions as elements within the study area (Exhibit 4-2):

- Light rail
- Public transportation
- Pedestrian comfort
- Cycling infrastructure
- On-Street parking

- Medians/boulevards/street furniture

Exhibit 4-2: Evaluation of Alternative Solutions

Element	Recommendation
1. Light Rail	Not carried forward
2. Public Transportation:	
• Bus Rapid Transit	Not carried forward
• Dedicated Transit Lanes	Not carried forward
• Shared Lanes with Vehicular Traffic (3.65 m per lane)	Recommended
3. Pedestrian comfort:	
• AODA Standard Sidewalks (sidewalks at 1.5 m minimum as per AODA)	Recommended
4. Cycling Infrastructure:	
• Multi-Use Trails	Not carried forward
• Conventional On-Road Infrastructure	Not carried forward
• Protected Bike Facilities (approximately 2.2 m per lane)	Recommended
5. On-Street Parking	
• Context specific solution (approximately 2.5 m)	Recommended
6. Medians/ Boulevards/Street furniture:	
• Context specific solution	Recommended

4.2. Phase 1 and 2 Consultation

4.2.1. Notice of Study Commencement

The Notice of Study Commencement was prepared to inform the public and agencies of the commencement of the study. The Notice was advertised in the Windsor Star on July 25 and 28, 2018. The Notice was mailed or emailed to 1,350 property owners within the study limits and 26 agency representatives and stakeholders on July 25, 2018. A copy of the Notice of PIC No.1 and the list of agency representatives is included in Appendix G.

The Notice of Study Commencement outlined the purpose of the study and invited public comments on the study by contacting the project team.

4.2.2. Notice of Public Information Centre No. 1

The Notice of Public Information Centre No. 1 was prepared to inform the public and agencies of the opportunity to review the project and provide input. The Notice was advertised in the Windsor Star on October 27 and 31, 2018. The Notice was mailed to 1,109 property owners within the study limits on October 26, 2018.

A separate letter inviting stakeholders and agencies to attend Stakeholder Meeting #1 was emailed or emailed to 36 agency representatives and stakeholders on October 24th. The stakeholder meeting was held on the same date and at the same location as the PIC (one hour in advance of the PIC). A copy of the Notice of PIC No.1, agency letters and the list of agency representatives is included in Appendix H.

The Notice of Public Information Centre No. 1 outlined the purpose of the meeting and identified the time, date, and location for the PIC. The Notice invited public comments on the study by either attending the PIC or contacting the project team.

4.2.3. Public Information Centre No. 1

The PIC was held on November 1, 2018 from 5:00 PM to 8:00 PM at the Windsor International Aquatic and Training Centre, Lower East Atrium at 401 Pitt Street West in the City of Windsor. The PIC was held in an open-house format where the public was invited to review display boards, ask questions, and discuss comments with the project team. The display boards described the following:

- Welcome
- Purpose of the Study
- Municipal Class EA Process
- Background Studies
- Concurrent Studies
- Study Context Zones
- Existing Conditions
- University Avenue
- Victoria Avenue
- Problem and Opportunity Statement
- Evaluation Criteria

- Alternative Solutions
- University Avenue
- Victoria Avenue (Chatham Street W to University Avenue)
- Victoria Avenue (Flex-Street)
- Next Steps

A sign-in sheet and comment sheets were provided to record attendance and obtain written comments. An interactive activity was also set up which provided different cross-sectional elements (e.g. travel lanes, bicycle lanes, boulevards, etc.) to-scale with different right-of-way cross-sections. Attendees were invited to brainstorm which of their preferred roadway elements could fit into a given cross-section and provide their comments to the Project Team. A copy of the PIC material is included in Appendix H. Thirty-six (36) people signed into the Stakeholder Meeting/PIC and forty (40) comments were received through comment sheets and email correspondence.

Summary of Public Comments

The comments received during the PIC No.1 comment period were reviewed and the common themes were summarized. Exhibit 4-3 provides a summary of the elements that the public and Stakeholders indicated a general support for.

Many of the comments noted support for protected cycle lanes (either off-road or physically protected with a curb). The comments also indicated support for additional trees, landscaping, street furniture and wider sidewalks.

Exhibit 4-4 provides a summary of the roadway elements that the public and stakeholders expressed concern for. Seven comments noted concern for vulnerable road users (i.e. pedestrians and cyclists).

Exhibit 4-3: Summary of Public Support

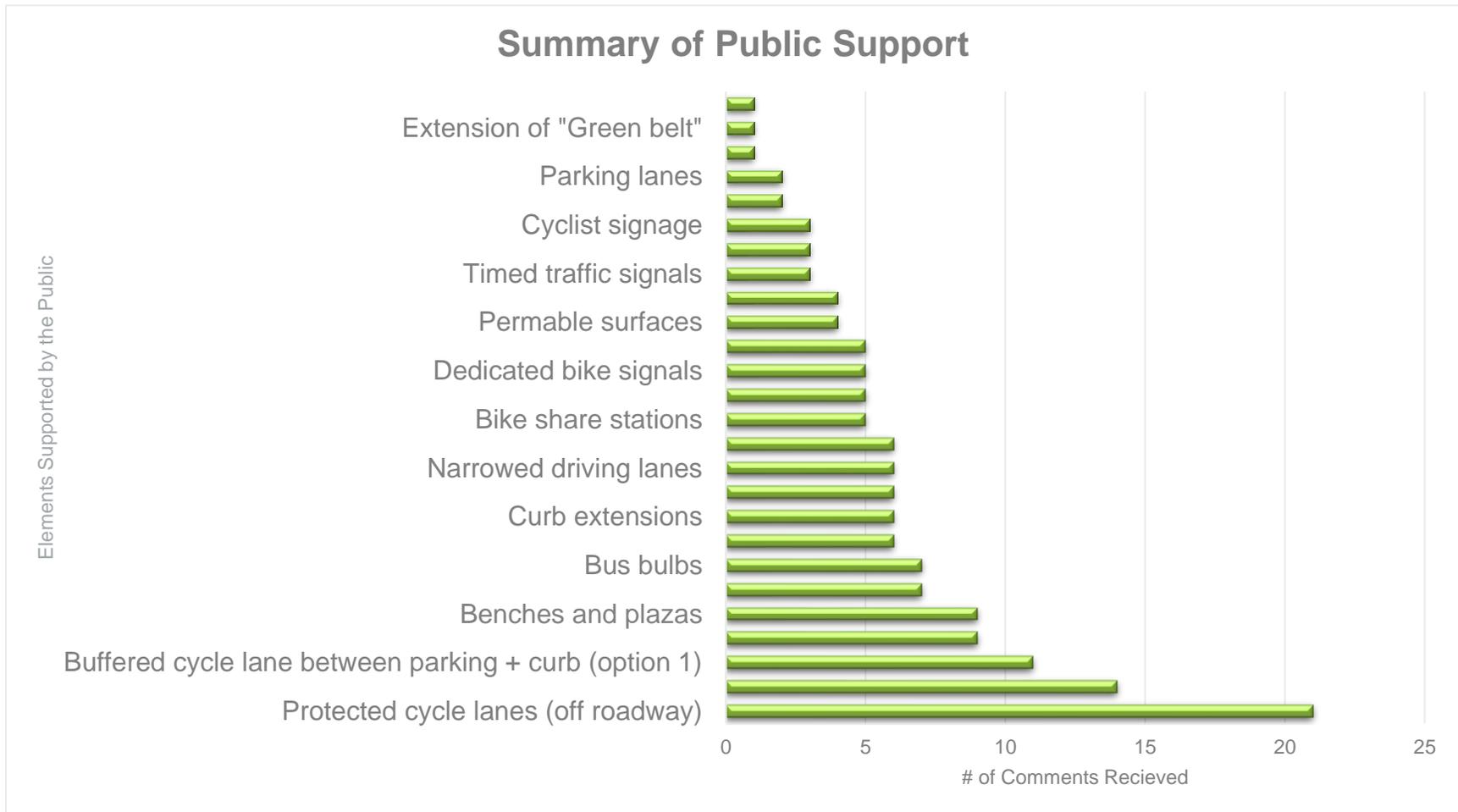


Exhibit 4-4: Summary of Public Concerns

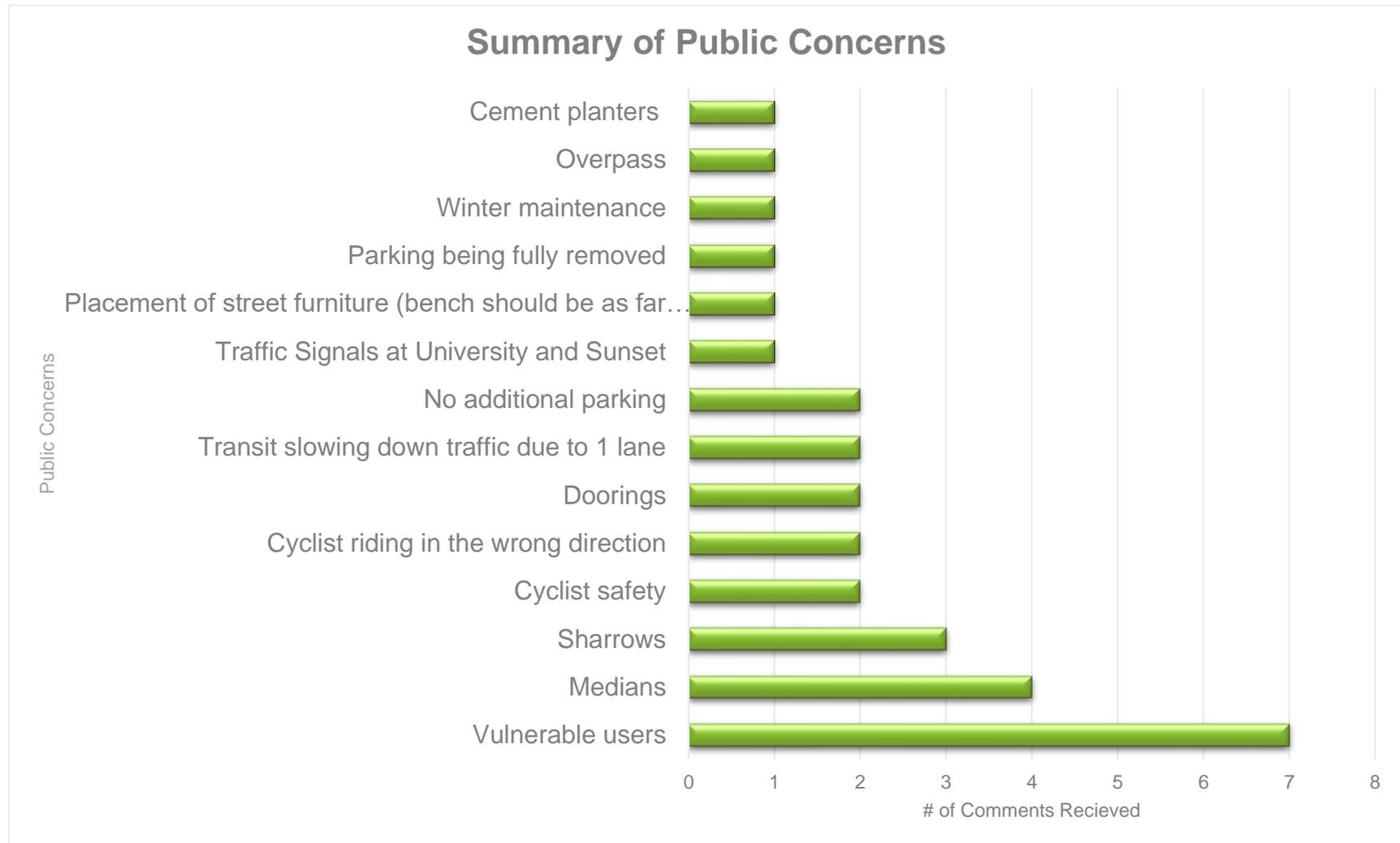
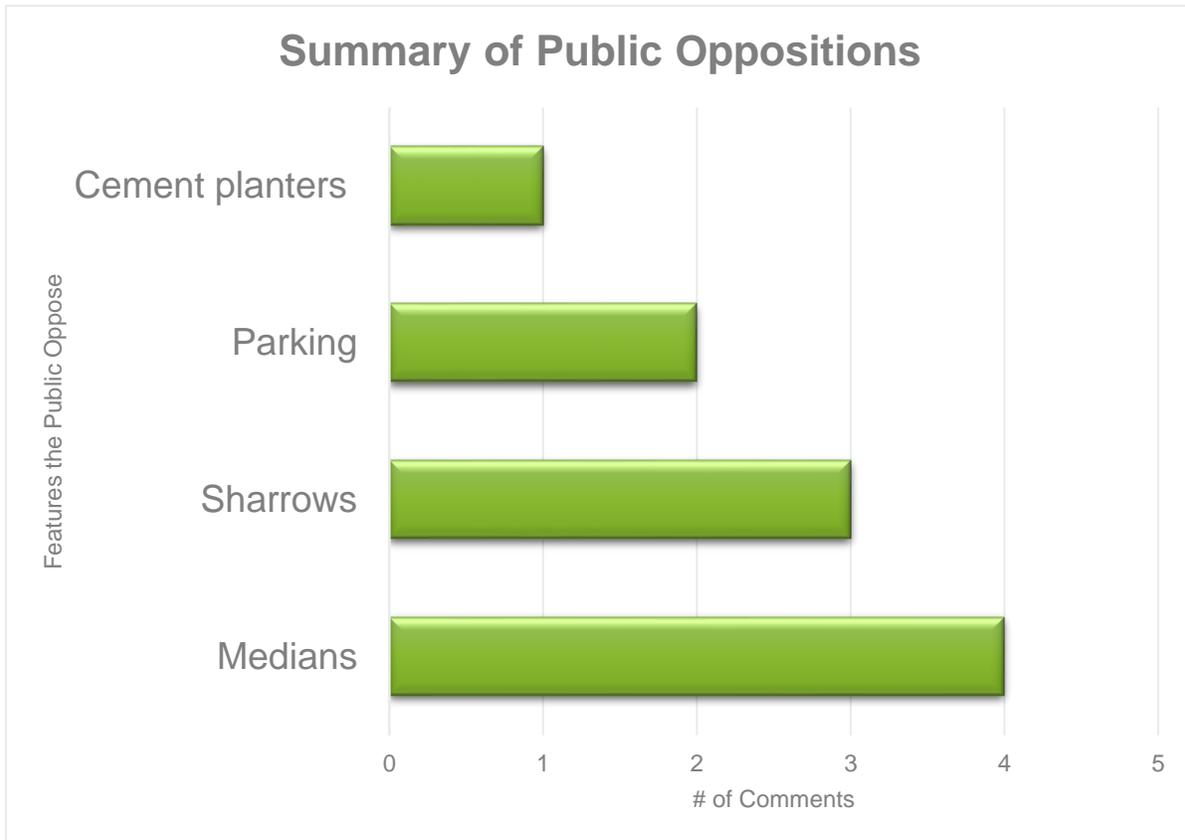


Exhibit 4-5 provides a summary of roadway elements which the public noted opposition towards. A few comments indicated oppositions for medians, sharrows and parking.

Exhibit 4-5: Summary of Public Oppositions



4.2.4. Online Survey

An online survey was made available for members of the public to provide input on the alternative solutions. The survey was generated and hosted using SurveyMonkey and included the following elements:

- Introduction to the Project and Purpose of the Survey
- Questions
 - Cycling Infrastructure
 - On-Street Parking
 - Streetscaping

The survey was available for public access from December 14, 2018 to January 07, 2019. During that time 345 responses were collected. The results of the survey are summarized in Exhibit 4-6 through Exhibit 4-11.

Exhibit 4-6: Summary of Public Oppositions

Three different types of protected cycling facilities are considered for the University Avenue and Victoria Avenue corridors. Which of these options do you recommend to support the project goals?

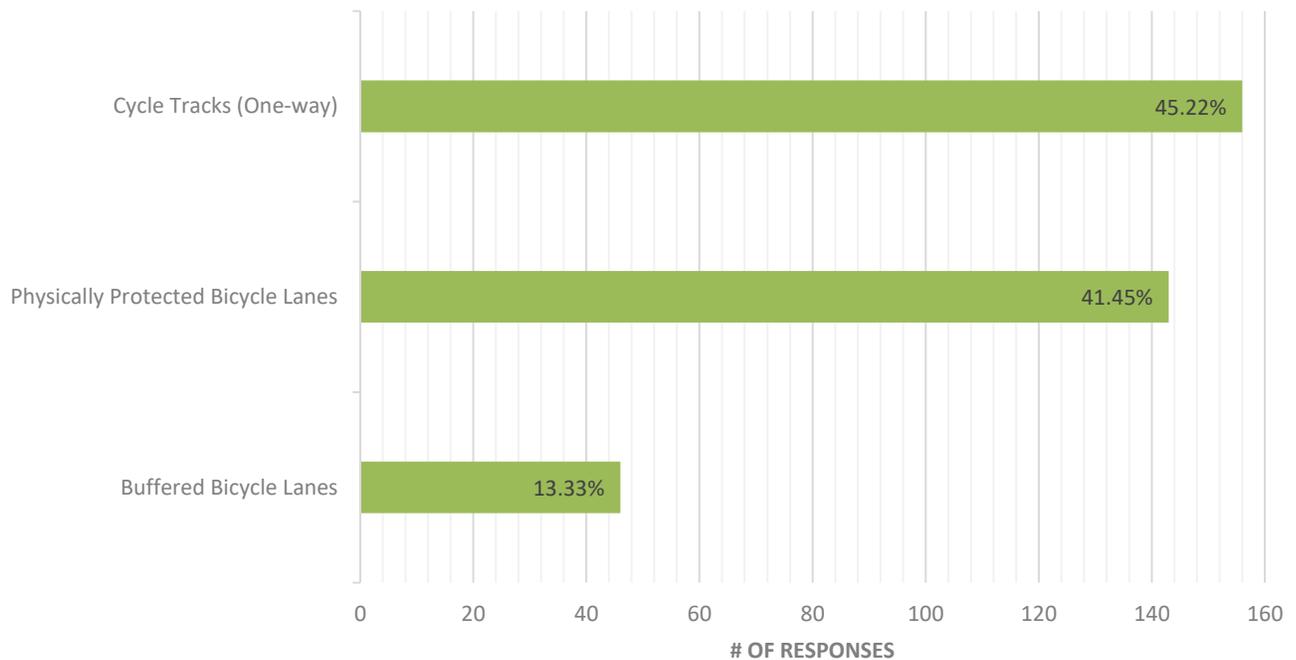


Exhibit 4-7: On-street Parking Spaces Along Segments of University Avenue

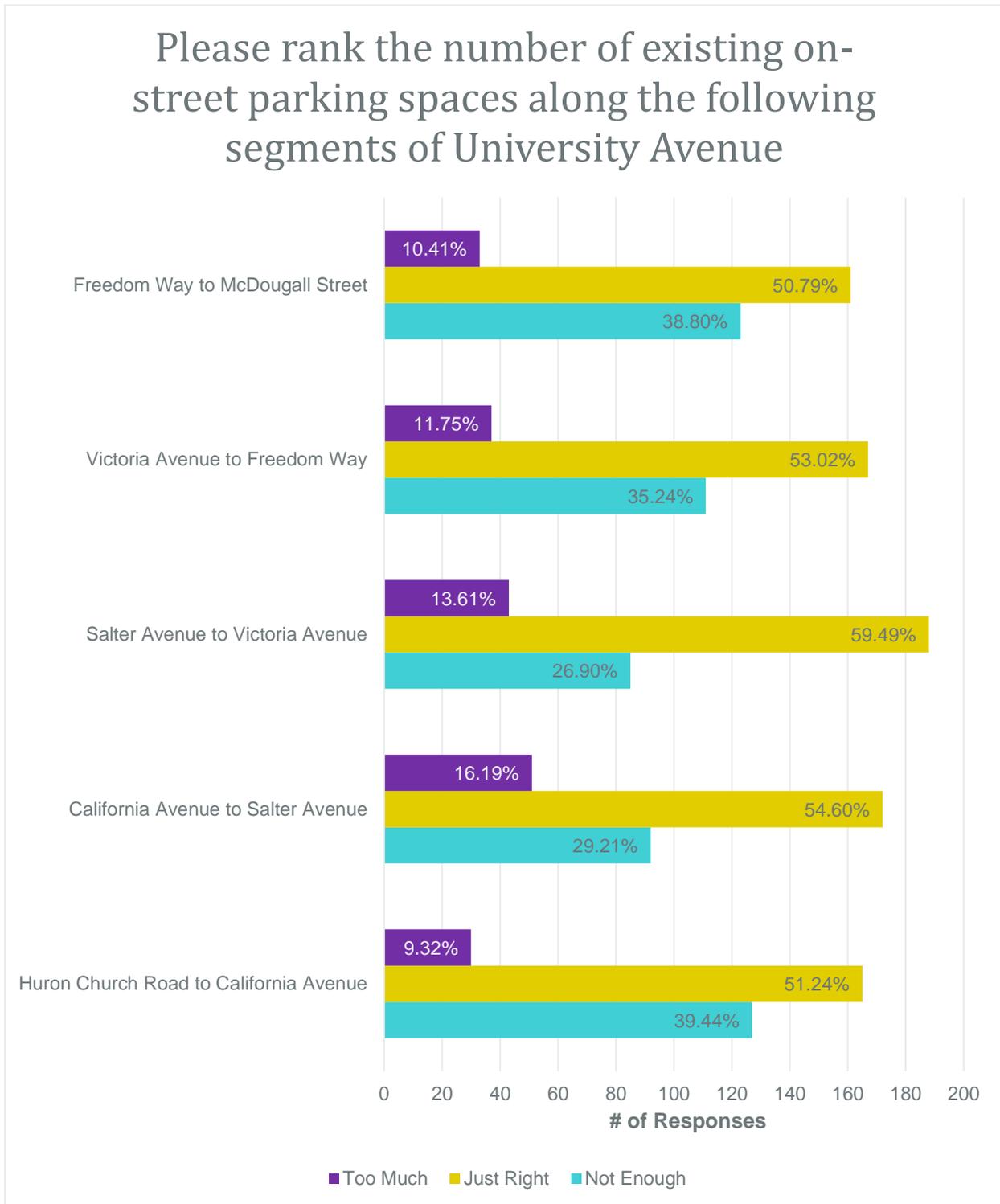


Exhibit 4-8: On-street Parking Spaces Along Segments of Victoria Avenue



Exhibit 4-9: Streetscaping Along University Avenue

Please rank the use of the following elements for any identified extra space on the future **University Avenue** corridor.

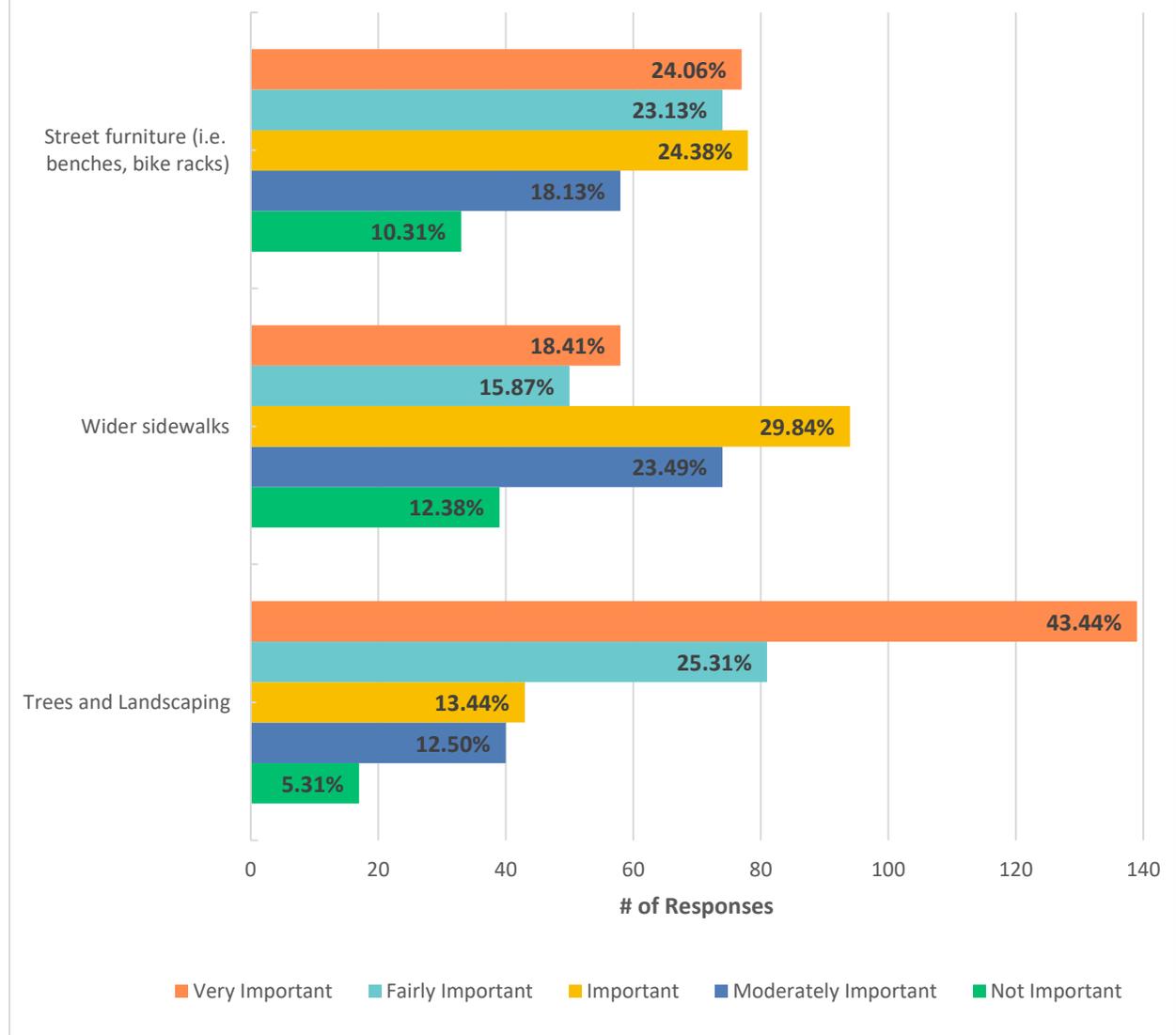


Exhibit 4-10: Streetscaping Along Victoria Avenue

Please rank the use of the following elements for any identified extra space on the future **Victoria Avenue** corridor.

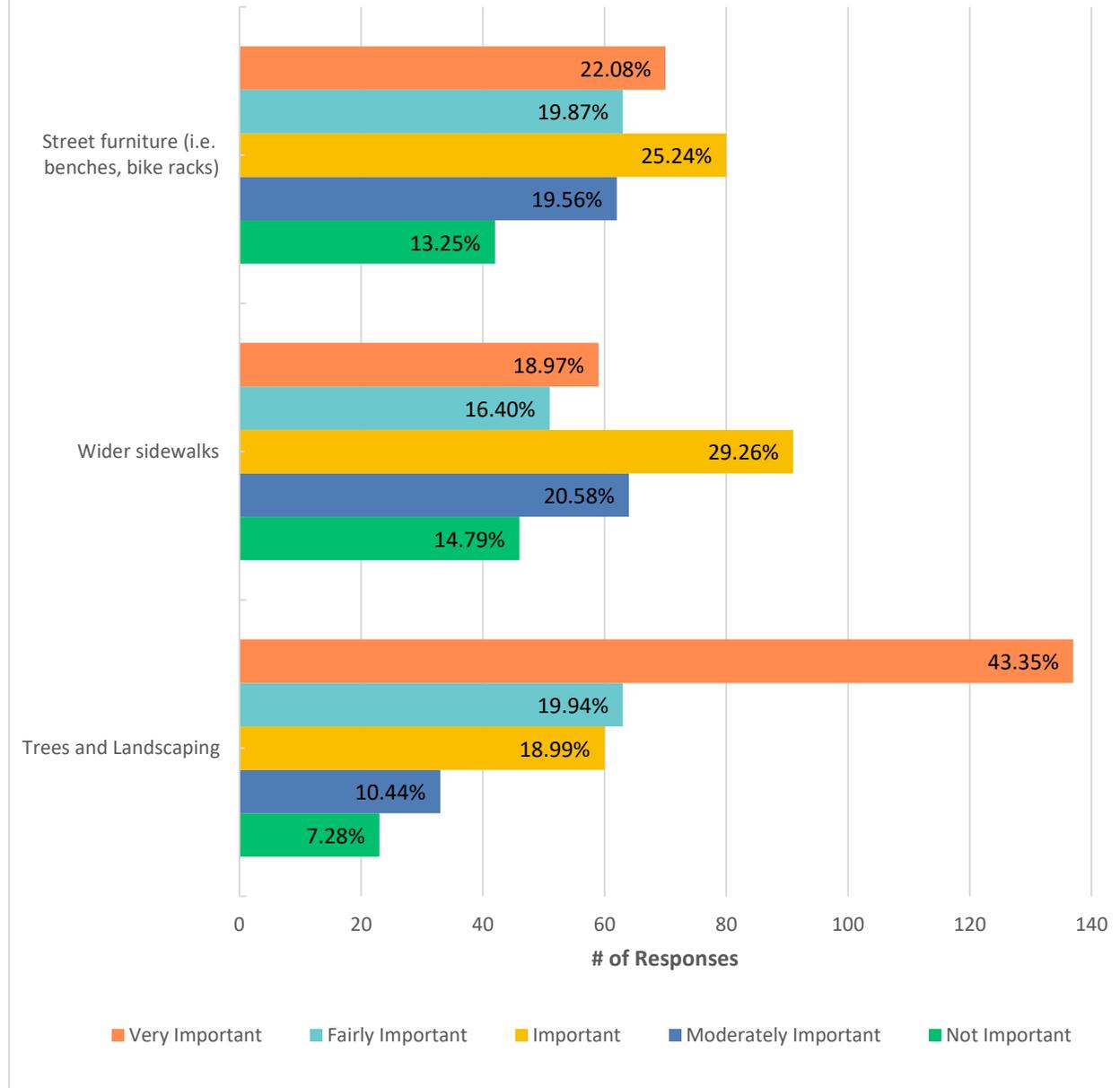
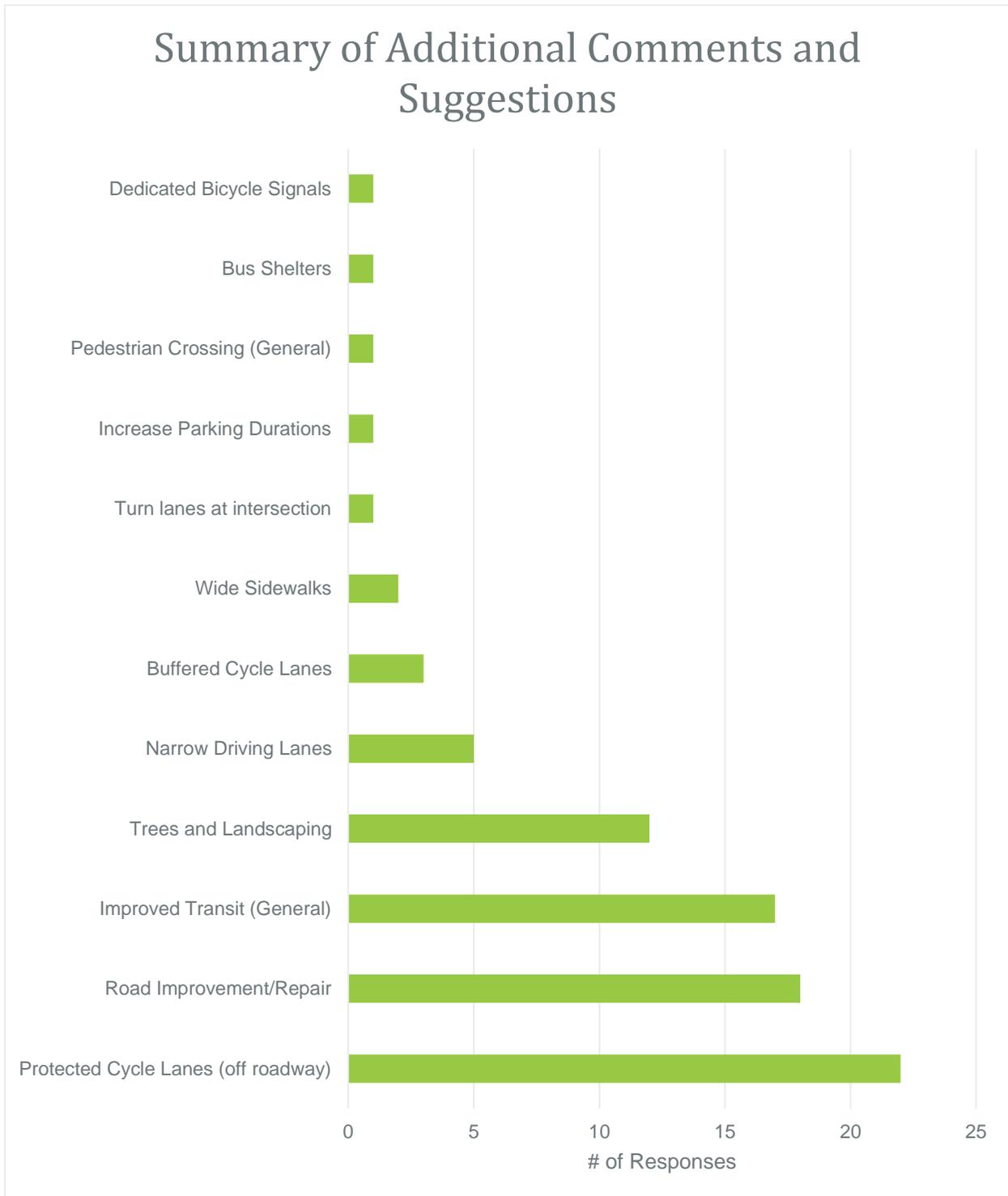


Exhibit 4-11: Summary of Additional Comments and Suggestions



4.2.1. Open Streets

As part of the public consultation process, the City took advantage of the Open Streets as it engaged many residents through the study area. Preliminary information regarding the Study was presented and interested residents offered their feedback.

4.2.2. Stakeholder Meeting No. 1

A drop-in style Stakeholder Meeting was held in advance of Public Information Centre No.1 to provide stakeholders with an opportunity to review the project material on display and provide comments. A separate letter inviting stakeholders and agencies to attend Stakeholder Meeting #1 was mailed or emailed to 36 agency representatives and stakeholders on October 24th. The Stakeholder Meeting was held on November 1, 2018 from 4:00 PM to 5:00 PM at the Windsor International Aquatic and Training Centre. Stakeholders who attended the meeting included:

- Windsor Essex County Health Unit
- Windsor Police Service

4.2.3. Stakeholder Meeting No. 2

A second Stakeholder Meeting was held on December 6, 2018 at the City of Windsor to provide stakeholders with an opportunity to discuss the potential alternatives for the corridor. A separate letter inviting stakeholders and agencies to attend Stakeholder Meeting #2 was emailed or mailed to 28 agency representatives and stakeholders on November 23rd, 2018.

Minutes of meeting for Stakeholder Meeting No. 2 are included in Appendix H. The following stakeholder groups attended the meeting:

- Windsor Essex County Health Unit
- Erwin Utilities
- Downtown Windsor Community Collaborative
- All Saints Church
- AM800 News
- Windsor Police Traffic
- Transit Windsor
- Downtown Windsor BIA
- Urban Systems

4.3. Preferred Solution

The results of Phases 1 and 2 of the Class EA, including the recommended planning solution, was presented to agencies and the public for review and input at PIC No.1 (Section 4.2.3). No comments were received during or following the PIC that could not be addressed or which were not in support of the recommended solution.

Following the PIC and based on consultation with agencies and the public, the preferred planning solution was selected as a combination of the following:

- Public Transportation: Shared Lanes with Vehicular Traffic (3.65 m per lane)

- Pedestrian Comfort: AODA Standard Sidewalks (sidewalks at 1.5 m minimum as per AODA)
- Cycling Infrastructure: Protected Bike Facilities (approximately 2.2 m per lane)
- On Street Parking: context specific solution (approximately 2.5 m)
- Medians/ Boulevards/Street furniture: Context specific solution

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5. Alternative Design Concepts

5.1. Development of Alternative Design Concepts

Four alternative design concepts were developed for the preferred planning solution University Avenue West corridor (Exhibit 5-1 to 5-3). It should be noted that Alternative 4 is a hybrid version of Alternative 2 and Alternative 4 in which the proposed cross-section elements varies along the corridor understudy.

- Alternative 1: Physically Protected Bicycle Lanes
- Alternative 2: Buffered Bicycle Lanes
- Alternative 3: Cycle Tracks (one-way)
- Alternative 4: Cycle Tracks and Buffered Bicycle Lanes (hybrid)

Similarly, six alternative design concepts were developed for the Victoria Avenue corridor:

- Alternative 1: Physically Protected Bicycle Lanes
- Alternative 2: Buffered Bicycle Lanes
- Alternative 3: Cycle Tracks (one-way)
- Alternative 4: Physically Protected Bicycle Lanes with Flex Boulevard (Exhibit 5-4)
- Alternative 5: Buffered Bicycle Lanes with Flex Boulevard (Exhibit 5-5)
- Alternative 6: Cycle Tracks (one-way) with Flex Boulevard (Exhibit 5-6)

Each of the alternative solutions are illustrated in bigger detail in Appendix J.

5.2. Analysis and Evaluation of Alternative Design Concepts

In order to determine the recommended alternative design concept, each alternative for the University Avenue and Victoria Avenue corridors were analyzed against the following criteria:

- Traffic Operations and Safety
 - Future Traffic Operations
 - Motorist Safety
 - Pedestrian Safety
 - Cyclist Safety
 - Pedestrian and Cyclist Security and Comfort
 - Parking
 - Transit

University Avenue (Representative Cross-Sections)

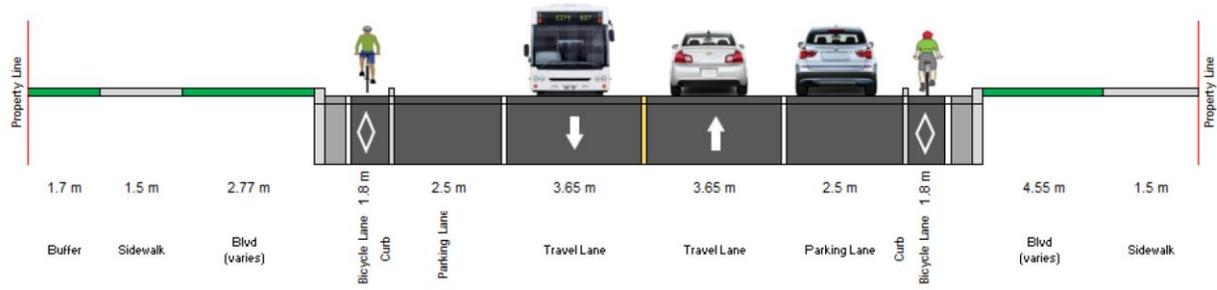


Exhibit 5-1: Physically Protected Bicycle Lanes

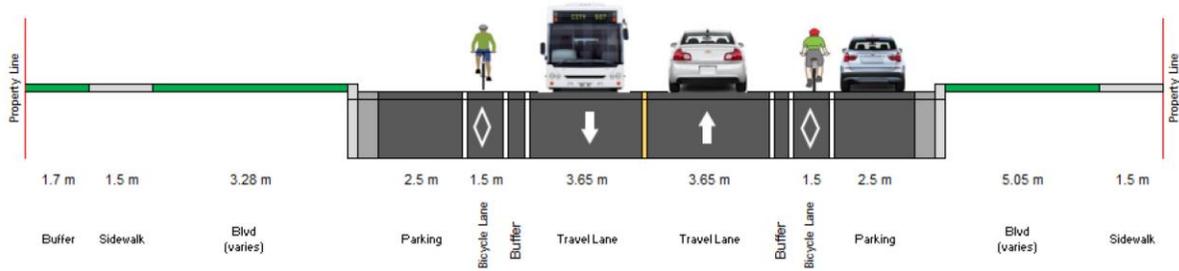


Exhibit 5-2: Buffered Bicycle Lanes



Exhibit 5-3: Cycle Tracks

Victoria Avenue (Representative Cross-Sections)

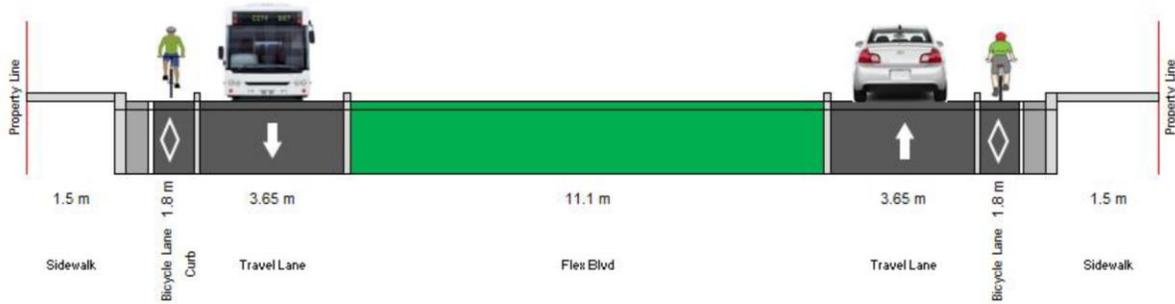


Exhibit 5-4: Physically Protected Bicycle Lanes with Flex Boulevard

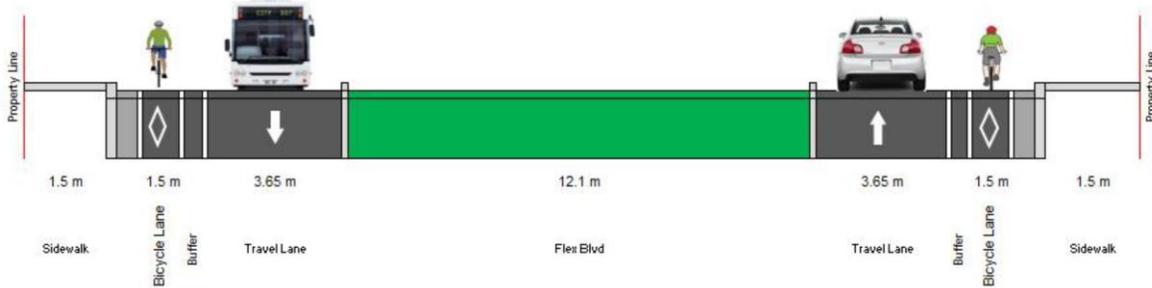


Exhibit 5-5: Buffered Bicycle Lanes with Flex Boulevard

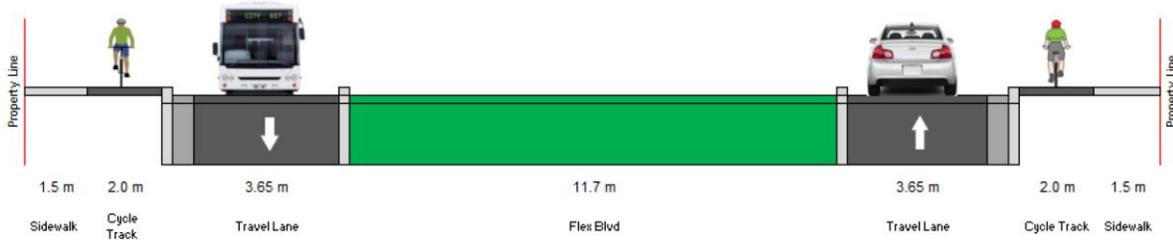


Exhibit 5-6: Cycle Tracks (one-way) with Flex Boulevard

- Transportation Planning
 - Compliance with Concurrent Studies
- Natural Environment
 - Stormwater Management
 - Opportunities for Landscaping (Urban Heat Island Reduction/Climate Change Mitigation)
- Socio-Economic
 - Opportunities for Streetscaping
 - Cultural Heritage/Archaeological Impacts
 - Accessibility
 - Network Connectivity
 - Implications to Stakeholders
- Implementation
 - Utility Relocation
 - Operations and Maintenance
 - Construction Staging and Constructability
 - Cost

The alternatives were then evaluated against one another and assigned a score based on the scoring system illustrated in Exhibit 5-7 and their respective benefits to the surrounding environments.

Highest Benefit	Fairly High Benefit	Moderate Benefit	Fairly Low Benefit	Least Benefit

Exhibit 5-7: Scoring System

Main elements of the evaluation process are summarized below and the full results of the analysis and evaluation of alternative design concepts are provided in Exhibit 5-8 and Exhibit 5-9.

5.2.1. University Avenue

Traffic Operations and Safety

Although all proposed alternatives will provide an adequate level of Services (LOS B or better) for vehicular traffic, their effect on pedestrian and cycling facilities – including the level of comfort, differs depending on the type of improvements considered for each alternative. From the perspective of this criteria, the use of physically protected bicycle lanes (Alternative 1) and

cycle tracks (Alternative 3) provides a more adequate environmental for pedestrian and cycling activities.

Transportation Planning

The use of cycle tracks (Alternative 3) along the entire corridor fully complies with the designation of University Avenue as an “all ages and abilities” bicycle route as identified by the City of Windsor Active Transportation Master Plan (and BUMP).

Natural Environment

With the exception of the Do-Nothing Alternative, the proposed alternatives not only limits the potential effect on the existing natural environment but also provides the opportunity for landscaping and the reduction of urban heat island effect along the entire corridor under study. From that perspective, Alternative 2 (Buffered Bicycle Lanes) was provided with the higher evaluation score.

Socio-Economic

Evaluation of socio-economic effects included a variety of elements from opportunities to enhance the pedestrian realm (streetscaping), preservation of archaeological and cultural heritage, to accessibility and effects to surrounding commercial areas. Although the results of the evaluation of these elements varied depending on the cross-section proposed as part of each alternative, Alternatives 2 and 3 as well as Alternative 4 (a hybrid version of Alternative 3) were evaluation as the most adequate for recommendation.

Implementation

From this perspective, the Do-Nothing alternative was provided with the higher evaluation score do to the fact that – under this alternative, no need for changes is required. However if consideration is given to implementation of the proposed alternatives, Alternative 2 and Alternative 4 (a hybrid version of Alternative 3) were identified as the second higher evaluation score.

After summarizing the results of the evaluation process, Alternative 3 (cycle tracks) was identified as Recommended.

5.2.2. Victoria Avenue

Traffic Operations and Safety

Although all proposed alternatives will provide an adequate level of Services (LOS B or better) for vehicular traffic, their effect on pedestrian and cycling facilities – including the level of comfort, differs depending on the type of improvements considered for each alternative. From the perspective of this criteria, the use of physically protected bicycle lanes (Alternative 1) and

cycle tracks (Alternative 3) provides a more adequate environmental for pedestrian and cycling activities.

Transportation Planning

The use of Buffered Bicycle Lanes with Flex Boulevard (Alternative 5) and Cycle Tracks with Flex Boulevard (Alternative 6) can provide the corridor with facilities intended for “all ages and abilities”.

Natural Environment

With the exception of the Do-Nothing Alternative, all proposed alternatives not only limits the potential effect on the existing natural environment but also provides the opportunity for landscaping and the reduction of urban heat island effect along the entire corridor under study. From that perspective, Buffered Bicycle Lanes with Flex Boulevard (Alternative 5) and Cycle Tracks with Flex Boulevard (Alternative 6) were provided with the higher evaluation score.

Socio-Economic

Evaluation of socio-economic effects included a variety of elements from opportunities to enhance the pedestrian realm (streetscaping), preservation of archaeological and cultural heritage, to accessibility and effects to surrounding commercial areas. Although the results of the evaluation of these elements varied depending on the cross-section proposed as part of each alternative, all proposed alternatives – with the exception of Do-Nothing, were assigned the same evaluation score.

Implementation

From this perspective, the Do-Nothing alternative was provided with the higher evaluation score do to the fact that – under this alternative, no need for changes is required. However if consideration is given to implementation of the proposed alternatives, all the alternatives in which the Flex Boulevard was not considered were identified with the higher evaluation score.

After summarizing the results of the evaluation process, Alternative 3 (cycle tracks) was identified as Recommended.

Exhibit 5-8: University Avenue - Analysis and Evaluation of Alternative Design Concepts

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Cycle Track and Buffered Bicycle Lane (Hybrid)
Traffic Operations and Safety					
Future Traffic Operations	All existing movements are operating at a Level of Service (LOS) B or better. 	All existing movements are operating at a LOS B or better. 	All existing movements are operating at a LOS B or better. 	All existing movements are operating at a LOS B or better. 	All existing movements are operating at a LOS B or better.
Motorist Safety	Although this alternative will not increase existing operational issues and traffic concerns, this alternative does not provide opportunities to address existing issues. 	Existing operational issues and traffic concerns will not be increased as part of alternative and opportunities to reduce existing issues can be considered as part of alternative (e.g. road narrowing, speed reduction). 	Existing operational issues and traffic concerns will not be increased as part of alternative and opportunities to reduce existing issues can be considered as part of alternative (e.g. road narrowing, speed reduction). 	Existing operational issues and traffic concerns will not be increased as part of alternative and opportunities to reduce existing issues can be considered as part of alternative (e.g. road narrowing, speed reduction). 	Existing operational issues and traffic concerns will not be increased as part of alternative and opportunities to reduce existing issues can be considered as part of alternative (e.g. road narrowing, speed reduction).
Pedestrian Safety	Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor. 	Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor. 	Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor. 	Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor. 	Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor.
Cyclist Safety	Dedicated bicycle facilities are provided along University Avenue from Huron Church Road to Bruce Avenue only. East of this intersection, cyclists share the road with vehicular traffic. 	Dedicated cycling facilities are provided with a physical barrier between vehicles and cyclists along full length of corridor. 	Dedicated cycling facilities are provided with a 0.5 metre buffer between vehicles and cyclists along full length of corridor. 	Off-road dedicated cycling facilities are provided along full length of corridor. 	Off-road dedicated cycling facilities are provided between Huron Church Road and Campbell Avenue. Dedicated cycling facilities are provided with a 0.3 to 0.5 metre buffer between vehicles and cyclists between Campbell Avenue and McDougall Street.
Pedestrian and Cyclist Security and Comfort	Very low level of comfort for cyclists as dedicated facilities are not provided along most of the corridor. Sidewalks are provided on both sides of the road however, obstructions (e.g. hydro poles) are present at some locations reducing effective width to less than 1.5 metres. 	High level of comfort for cyclists. Cyclist are physically separated from vehicles. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	Moderate level of comfort for cyclists. Dedicated space provided along full length of corridor. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	Highest level of comfort for cyclists. Cyclist are physically separated from vehicles (off-road). High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	High level of comfort for cyclists. Dedicated space provided along full length of corridor, portions are physically separated from vehicles. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor.
Parking	On street parking provided on both sides of University Avenue between Vista Place and Goyeau Street. 	On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue. 	On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue. 	On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue. 	On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.
Transit	Does not improve current transit services. Does not provide opportunities for improvements (i.e. bus stops). 	May require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes. 	Does not require consideration (at detailed design) at bus stop locations. Minor changes to pavement markings may be required. 	Will require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes. 	Will require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes.
Summary of Traffic Operations and Safety					

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Cycle Track and Buffered Bicycle Lane (Hybrid)
Transportation Planning					
Compliance with Concurrent Studies	Not compliant with the City of Windsor Active Transportation Master Plan and BUMP as University Avenue is designated as an "all ages and abilities" bicycle route. 	More compliant than Alternative 2 but less compliant than Alternative 3 with the City of Windsor Active Transportation Master Plan and BUMP which designates University Avenue as an "all ages and abilities" bicycle route. 	Less compliant with the City of Windsor Active Transportation Master Plan and BUMP which designates University Avenue as an "all ages and abilities" bicycle route. 	Most compliant with the City of Windsor Active Transportation Master Plan and BUMP which designates University Avenue as an "all ages and abilities" bicycle route. 	Moderately compliant with the City of Windsor Active Transportation Master Plan and BUMP which designates University Avenue as an "all ages and abilities" bicycle route
Natural Environment					
Stormwater Management	No change to total surface runoff. 	Reduces impervious area least and decreases total surface runoff less than other options. 	Reduces impervious area most and decreases total surface runoff more than other options. 	Reduces impervious area and decreases total surface runoff (more than Option 1 and less than Option 2). 	Reduces impervious area and decreases total surface runoff (more than Option 1 and less than Option 2).
Opportunities for Landscaping (Urban Heat Island Reduction/Climate Change Mitigation)	No opportunity for enhanced landscaping. 	1.3 m to 4.7 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings and landscaping features. 	1.8 m to 5.2 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings and landscaping features. 	1.6 m to 5.1 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings and landscaping features. 	1.5 m to 5.1 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings and landscaping features.
Summary of Natural Environment					
Socio-Economic					
Opportunities for Streetscaping	No opportunity for enhanced streetscaping. 	1.3 m to 4.7 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	1.8 m to 5.2 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	1.6 m to 5.1 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	1.5 m to 5.1 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.)
Cultural Heritage/Archaeological Impacts	No impact. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area.

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Cycle Track and Buffered Bicycle Lane (Hybrid)
Accessibility	Obstructions along sidewalks (e.g. hydro poles) are present at some locations reducing effective width to less than 1.5 metres. AODA compliant features (i.e. push buttons, tactile plates, etc.) are not present at all intersections. No opportunity to provide AODA compliant features. 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 
Network Connectivity	Sidewalks are present on both north and south sides of University Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present east and west of University Avenue. No opportunity to connect to cycling facilities on side streets adjacent to University Avenue. 	Sidewalks are present on both north and south sides of University Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present east and west of University Avenue. Opportunity to connect to cycling facilities present on side streets adjacent to University Avenue. 	Sidewalks are present on both north and south sides of University Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present east and west of University Avenue. Opportunity to connect to cycling facilities present on side streets adjacent to University Avenue. 	Sidewalks are present on both north and south sides of University Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present east and west of University Avenue. Opportunity to connect to cycling facilities present on side streets adjacent to University Avenue. 	Sidewalks are present on both north and south sides of University Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present east and west of University Avenue. Opportunity to connect to cycling facilities present on side streets adjacent to University Avenue. 
Implications to Stakeholders	Not consistent with the University of Windsor Campus Vision Master Plan. On-street parking is provided for adjacent businesses along the full length of corridor. Not consistent with the City's Civic Plaza/Esplanade design plans. 	Consistent with the University of Windsor Campus Vision Master Plan recommendation for cycling facilities between Huron Church Road and California Avenue. Parking is not provided for adjacent businesses between Bruce Avenue and Victoria Avenue. Cycling facilities can be implemented without impact to the City plans for the Civic Plaza/Esplanade. 	Consistent with the University of Windsor Campus Vision Master Plan recommendation for cycling facilities between Huron Church Road and California Avenue. Parking is not provided for adjacent businesses between Bruce Avenue and Victoria Avenue. Cycling facilities cannot be implemented without impact to the City plans for the Civic Plaza/Esplanade. Additional property is required for buffered bicycle lanes. 	Consistent with the University of Windsor Campus Vision Master Plan recommendation for cycling facilities between Huron Church Road and California Avenue. Parking is not provided for adjacent businesses between Bruce Avenue and Victoria Avenue. Cycling facilities can be implemented without impact to the City plans for the Civic Plaza/Esplanade. 	Consistent with the University of Windsor Campus Vision Master Plan recommendation for cycling facilities between Huron Church Road and California Avenue. Parking is not provided for adjacent businesses between Bruce Avenue and Victoria Avenue. Cycling facilities can be implemented without impact to the City plans for the Civic Plaza/Esplanade. 
Summary of Socio-Economic					

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Cycle Track and Buffered Bicycle Lane (Hybrid)
Implementation					
Utility Relocation	No impact 	Requires additional boulevard along Zones 1 and 2 to avoid utility relocation. Utility relocation required along Zones 4 and 5. 	Utility locations required at specific locations. 	Requires additional boulevard along Zones 1 and 2 to avoid utility relocation. Utility relocation required along Zones 4 and 5. 	Utility locations required at specific locations (more than Alternative 3 and less than Alternative 2).
Operations and Maintenance	No impact. 	Anticipated annual cost per kilometer: \$15,000. 	Anticipated annual cost per kilometer: \$13,000. 	Anticipated annual cost per kilometer: \$15,000. 	Anticipated annual cost per kilometer: \$13,000 to \$15,000.
Construction Staging and Constructability	No impact. 	Requires road reconstruction to accommodate bicycle lanes. 	Requires road reconstruction to accommodate bicycle lanes. 	Requires road reconstruction to accommodate cycle tracks. 	Requires road reconstruction to accommodate cycle tracks/ bicycle lanes.
Cost	No cost. 	Approximate construction cost: \$9.5M 	Approximate construction cost: \$9.1M 	Approximate construction cost: \$9.7M 	Approximate construction cost: \$9.4M
Summary of Implementation					

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Cycle Track and Buffered Bicycle Lane (Hybrid)
Recommendation					
Summary	<p>Sidewalks are provided on the north and south sides of University Avenue along the full length of the corridor.</p> <p>Dedicated bicycle facilities are provided along University Avenue from Huron Church Road to Bruce Avenue only. East of this intersection, cyclists share the road with vehicular traffic.</p> <p>On street parking provided on both sides of University Avenue between Vista Place and Goyeau Street.</p> <p>No opportunity for enhanced landscaping or streetscaping.</p> <p>No change in operations and maintenance.</p> <p>No construction costs.</p>	<p>Sidewalks and dedicated cycling facilities are provided along both sides of the road along the full length of the corridor.</p> <p>On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.</p> <p>1.3 m to 4.7 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost for operations and maintenance per kilometer: \$15,000.</p> <p>Moderate construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are provided along both sides of the road along the full length of the corridor.</p> <p>On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.</p> <p>1.8 m to 5.2 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost for operations and maintenance per kilometer: \$13,000.</p> <p>Lowest construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are provided along both sides of the road along the full length of the corridor.</p> <p>On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.</p> <p>1.6 m to 5.1 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost for operations and maintenance per kilometer: \$15,000.</p> <p>Highest construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are provided along both sides of the road along the full length of the corridor.</p> <p>On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.</p> <p>1.5 m to 5.1 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.)</p> <p>Anticipated annual cost for operations and maintenance per kilometer: \$13,000 - \$15,000.</p> <p>Moderate construction cost.</p>
Recommendation	 Not recommended	 Not recommended	 Not recommended	 Recommended	 Not recommended

Exhibit 5-9: Victoria Avenue - Analysis and Evaluation of Alternative Design Concepts

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Physically Protected Bicycle Lanes with Flex Boulevard	Alternative 5 Buffered Bicycle Lanes with Flex Boulevard	Alternative 6 Cycle Tracks (One-way) with Flex Boulevard
Traffic Operations and Safety							
Future Traffic Operations	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better. 	All existing movements are operating at a LOS C or better.
Motorist Safety	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns. 	No existing operational issues causing traffic safety concerns.
Pedestrian Safety	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor. 	Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor.
Cyclist Safety	There are no cycling facilities provided along Victoria Avenue. 	Dedicated cycling facilities are provided with a physical barrier between vehicles and cyclists along the full length of the corridor. 	Dedicated cycling facilities are provided with a 0.5 metre buffer (no physical buffer) between vehicles and cyclists along the full length of the corridor. 	Dedicated off-road cycling facilities are provided along the full length of the corridor. 	Dedicated cycling facilities are provided with a physical barrier between vehicles and cyclists along the full length of the corridor. 	Dedicated cycling facilities are provided with a 0.5 metre buffer (no physical buffer) between vehicles and cyclists along the full length of the corridor. 	Dedicated off-road cycling facilities are provided along the full length of the corridor. Curbs are required to delineate cycle track from flex boulevard.
Pedestrian and Cyclist Security and Comfort	Very low level of comfort for cyclists as dedicated facilities are not provided. Sidewalks are provided on both sides of Victoria Avenue. 	Dedicated cycling facilities are provided with a physical barrier between vehicles and cyclists along full length of corridor. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	Dedicated cycling facilities are provided with a 0.5 metre buffer between vehicles and cyclists along full length of corridor. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	High level of comfort for cyclists. Cyclist are physically separated from vehicles. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	Dedicated cycling facilities are provided with a physical barrier between vehicles and cyclists along full length of corridor. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	Dedicated cycling facilities are provided with a 0.5 metre buffer between vehicles and cyclists along full length of corridor. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor. 	High level of comfort for cyclists. Cyclist are physically separated from vehicles. High level of comfort for pedestrians as 1.5 metre sidewalks are provided along full length of corridor.
Parking	Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street. 	Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street. 	Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street. 	Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street. 	Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided. 	Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided. 	Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided.
Transit	Does not improve current transit services. Does not provide opportunities for improvements (i.e. bus stops). 	May require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes. 	Does not require consideration (at detailed design) at bus stop locations. Minor changes to pavement markings may be required. 	Will require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes. 	May require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes. 	Does not require consideration (at detailed design) at bus stop locations. Minor changes to pavement markings may be required. 	Will require consideration (at detailed design) at bus stop locations including pavement markings and redesign of the protected bicycle lanes.
Summary of Traffic Operations and Safety							

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Physically Protected Bicycle Lanes with Flex Boulevard	Alternative 5 Buffered Bicycle Lanes with Flex Boulevard	Alternative 6 Cycle Tracks (One-way) with Flex Boulevard
Natural Environment							
Stormwater Management	No change to total surface runoff. 	Reduces impervious area least and decreases total surface runoff less than other options. 	Reduces impervious area most and decreases total surface runoff more than other options. 	Reduces impervious area and decreases total surface runoff (more than Option 1 and less than Option 2). 	Reduces impervious area least and decreases total surface runoff less than other options. 	Reduces impervious area most and decreases total surface runoff more than other options. 	Reduces impervious area and decreases total surface runoff (more than Option 1 and less than Option 2).
Opportunities for Landscaping (Urban Heat Island Reduction/Climate Change Mitigation)	No opportunity for enhanced landscaping. 	3.1 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings and landscaping features. 	3.6 m to 6.1 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings and landscaping features. 	3.4 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings and landscaping features. 	11.1 m to 15.7 m boulevards are provided in the flex boulevard which provides an opportunity for plantings and landscaping features. 	12.1 m to 16.2 m boulevards are provided in the flex boulevard which provides an opportunity for plantings and landscaping features. 	11.7 m to 16.3 m boulevards are provided in the flex boulevard which provides an opportunity for plantings and landscaping features.
Summary of Natural Environment							
Socio-Economic							
Opportunities for Streetscaping	No opportunity for enhanced streetscaping. 	3.1 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	3.6 m to 6.1 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	3.4 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	11.1 m to 15.7 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	12.1 m to 16.2 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.) 	11.7 m to 16.3 m boulevards are provided which present the opportunity for additional streetscaping (i.e. bicycle parking, street furniture, etc.)
Cultural Heritage/Archaeological Impacts	No impact. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area. 	Built heritage resources and cultural heritage landscapes are present within the study area. Mitigation strategies can be implemented to address potential adverse impacts. A Stage 2 Archaeological Assessment is required for a portion of the study area.
Accessibility	Sidewalks are provided on both sides of the road along the full length of the corridor however, AODA compliant features (i.e. push buttons, tactile plates, etc.) are not present at all intersections. Cycling facilities are not present along Victoria Avenue. No opportunity to provide AODA compliant features. 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.) 	Dedicated facilities are provided along the corridor that are accessible to both pedestrians and cyclists (AODA compliant). Opportunity to ensure all intersections are AODA compliant (i.e. push buttons, tactile plates, etc.)

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Physically Protected Bicycle Lanes with Flex Boulevard	Alternative 5 Buffered Bicycle Lanes with Flex Boulevard	Alternative 6 Cycle Tracks (One-way) with Flex Boulevard
Network Connectivity	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided within the study area.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue and must share the road with other road users.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue therefore there is no network connectivity requirement.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue and must share the road with other road users.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue and must share the road with other road users.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue and must share the road with other road users.	Sidewalks are present on both east and west sides of Victoria Avenue providing a continuous pedestrian route connecting with the sidewalk facilities present north and south of Victoria Avenue. Cycling facilities are not provided on side streets adjacent to Victoria Avenue and must share the road with other road users.
Implications to Stakeholders	Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street	Permanent on street parking for adjacent businesses is present on both sides of Victoria Avenue between Chatham Avenue and Park Street.	Permanent on street parking for adjacent businesses is present on both sides of Victoria Avenue between Chatham Avenue and Park Street.	Permanent on street parking for adjacent businesses is present on both sides of Victoria Avenue between Chatham Avenue and Park Street.	Permanent on street parking for adjacent businesses is not present on Victoria Avenue. Flex boulevard provides multi-purpose space for adjacent businesses owners.	Permanent on street parking for adjacent businesses is not present on Victoria Avenue. Flex boulevard provides multi-purpose space for adjacent businesses owners.	Permanent on street parking for adjacent businesses is not present on Victoria Avenue. Flex boulevard provides multi-purpose space for adjacent businesses owners.
Summary of Socio-Economic							
Implementation							
Utility Relocation	No impact	Potential relocation of existing hydro poles and parking metres.	Potential relocation of existing hydro poles and parking metres.	Potential relocation of existing hydro poles and parking metres.	Potential relocation of existing hydro poles and parking metres.	Potential relocation of existing hydro poles and parking metres.	Potential relocation of existing hydro poles and parking metres.
Operations and Maintenance	No impact.	Anticipated annual cost per kilometer: \$15,000.	Anticipated annual cost per kilometer: \$13,000.	Anticipated annual cost per kilometer: \$15,000.	Anticipated annual cost per kilometer: \$15,000 for physically protected bicycle lanes and \$10,000 for flex boulevard.	Anticipated annual cost per kilometer: \$13,000 for buffered bicycle lanes and \$10,000 for flex boulevard.	Anticipated annual cost per kilometer: \$15,000 for cycle tracks and \$10,000 for flex boulevard.
Construction Staging and Constructability	No impact.	Requires road reconstruction to accommodate bicycle lanes.	Requires road reconstruction to accommodate bicycle lanes.	Requires road reconstruction to accommodate cycle tracks.	More complex design and construction for the flex option as changes to the roadway are required in addition to those considered for the cycling facilities.	More complex design and construction for the flex option as changes to the roadway are required in addition to those considered for the cycling facilities.	More complex design and construction for the flex option as changes to the roadway are required in addition to those considered for the cycling facilities.
Cost	No cost.	Approximate construction cost: \$1.8M	Approximate construction cost: \$1.8M	Approximate construction cost: \$1.9M	Approximate construction cost: \$2.0M	Approximate construction cost: \$1.9M	Approximate construction cost: \$2.1M
Summary of Implementation							

TECHNICAL CRITERIA	Do Nothing	Alternative 1 Physically Protected Bicycle Lanes	Alternative 2 Buffered Bicycle Lanes	Alternative 3 Cycle Tracks (One-way)	Alternative 4 Physically Protected Bicycle Lanes with Flex Boulevard	Alternative 5 Buffered Bicycle Lanes with Flex Boulevard	Alternative 6 Cycle Tracks (One-way) with Flex Boulevard
Recommendation							
Summary	<p>Sidewalks are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>There are no cycling facilities provided along Victoria Avenue.</p> <p>Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street.</p> <p>No opportunity for enhanced landscaping or streetscaping.</p> <p>No change in operations and maintenance.</p> <p>No construction costs.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street.</p> <p>3.1 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$15,000.</p> <p>Moderate construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street.</p> <p>3.6 m to 6.1 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$13,000.</p> <p>Lowest construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street.</p> <p>3.4 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$15,000.</p> <p>Moderate construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided.</p> <p>11.1 m to 15.7 m boulevards are provided in the flex boulevard which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$25,000.</p> <p>Moderate construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided.</p> <p>12.1 m to 16.2 m boulevards are provided in the flex boulevard which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$23,000.</p> <p>Moderate construction cost.</p>	<p>Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.</p> <p>Opportunity to provide temporary parking during special events within the flexible boulevard. No permanent parking provided.</p> <p>11.7 m to 16.3 m boulevards are provided in the flex boulevard which provides an opportunity for plantings, landscaping features and streetscaping.</p> <p>Anticipated annual cost per kilometer: \$25,000.</p> <p>Highest construction cost.</p>
Recommendation	 Not recommended	 Not recommended	 Not recommended	 Recommended	 Not recommended	 Not recommended	 Not recommended

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5.3. Technically Preferred Alternative Design

Based on the results of the analysis and evaluation of alternative design concepts, Cycle Tracks (one-way) were selected to be the preliminary preferred design concept for University Avenue and Victoria Avenue, subject to agency and public review.

Elements of the Preferred Alternative for University Avenue include:

- Sidewalks and dedicated cycling facilities are provided along both sides of the road along the full length of the corridor.
- On street parking provided on both sides of University Avenue between Huron Church Road and Bruce Avenue.
- 1.6 m to 5.1 m boulevards are provided on both sides of the corridor along most of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.

Elements of the Preferred Alternative for Victoria Avenue include:

- Sidewalks and dedicated cycling facilities are present on the east and west sides of Victoria Avenue along the full length of the corridor.
- Permanent on street parking present on both sides of Victoria Avenue between Chatham Avenue and Park Street.
- 3.4 m boulevards are provided on both sides of the corridor which provides an opportunity for plantings, landscaping features and streetscaping.

For both corridors under study, City Staff considered the following changes as part of the recommended alternative (March 25, 2021)

- The Cycle Track is preferred to be behind the boulevard in all instances throughout the project and not against the curb area.
- This provides an area for snow storage during the winter months from both the road and the cycle tracks
- Additionally, it eliminates a hazard to both cyclists and pedestrians exiting and leaving vehicles.
- Utilities relocation including hydro poles is acceptable for a project of this scope and scale.

The requested change to the location of the cycle tracks behind the boulevard required the following activities:

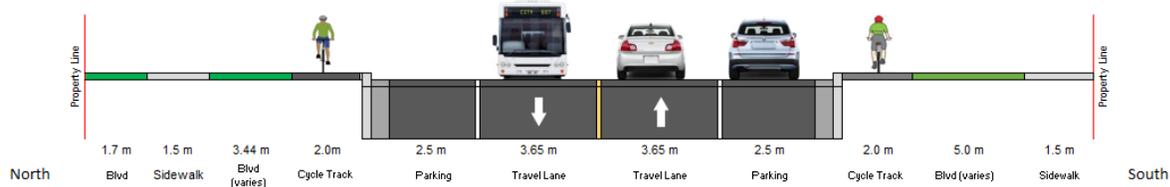
5.3.1. From Huron Church Road to Partington Avenue



Typical Cross Section - as per Design Plates (August 2020)

- North side of University Avenue.
 - Relocate the cycle track besides the sidewalk.
 - Modify the boulevard in accordance.
 - Relocation of all utility poles, parking meters and existing curbs
 - Removal of trees at the existing boulevards
 - Relocation of IPS poles at Sunset Avenue.
- South side.
 - No changes

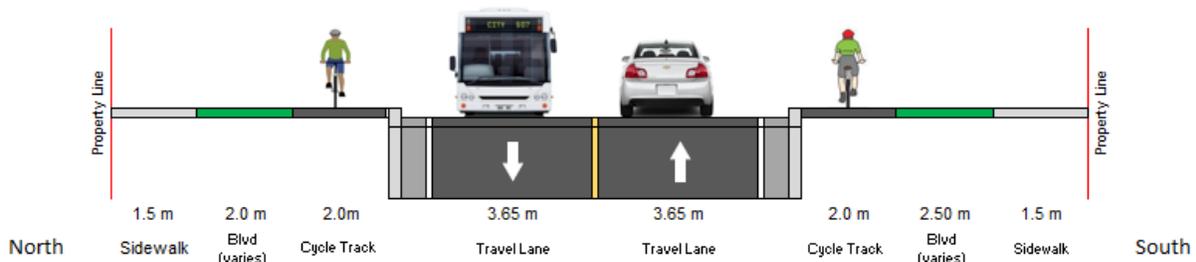
5.3.2. From Partington Avenue to Salter Avenue



Typical Cross Section - as per Design Plates (August 2020)

- North side of University Avenue.
 - Maintain the existing sidewalk and buffer.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles, parking meters and existing curbs.
 - Relocate the proposed boulevard besides the parking lane.
- South side of University Avenue.
 - Maintain the existing sidewalk.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all hydro and utility poles, parking meters and existing curbs.
 - Relocate the proposed boulevard besides the parking lane.
 - Relocation of traffic signal at McKay Ave.
 - Relocation of traffic signal at Crawford Avenue.

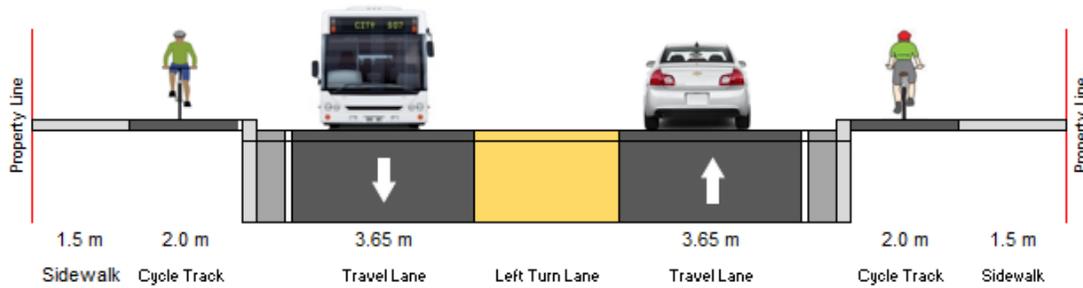
5.3.3. From Salter Avenue to Pelissier Street



Typical Cross Section - as per Design Plates (August 2020)

- Both sides of University Avenue.
 - Maintain the existing sidewalk.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles and existing curbs.
 - Relocated the proposed boulevard besides the vehicular lane.

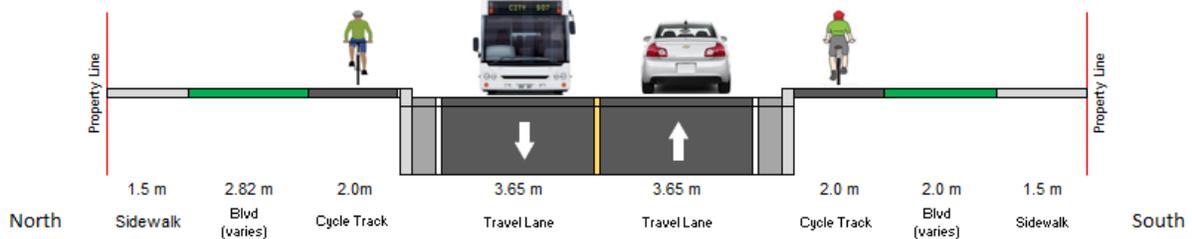
5.3.4. From Pelisser Avenue to Oullette Avenue



Final Preferred Cross Section

- Both sides of University Avenue
 - No required changes

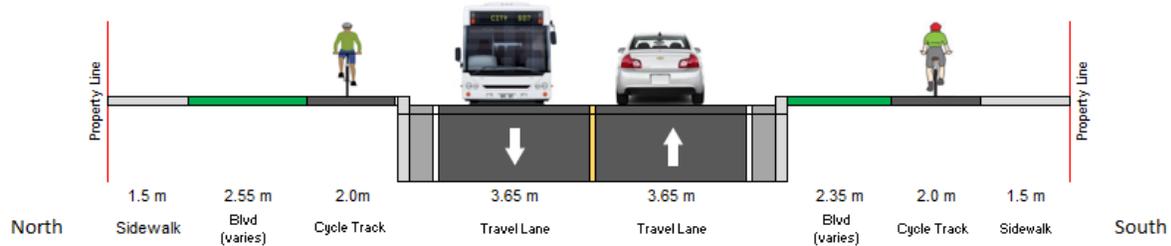
5.3.5. From Ouellette Avenue to Freedom Way



Typical Cross Section - as per Design Plates (August 2020)

- Both sides of University Avenue
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles and existing curbs.
 - Removal of all trees.
 - Relocate the proposed boulevard besides the vehicular lane.

5.3.6. From Freedom Way to City Hall Square



Typical Cross Section - as per Design Plates (August 2020)

- North of University Avenue:
 - Maintain the existing sidewalk.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles and existing curbs.
 - Removal of all trees.
 - Relocated the proposed boulevard besides the vehicular lane.

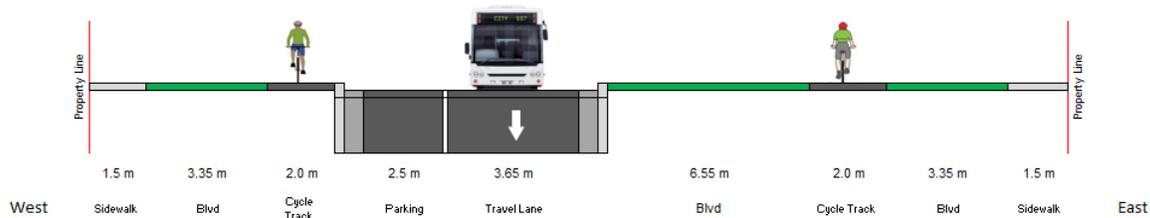
5.3.7. From Chatham Street to University Avenue



Typical Cross Section - as per Design Plates (August 2020)

- Both sides of Victoria Avenue
 - Maintain the existing sidewalk.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles and existing curbs.
 - Removal of all trees.
 - Relocated the proposed boulevard besides the vehicular lane.

5.3.8. From University Avenue to Park Street



Typical Cross Section - as per Design Plates (August 2020)

- Both sides of Victoria Avenue
 - Maintain the existing sidewalk.
 - Relocate the cycle track besides the sidewalk.
 - Relocation of all utility poles and existing curbs.
 - Removal of all trees.
 - Repurpose the proposed boulevard (east) as flex area

5.4. Phase 3 Consultation

5.4.1. Notice of Public Information Centre No. 2

The Notice of Public Information Centre No. 2 was prepared to inform the public and agencies of the opportunity to review the preferred alternative design for input. The notice was advertised in the Windsor Star on July 15 and 20, 2021 and was mailed to 1,109 property owners within the study limits on July 16, 2021.

The Notice of Public Information Centre No. 2 outlined the purpose of the meeting and identified the time, date, and location for the PIC. The public was invited to provide comments on the study by attending the virtual PIC or contacting the project team directly via an online comment form/email.

5.4.2. Public Information Centre No. 2

PIC No.2 was held on July 27, 2021 from 6:00 PM to 8:00 PM. The PIC was held in a virtual format where the public was invited to review the presentation slides, ask questions, and discuss comments with the project team. The display boards described the following:

- Welcome
- Purpose of the Study
- Municipal Class EA Process
- Public Information Centre (PIC) 1
- Other Engagement Opportunities
- Overview of Material Presented at PIC 1
- What We Heard
- Preferred Solutions

- Phase 3 –Alternative Design Concepts for Preferred Solution
- Comment and Feedback

Twenty-one (21) comments were received through email correspondence as part of the PIC No.2 consultation in addition to the questions answered during the live session. A copy of the PIC material and comments are included in Appendix K.

5.4.3. Stakeholder Meeting No. 3

A third virtual Stakeholder Meeting was held on August 19, 2021 to review the design from PIC No.2 and solicit feedback. The Downtown Districting Committee was the only stakeholder group that attended this meeting. Minutes of meeting for Stakeholder Meeting No. 3 are included in Appendix K.

5.5. Design Concept

The results of the first 3 Phases of the Class EA, including the preliminary preferred design, was presented to the stakeholders and the public for review and input at PIC No. 2 (Section 5.4.2).

All comments during the consultation period could be addressed and provide an overall support to the recommended solution. Therefore, the preferred design concept for University Avenue West and Victoria Avenue was confirmed to be the provision of one-way cycle tracks.

6. Description of the Recommended Plan

The Recommended Plan considers opportunities to optimize the right-of-way to provide a safe, comfortable and efficient travel for all roadway users. The recommended corridors include the provision of Cycle Tracks (one-way) along University Avenue and Victoria Avenue with sidewalks on both sides of the road. The main features of the recommended plan are presented in the following sections. The proposed alignments are generally consistent with the existing road profile but may be refined in detailed design.

Based on the results of the technical studies, comments from general public and feedback from stakeholders the elements of the preferred solution were identified as follow:

- Public Transportation. Shared Lanes with Vehicular Traffic
- Pedestrian infrastructure. Sidewalks at 1.5 minimum as per AODA
- Cycling Infrastructure. Protected Bike Facilities
- On-Street Parking. Context specific solution based on availability of space
- Boulevards and Streetscaping. Context specific solution based on availability of space.

6.1. Roadway Geometry

University Avenue and Victoria Avenue are classified as local roads with statutory speed limits of 50km/h within the study area. The geometric design standards used to develop the alignment and cross-sections are summarized in Exhibit 6-1. Geometric design standards are based on the classification of the road and the design speed.

Exhibit 6-1: Design Criteria

Roadway Element	Desired	Minimum	Notes/Sources
Vehicular Travel Lanes (Shared with Transit)	3.65 m	3.2 m	City standard is 3.65 m when buses/trucks are present. No BRT lanes (transit email)
Vehicle Parking Lanes	2.4 m	<ul style="list-style-type: none"> • 2.2 m • 2.4 m with bike lanes present 	City Standard
Sidewalks – Pedestrian Comfort	Meet or exceed AODA requirements	1.5 m	AODA Standards
Cycling Facilities	2 m per direction	1.5 m per direction	OTM Book 18

Roadway Element	Desired	Minimum	Notes/Sources
-Separated Bike Lanes (Cycle-tracks)			
Cycling Facilities - Buffered Bike lanes	1.5 m lane with 0.3 m buffer	1.5 m with 0.3 m buffer	<ul style="list-style-type: none"> Location of buffer at the right side of the vehicular travel lane Having wider lanes or buffers encourages use as a travel lane
Cycling Facilities -Bike lanes no buffer	OTM Book 18 requirements <ul style="list-style-type: none"> 1.8 m 	<ul style="list-style-type: none"> 1.5 m no parking 1.6 m with parking 	OTM Book 18/City Standard
Transit Stops/Bulb out requirements	60ft bulb-outs (per email)	40ft bulb-outs(existing)	Information provided via email (Pre PIC)
	Modifications to Randolph bus stop		Information provided via email (Post PIC)
	Signal Priority at bus stops working with City ITS		Information provided via email (Post PIC)
	Needs confirmation on what the cycle treatments at bus stops would look like		Information provided via email (Post PIC)
Sustainability and Climate Change	Explore the possibility of including elements like:		Information provided via email (Post PIC)

Roadway Element	Desired	Minimum	Notes/Sources
	<ul style="list-style-type: none"> • Permeable pavement • Using greenspace for stormwater capacity • LID Technology • Placing Trees so they provide shade to bus stops 		
Parks Department	<ul style="list-style-type: none"> • Large Canopy trees (size and placement) • Planters • Benches • Artificial Shade Structures 		No additional comments from Parks Department.

6.2. Typical Cross-Sections

The typical cross-sections for the recommended plan are illustrated in the exhibits below. In areas where the right-of-way is constrained (i.e., intersections), the cross-section has been modified in order to avoid impacts to private property. The right-of-way creates opportunity to optimize the roadway elements of the right-of-way to space for all elements, specific to the immediate context:

- Create a pleasant mobility experience for
- Pedestrians
- Cyclists
- Transit operations
- Increase green areas and pervious surface for the mitigation of urban heat island effects
- Incorporate street furniture and amenities within the right-of-way

The features provided in the typical cross-section introduce or enhance opportunities for integration of other modes of transportation. The final cross-sections of the preferred design are illustrated below, including the requested changes to consistently align the cycle tracks behind the boulevard. The preferred cross-sections will differ based on the specific context zones.

University Avenue:

- Right-of-way typically between 28 m and 29 m
- Two 3.65 m travel lanes (one per direction)
- 2.5 m parking lanes on both sides
- 2.0 m cycle track on both sides
- 1.5 m sidewalk on both sides
- Boulevard on both sides between the cycle track and sidewalk (varying width)

6.2.1. From Huron Church Road to Partington Avenue



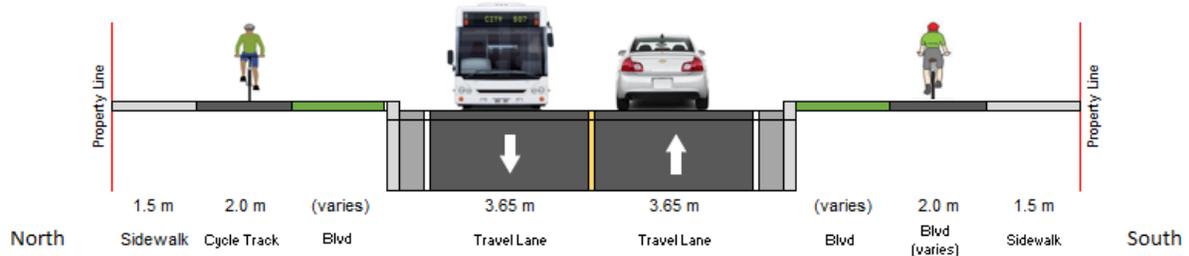
Final Preferred Cross Section

6.2.2. From Partington Avenue to Salter Avenue



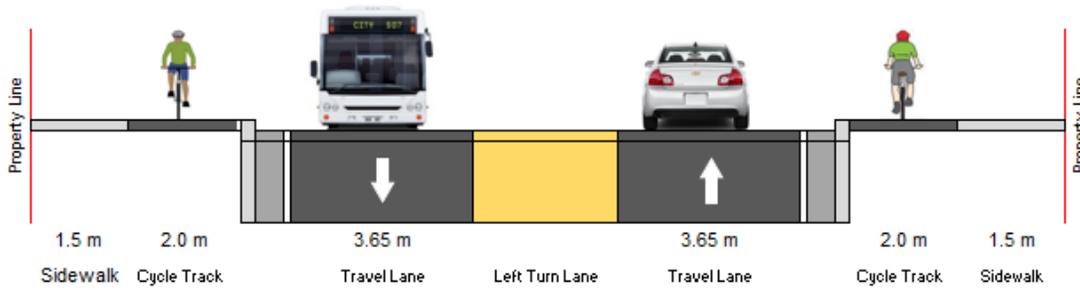
Final Preferred Cross Section

6.2.3. From Salter Avenue to Pelissier Street



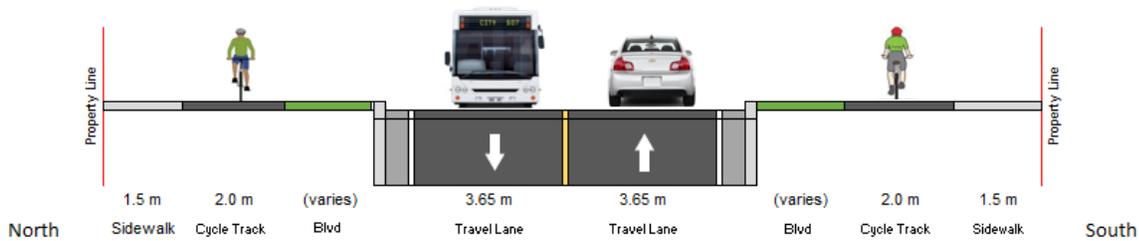
Final Preferred Cross Section

6.2.4. From Pelisser Avenue to Oullette Avenue



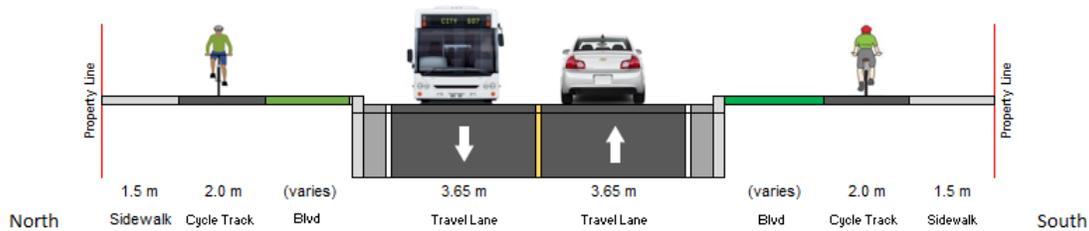
Final Preferred Cross Section

6.2.5. From Ouellette Avenue to Freedom Way



Final Preferred Cross Section

6.2.6. From Freedom Way to City Hall Square



Final Preferred Cross Section

The cross-section of Victoria Avenue north of University Avenue includes two travel lanes, one per direction. South of University Avenue, the northbound travel lane ends where the travel becomes one-way only 6.55 m boulevard is provided on the east side of Victoria Avenue between the curb and cycle track.

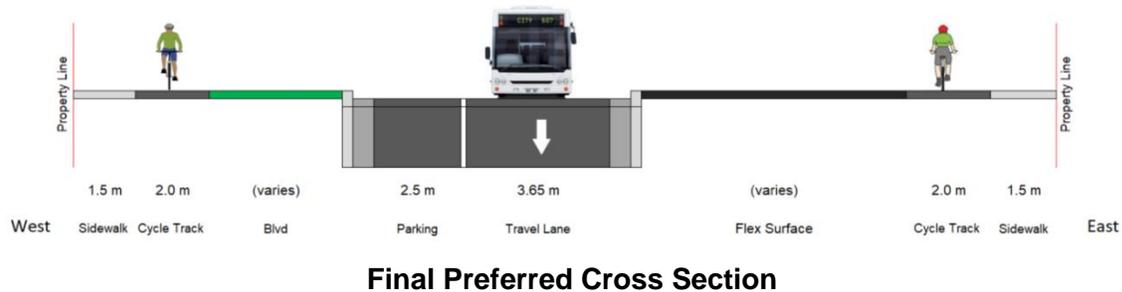
Victoria Avenue:

- 26 m right-of-way
- 3.65 m travel lanes (one per direction)
- 2.5 m parking lane on both sides
- 2.0 m cycle track on both sides
- 1.5 m sidewalk on both sides
- Boulevard on both sides between the cycle track and sidewalk (varying width)

6.2.7. From Chatham Street to University Avenue



6.2.8. From University Avenue to Park Street



6.3. Active Transportation

The proposed typical cross-section has been designed to accommodate bike lanes and sidewalks along both sides of the roadway. Active transportation was a key consideration as part of this project to create a physical environment that encourages safe roadway user behaviour and minimizes conflict between different modes of transport.

For both the University Avenue and Victoria Avenue corridors, continuous one-way cycle tracks are recommended on both sides of the road, where the cycle tracks are 2.0 m wide and are separated from the 2.5 m parking lane by a boulevard. Cross-rides are also proposed at intersections to provide dedicated space for cyclists crossing. Continuous 1.5 metre sidewalks are provided on both sides of the roads adjacent to the boulevard with crosswalks at intersections to facilitate pedestrian movement along the corridor. The sidewalks conform to AODA requirements for new construction or redeveloped exterior paths of travel and is clear of

obstructions such as hydro poles or trees. The cycle track is preferred to be behind the boulevard in all instances throughout the project and not against the curb area. This provides an area for snow storage during the winter months from both the road and the cycle tracks.

6.3.1. Key Intersections and Connections

Though all intersections warrant a design that ensures the safety of all users, the following intersections were identified in which additional consideration and attending will be required during further phases of the design process. These intersections were identified through the Windsor Active Transportation Master Plan as being prioritized for AAA facilities or connect to existing AT facilities.

- California Avenue.
 - Adjust curb lines to create parking bays and reduce crossing distance at University Avenue
 - Include advanced bike box on south side of University Avenue to facilitate the northbound left movement from California Avenue onto University Avenue.
- International Gardens trail crossing
 - The International Gardens Linear Park has a trail that runs its length but no crossing at University Avenue. The closest controlled crossing is nearly two blocks west at Mackay Avenue. It is recommended that a pedestrian crossover be considered for this location to improve the continuity of the trail.
- Crawford Avenue. Under existing conditions, the roadway has a mixed traffic environment with no dedicated cycling facilities.
 - In order to provide a AAA intersection, it is recommended that a full protected intersection be considered as part of future reconfiguration of the roadway, where cyclists are transitioned off the roadway into cycle tracks at the intersection.
 - Should space do not allow for a full protected intersection, it is still recommended to make the proposed curb line adjustments in order to reduce pedestrian and cyclist crossing distances. Left turn bike boxes are also a priority at this intersection in order to clearly facilitate bicycle movements in all directions.
- Victoria Avenue. The intersection at Victoria Avenue is proposed to have a significant reallocation of space and will have cycle tracks along both streets. As such, it is recommended that a full protected style intersection design is considered as part of the detailed design of this intersection.
- Goyeau Street. The cross section of Goyeau Street does not currently include any cycling facilities. Based on the identification in the AT plan as having a need for AAA facilities, it is presumed likely that cycle tracks may be incorporated in the future. It is recommended that this intersection maintain the proposed design until a future design for Goyeau St. can be established and the facilities tied in properly.

6.4. Transit Facilities

Evaluation of the existing transit operations along University Avenue and Victoria Avenue corridors indicated that all evaluated locations were under acceptable LOS and no further

improvements were required. However, due to the proposed modifications of the roadway elements servicing the corridors under study, Transit Windsor requested that the following items should be considered (or discarded) during detailed design of the preferred alternative:

- No need for consideration of exclusive transit lanes or bus rapid transit facilities on University Avenue.
- Transit Windsor would continue to operate their buses in mixed traffic and would want to do so without bus bays and with, if necessary, appropriate transit priority measures that would be suitable to the particular intersection in question.
- Consideration for bulb-outs to eliminate bus bays and enhance space for waiting transit customers, and to take advantage of transit priority/ITS opportunities. Consider bulb outs be built to a 60ft length for passengers rather than 40ft so that we can accommodate future use of articulated buses
- Consideration for maintaining the current bus stops location with the exception of the one on the north side at Randolph Street.
- Identify the interaction between the proposed cycling infrastructure and the bus stop operations.

With respect of the interactions between transit operations and the proposed cycling facilities the detailed design of the preferred alternative will consider the location and layout of the bus stops along the corridors under study. Although Transit Windsor is suggesting the bus stop layout shown in Exhibit 6-2, it will need to be subjected to some modifications depending of the type of cycling facility and the available right-of-way at each location.

Exhibit 6-2: Transit Windsor – Preferred Bus Stop Layout



Exhibit 6-3 and Exhibit 6-4 provide an example of the design elements of near-side and far-side boarding island stop with dedicated cycling facilities at sidewalk level as recommended by the National Association of City Transportation Officials (NATCO).

Exhibit 6-3: Near-Side Stop with Bike Channel at Sidewalk Level



Exhibit 6-4: Far-Side Stop with Bike Channel at Sidewalk Level



- The boarding platform must at minimum span from the front door to the rear door, and may be extended to meet capacity demands (i.e. 60 ft as per Transit Windsor comments);

- The cycling facility behind the floating boarding island can be at street grade or may be raised; and
- Mark pedestrian crossings through bike lane.
- If high turn volumes are present, include a rear storage area so cars are less likely to queue into the intersection while the bus dwells;
- Accessible ramps should be paired with crosswalks to direct users to safe crossings; and
- At high passenger volumes, channelize pedestrian movements on and off the platform to reduce conflicts.

It should be considered as part of the detailed design that accommodation of this type of transit related infrastructure will affect the availability of parking space as well as access to residential and commercial driveways along the corridors under study.

6.5. On-Street Parking

The University Avenue corridor generally allows on-street parking on both north and south side, with more prominent restrictions on the east section. Most parking spaces along University Avenue have a minimum width of 2.3-metre, which follows specifications of OTM Book 11 – Pavement, Hazard and Delineation Markings.

The Cycle Track is preferred to be behind the boulevard in all instances throughout the project to eliminate the hazard to cyclists and pedestrians exiting and leaving vehicles.

Parking availability along University Avenue:

- Huron Church Road to Slater Avenue – North and South Parking Available
- Slater Avenue to McDougall Street – No Parking Available

Parking availability along Victoria Avenue:

- Chatham Street West to University Avenue – West and East Parking Available
- University Avenue to Park Street West – West Parking Available

6.6. Intersections

Dedicated left turn lanes are provided at the following intersections with University Avenue:

- Campbell Avenue
- Crawford Avenue
- Salter Avenue
- Caron Avenue
- Janette Avenue
- Bruce Avenue
- Ouellette Avenue
- McDougall Avenue

The remaining intersections operate as shared left/through/right lanes.

Victoria Avenue transitions from a two-way street to one-way at University Avenue. The northbound lane ends at this intersection and one through lane continues through the intersection to the south.

6.6.1. Minor Intersections

University Avenue has a significant number of minor intersections which are not signalized and likely see relatively low traffic volumes on the cross streets. As such, the design of these intersections has the potential to significantly improve the safety and comfort of pedestrians and cyclists while having a minimal impact on vehicle traffic. In order to benefit from this opportunity, it is recommended as continuous sidewalk and cycle track design be considered, also known as a gateway treatment. This design forgoes traditional curb returns and treats the minor side street more similarly to a driveway, where the sidewalk and cycle track are continuous and raised from the roadway.

A list of intersections for further consideration is as follow:

- Patricia Road
- Sunset Avenue
- Askin Avenue
- Randolph Avenue
- Randolph Pl
- Rankin Avenue
- Partington Avenue
- Bridge Avenue
- Josephine Avenue
- McEwan Avenue
- Curry Avenue
- McKay Avenue
- Wellington Avenue
- Elm Avenue
- Oak Street
- Salter Avenue
- Caron Avenue
- Janette Avenue
- Dougal Avenue
- Freedom Way

6.7. Potential Bridge Removal (CHL5- Canadian Pacific Railway)

The potential removal of the bridge over the abandoned Canadian Pacific Railway corridor (CHL5) was considered as part of the determination of the preferred design alternative. Although the EA did not consider the removal of the existing bridge structure as part of the proposed recommendations, the City considered Phase 3 of the EA process as a good opportunity to (1) review the feasibility of replacing the existing infrastructure (2) inform the public about the potential removal of the existing bridge, and (3) engage affected property owners as part of the feasibility review.

To support the consideration of the potential removal, the following activities were conducted as part of the environmental assessment process:

- Completion of a Heritage Impact Assessment to determine the suitability of the removal of the bridge,
- Review of potential alternatives for the replacement of the existing structure.

6.7.1. Heritage Impact Assessment

The Canadian Pacific Rail Line was identified as a Cultural Heritage Landscape in 2018 by Archaeological Research Associates Ltd as part of the Built Heritage and Cultural Heritage Landscape Assessment of the structures and landscapes with the potential to be impacted by the proposed improvements of the Environmental Assessment.

The 2018 Built Heritage and Cultural Heritage Landscape Assessment did not identify the bridge as a heritage resource; however, since it spans an identified heritage resource (CHL 5) and is adjacent to another heritage resource (BHR 27 302 Caron Avenue), the Heritage Impact Assessment was triggered. The property is located on Lots 76 77, Concession 1 Petite Cote, Geographic Township of Sandwich, former Essex County, in the Town Plot of Sandwich within the City of Windsor, Ontario. (See Exhibit 6-5). Based on communications provided by the City, the property is currently owned by the City of Windsor.

The current proposal for this section of the road reconstruction indicates that the box beam girder bridge will not be replaced by another bridge; instead, the gap will be filled with a retaining wall and the road will be reconstructed. At the time of writing this report a preferred redevelopment plan had not been disclosed and demolition and removal of the bridge and replacement with a retaining wall and reconstructed road along the project location represents the proponent's preliminary initiative. Detail design of the proposed bridge replacement options are not currently available. If consideration for the removal of the existing bridge structure is carried on (outside of the existing EA process) it has been assumed that a retaining wall will be constructed following the current alignment of University Avenue (see Exhibit 6-6) to support the reconstruction of the road without changes to the existing right of way and property lines.

Since the proposed bridge replacement is a retaining wall, which is assumed to be constructed following the current alignment of University Avenue, this would result in no changes to the existing right of way and property lines. As such, it can be considered that any effects to will be limited to those generated during the removal of the existing bridge, the construction of the retaining wall, and the reconstruction of University Avenue.

If the replacement of the existing structure with a retaining wall is approved, the following mitigation measures should be carried out:

- That material from the railway itself like wood railway ties may be worthy of salvage
- That plaques or other interpretative displays may be made of materials salvaged from the remaining parts of CHL 5 CP Rail;
- That if the work areas are to extend past the bridge to the east, north or south of the ROW, an archaeological assessment should be undertaken.
- That during demolition work, the laydown and turn around areas should be located away from BHR 27.
- That a Temporary Protection Plan should be developed to protect BHR 27 during construction.

- That an opening incorporated into the retaining wall design would conserve the linear corridor and could be considered during detailed design.

6.7.2. Review of Potential Alternatives

Based on communications with City Staff, the potential redevelopment of the lot north of the existing bridge structure as mid-rise residential limited the number of potential alternatives for the replacement of the bridge structure to the use of a retaining wall. Review of the proposed cross section for the preferred alternative confirmed that the removal/replacement of the existing structure will allow with the continuation of the sidewalk and cycle tracks in a format similar to the east end of the structure.

Preliminary review of the property lines suggested that there is enough space to construct the retaining walls and to accommodate the road features without parking lanes. However, based on the existing roadway geometrics, the City may consider the adjustment of the vertical alignment since it does not generate impacts to the adjacent building. Vertical alignment adjustment not only help to reduce the retaining wall height but also improve the alignment.

Exhibit 6-5: Bridge at Salter Avenue



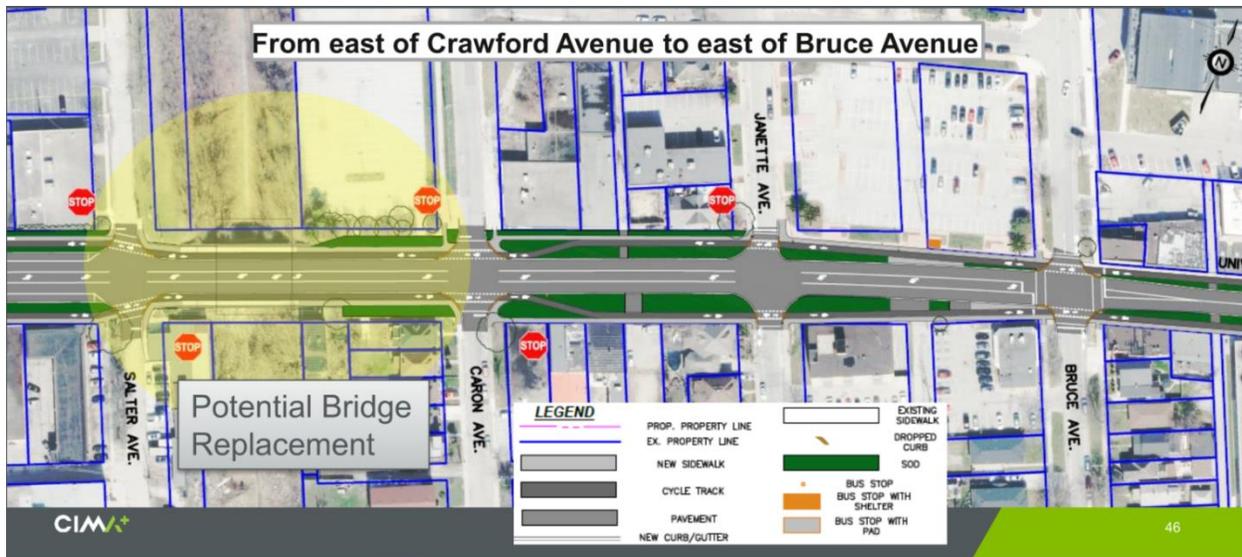


Exhibit 6-6: Location of Potential Bridge Replacement at Salter Avenue

The effects of the proposed demolition and replacement with a wall would result in the loss of the uninterrupted linear corridor along CHL 5 and the isolation of the cultural heritage resource. The use of heavy equipment to complete the removal of the existing bridge, the construction of the retaining wall, and the reconstruction of University Avenue have the potential to create land disturbance and thus impact archaeological resources.

6.8. Drainage and Stormwater Management

The stormwater/drainage considerations of the proposed improvements including identifying areas of issue/opportunity. It is understood all roadways will be re-urbanized with new curb and gutter to suit the new roadway and active transportation facilities. Re-urbanization with implementation of perforated subdrains provides an organized means of providing sub drainage to roadway granular base/subbase. The new vertical alignment of curbs is anticipated to largely resemble the existing condition. Roadway narrowing without re-profiling the roadway will likely result in slightly flattened boulevards, which may require boulevard area drains at specific/isolated areas.

With optimizing the rights-of-way, University Avenue and Victoria Avenue will be renewed with transportation improvements including sidewalks, on street cycling facilities or cycle tracks. Elevated medians present maintenance challenge hence prone to blocking drainage, a minimum cross slope of 2% is recommended to ensure positive transverse drainage.

To achieve an increased aspect of stormwater management within the corridor, large width planting strips/boulevard areas should be considered as potential locations for localized at grade/below grade LID stormwater facilities.

The proposed optimization of the rights-of-way and active transportation improvements will result in less impervious area. Using a weighted average approach results in a decrease in impervious area of 23% with a decrease in surface runoff of 643 l/s is calculated. It should be noted the

entirety of the impervious area/run-off reduction is not anticipated to be realized by one specific stormwater system or receiver, as it is anticipated that there are multiple systems throughout this large site.

6.9. Natural Environment

The Project is being undertaken to optimize the ROW to improve safety, operational efficiency, placemaking/implementation of green infrastructure, and provision of space for utility and sewer infrastructure. The preferred alternative (Appendix L) is not within the footprint of any valued ecosystem components and impacts to the natural heritage resources located at (1) the crossing over the CPR tracks between Caron Avenue and Salter Avenue and (2) the crossing over the Detroit River Tunnel Company lands (Gateway Park) between Wellington Avenue and Cameron Avenue, are not anticipated.

However, construction has the potential to cause ecological impacts to optimize the ROW utility for transportation and subsurface servicing infrastructure which will include some vegetation clearing and grading activities.

As the Project is in a highly urbanized area impacts are anticipated to occur within greenspaces predominantly limited to manicured cultural landscape features, such as maintained lawns and planted street trees and shrubs. As a result, it is anticipated that most impacts will be associated with site preparation, demolition, and construction activities.

Vegetation removal is anticipated to occur in advance of construction to facilitate access, grading, and to provide set up and laydown space, etc. These impacts will occur within the existing residential and commercial lands along University Avenue East/West and Victoria Avenue. The exact extent of the tree removal should be determined as part of the detailed design of the preferred alternative.

With respect of wildlife and wildlife habitat including migratory birds, several wildlife species were documented through background data review and have been confirmed through field investigations. Wildlife and associated habitat observed within the Study Area was typical of a disturbed setting and based on field observation common species are expected to be present within these habitat features all with secure habitats in Ontario. No significant wildlife habitat has been identified within the proposed construction footprint.

Several bird species have been previously recorded in the Study Area and the street trees provide suitable breeding bird habitat. Vegetation removal planned as part of the proposed roadway improvements has the potential to impact migratory birds and their nesting activities unless planned in accordance with the appropriate timing windows.

Project construction has the potential to directly impact the CVI_1, CVR_1, and CVC_1 ecosites. Use of heavy machinery, increased human presence, noise and light pollution, soil compaction, stockpiled earth, and sedimentation of existing terrestrial habitat has the potential to indirectly impact common wildlife and wildlife habitat in adjacent areas.

However, with proper implementation of avoidance and mitigations such as site clearing outside of the active season, and proper isolation of the construction areas, these impacts are

anticipated to be temporary and methods to restore the disturbed areas post-construction should be implemented.

Following a request from the Ministry of the Environment, Conservation and Parks received as part of the agency's engagement process, a review of the Draft "Client's Guide to Preliminary Screening for Species at Risk" was completed. The review identified that – at the time of the present document, no SAR or their habitats have been identified in the buildable area within the Project limits; however, there is potential for SAR (i.e., birds, and snakes) to travel through the Study Area during construction activities, therefore, standard wildlife mitigation recommended as part of this document should be implemented.

6.10. Streetscape

The City has a wonderful opportunity to improve on this already unique historic area, and the streetscape design philosophy should center on creating a space that provides both a familiar feel and a unique identity for the City of Windsor within the existing planning context. Through the implementation of universal design principles, AODA guidelines for the design of public spaces, and application of accepted Crime Prevention Through Environmental Design (CPTED) principles, the design must consider overall function, accessibility, safety, and vandal-resistance.

As part of the design process, close attention has been paid to access points from the surrounding community, ensuring that the safety of all travel modes is given due consideration and that accessibility for future users of the downtown area is accommodated and enhanced wherever possible. The design should also highlight the fact that the downtown area should be a human-scale space designed to support and enhance pedestrian use as well as safety, with clear separation of pedestrians, cyclists and vehicles.

Streetscape elements such as street trees, lighting, signage, and gateway features provide strong visual cues, link spaces together, and often compensate for a lack of cohesion in the built environment. A streetscape that is lined with trees and has a consistent street furniture style speaks the same visual language along its length, reading as a continuous space to the visitor. The repetition of these elements can also create a rhythm in the streetscape that can spill over to other streets within an area to define a distinct neighborhood.

The following sections identify some primary streetscape considerations for the project:

6.10.1. Urban Heat Island Reduction

As urban areas develop, changes occur in the landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist generally become impermeable and dry. This development leads to the formation of urban heat islands, a phenomenon whereby urban regions experience warmer temperatures than their rural surroundings.

- The redevelopment of University Avenue and Victoria Avenue provides an opportunity to integrate different strategies to reduce the Urban Heat Island Effect, such as:
- Use of high-albedo surface material with a high Solar Reflectance Index (SRI) value. High-albedo materials could include grey or white concrete, light-colored asphalt, or light colored interlocking concrete pavers;

- Use of permeable paving on sidewalks or in boulevard trails/bicycle facilities;
- Increase of shade in the corridor. Planting high branching deciduous shade trees will reduce surface and air temperatures by providing shade and cooling through evapotranspiration;
- Preservation of existing trees that are currently providing shade;
- Design the roadway with minimum lane widths to reduce hardscape areas and the demand on storm systems; and
- Replace hard surfaces with soft landscaping where possible, such as tree planting and sod in center medians and/or in boulevards, and the possibility of replacing sod in boulevards with bioswales that could include herbaceous plants.

6.10.2. Boulevard Streetscape along University Avenue

The planting plan must include species that are appropriate for the environment (i.e., hardiness, tolerance to urban conditions), will enhance the downtown's visual aesthetic through all seasons, will capitalize on existing sightlines, be resistant to insects and disease, and provide shelter and comfort for visitors now and over time. Urban form can be created through careful use of tree planting at strategic locations to help define the area.

Boulevards play an important role in defining the streetscape, providing an element of continuity and allowing an area for street trees and other vegetation to grow, further enhancing the street. Maintaining street trees and other ornamental plantings within the boulevard is a continuous challenge due to the harsh nature of this environment. An appropriate clearance along University Avenue of min. 1.5m from street to concrete sidewalk or pathway will allow for enough space for snow storage, and soil volume for salt resistant plants within the road allowance.

Existing vegetation and open space elements adjacent to the road are important and should be retained and enhanced in the overall design where possible.

Approaching intersections, ornamental trees can be planted closer together to provide a sense of arrival. Tree species will be located to infill the urban tree canopy among existing trees and will be selected to provide all-season interest.

Semi-rural condition from Huron Church Road to Josephine Avenue:

- Opportunity for street greening within the wide boulevard
- Preserve existing vegetation that provides shade from the existing tree canopy
- Accommodate transit and provide safe and dedicated facilities for pedestrians and cyclists
- Large deciduous trees planted in a wide permeable boulevard (grassed boulevards) with a continuous tree spacing of 10m, which will allow trees to grow to their full mature size with minimal pruning required long-term
- Bioswale in boulevard with planting to enhance water quality and aesthetics

Urban condition from Josephine Avenue to McDougall Street:

- Ornamental tree species in open tree pits in the vicinity of hydro lines (if applicable);
- Large deciduous trees planted in open tree pits in coordination with the proposed bicycle facility, with a continuous tree spacing of 10m.

6.10.3. Surface Treatment

Surface treatment for pavements including form, colour and texture of paving materials should be incorporated into the design and utilized to tie in existing design elements that may exist. Other viable options for using different paving materials and treatments to delineate parking, cycling facilities and pedestrian pathways should be explored.

Pay special attention to boulevards near intersections to ensure they reinforce the pedestrian priority and add to placemaking, designed to function as features with decorative paving patterns.

Charles J. Clark Square presents an opportunity for site improvement through enhanced landscape features such as public art, decorative lighting and wayfinding signage.

Pedestrian priority should be emphasized with an enhanced pedestrian crossing of the road using material such as colored impressed asphalt.

Semi-rural condition from Huron Church Road to Josephine Avenue:

- Ensure a minimum 1.5m wide concrete sidewalk
- Screened topsoil and sod in the boulevards with semi-rural areas where trees are being planted
- Granular material to promote infiltration could be placed in bioswale areas of boulevards

Urban condition from Josephine Avenue to McDougall Street:

- Ensure a minimum 1.5m wide concrete sidewalk
- Coloured impressed concrete or concrete unit pavers should be used in the boulevard areas adjacent to the 1.5m concrete sidewalk, especially at intersections to reinforce pedestrian priority

6.10.4. Street Furniture

Street furniture is a design element that can have a great impact on the unity of the streetscape and the overall character of an area. If there is a strong link between the street furniture elements, and furniture is placed strategically throughout the corridor, it can be used to identify a space, set it apart from other neighboring areas, and draw visitors into particular spaces.

Street furniture such as benches, trash receptacles, and bike racks should be placed along the corridor at a spacing that will meet AODA rest stop distance requirements. Furniture should be spaced closer together through the urban area, with a focus on gateways and transit stop locations.

6.10.5. Gateway Features

Public spaces throughout a corridor should have a cohesive thread that contributes to the streetscape and helps to create a distinct identity for the neighborhood. Improving and managing traffic and creating a sense of arrival to mark the entrance to the downtown will create a sense of place and further encourage people to stop and visit. A combination of landscaping and structures of an appropriate scale to be noticeable to vehicular traffic travelling along the corridor will emphasize the proposed gateway locations.

Potential gateway locations with enhanced streetscape elements to help identify pedestrian priority such as special pavement, curb extensions, artistic pedestrian crossings, integrated seating and signage could be integrated at the following locations:

- The intersection of University Ave W and Ouellette Ave
- St. Claire College at the intersection of Victoria Ave and University Ave W

6.10.6. Victoria Avenue

Victoria Avenue should be designed to accommodate vehicles and parking and remain open to one-way traffic from Park Street West to University Avenue. The street should include elements such as decorative paving, street lighting, street furniture and tree planting. A linear green urban park can be established in the wide boulevard through the center of the street, linked together in a series of small urban plazas connected with pedestrian pathways. The walkways can be framed by low growing planting beds to help separate pedestrians from vehicles and bicycles. A mid-block crossing could be considered to improve connectivity for pedestrians and help reduce vehicle speed. Wide paved boulevards located between the street and the building façade could allow for spill-out retail, patios, awnings and enhanced window displays.

Rows of street trees could help frame the street and create a strong urban form. To enhance the planned tree canopy and to provide an opportunity for reducing stormwater runoff, the City should consider investigating the value of using soil cells for tree planting. Soil cells are constructed below hard surfacing to provide increased soil volume at tree planting locations. Soil cells provide the following benefits:

- structurally support a roadbed, sidewalk or parking area
- optimize growth potential for planted trees, providing a sustainable soil environment that improves tree health and allows trees to grow to full maturity
- potentially reduce the need for watering by City staff, and
- act as a LID element in design to collect and use overland flow after a rain event rather than sending it to a conventional storm drainage system

Exhibit 6-7: Victoria Avenue Streetscaping



6.11. Utilities and Street Furniture

As part of comments and recommendations provided by City Staff with respect of the preliminary design of the preferred alternative, it was indicated that the cycle track is preferred to be behind the boulevard in all instances throughout the project and not against the curb area.

As such relocation of utilities and street furniture as presented in Exhibit 6-8 should be considered during the detailed design of the preferred alternative.

Exhibit 6-8: Utility and Street Furniture Relocation

University Avenue	North Side	South Side
From Huron Church Road to Partington Avenue	Relocation of all utility poles, parking meters and existing curbs Removal of trees at the existing boulevards Relocation of IPS poles at Sunset Avenue.	
From Partington Avenue to Salter Avenue	Relocation of all utility poles, parking meters and existing curbs	Relocation of all hydro and utility poles, parking meters and existing curbs.

University Avenue	North Side	South Side
		Relocation of traffic signal at McKay Ave. Relocation of traffic signal at Crawford Avenue.
From Salter Avenue to Pelissier Street	Relocation of all utility poles	Relocation of all utility poles
From Ouellette Avenue to Freedom Way	Relocation of all utility poles Removal of all trees	Relocation of all utility poles Removal of all trees
From Freedom Way to City Hall Square	Relocation of all utility poles Removal of all trees	Relocation of all utility poles Removal of all trees

6.12. Property Requirements

Based on the preliminary design of the preferred alternative, acquisition of private property is not required for the recommended plan for University Avenue or Victoria Avenue. However, it is expected that property requirements will be revisited as part of detailed design of each segment of University Avenue and Victoria Avenue.

6.13. Construction Staging

Construction of the new University and Victoria Avenues will be staged to minimize traffic impacts during the construction of the Recommended Plan. Based on preliminary discussion with the City the construction staging strategy is comprised of:

Stage 1. University Avenue: From Ouellette Avenue to McDougall Street

- Implementation of the preferred alternative along University Avenue as part of the proposed City Hall Square reconstruction and the related pathway to Riverside Drive.
- During construction traffic can be diverted to Oullette Avenue (eastbound) and Chatham Street East.
- Access to City Hall can be maintained via City Hall Square East.

Stage 2. University Avenue: From Church Street to Oullette Avenue and Victoria Avenue

- During construction, transit service can be directed to Pelisser Street and Dougall Street to facilitate the full closure of Victoria Avenue.
- During construction, traffic can be diverted to Chatham Street (westbound) and Pitt Street (eastbound). A temporary conversion of Chatham Street as a two-way corridor during construction can be also considered.

Stage 3. University Avenue: From Caron Avenue to Church Street

- During construction it is expected that traffic will be directed to Riverside Drive via Church Street and Caron Avenue.
- An opportunity can be explored to use in a temporary basis the access to the Windsor Aquatic Club parking area to direct traffic from Church Street to Caron Avenue via Chatham Street to reduce the length of the detour.

Stage 4. University Avenue: From Caron Avenue to Crawford Avenue

- If the removal of the existing bridge structure is carried on as part of the design and construction of the preferred alternative, the reconstruction of this portion of University Avenue can be conducted concurrently.
- Disregarding of the replacement of the bridge structure, all traffic during construction will be directed to Riverside Drive via Crawford Avenue and Caron Avenue.

Stage 5. University Avenue: From Huron Church Road to Crawford Avenue

- The current cross-section along this segment of University Avenue may allow the construction of the preferred alternative without required a full road closure of the diversion of traffic to other roads.
- It is expected that the section between Huron Church Road and Partington Avenue can be conducted in coordination with improvements considered by the University of Windsor.

6.14. Preliminary Cost Estimate

The estimated capital cost associated with the proposed improvements for University Avenue including engineering, construction, and other project costs is approximately \$15,870,000. The estimated capital cost for Victoria Avenue is approximately \$2,170,000.

Construction Cost Estimate					
Preferred Alternative – University Avenue : Cycle Track					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Price
1	Clearing and Grubbing	m ²	31500	\$13.50	\$425,250
2	Asphalt Removal	m ²	16500	\$11.50	\$189,750
3	Curb Removal	m	6510	\$24.00	\$156,240
4	Sidewalk Removal	m ²	9800	\$11.00	\$107,800
5	Median/Concrete Removal	m ²	40	\$14.00	\$560
6	Earth Excavation	m ³	15750	\$13.50	\$212,625
7	Asphalt HL-1	t	5012.5	\$115.00	\$576,438
8	Asphalt HL-8	t	60	\$100.00	\$6,000
9	Granular A	m ³	30	\$55.00	\$1,650
10	Granular B	m ³	120	\$35.00	\$4,200
11	Concrete Sidewalk	m ²	9800	\$60.00	\$588,000
12	Concrete Curb & Gutter/Curb/Barrier	m	6500	\$60.00	\$390,000
13	Concrete Cycle Track	m ²	12600	\$60.00	\$756,000
14	Concrete Median/Raised Buffer	m ²	110	\$50.00	\$5,500
15	Signs	each	100	\$300.00	\$30,000
16	Pavement Marking & Symbols	m	8500	\$5.00	\$42,500
17	Traffic Signal Modifications	each	11	\$200,000	\$2,200,000
18	Storm Water				
	1. Remove and Replace Catchbasin Including Leads	each	132	\$6,000.00	\$792,000
	2. Supply and Install Perforated Subdrains	m	6560	\$30.00	\$196,800
	3. Area Drain Including Connection	each	132	\$3,000.00	\$396,000
	4. LID Facility Allowance	LS	1	\$150,000.00	\$150,000
19	Streetscaping				
	1. Boulevard Tree Planting	each	600	\$550.00	\$330,000
	2. Decorative Paving	m ²	3500	\$150.00	\$525,000
	3. Topsoil & Sod in Boulevard	m ²	11200	\$13.00	\$145,600
	4. Street Furniture	LS	1	\$150,000.00	\$150,000
20	Traffic Management-Staging	LS	5	\$25,000.00	\$125,000
21	Utility Relocation - Hydro	each	71	\$25,000.00	\$1,775,000
22	Street Lighting Pole Relocation	each	68	\$5,000.00	\$340,000

Construction Cost Estimate					
Preferred Alternative – University Avenue : Cycle Track					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Price
23	Utility Relocation - Decorative Lamps	each	23	\$5,000.00	\$115,000
24	Utility Relocation - Parquimeters	each	82	\$2,000.00	\$164,000
25	Traffic Calming Treatment (Minor Intersections)	each	20	\$22,000.00	\$440,000
Sub-Total Construction Cost					\$11,336,913
Contingency (30% of Construction Cost)					\$3,401,073.75
Estimated Engineering - Civil, Geo, etc. (10%)					\$1,133,691.25
Total Construction Cost					\$15,871,677.50

Construction Cost Estimate					
Preferred Alternative Victoria Alternative: Cycle Track + Flex Boulevard					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Price
1	Clearing and Grubbing	m ²	1500	\$13.50	\$20,250
2	Asphalt Removal	m ²	2500	\$11.50	\$28,750
3	Curb Removal	m	430	\$24.00	\$10,320
4	Sidewalk Removal	m ²	650	\$11.00	\$7,150
5	Street Lighting Pole Relocation	each	14	\$5,000.00	\$70,000
6	Asphalt HL-1	t	191.25	\$115.00	\$21,994
7	Asphalt HL-8	t	0	\$100.00	\$0
8	Granular A	m ³	0	\$55.00	\$0
9	Granular B	m ³	0	\$35.00	\$0
10	Concrete Sidewalk	m ²	630	\$60.00	\$37,800
11	Concrete Cycle Track	m ²	840	\$60.00	\$50,400
12	Concrete Curb & Gutter/Curb/Barrier	m	850	\$60.00	\$51,000
13	Signs	each	10	\$300.00	\$3,000
14	Pavement Marking & Symbols	m	350	\$5.00	\$1,750
15	Traffic Signal Modifications	each	1	\$100,000	\$100,000
16	Storm Water				

Construction Cost Estimate					
Preferred Alternative Victoria Alternative: Cycle Track + Flex Boulevard					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Price
	1. Remove and Replace Catchbasin Including Leads	each	10	\$6,000.00	\$60,000
	2. Supply and Install Perforated Subdrains	m	444	\$30.00	\$13,320
	3. Area Drain Including Connection	each	9	\$3,000.00	\$27,000
	4. LID Facility Allowance	LS	1	\$100,000.00	\$100,000
17	Streetscaping				
	1. Tree Planting (Soil cell)	each	34	\$10,000.00	\$340,000
	2. Decorative Paving (unit pavers on concrete base)	m ²	2400	\$200.00	\$480,000
	3. Street Furniture	LS	1	\$125,000.00	\$125,000
Sub-Total Construction Cost					\$1,547,734
Contingency (30% of Construction Cost)					\$464,320.13
Estimated Engineering - Civil, Geo, etc. (10%)					\$154,773.38
Total Construction Cost					\$2,166,827.25

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7. Mitigation and Commitments to Further Work

In consultation with agencies, the preferred design has mitigated negative impacts to the environment where possible. Where impacts cannot be entirely avoided, mitigation measures and commitments for detailed design and construction have been developed to minimize or avoid impacts (Exhibit 7-1).

Exhibit 7-1: Mitigation and Commitments to Further Work

Category	Commitment
Community Engagement	<ul style="list-style-type: none"> Consider preparing a public information package/newsletter during detailed design to provide community members with an opportunity to review the detailed design plan, construction staging and phasing, including the sequence of municipal services and road construction
Natural Environment	<ul style="list-style-type: none"> Develop a Tree Protection Plan which identifies locations to be preserved. Vegetation removal will be minimized and clearly delineated on construction drawings. The root system, trunk or branches of any tree not designated for removal will be protected from damage. In the event of accidental damage to trees, or unexpected vegetation removal, vegetation shall be replaced / restored with native species. Material or equipment will not be placed within the critical root zone of any tree. The existing grade will not be raised/lowered within the critical root zone without approval. Signs, notices, or posters will not be attached to any tree. Exhaust fumes from equipment will not be directed towards any tree’s canopy; and Construction vehicles will have designated access routes from and to the construction area. Removal of any woody vegetation and/or existing infrastructure will not occur during the breeding bird season from April 15 - August 31 inclusive, unless a qualified biologist has searched the site for nests and concluded that no nests are present, no more than 2 days prior to clearing. If nests are found, a protective buffer around the location will be required until such time that the nest is abandoned. If work must occur during the peak activity period for snakes, exclusion fencing shall be installed adjacent to natural areas prior to the peak activity period (April 1) and

Category	Commitment
	<p>shall be properly maintained and monitored for the duration of construction. The goal of exclusion fencing is to prevent or minimize the risk of harm to herpetofauna and their nests and/or eggs by physically preventing them from entering the work areas at any time prior to and during construction.</p> <ul style="list-style-type: none"> • Fence installation shall be consistent with the methods prescribed in the Reptile and Amphibian Exclusion Fencing: Best Practices (MNRF, 2013). • Inspect protective exclusion measures daily and after each rain event to ensure their integrity and continued function. • Removal of natural vegetation will be minimized and clearly delineated on construction drawings. • Workforce will be educated on potential wildlife which could occur in the vicinity of the work area and measures to avoid wildlife. • Harassment and/or harm to wildlife during construction is prohibited. • When possible, work will be completed during daylight hours. If nighttime lights are used, they will be installed to illuminate the work area only to minimize impacts to nighttime activities of wildlife. • Vehicles and equipment will have the appropriate mufflers installed. • Vehicle and equipment engine idling will be minimized. • Construction vehicles will have designated access routes from and to the construction area. • Stockpiled materials will be surrounded by sediment control fencing to prevent usage by wildlife. • Existing access roads will be used as much as possible and speed limits will be clearly posted on site access and construction roads to minimize the potential for wildlife road mortality; and • If an unexpected, rare plant or animal species are encountered, construction activities will be halted, and MECP will be contacted to provide advice on additional mitigation measures or permits which may be required • A worker awareness program shall be provided to all on-site personnel that includes species at risk identification and habitat characteristics and provides general species-specific guidance with respect to appropriate actions to be taken whenever these species are encountered.

Category	Commitment
	<ul style="list-style-type: none"> • A daily pre-construction search of the machinery and the work area shall be implemented to identify presence of species at risk, as animals may be found hiding or basking around equipment, rocks, debris piles etc. • If endangered or threatened species are observed in or near the study area, work shall stop immediately, a photograph shall be taken of the species (if possible) and the SAR shall be allowed to move out of the work area on its own. The MECP shall be notified (as required). • Consultation with MNRF and MECP should be completed upon detailed design to confirm permitting and approval requirements.
Stormwater Management	<ul style="list-style-type: none"> • Relocation or replacement of catch basins will be required throughout the corridor to suit the revised curb locations and elevations. Curb and Gutter provides organized, defined and low maintenance roadway drainage patterns. • At localized areas, the flat gradient of the existing boulevards on the north side of University Avenue will pose challenges to establish positive overland drainage to the roadway and will likely require localized inlets. These inlets will be shallow and at low slope to ensure drainage to the existing sewer if feasible. • The new horizontal alignment of curbs should consider the existing and proposed underground storm sewers/utilities to avoid conflicts. • Low points should be avoided wherever possible and curb profiles should maintain a minimum of 0.5% slope gradient and maintain major system patterns. • A minimum cross slope of 2% is recommended to ensure positive transverse drainage within right-of-way limit.
Built and Cultural Heritage	<ul style="list-style-type: none"> • During the planning and design phases, cultural heritage resources be avoided where possible and any construction staging areas be located on lands located well away from any of the BHRs and CHLs. • During the design phases, the removal of mature trees on BHRs 5, 15, 17, 24-26 and CHLs 1, 2, 6, and 7 should be avoided where possible. For any trees that cannot be saved during construction, replacement with similar trees should be examined. • The reduction in properties' frontage that may occur during the detailed design may have impacts on the BHRS with

Category	Commitment
	<p>minor setbacks or no setbacks from the roadways (BHRs 5, 6, 15, 18-22, 24-29, 31, 32, 35, 36 and 39-40).</p> <ul style="list-style-type: none"> • If infrastructure installations are above ground (i.e., overpasses), they may impact identified cultural heritage resources and mitigation measures such as additional landscaping may be required to minimize visual impacts. • Consideration should be given to the type of construction techniques and machinery used in close proximity to cultural heritage resources with little or no setbacks (BHRs 5, 6, 15, 18-22, 24-29, 31, 32, 35, 36 and 39-40). • The selection and placement of any tree plantings as well as proposed streetscaping/placemaking elements should be sympathetic to the identified BHRs/CHLs. • An enhanced public realm and traffic calmed environment will allow for the appreciation of identified cultural heritage resources and opportunities for interpretation of BHRs/CHLs should be explored (i.e., interpretative plaques). • Once a preferred alternative has been selected and design work has begun, a Heritage Impact Assessment (HIA) report should be undertaken to confirm the anticipated impacts outlined in this report, evaluate any additional impacts of the proposed design, as well as outline avoidance/mitigation measures to minimize the impact. Mitigation measures may be discussed with planners at the City of Windsor. • Public consultation may result in additional potential cultural heritage resources being identified. These potential cultural heritage resources should be reviewed by a qualified heritage consultant to: 1) determine their CHVI, 2) evaluate potential project impacts, and 3) suggest strategies for future conservation of any candidate cultural heritage resources. • Previously-unrecognized cultural heritage resources with CHVI discussed in this assessment may be worthy of inclusion on a Municipal Heritage Register and research undertaken for the listed properties on the Municipal Heritage Register may be used to support designation reports in the future.
Archaeology	<ul style="list-style-type: none"> • The identified areas of no archaeological potential do not require additional assessment. • If the detail design process results in the determination that project impacts are required within any of the identified areas of archaeological potential, then no ground alterations

Category	Commitment
	<p>or development of any kind may occur until the Stage 2 assessment is complete, a recommendation that the lands require no further archaeological assessment is made, and the associated report is entered into the Ontario Public Register of Archaeological Reports.</p>
<p>Noise and Vibration</p>	<ul style="list-style-type: none"> • Where possible construction shall be carried out during the daytime. If construction activities are required outside of these hours, the Contractor shall minimize the amount of noise being generated. • The Contract Documents will contain a reference to appropriate City Noise By-laws. Contractor is expected to adhere to these unless otherwise permitted. • All equipment shall be properly maintained to limit noise emissions. As such, all construction equipment will be operated with effective muffling devices that are in good working order. In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required.
<p>Air Quality</p>	<ul style="list-style-type: none"> • Environment Canada “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” practices shall be followed during construction of the roadway to reduce any air quality impacts that may occur. • During construction, vehicles/machinery and equipment will be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
<p>Streetscape Plan and Tree Management</p>	<ul style="list-style-type: none"> • A detailed Streetscaping plan will be developed during detailed design related to construction and post-construction activities. • A detailed Tree Management Plan will be prepared that details specific tree impacts, mitigation and replacement.
<p>Geotechnical</p>	<ul style="list-style-type: none"> • Excess soil may be disposed of off-site as waste at a licensed facility (i.e. landfill and/or treatment facilities) with an Environmental Compliance Approval (ECA) to receive this material, pending approval of receiving site authorities
<p>Utility Relocation</p>	<ul style="list-style-type: none"> • It is intended that the City will fully integrate storm sewer upgrades into the detailed design and construction. • Utility relocations shall be coordinated to minimize service disruptions where possible through liaison and contract requirements.

Category	Commitment
	<ul style="list-style-type: none"> All utilities and their locations within the study area shall be confirmed in Detailed Design and, if required, a protection plan or utility relocation will be completed.
Construction Monitoring	<ul style="list-style-type: none"> Mitigation measures shall be implemented and maintained to ensure that the natural, social and economic environments are not impacted by the construction activities and/or that impacts are minimized. The inspection staff will also ensure that items such as sedimentation controls and appropriate signage are maintained throughout construction. Appropriate signage shall be implemented to identify detour routes at the time of temporary roadway/sidewalk closure. Emergency vehicle access will be maintained at all times.

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