

**OLT-23-000534**  
**OLT-23-000939**  
**OLT-23-000940**

**ONTARIO LAND TRIBUNAL**

**PROCEEDING COMMENCED UNDER** subsection 22(7) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended.

Applicant and Appellant: Caivan (Perth GC) Limited  
Subject: Request to amend the Official Plan – Failure to adopt the requested amendment  
Description: To permit 940 single detached dwellings and townhomes, a nine-hole golf course, park and open space areas  
Reference Number: OPA-01-2023  
Property Address: 141 Peter Street, Part of Lots 26 & 27, Concession 1, Part Lots 25, 26 & 27, Concession 2, Geographic Township of Bathurst, and Part Lot 1 in Southeast Half Lot 1, Concession 1, Part Lot 1 in Southwest Half Lot 1, Concession 2, Geographic Township of Drummond, now in the Town of Perth, County of Lanark  
Municipality/UT: Town of Perth / County of Lanark  
OLT Case No.: OLT-23-000939  
OLT Lead Case No.: OLT-23-000534

**PROCEEDING COMMENCED UNDER** subsection 34(11) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended.

Applicant and Appellant: Caivan (Perth GC) Limited  
Subject: Application to amend the Zoning By-law – Refusal or neglect to make a decision  
Description: To permit 940 single detached dwellings and townhomes, a nine-hole golf course, park and open space areas  
Reference Number: ZBL-03-2023  
Property Address: 141 Peter Street, Part of Lots 26 & 27, Concession 1, Part Lots 25, 26 & 27, Concession 2, Geographic Township of Bathurst, and Part Lot 1 in Southeast Half Lot 1, Concession 1, Part Lot 1 in Southwest Half Lot 1, Concession 2, Geographic Township of Drummond, now in the Town of Perth, County of Lanark  
Municipality/UT: Town of Perth / County of Lanark  
OLT Case No.: OLT-23-000940

**PROCEEDING COMMENCED UNDER** subsection 51(34) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended.

Applicant and Appellant: Caivan (Perth GC) Limited  
Subject: Proposed Plan of Subdivision – Failure of Approval Authority to make a decision  
Description: To permit 940 single detached dwellings and townhomes, a nine-hole golf course, park and open space areas  
Reference Number: 09-T-22001

**OLT-23-000534**  
**OLT-23-000939**  
**OLT-23-000940**

Property Address: 141 Peter Street, Part of Lots 26 & 27, Concession 1, Part  
Lots 25, 26 & 27, Concession 2, Geographic Township of  
Bathurst, and Part Lot 1 in Southeast Half Lot 1, Concession  
1, Part Lot 1 in Southwest Half Lot 1, Concession 2,  
Geographic Township of Drummond, now in the Town of  
Perth, County of Lanark  
Municipality/UT: Town of Perth / County of Lanark  
OLT Case No.: OLT-23-000534  
OLT Lead Case No.: OLT-23-000534  
OLT Case Name: Caivan (Perth GC) v Lanark County

**Witness Statement of Christopher Gordon, P. Eng.**

President and Senior Transportation Project Manager/Director

CGH Transportation Inc.

## Qualifications

1. I am a Professional Engineer practicing in the Province of Ontario, licensed through the Professional Engineers of Ontario. I am a Senior Transportation Project Manager/Director, President, and one of the founders of CGH Transportation Inc. I have over 30 years of professional experience in the field of transportation planning and traffic engineering.
2. I have worked on a wide variety of transportation engineering projects in Eastern Ontario and Atlantic Canada with the vast majority of my work involving Transportation Impact Assessments and Functional Designs in support of private-sector development applications.
3. I have been previously qualified by the Ontario Land Tribunal (formerly the Ontario Municipal Board or Local Planning Appeal Tribunal) to provide expert opinion evidence in the area of Transportation Planning and Traffic Engineering.
4. My curriculum vitae is attached to this witness statement as **Appendix "A"**. A copy of my Acknowledgement of Expert Duty is attached as **Appendix "B"**.

## Retainer

5. CGH Transportation Inc. (CGH) was retained by Caivan (Perth GC) Limited (Caivan) in November 2021 to undertake the transportation planning and traffic engineering analyses associated with a proposed residential plan of subdivision project at the subject site.
6. As part of this retainer, I managed several tasks including a review of the transportation components of the Town's Infrastructure Master Plan (IMP), as well as an examination of the different crossing alternatives and recommended crossing solutions. Throughout the various stages of CGH's retainer, I have attended technical meetings with the Town and County and carried out site visits.

**Documents Reviewed**

- 7. As part of this retainer and in preparation for my evidence, I reviewed the transportation-related portions of following documents:
  - a. Town of Perth IMP Sections 1, 3.4 and 3.5, 5.1 and 5.2, 5.6.1 and 5.6.2, 6.1.1 and 6.1.2, Figures 6-1 and 6-2, and 8.
  - b. Town of Perth Official Plan, including Section 8, as it pertains to New Development Access
  - c. Town of Perth TMP and Forecasting Memo
  - d. Caivan’s updated draft plan of subdivision (2024 06 12), a copy of which is attached as **Appendix “C”**.

**Issues**

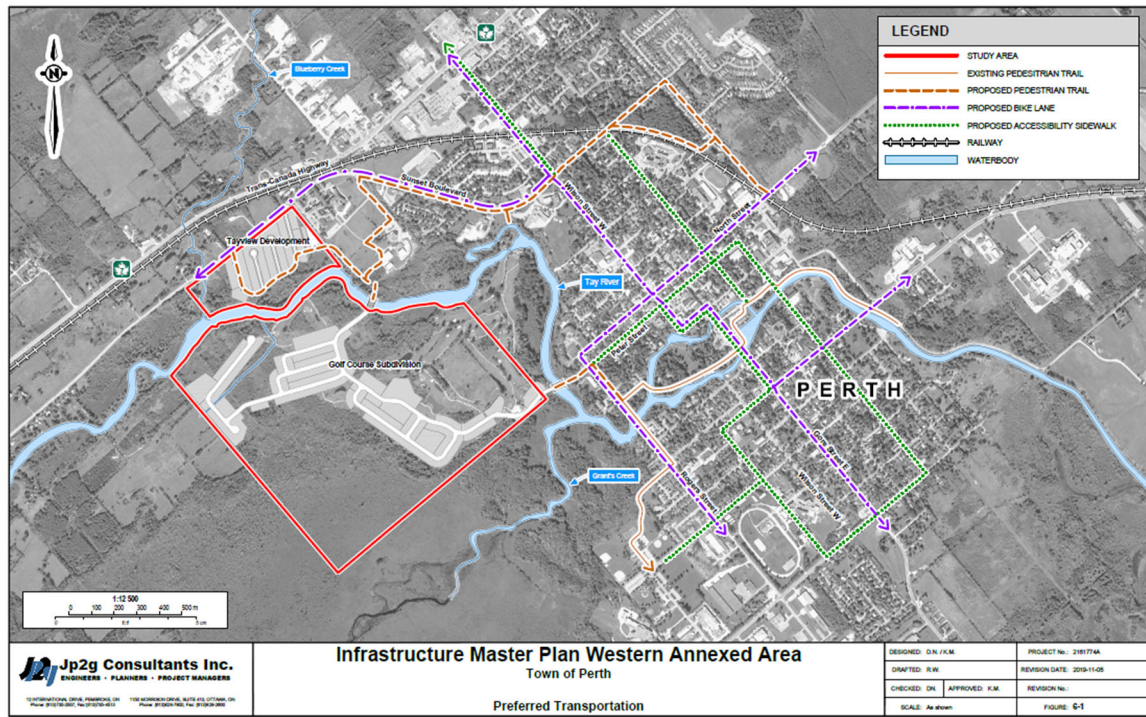
- 8. The issues that I will address in this witness statement include the following:

<p><b>Planning Issues</b></p> <ul style="list-style-type: none"><li>5. Does the Application conform to the policies, purpose and intent of the Town of Perth Official Plan (the “Official Plan”)?<ul style="list-style-type: none"><li>a. The application of the conformity test will consider, but not be limited to the following policies of the Town of Perth Official Plan:<ul style="list-style-type: none"><li>x. 5.5 Transportation</li></ul></li></ul></li></ul> <p><b>Transportation Issues</b></p> <ul style="list-style-type: none"><li>6. Will the proposed ingress and egress to and from the subdivision be sufficient from an emergency services perspective and from the perspective of long-term infrastructure replacement/maintenance?</li><li>7. Does the proposed ingress and egress to the site conform to the principles of good transportation planning and does it provide safe access?</li><li>8. Does the proposed ingress and egress to the site create unacceptable traffic impacts on adjacent streets?</li><li>9. Are the proposed parking standards functional?</li></ul>
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## Summary Intended Expert Evidence

### Background Context

9. As part of the Golf Course Lands development, the Town's IMP proposed two bridge crossings of the Tay River as shown on the figure below, which is Figure 6-1 of the IMP.

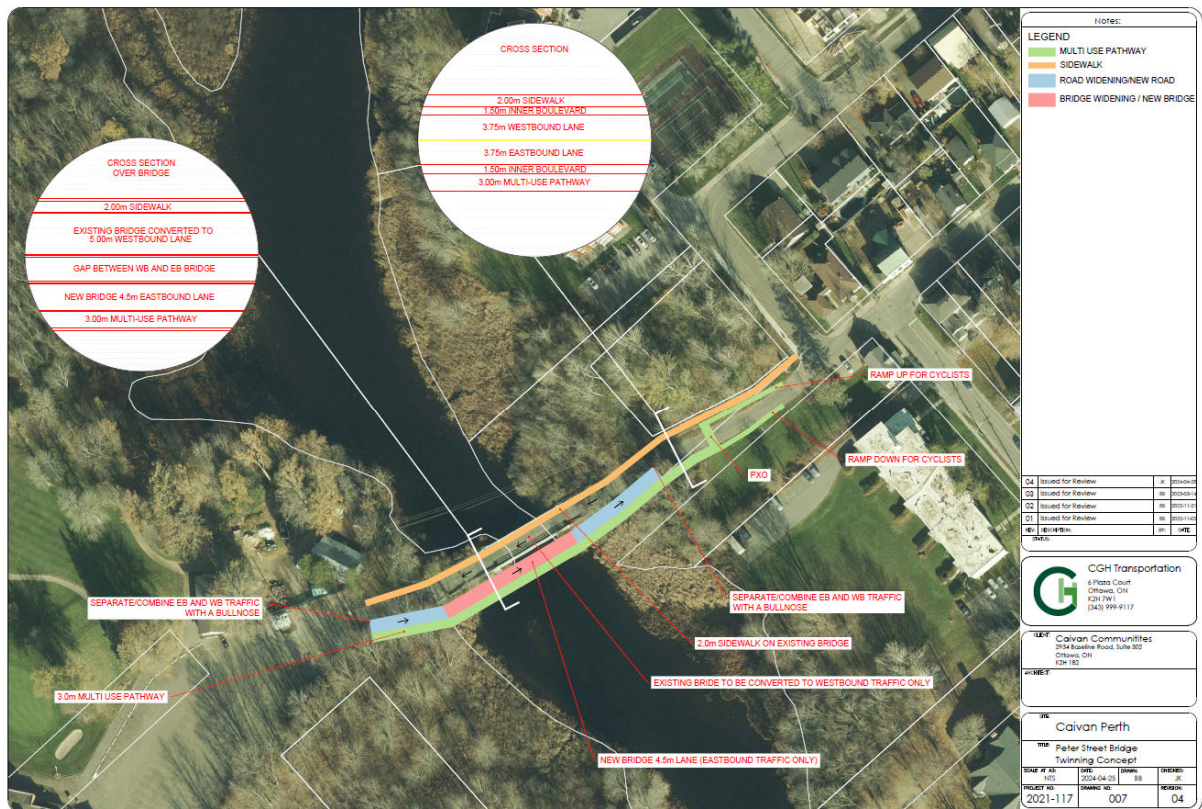


10. The two crossings are at Peter Street and the connection to the County Lands, which, through this witness statement, is referred to as the Second Crossing.

11. There is an existing bridge at Peter Street that provides access to the Golf Course. The two photos below are an aerial image of the existing bridge and a view of the existing bridge, from Peter Street (west of Lustre Lane), looking west.



12. When Caivan’s Draft Plan of Subdivision was submitted, the transportation plan differed from the IMP and proposed a twinned crossing at Peter Street. The Traffic Impact Study (TIS) and associated materials that CGH produced to support the development demonstrated that a twinned Peter Street Crossing arrangement, where the existing bridge would be twinned, along with modifications to the roadway network, would be suitable to support the level of development proposed.



13. Notwithstanding CGH’s findings and opinions as noted above, Caivan informed CGH that Caivan would commit to the design and construction of the Second Crossing in addition to the twinned Peter Street Crossing. This was communicated to the Town by Caivan, with a short memorandum from CGH on March 1<sup>st</sup>, 2024.

14. The Town replied by letter on April 9, 2024 asserting that additional technical tasks would need to be completed in order to ensure the Town could meaningfully assess the merits of a revised development plan that included the Second Crossing.

15. To demonstrate how Caivan and its team would continue the planning, design and construction tasks, as outlined in the Town's April 9<sup>th</sup>, 2024 letter, CGH prepared a Transportation Issues Resolution Memo (**Appendix "D"**) in which we itemize the tasks ahead in order to address the outstanding issues and obtain approvals for both crossings. This Memo also speaks to the phasing of the development and the appropriate number of homes that could be constructed before the Second Crossing is required to be built and operational.
  
16. As I address the transportation related issues below, for clarity and based on established facts above, my opinions are provided on the understanding that Caivan will plan, design and construct the twinned Peter Street Crossing and the Second Crossing. As well, references hereafter to Caivan's plan of subdivision imply the June 12, 2024 version attached hereto as **Appendix "C"**.



**Issue No. 5.** – Does the Application conform to the policies, purpose and intent of the Town of Perth Official Plan (the “Official Plan”)?

a. The application of the conformity test will consider, but not be limited to the following policies of the Town of Perth Official Plan:

x. 5.5 Transportation

17. Considering that Caivan has committed to fund and construct both the twinned Peter Street Crossing and the Second Crossing, it is my opinion that the Application does conform to the Town’s OP, as it meets the test for conformity, from a transportation perspective.

18. The Town’s Official Plan includes policies related to residential development in Section 8. Section 8.1.4, speaks to the Objectives, Development Concept, Range of Permitted Uses, Development Restrictions and in particular, Access Constraints, for the New Residential Area Designation.

19. Section 8.1.4.5 of the Town’s OP refers to Access Constraints and paragraph b) states:

b) The rezoning of land within this area for new development shall limit the number of

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residential units and shall be based in part on the traffic management capacity of the existing Peter Street Bridge and the associated Peter Street road corridor to accept additional traffic without a reduction in the level of service. The Zoning amendment should not proceed until such time as a new primary vehicle access corridor has been established either by plan of subdivision, acquisition of a corridor by the Town of Perth or by identification of a specific road corridor in a completed formal Master Plan for the lands annexed to the westerly side of Perth.

20. The above paragraph notes that for the proposed rezoning to proceed, a new primary vehicle access corridor needs to be established. Among the ways to establish this corridor was by completing a formal Master Plan for the lands. The Town did complete an Infrastructure Master Plan (i.e. the IMP) for these lands, dated November 2019.
21. The IMP contains several relevant transportation sections:
- a. Sections 3.4.1 & 2 Transportation Existing Roadway Network and Background Traffic Volumes – these sections describe the key transportation roadways and intersections that were considered in the overall transportation analysis presented in the IMP.
  - b. Section 5.1 presents the results of the IMP's Traffic Impact Study (TIS) and outlines the four optional access scenarios considered. Each option was analyzed and evaluated, leading to a preferred plan.
  - c. Section 6.1.1 notes the preferred design, that being Option 3, and its rationale, which included the use of the existing Peter Street Bridge access as well as a Second Crossing of the Tay River located at the Lanark County lands.
  - d. Figure 6-1 illustrates the Preferred Transportation plan. This figure locates the Peter Street Bridge as well as the Second Crossing connecting the Golf Course lands to the Lanark County property.
  - e. Section 1.3 of the IMP describes how the IMP itself fulfills Ontario's Environmental Assessment Act by following the Municipal Class Environmental Assessment process. Section 8 of the IMP continues this description and summarizes future planning activities required for the various pieces of infrastructure, mostly notably for transportation, including the processes required for both the Peter Street Bridge and the Second Crossing.
22. Based on the foregoing it is my opinion that the IMP fulfills the Town's OP requirement to complete a Master Plan and develop an access solution across the Tay River.
23. It is noted that the rezoning for the area of new development shall limit the number of residential units and shall be based in part on the traffic management capacity of the Peter

Street Bridge. This is relevant to the potential phasing of Caivan's proposed development and to the Transportation Issues List presented below.

24. To address the foregoing, attached as **Appendix "E"** to this witness statement is a report titled "Western Annex Lands – 141 Peter Street Transportation Review", by CGH Transportation Inc. (herein referred to as the "June 2024 TR"). Building on the preferred transportation solution as presented in the IMP, the June 2024 TR analyzes and compares the transportation impacts of Caivan's updated plan of subdivision with the land use assumptions considered in the IMP. The June 2024 TR considers relevant revisions such as phasing, rights-of-way and the twinning of the Peter Street Crossing.
25. Based on the analysis and comparison outlined in the June 2024 TR, the increase in the number of homes over the IMP does result in an increase in the number of car trips anticipated during the AM and PM peak hours. Our conclusion is that operations for the updated subdivision concept full build-out will be similar to those anticipated by of the IMP.

**Issue No. 6** - *Will the proposed ingress and egress to and from the subdivision be sufficient from an emergency services perspective and from the perspective of long-term infrastructure replacement/maintenance.*

26. It is my opinion, based on the conclusions of the June 2024 TR, that the ultimate crossing solutions (i.e. the twinned Peter Street Crossing and the Second Crossing), as identified in the IMP, and now included in the updated plan of subdivision, are sufficient for emergency services and infrastructure replacement/maintenance.
27. It is my opinion, based on my experience, that 200 homes can be built and occupied in reliance upon the proposed twinning of the Peter Street Crossing. My opinion on this point is based, in part, on transportation planning experience in and around the City of Ottawa, where a threshold of more than 200 homes has been the value used to warrant a secondary access.
28. Given that a twinned Peter Street Crossing would provide additional capacity and a second emergency vehicle crossing, the link between Lustre Lane and the eastern terminus of the existing bridge is relatively narrow. The asphalt width varies between 5 and 6 metres. However, the roadway right-of-way is currently approximately 15 metres. As part of the twinning of the Peter Street Crossing, the link between the structure and Lustre Lane will need to be widened to accommodate emergency vehicle operations.
29. As part of the twinned Peter Street Crossing, the dimensions of the structures and roadway links on both east and west sides of the bridge will be designed to the satisfaction of the Fire Chief and Emergency Services.
30. As the twinned Peter Street Crossing will ultimately become part of the Town's infrastructure, the design of the crossing improvement will be circulated to the Town for their approval, which will ensure it meets their standards for infrastructure replacement and maintenance. In my opinion, it would be appropriate to finalize this design as an approval condition associated with the draft plan (i.e. the detail design stage).

***Issue No. 7. – Does the proposed ingress and egress to the site conform to the principles of good transportation planning and does it provide safe access?***

31. It is my opinion that the proposed crossing solutions represent a ‘good transportation plan’ to serve the transportation needs for the new community. I rely upon the analysis presented in the June 2024 TR in support of this opinion.
32. A ‘good transportation plan’, will do the best for the most people, will provide suitable connectivity and capacity for all modes as well as goods movement to accommodate needs, and will promote sustainable choices for travellers while minimizing impacts to the social, environmental and economic environments.
33. The twinned Peter Street Crossing will accommodate all transportation modes, those being pedestrians, cyclists, automobiles and trucks (goods movement).
34. The Second Crossing will also be able to accommodate all transportation modes. The IMP noted the requirement to complete Phases 3 and 4 of the MCEA process, where the functional design of the Second Crossing will be established. The CGH Transportation Issues Resolution Memo (see **Appendix “D”**) describes the tasks that Caivan and its team will complete, in consultation with the Town, to design and implement the Second Crossing.
35. Issue No. 7 also speaks to safety. While transportation planning work can establish a foundation for a relatively safe transportation connection, safety is typically realized through design, construction and operation. Crossing solutions at both Peter Street and the Second Crossing will be finalized at detailed design to the satisfaction of the Town and operated with a focus on public safety .

**Issue No. 8.** – Does the proposed ingress and egress to the site create unacceptable traffic impacts on adjacent streets?

36. In my opinion, the transportation impacts of the proposed crossings at Peter Street and the Second Crossing on adjacent streets will be acceptable.

37. The June 2024 TR demonstrates how the resulting number of auto trips to and from the new plan of subdivision will have similar impacts to those assumed in the IMP.

**Issue No. 9.** – *Are the proposed parking standards functional?*

38. It is my opinion that the updated plan of subdivision provides appropriate space on roadways as well as on blocks to provide functional parking.

39. Reviewing the updated plan of subdivision, collector roads are measured to be 23 metres and local roads are measured to be either 18.5 metres or 16.75 metres. These rights-of-way are sufficient to enable on street parking.

40. Further, the proposed lot depths for both the townhome and single home blocks are typically 21 metres in depth. This dimension is typical of most subdivisions (in which CGH has been involved) and provides appropriate driveway space for larger vehicles, such as pick up trucks, to park and not impede the roadway or sidewalks.

## Conclusions and Recommendations to the Tribunal

41. In my opinion, from a transportation perspective, based on the results of the June 2024 TR, Caivan's updated draft plan of subdivision constitutes good transportation planning. The transportation network and crossing improvements proposed through Caivan's draft plan are consistent with the objectives of the IMP, confirm with the policies of the Town's OP respecting transportation planning for this new residential area and will provide sufficient connectivity, capacity and safety for all transportation modes to the benefit of the residents of Perth's new neighbourhood.

42. It is my recommendation that transportation infrastructure be implemented in the following manner:

- Construction of the Peter Street Crossing should take place in parallel with the construction of the first phase of development, that being the first 200 homes.
- Occupancy of the first 200 homes should take place upon the twinned Peter Street Crossing being deemed operational, which will include the widening of Peter Street west of Lustre Lane
- EA Phases 3 and 4 associated with the Second Crossing, should take place, resulting in the design and approvals of the Second Crossing.
- Construction of the Second Crossing should take place in parallel with the construction of subsequent phases of development, with occupancy occurring once the Second Crossing is deemed operational.

43. Based on the foregoing, it is my recommendation to the Tribunal that the following draft plan approval conditions be imposed upon the draft plan of subdivision:

### **Peter Street Bridge**

- 29) The first phase of development shall consist of a maximum of 200 units and can proceed once the twinning of the Peter Street Bridge is completed. The following improvements shall be required to the Peter Street Bridge and nearby right of ways prior to the first occupancy:
- a) The new structure for the twinning of the Peter Street Bridge will be adjacent to the existing structure, and the total transportation facilities crossing these twinned bridges will comprise of two vehicle travel lanes, one multi-use pathway, and one sidewalk.

- b) Improvements to Peter Street between Lustre Lane and the existing Peter Street Bridge shall be completed to the satisfaction of the Town of Perth to ensure appropriate emergency vehicle access and egress to the improved Peter Street Bridge.
- 30) Notwithstanding condition #29, additional units (beyond 200) may be permitted within the first phase of development prior to the construction of a second bridge subject to traffic monitoring at the intersections of Peter/Lustre and Peter/Rogers to be undertaken by the Owner, all to the satisfaction of the Town of Perth.

**Second Bridge**

- 31) A second bridge crossing of the Tay River shall be required to support the development beyond the first phase expressed in conditions #29 and 30. The Owner will complete the process initiated in the Western Annex Lands Infrastructure Master Plan (Town of Perth, 2019) and follow the requirements of the Municipal Class Environmental Assessment, as applicable, including functional design.
- 32) The Owner will construct the second bridge with final "as built" construction drawings provided in both hard copy and digital format to specifications acceptable to the Town.
- 33) Occupancies beyond the first phase of development can occur when the second bridge is completed. Notwithstanding the foregoing, the Town of Perth shall not withhold building permits for the second phase of development provided the Owner has provided all necessary financial securities for the second bridge to the Town of Perth, and provided that a Commence Work Notice has been issued by the Town of Perth for the construction of the second bridge.
- 34) Notwithstanding the above, the Owner shall be permitted to commence underground servicing beyond the first phase prior to the second bridge being completed provided all other requirements have been met to the satisfaction of the Town of Perth.

I look forward to being present at the hearing to present this information, answer questions from legal counsel and provide the Tribunal with my opinion about this matter.



Christopher A. Gordon, P. Eng.

June 12, 2024



# Appendix “A”

Curriculum Vitae – Christopher A Gordon, P. Eng, CGH Transportation Inc.

# Christopher Gordon, P.Eng.



## Transportation Project Director

### Education

Bachelor of Civil Engineering  
Carleton University,  
Ottawa, Ontario 1994

### Memberships

Professional Engineer,  
Professional Engineers  
Ontario

Greater Ottawa Home  
Builders' Association  
(CGH)

Transportation  
Association of Canada  
(CGH)

Christopher Gordon, P. Eng., is a Senior Transportation Director/Project Manager with CGH Transportation Inc. Since graduating in 1994, Chris has led and contributed to many community building projects for both the public and private sectors throughout Ottawa, GTA and Atlantic Canada. These range from roadway, transit, and pedestrian bridge/facility environmental assessments to small and large scale residential, commercial, institutional, and industrial land use development projects. His roles range from project management, client liaison, and public consultation. Chris has been an approved expert witness at OMB/LPAT Hearings and supports the land use industry with topics such as development charges.

Chris is one of the founding members of CGH Transportation Inc., which was created to support the land use industry with transportation services to plan, design and implement developments through innovative approaches to TOD, mixed use, intensification, parking, on and off-site circulation and design for all modes.

### Relevant Project Experience

#### Barrhaven South:

Chris has directed/managed many transportation projects in Barrhaven, south of the Jock River, including:

- Mattamy Half Moon Bay TIAs, RMAs and other studies such as Greenbank Road Bridge MUP Design and Construction Management
- Caivan ABIC and The Ridge TIAs, RMA
- Minto Harmony and Kennedy TIA and Construction Management Strategy
- Tamarack Meadows TIA
- Metro Grocery Store TIA and RMA
- Represented Caivan and Minto for of the Highway 416/Barnsdale Interchange
- Represent Caivan, Minto, Mattamy and Metro for the Greenbank Road Detail Design
- Chapman Mills Drive, Ottawa
- City of Ottawa Jockvale Road EA\*
- City of Ottawa Cambrian Road EA\*

#### Barrhaven West Communities along Strandherd Drive

Barrhaven West has been a focus for development in recent years. Chris' project experience in these areas include:

- Mattamy Mews and TIA and RMA\*
- Minto Harmony TIAs, RMA and GRDD
- Caivan Conservancy TIAs, RMAs and related studies such as the Transit Strategy and Fill/Haul Operations
- Mattamy Cedarhill Transportation Considerations and Connections
- Represented Caivan for McKenna Casey Connection to Strandherd
- City of Ottawa Chapman Mills EA\*
- Represented Minto and Caivan for the Chapman Mills DC Bylaw LPAT Hearing

\* - work completed at previous organization

## Transportation Project Director

### Cardinal Creek Village

Cardinal Creek Village has grown in several phases and Chris has been leading the transportation file, undertaking the following:

- Tamarack North and South TIAs and GRDDs
- Tamarack Mixed Use Area Planning Considerations and Road Network
- Tamarack Cardinal Creek Drive Functional Design from Old Montreal Road to Highway 174
- Tamarack Traffic Monitoring on Old Montreal Road at Famillie Laporte Drive and Cardinal Creek Drive
- Tamarack Old Montreal Road Conceptual Design

### Kanata West and North

While CGH has carried out many TIAs in Ottawa's west urban community that were part of larger Community Design Plans, significant projects Chris has managed are:

- Minto Brookline TIA and RMA as well as considerations along March Road
- Cavanagh 195 Huntmar TIAs and RMA for the Palladium Drive Realignment
- Cavanagh Palladium Drive Realignment Roundabout Detail Design
- Lepine 910 March Road TIA and RMA
- Cavanagh Northridge GRDD

### Eastern and Central Ontario

Chris has worked with developers and the CGH Team throughout Ontario including:

- Mattamy and ARGO Neighbourhood 9-10 11 (Oakville) TIAs
- Julida Fairgrounds Redevelopment (Arnprior) TIA and Access Design
- Caivan Golf Course Redevelopment (Perth) TIA, Bridge Location Study and EA
- Broccolini AEGD Commercial Development (Hamilton) TIS and Arterial 1N EA
- Dymon Self Storage Facilities (throughout Ottawa and the GTA) TIS and Access Studies/Designs
- Lepine Smiths Fall and Renfrew TISs
- Calabogie Peaks TIS

### Unique Site Plans and High-Rise Plans of Subdivision

Site plans and high-rise developments require particular attention paid to issues such as access design, parking garage design, loading and garbage pick up design. Chris has managed several transportation site plan studies and designs including:

- Salvation Army Booth Centre on Montreal Road TIA and Circulation Study
- Caivan ABIC Manufacturing Facility TIA and RMA
- Theberge 780 Baseline Road TIA
- Trinity 151 Chapel TIA and RMA
- CLV 530 Tremblay TIA
- Cavanagh Concrete Batching Plant TIA and LPAT Witness
- CLV 473 Albert TIA
- Metro Greenbank Road TIA and RMA
- Properties Group Stillwater Station TIA and Functional Design
- Bertone 1649 Montreal Road TIA
- Trinity 70 Richmond Road TIS

### Transportation Environmental Assessments:

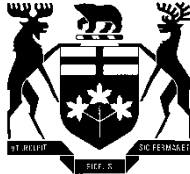
In addition to the above, Chris has managed (as City Staff and Consultant) and contributed to several different Transportation Environmental Assessments:

- Limebank Road and Armstrong Road, Ottawa\*
- Alta Vista Transportation Corridor, Ottawa\*
- Innes-Walkley-Hunt Club Connection, Ottawa\*
- Interprovincial Crossings, NCR\*
- Chapman Mills Drive, Ottawa\*
- Jockvale Road, Ottawa\*
- Cambrian Road, Ottawa\*
- North South Arterial, Ottawa
- Southwest Transitway, Ottawa\*
- Fallowfield Road, Ottawa\*
- Airport Parkway Pedestrian Bridge, Ottawa\*
- Rideau River Pedestrian Bridge, Ottawa\*
- AEGD Arterial 1N, Hamilton

\* - work completed at previous organization

# Appendix “B”

Acknowledgement of Expert Duty – Christopher A Gordon, P. Eng, CGH Transportation Inc.



Ontario  
Ontario Land Tribunal  
Tribunal ontarien de l'aménagement du territoire

**Acknowledgment Of Expert's Duty**

OLT Case Number	Municipality
OLT-23-000534 OLT-23-000939 OLT-23-000940	Town of Perth

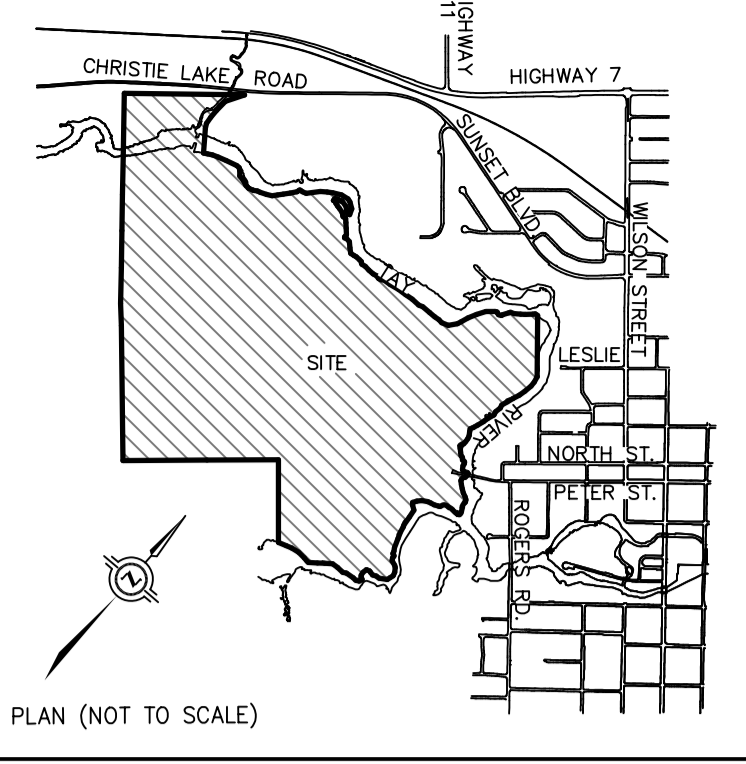
1. My name is Christopher Gordon  
I live in the City of Ottawa  
in the Province of Ontario
2. I have been engaged by or on behalf of Caivan (Perth GC) Limited to provide evidence in relation to the above-noted Ontario Land Tribunal ('Tribunal') proceeding.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
  - a. to provide opinion evidence that is fair, objective and non-partisan;
  - b. to provide opinion evidence that is related only to matters that are within my area of expertise;
  - c. to provide such additional assistance as the Tribunal may reasonably require, to determine a matter in issue; and
  - d. not to seek or receive assistance or communication, except technical support, while under cross examination, through any means including any electronic means, from any third party, including but not limited to legal counsel or client.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date 2024 06 12.....

# Appendix “C”

Caivan’s Updated Draft Plan of Subdivision (2024 06 12).

SCHEDULE OF LAND USE		
LAND USE	LOT/BLOCK	AREA (sq.m/acs.)
DETACHED HOMES	LOT 1 TO 632 BOTH INCLUSIVE	177247.3 / 43.8
TOWNHOUSE	BLOCK 633 TO 696 BOTH INCLUSIVE	49832.4 / 12.3
MULTI-USE PATH	BLOCKS 697, 698, 699 AND 709	916.7 / 0.2
TRAMP STATION	BLOCK 706	502.3 / 0.1
PARK/OPEN SPACE	BLOCKS 700, 701 AND 702	22474.2 / 5.6
AFFORDABLE HOUSING	BLOCK 707	6099.9 / 1.5
SWM	BLOCKS 703, 704, 705 AND 710	40397.3 / 9.9
WETLAND	BLOCK 708	32793.8 / 81.0
STREETS	STREETS A TO STREET X	152142.2 / 37.8
TOTAL		777242.2 / 192.0



ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 OF THE PLANNING ACT.

- (A)-(E)(F)(G) AND (L)-AS SHOWN ON DRAFT PLAN
- (C)-AS SHOWN ON DRAFT AND KEY PLANS
- (D)-LAND TO BE USED IN ACCORDANCE WITH SCHEDULE OF LAND USE
- (F)-FULL MUNICIPAL SERVICES
- (I)-OFFSHORE MARINE DEPOSITS OF CLAY, SILTY CLAY AND SILT, BEDROCK

SHEET 1 OF 3

DRAFT PLAN OF SUBDIVISION OF  
**PART OF LOT 26 AND 27 CONVESSION 1**  
 AND  
**PART OF LOT 25 AND 26 CONVESSION 2**  
 AND  
**PART OF PARK LOT 1 IN LOT 27 CONVESSION 2**  
 AND  
**PART OF THE ROAD ALLOWANCE BETWEEN CONCESSIONS 1 & 2 CLOSED BY BY-LAW LC204235**  
 ALL IN THE GEOGRAPHIC TOWNSHIP OF BATHURST

AND  
**SOUTH EAST PART OF LOT 1 CONVESSION 1 AS SHOWN ON COMPILED PLAN No. 8828**  
 IN THE GEOGRAPHIC TOWNSHIP OF DRUMMOND TOWN OF PERTH

AND  
**PART OF THE ROAD ALLOWANCE BETWEEN GEOGRAPHIC TOWNSHIPS OF BATHURST AND DRUMMOND**  
 COUNTY OF LANARK  
 J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SCALE 1 : 1750

NOTES  
 BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS (SCP) 088720150511 AND 01019803271, UTM ZONE 18, NAD83 (CSRS).

ELEVATIONS  
 ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM CGVD08/20

CONTOUR INTERVALS ARE SHOWN AS 1m FOR MAJOR AND 0.25m FOR MINOR

— DENOTES MAJOR CONTOUR  
 - - - DENOTES MINOR CONTOUR

OWNER'S CERTIFICATE  
 CAIVAN (PERTH) INC. BEING THE REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZES J.D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE \_\_\_\_\_

FRANK CARO  
 PRESIDENT  
 (I HAVE THE AUTHORITY TO BIND THE CORPORATION)  
**CAIVAN (PERTH) INC.**

SURVEYOR'S CERTIFICATE  
 I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ARE CORRECTLY SHOWN.

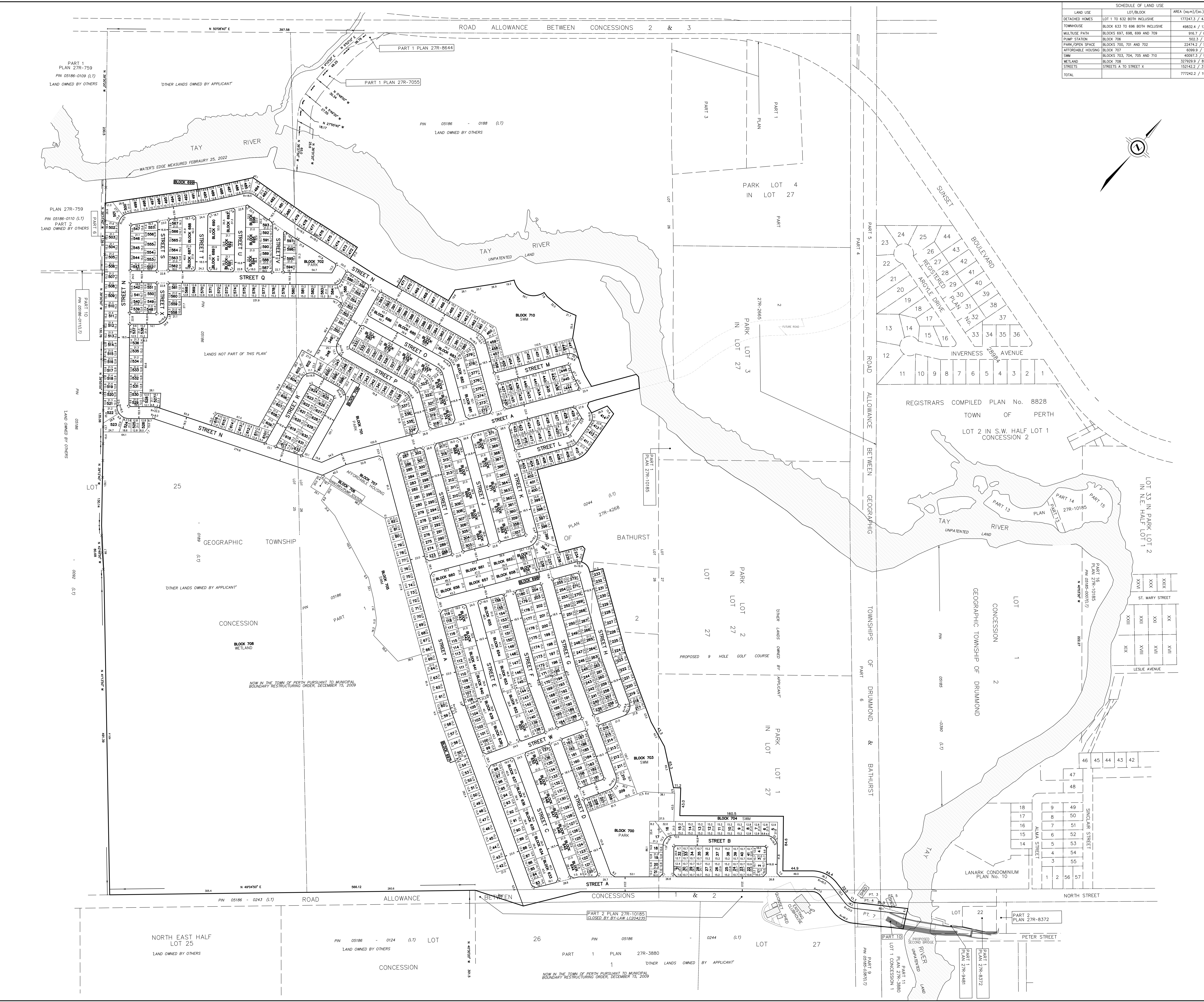
DATE MAY 31, 2024

CHIEF OF  
 ONTARIO LAND SURVEYOR

DATA SOURCE  
 DATA SHOWN HEREON IS COMPILED FROM VARIOUS SOURCES:  
 - 1:100 FLOOD PLAN - PERTH GOLF COURSE FLOODPLAIN MAPPING AMENDMENT MAY 31, 2024, FSA  
 - 2024 GRANTS OVER PROPOSED SIGNIFICANT WETLAND BOUNDARY AS PER METHURP AND ASSOCIATES  
 - 2022 THE EROSION AND EROSION ACCESS ALLOWANCE AS PER GARDNER CONSULTING ENGINEERS AND SCIENTISTS  
 - 2024 MENDERSHALL AS PER GEO MAPPING LTD  
 - HYDROGRAPHIC INFORMATION SHOWN HEREON AS PER FIRST BASE MAPPING 2022  
 - SECOND BRIDGE OPTION AS PER CGH TRANSPORTATION

**J.D. BARNES** SURVEYING & MAPPING LIMITED GIS  
 LAND INFORMATION SPECIALISTS  
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DRAWN BY: CE CHECKED BY: CF REFERENCE NO: 22-10-008-00 07  
 PLOTTED: 5/23/24 DATE: 05/31/2024 SHEET 1 OF 3



LOT 33 IN PARK LOT 2 IN N.E. HALF LOT 1

XXIX	XX
XXX	XVI
XXII	XVII
XXIII	XVIII
XXIV	XIX

FILE: G:\22-10-008\00\Drawings\Draft Plan\G:\22-10-008-00 Draft Plan v7.2\_25 1.dwg

# Appendix “D”

Transportation Issues Resolutions Memo.





# Technical Memorandum

To:	Hugo Lalonde – Caivan	Date:	2024-04-29
Cc:	Susan Murphy, Colin Haskin – Caivan		
From:	John Kingsley, Christopher Gordon – CGH	Project Number:	2021-117

## Re: 141 Peter Street – Transportation Issue Resolution

### Context

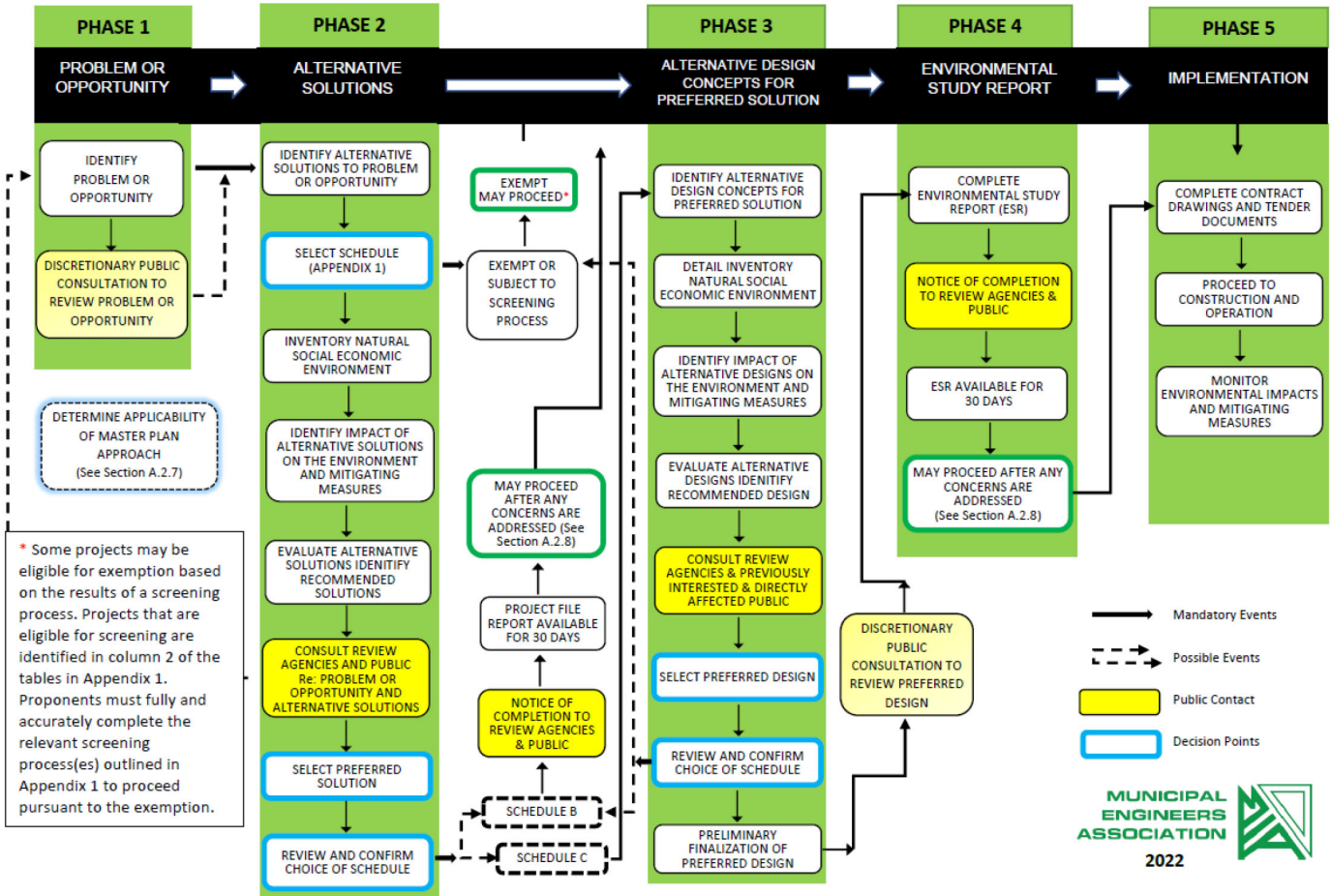
Pursuant to the resolution of concerns pertaining to the development of the Golf Course Lands (141 Peter Street), the Town of Perth and County of Lanark produced a list of issues dated April 9, 2024 that they requested the proponent address. While all disciplines of development are interdependent, a number of these listed issues directly implicate the transportation aspects of the development, and the response to these items is the subject of this memo. Those issues of direct impact to transportation strategy and staging are as follows:

- 1. The timing of development phases that is tied to construction of the second bridge.*
- 3. Outstanding infrastructure issues that need to be included in the mediation include, but are not limited to the following:*
  - a) Transportation: Additional information requirements to Peter Street crossing and the proposed additional crossing over the Tay River, including hydraulic, floodplain and ecological impacts as well as the phasing for construction/timing of the second crossing. Construction traffic routes and strategies need to be fully vetted.*

To address these issues, the process for the construction of the second bridge and the proposed scope of modifications to the existing Peter Street crossing will first be outlined.

### Framework for the Bridge Improvements

Municipal Class Environmental Assessments (MCEA) are a category of Class Environmental Assessment required for various municipal infrastructure projects and are governed by Ontario’s Environmental Assessment Act under the Ministry of Environment, Conservation and Parks (MECP). The MCEA process follows a prescribed, phased progression, which is presented below.



The 2019 Infrastructure Master Plan (IMP) conformed to a Schedule B project and was therefore subject to the first two phases of the MCEA process. These MCEA requirements were fulfilled and the notice of completion to review agencies and public was completed.

Based on Appendix 1 of the February 2024 Municipal Class Environmental Assessment document, the future crossing of the Tay River at the second location is understood to be a Schedule B project. Given the IMP satisfied the MCEA Schedule B requirements, the remaining planning and design for this new facility will proceed from this completed work.

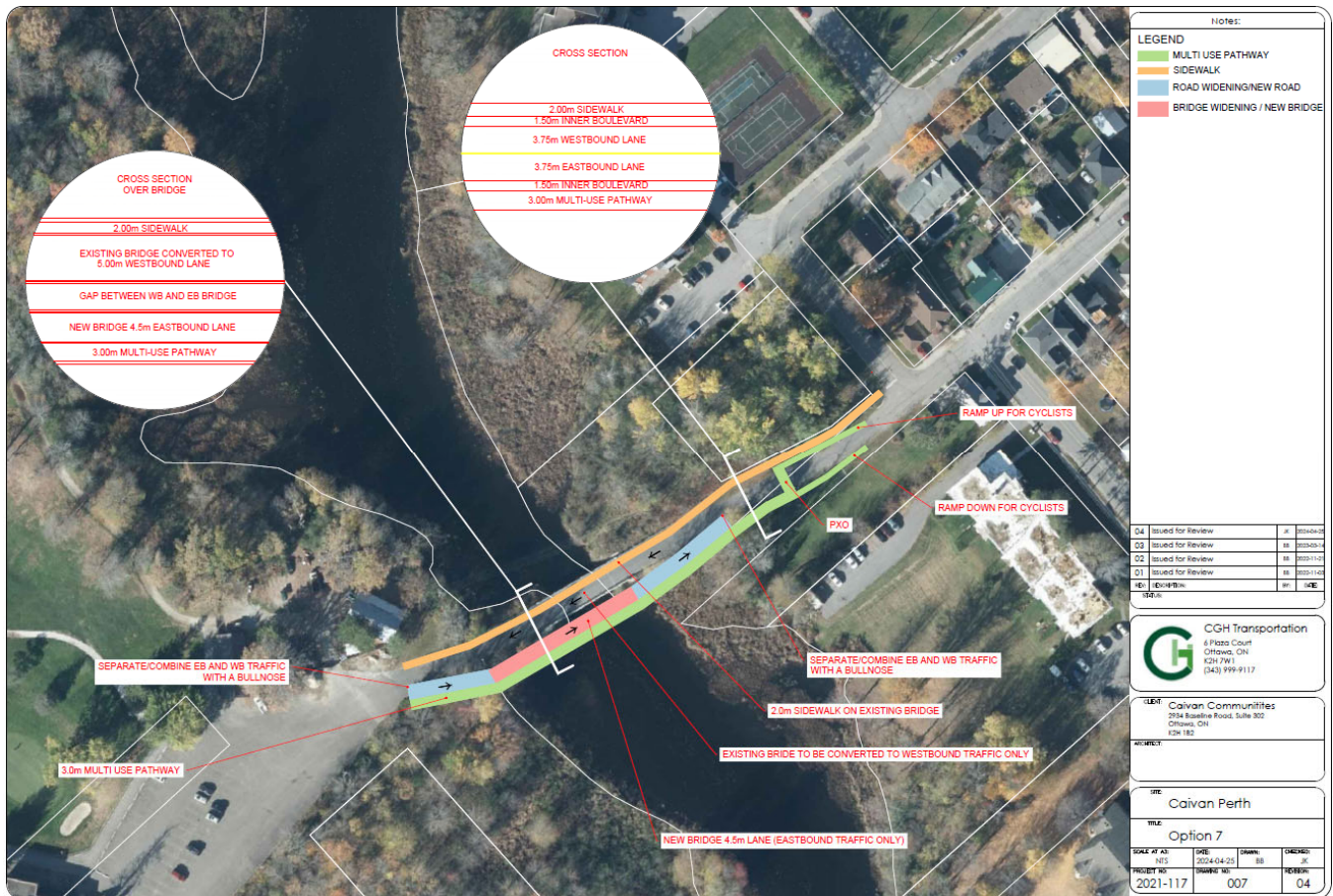
With respect to the Peter Street Crossing, the EA requirements for this project have been satisfied through the Planning Act via the development applications to date. The Commencement Notice has been issued, and analysis of alternatives has been provided through the Transportation Impact Study (TIS) submission (CGH, 2023).

### Proposed Changes to the Peter Street Crossing Location

The Peter Street crossing requirements have been studied and documented throughout the development application process. Notably, the 141 Peter Street TIS (CGH, 2023) includes an appendix detailing the various alternatives explored for crossing the Tay River, including numerous modifications to the Peter Street bridge and environs.

The previous work has found that the existing Peter Street bridge cannot accommodate the addition of cycling and pedestrian facilities with its current structure. As such, the construction of an additional bridge in the immediate vicinity of the existing crossing (either to the north or to the south) will be undertaken. In total, the decks of both bridges are to include one vehicle travel lane in each direction, a bi-directional multi-use path (MUP), and a bi-directional sidewalk. Further study will be required to determine which deck will contain which elements, but it is anticipated that a single travel lane and one active transportation facility (either the sidewalk or the MUP) will be provided on each deck. In addition to separating vulnerable users from vehicle traffic, this twinning will provide two connections on the east side of the development for enhanced emergency servicing of the community and will accommodate construction traffic.

An illustration of this concept, similar to those presented in the preceding work by CGH is provided in the below graphic and in a full-sized sheet in Attachment 1.



The Peter Street roadway between Lustre Lane and the existing bridge will also be formalized and widened to the full roadway width consistent with the cross-section east of Lustre Lane. The new sidewalk will be carried through to Lustre Lane and the new MUP will terminate with a pedestrian cross-over, splitting out the cycling directions and ramping them up/down onto the roadway as appropriate.

**Terms of Reference for the Design and Construction of the Second Crossing Location**

Despite its MCEA process having been completed, the prior planning and design for the Tay River crossing solution for the Golf Course Lands (141 Peter Street) in Perth, Ontario are proposed to be revisited as part of subdivision approvals. After this due diligence review, the remaining work to advance the design will be completed, and

construction will follow. This memorandum serves to establish a Terms of Reference (ToR) for these activities which is presented below.

#### Review of MCEA Phase 1: Problem or Opportunity

- Identification the settlement area
- Identification of the need for connectivity and transportation capacity to these lands across the Tay River
- Review of IMP
  - The IMP identified the need for an overarching strategy to service the 141 Peter Street Parcel from a transportation and civil infrastructure perspective given the separation from the remainder of the Town of Perth by the Tay River
  - The IMP was written to satisfy the first phase of the MCEA process, and this work will be reviewed and validated
- Review of relevant Official Plan policies pertaining to the settlement

#### Review of MCEA Phase 2: Alternative Solutions

- Review of IMP
  - Review of existing transportation conditions
  - The IMP was written to satisfy the second phase of the MCEA process, and this work will be reviewed and validated

#### Design, Permitting, Implementation, and Construction

- Definition of criteria for analysis
- High level analysis and evaluation of all alternatives, considering all relevant environments
- Develop preferred plan, which addresses key issues such as traffic flows in the town and emergency vehicle access to the new development.
- Provision of a qualitative description of the functional facilities crossing the Tay River and the required phasing of these to permit development, including analysis of alternative staging strategies for the preferred design
- Provision of preliminary designs of the ultimate set of facilities crossing the Tay River
- The preferred facilities identified will be advanced to detailed design and construction
- Mitigation strategies will be developed and presented
- Permitting requirements will be identified

## Issue Resolution

### Information Requirements

Considering the foregoing context, responding to the transportation comment with respect to the second crossing:

*3. Outstanding infrastructure issues that need to be included in the mediation include, but are not limited to the following:*

*a) Transportation: Additional information requirements to Peter Street crossing and the proposed additional crossing over the Tay River, including hydraulic, floodplain and ecological impacts as well as the phasing for construction/timing of the second crossing. Construction traffic routes and strategies need to be fully vetted.*

The information requirements to the proposed additional crossing over the Tay River, including hydraulic, floodplain and ecological impacts of the second crossing will necessarily be subject to the findings of the planning and design activities outlined in the above ToR.

### Phasing/Construction Timing

Phasing for the construction and timing of both crossing locations as discussed in issue 3. a) above and in issue 1. below, will be addressed herein.

#### *1. The timing of development phases that is tied to construction of the second bridge.*

##### Peter Street Bridge Works

To permit construction traffic, which is typically concurrent with the traffic of the first occupancies, the Peter Street Bridge works are proposed to be commenced simultaneously with other site preparation activities. Additionally, the formalization of the Peter Street roadway along with the sidewalk and MUP tie-in will be completed as part of these activities.

These bridge and road works will be completed before the first occupancy, with their construction occurring concurrently with home construction for the first subdivision phase(s).

##### First Subdivision Phase(s)

After the twinning of the existing Peter Street crossing, the risks associated with emergencies and emergency servicing of the development are reduced. Until the twinning occurs, a single crossing of the Tay River is present. While there will still be a single roadway connection on either side of the bridges, numerous diverse emergency conditions may differently utilize the lands surrounding the roadway, as an interim condition, it is considered appropriate for a certain level of development.

After the twinning of the Peter Street crossing, typical limits for developments with limited road service are proposed to be applied. While these limits vary by jurisdiction, the value of 200 units was proposed within the TIS (CGH, 2023) and confirmed to be reasonable in the Town's peer review of the TIS (Novatech, 2023) while no industry or statutory guidance is understood to exist for this consideration.

From a traffic generation and capacity perspective, it was demonstrated within the Transportation Review of the IMP traffic work (CGH, 2021) that 150 units of traffic would have no additional impact on the transportation network than was assumed within the IMP's traffic study and was supportable. While no traffic work has yet been undertaken to demonstrate that 200 units' worth of traffic from the first phases of development can be supported, this work will be required as part of future submissions. Whatever the results of future traffic work, however, monitoring of the traffic conditions along Peter Street will be required to ensure that impacts are as anticipated.

Therefore, subject to the future traffic work supporting the upper limit, and monitoring of conditions to validate the anticipated operation of Peter Street, the first phases of development before the construction of the second crossing will include 200 units.

##### Construction of the Second Crossing

The background planning work for the second crossing has been ongoing throughout the site investigations in preparing the previous submissions. The activities in the ToR presented above are recommended to begin immediately upon zoning approval. This planning and design work will continue as the first development phases are being constructed. Once the second connection is made, the latter phases of development can proceed and the community buildout can ultimately conclude.

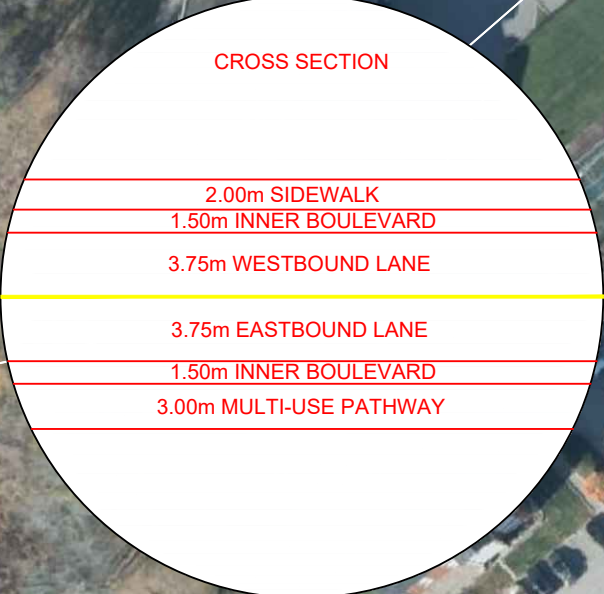
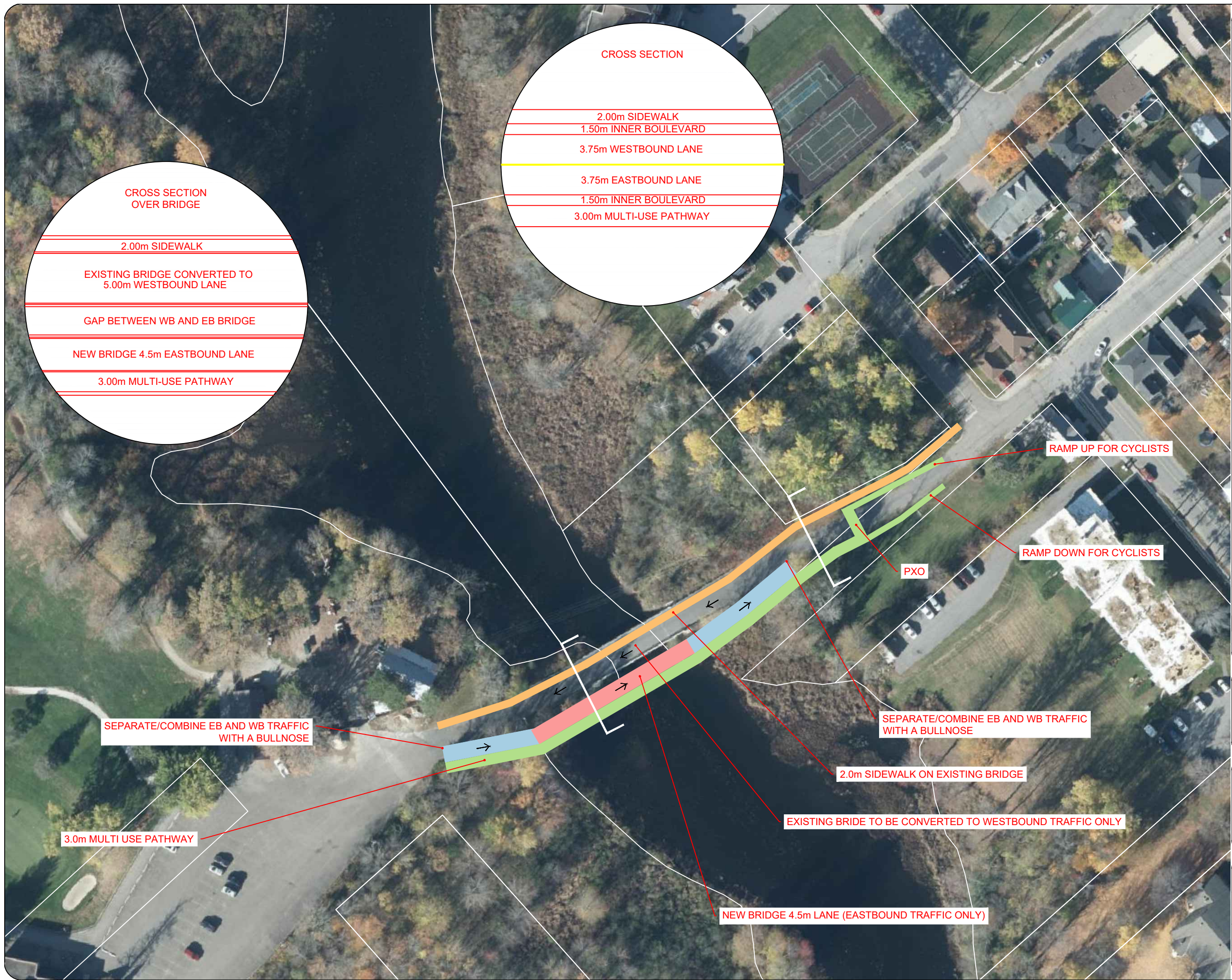
### Proposed Draft Conditions

On the basis of the foregoing, the following draft conditions are proposed:

- The Peter Street roadway, sidewalk, and MUP and the additional Tay River crossing in the vicinity of the existing Peter Street bridge will be completed before the occupancy of the first dwelling in the Golf Course Lands, and unit construction permitting may proceed concurrently with these works
- The development of 200 dwelling units may proceed in the absence of a the completion of a second crossing
- Planning and design of the second crossing will proceed along a schedule to permit the commencement of construction of this bridge for the latter phases of construction without undue delay to the greater subdivision buildout, and unit construction permitting (dwelling units 201+) may proceed concurrently with the bridge construction activities
- Should the bridge planning work conclude that the second crossing be located at the location identified in the IMP, the Town of Perth will facilitate the acquisition rights for the lands on the opposite side of the Tay River.

# Attachment 1

Peter Street Crossing Concept



Notes:

**LEGEND**

- MULTI USE PATHWAY
- SIDEWALK
- ROAD WIDENING/NEW ROAD
- BRIDGE WIDENING / NEW BRIDGE

04	Issued for Review	JK	2024-04-25
03	Issued for Review	BB	2023-03-14
02	Issued for Review	BB	2022-11-21
01	Issued for Review	BB	2022-11-03
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

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 2934 Baseline Road, Suite 302  
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 K2H 1B2

ARCHITECT:

SITE: Caivan Perth

TITLE: Option 7

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2024-04-25	BB	JK
PROJECT NO:	DRAWING NO:	REVISION:	
2021-117	007	04	



# Appendix “E”

Western Annex Lands – 141 Peter Street Transportation Review – 2024 06 12.

# Western Annex Lands – 141 Peter Street Transportation Review

Revision #1

Prepared for:

Caivan (Perth GC) Ltd.  
2934 Baseline Road, Suite 302  
Ottawa ON K2H 1B2

Prepared by:



6 Plaza Court  
Ottawa, ON K2H 7W1

June 2024

PN: 2021-117

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## 1 Transportation Review Background

Subsequent to the addition of the Western Annex Lands to the Town of Perth’s Urban Settlement Boundary, an Infrastructure Master Plan (IMP) was commissioned by the Town and prepared by Jp2g Consultants Inc. in 2019, in part to develop a transportation framework for the area, identifying high-level opportunities and constraints. This Infrastructure Master Plan forms the foundation for future planning work to develop these lands. The Western Annex Lands are separated into two components, the Tayview Lands and the Golf Course Lands, and the Golf Course Lands are the subject of this Transportation Review.

The Infrastructure Master Plan’s concept plan considered the development of 650 detached single dwelling units within the Golf Course Lands, based upon the expected increase in population from the Town’s Official Plan, and a Transportation Impacts Study (TIS) performed by D. J. Halpenny & Associates Ltd. was undertaken in support of this concept.

Caivan (Perth GC) Ltd. is pursuing the approvals to develop the Golf Course Lands, 141 Peter Street. As part of the planning approvals process, this Transportation Review examines the refinements to the Golf Course concept plan, compares their impacts relative to the Infrastructure Master Plan’s transportation conclusions for both the first phase and the total buildout. This Transportation Review is in support of a zoning by-law amendment, official plan amendment, draft plan of subdivision application, and a Municipal Class Environmental Assessment.

The revised subdivision concept comprises 621 single detached dwellings and 350 townhome units. The first phase is planned to comprise 200 dwellings and proposes access via a twinning of the existing Peter Street Bridge. The subsequent phases propose the construction of the second Tay River crossing, consistent with the Infrastructure Master Plan location, connecting to the existing driveway of the Lanark County Administration Building located at 99 Christie Lake Road. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <https://www.openstreetmap.org/> Accessed: December 20, 2021



## 2 Existing and Planned Conditions

### 2.1 Existing Conditions

#### 2.1.1 Area Road Network

*Highway 7:* Highway 7 (Dufferin Street) is a provincial freeway with a two-lane rural cross-section with gravel shoulders to the west of Lanark Road (Hwy 511) and a four-lane cross-section with paved shoulders to the east within the study area. The posted speed limit is 60 km/h and the existing right-of-way varies within the study area.

*Christie Lake Road:* Christie Lake Road is an arterial road with two-lane rural cross-section with paved shoulders on both sides of the road. Approximately 450 metres west of the Lanark County Administration Building access, the posted limit changes from 60 km/h to 80 km/h to the west. The existing right-of-way is 30 metres.

*Sunset Boulevard:* Sunset Boulevard is an arterial road with two-lane rural cross-section with paved shoulders on both sides of the road. An asphalt pathway is provided along the south side of the roadway. Approximately 70 metres east of the Lanark County Administration Building, the posted limit changes from 60 km/h to 50 km/h to the east. The existing right-of-way is 30 metres.

*Wilson Street:* Wilson Street is an arterial road to the north of Foster Street and a collector road to the south. Between the Perth Mews access and Sunset Boulevard, Wilson Street has a three-lane urban cross-section with two southbound lanes, and it has a two-lane urban cross-section to the south. Sidewalks are provided on both sides of the road and bike lanes are provided on both sides of the road between Sunset Boulevard and Leslie Street. Street parking is permitted on both sides of the road between Leslie Street and the Best Western, and on the east side of the road to the south. The posted speed limit is 50 km/h, and the existing right-of-way is typically 20 metres.

*Gore Street:* Gore Street is a local road north of Foster Street and an arterial Road to the south with a two-lane urban cross-section and with sidewalks on both sides of the road. Street parking is permitted on both sides of the road south of D'Arcy Street and on the east side to the north. The unposted speed limit is assumed to be 50 km/h and the existing right-of-way is 20 metres.

*Foster Street:* Foster Street is an arterial road between Wilson Street and Gore Street, a collector road between Gore Street and Drummond Street, and a local road east of Drummond Street. Sidewalks are provided on both sides of the road west of Beckwith Street. Street parking is permitted on both sides of the road west of Drummond Street and on the north side of the road to the east. The unposted speed limit is assumed to be 50 km/h, and the existing right-of-way is 20 metres.

*Peter Street:* Peter Street is a collector road with a two-lane cross-section that is urbanized east of Lustre Lane, and transitions to a rural cross-section to the west. Sidewalks are provided on the north side of the road between Rogers Road and Lustre Lane, and both sides east of Rogers Road. The posted speed limit is 40 km/h east of Lustre Lane and 30km/h to the west. The existing right-of-way is 12 metres.

*Harris Street South:* Harris Street South is a collector road with a two-lane urban cross-section with a sidewalk on the north side of the road. The unposted speed limit is assumed to be 50 km/h and the existing right-of-way is 16 metres.

2.1.2 Existing Intersections

The key signalized area intersections have been summarized below:

- Wilson Street W/Canadian Tire Access at Highway 7 (Dufferin Street)*    The intersection of Wilson Street West/the Canadian Tire Access at Highway 7 (Dufferin Street) is a signalized intersection. The northbound approach and private southbound approach each consist of a shared left-turn/through lane and an auxiliary right turn lane. The eastbound and westbound approaches each consists of a shared left-turn/through lane and a shared through/right-turn lane. No turn restrictions were noted.
- Wilson Street W at Sunset Boulevard / Harris Street S*    The intersection of Wilson Street West at Sunset Boulevard/Harris Street South is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a shared through/right-turn lane, and a bike lane and the southbound approach consists of an auxiliary left-turn lane, a through lane, and a right-turn lane. The eastbound approach consists of a shared left-turn/through lane and an auxiliary right-turn lane, and the westbound approach consists of shard all-movement lane. No turn restrictions were noted.
- Wilson Street W / Wilson Street E at Peter Street / Foster Street*    The intersection of Wilson Street West/Wilson Street East at Peter Street/Foster Street is a signalized intersection. The northbound and eastbound approaches each consist of a shared all-movement lane. The southbound approach consists of a left-turn lane and a shared through/right-turn lane, and the westbound approach consists of a shared left-turn/through lane and an auxiliary right-turn lane. No turn restrictions were noted.
- Gore Street W / Gore Street E at Foster Street*    The intersection of Gore Street West/Gore Street East at Foster is a signalized intersection. The northbound approach consists of a left-turn lane and an auxiliary shared through/right-turn lane, and the southbound approach consists of a shared all-movement lane with enough pavement width to operate as a shared left-turn/through lane and a short auxiliary right-turn lane. The eastbound approach consists of a shared left-turn/through lane and an auxiliary right-turn lane, and the westbound approach consists of a shared all-movement lane with enough pavement width to operate as a shared left-turn/through lane and a short auxiliary right-turn lane. No turn restrictions were noted.
- Lanark County Administration Building Access at Sunset Boulevard / Christie Lake Road*    The intersection of the Lanark County Administration Building Access at Sunset Boulevard/Christie Lake Road is an unsignalized T-intersection, stop-controlled on the minor approach of the access. The northbound approach consists of a shared left-turn/right-turn lane, the eastbound approach consists of a shared through/right-turn lane, and the westbound approach consists of a shared left-turn/through lane. No turn restrictions were noted.



2.1.3 Cycling and Pedestrian Facilities

Sidewalks are provided on both sides of Wilson Street, Foster Street, North Street, Peter Street east of Rogers Road, on the north side of Peter Street between Rogers Road and Lustre Lane, on the west side of Rogers Road. An asphalt pathway is provided along the south side of Sunset Boulevard.

Bike lanes are provided on both sides of Wilson Street W between Harris St S/Sunset Boulevard and Leslie Street.

Figure 3 illustrates the candidate pedestrian network routes, and Figure 4 illustrates the candidate bicycle network routes, each including existing facilities, from the 2017 Town of Perth Municipal Transportation Master Plan (TMP) prepared by Stantec Consulting Ltd.

Figure 3: TMP Pedestrian Network Candidate Routes

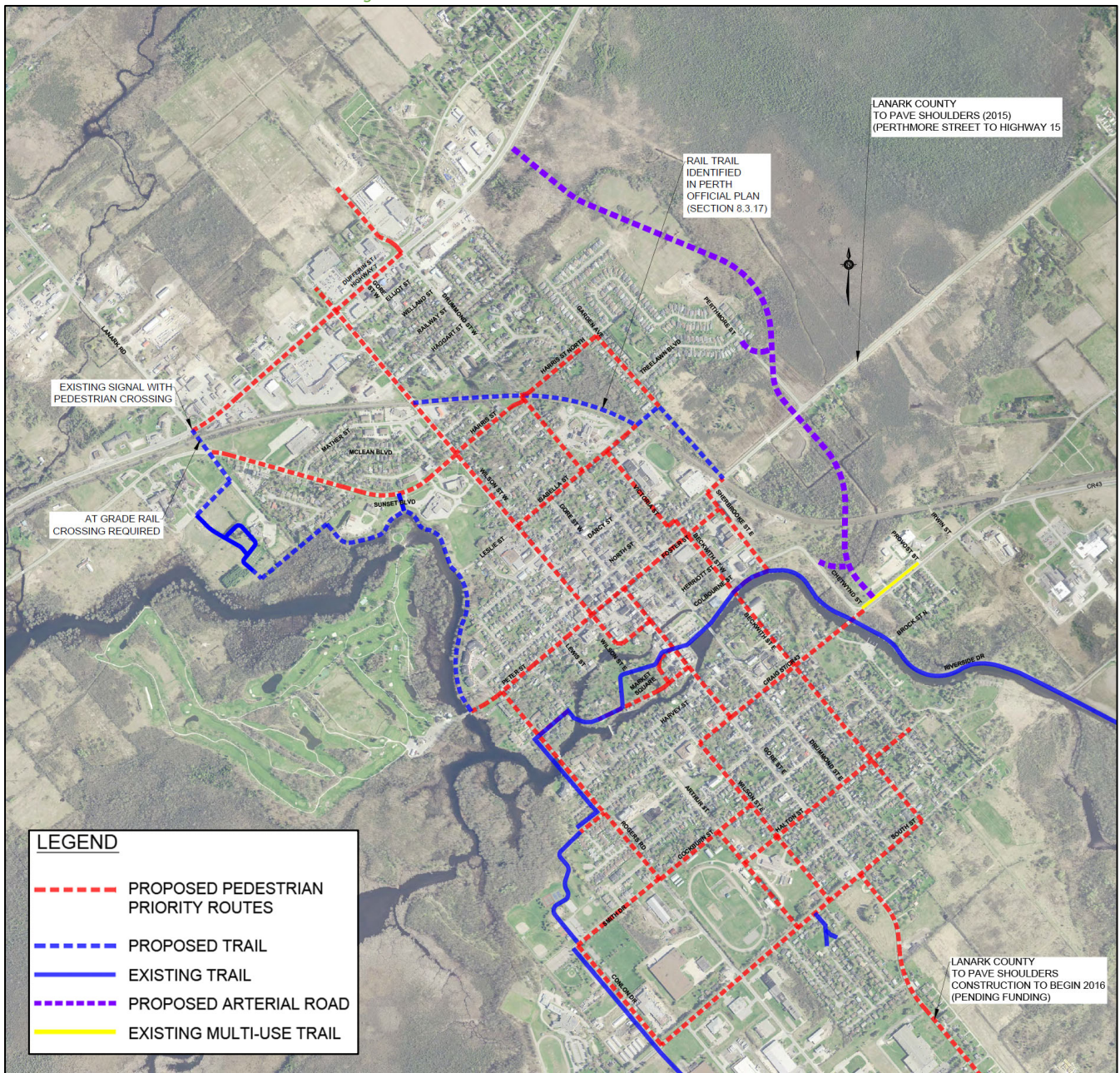
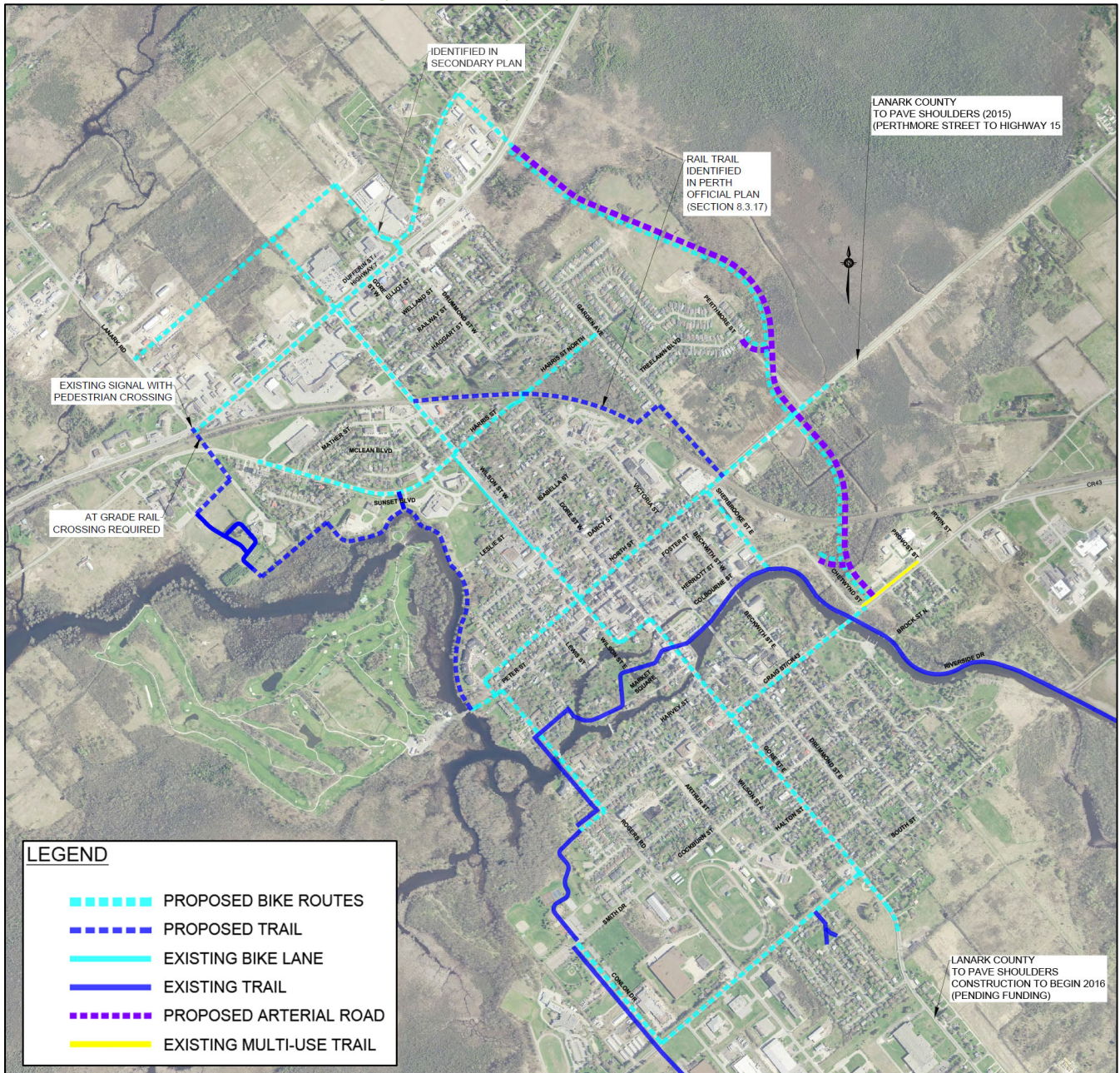


Figure 4: TMP Bicycle Network Candidate Routes



## 2.2 Changes to the Area Transportation Network

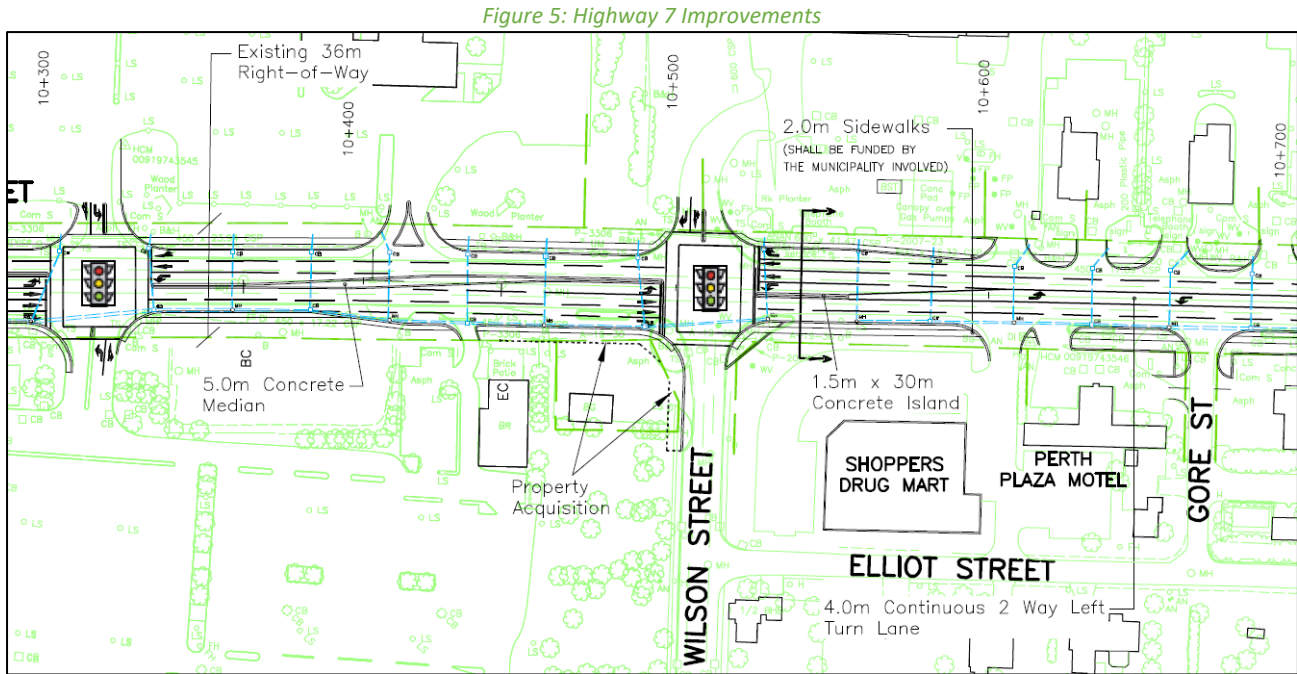
Two projects within the study area are presently planned that will impact the road or active transportation networks.

### Highway 7 Reconstruction

The Ministry of Transportation has retained the services of McIntosh Perry Consulting Engineers Ltd. and LEA Consulting Ltd. Joint Venture to carry out the Class EA and Detail Design for the reconstruction of Highway 7 in the Town of Perth from approximately 1.3 km west of the County’s Highway 511 easterly to Wayside Drive West, approximately 4.5 km in length. The project scope of work relevant to the subject study includes:

- Widening of Highway 7 between Wilson Street and Drummond Street to accommodate a continuous two-way left-turn lane
- Intersection improvements including dedicated left-turn lanes

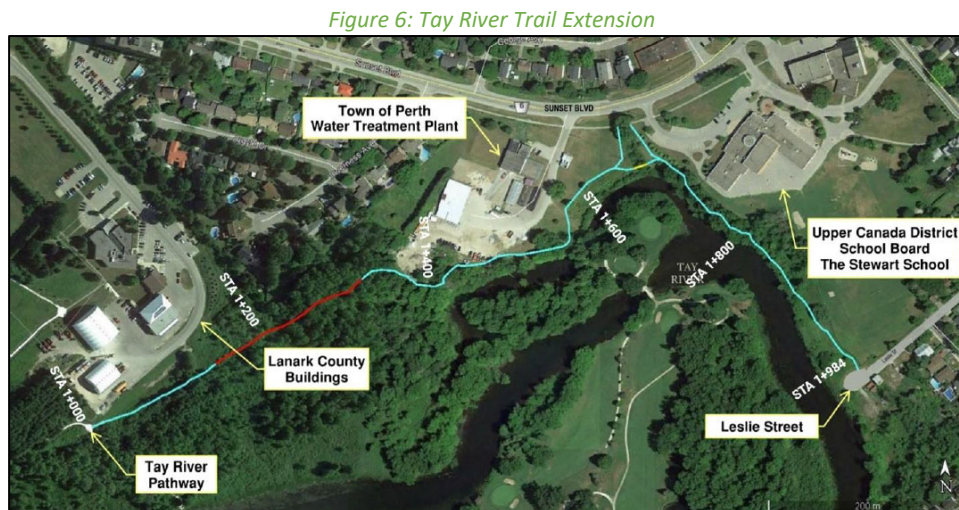
The preliminary design of the facility through the study area is illustrated in Figure 5.



Source: <https://www.highway7improvements.com/> Accessed: January 26, 2022

### Tay River Trail Extension

The Corporation of the Town of Perth retained the services of Jp2g Consultants Inc. to design an extension for the Tay River Pathway. The proposed nature trail will meander along the north shore of the Tay River, connecting the existing Tay River Pathway (adjacent the Lanark County buildings) to the west end of Leslie Street. The proposed alignment concept is illustrated in Figure 6.



Source: Design of the Tay River Trail Extension – Design Brief rev. 1 (JP2G, 2021)

### 3 Infrastructure Master Plan – Transportation Summary

The key takeaways from the transportation component of the infrastructure master plan to be referenced within the subject Transportation Review have been summarized below.

#### 3.1 Development Concept and Transportation Options

Within the development, a collector road was proposed as a spine through the development from the Peter Street Bridge to the northern extent of the development area, accessed by numerous local roads.

The Infrastructure Master Plan presented four transportation options for the community’s vehicular access to the proposed collector as summarized below:

- Option 1 assumed all traffic crossed the Peter Street Bridge
- Option 2 assumed 65% of the traffic used the Peter Street Bridge and 35% used a new connection to the County lands access
- Option 3 assumed the volume of traffic generated by the first 120 unit used the Peter Street Bridge and traffic generated by the remaining 530 units used a new connection to the County lands access, via a new bridge across the Tay River
- Option 4 assumed a one-way couplet for Peter Street and North Street with a second bridge from North Street to the subject lands

As acknowledged within the Infrastructure Master Plan, Options 2 and 3 are similar, both requiring the construction of a new bridge across the Tay River to the Lanark County Administration Building lands.

In addition to the four vehicular access options, three active transportation alternatives were assessed.

- Option 1 consisted of a multi-use pathway system
- Option 2 consisted of a limited multi-use pedestrian and separated pathway system
- Option 3 consisted of a separated pedestrian (resident/visitor) and bicycle pathway

The first two options include bike lanes on the internal collector road, and the third includes no cycling facility along the internal collector road.

#### 3.2 Trip Generation and Distribution

Using the auto trip generation rates from the ITE Trip Generation Manual 9<sup>th</sup> Edition (2012), the trip generation for the Golf Course Lands was forecasted within the Infrastructure Master Plan, as summarize in Table 1.

*Table 1: IMP Golf Course Lands Vehicle Trip Generation*

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Family Detached	650	116	349	465	339	199	538

The distribution of trips from the Infrastructure Master Plan was consistent with the Perth Transportation Master Plan Future Traffic Forecasting Memo (Stantec, 2016). This methodology based upon the existing turning movement splits, and access to major infrastructure is considered to be valid. Table 2 below summarizes the distributions from the Infrastructure Master Plan.

Table 2: IMP Trip Distribution

To/From	Residential % of Trips	Via
South	50%	Gore St E
East	25%	10% Hwy 7, 15% Foster St
West	25%	15% Hwy 7, 10% Christie Lake Rd
<b>Total</b>	<b>100%</b>	<b>100%</b>

### 3.3 Traffic Volumes

With the above trip generation and distribution, the site trip generation for each option was presented within the Infrastructure Master Plan. The Option 2 trip generation is excerpted in Figure 7 and the Option 3 trip generation in Figure 8.

Figure 7: IMP Option 2 – 2041 Future Total Traffic Volumes

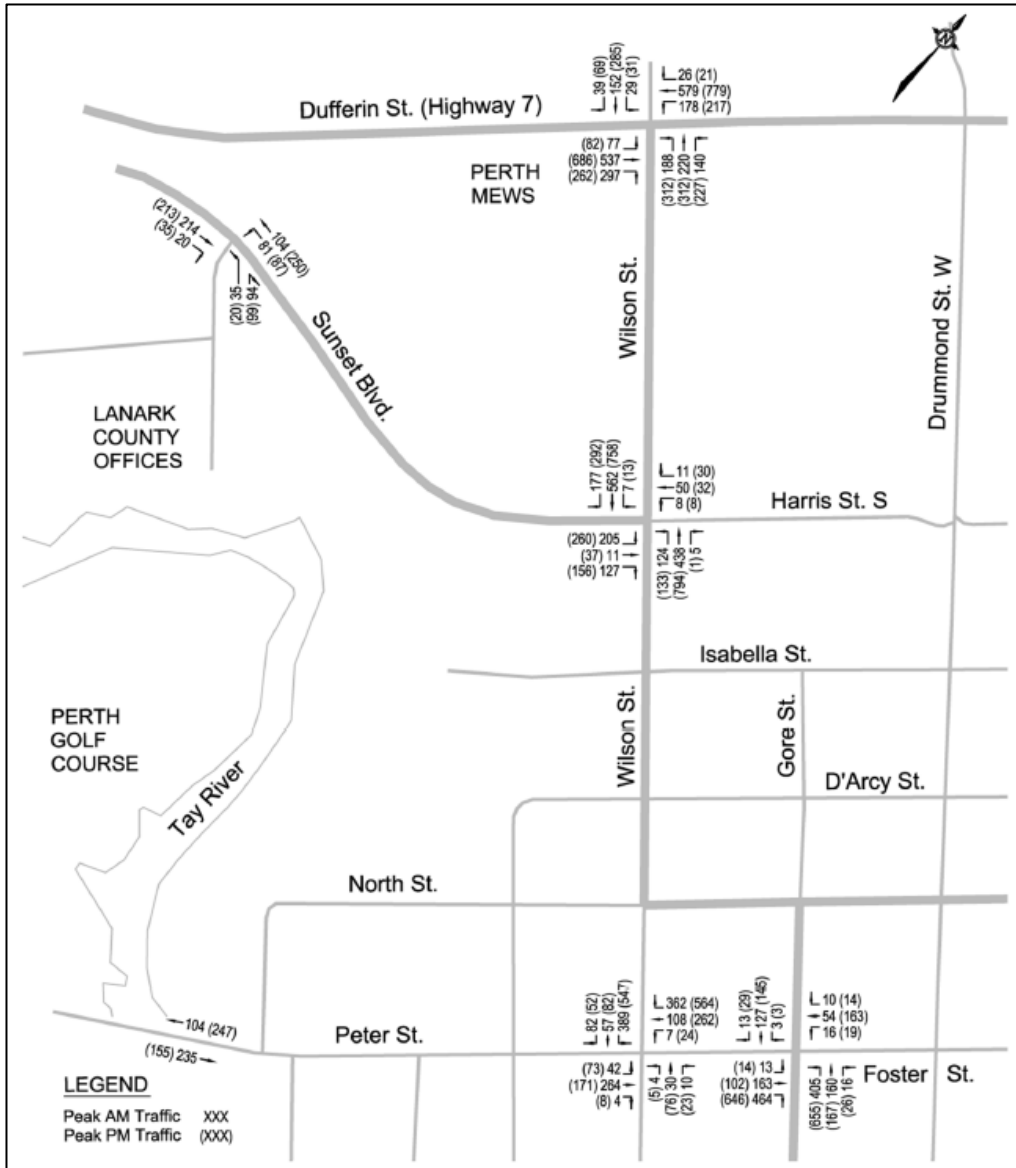
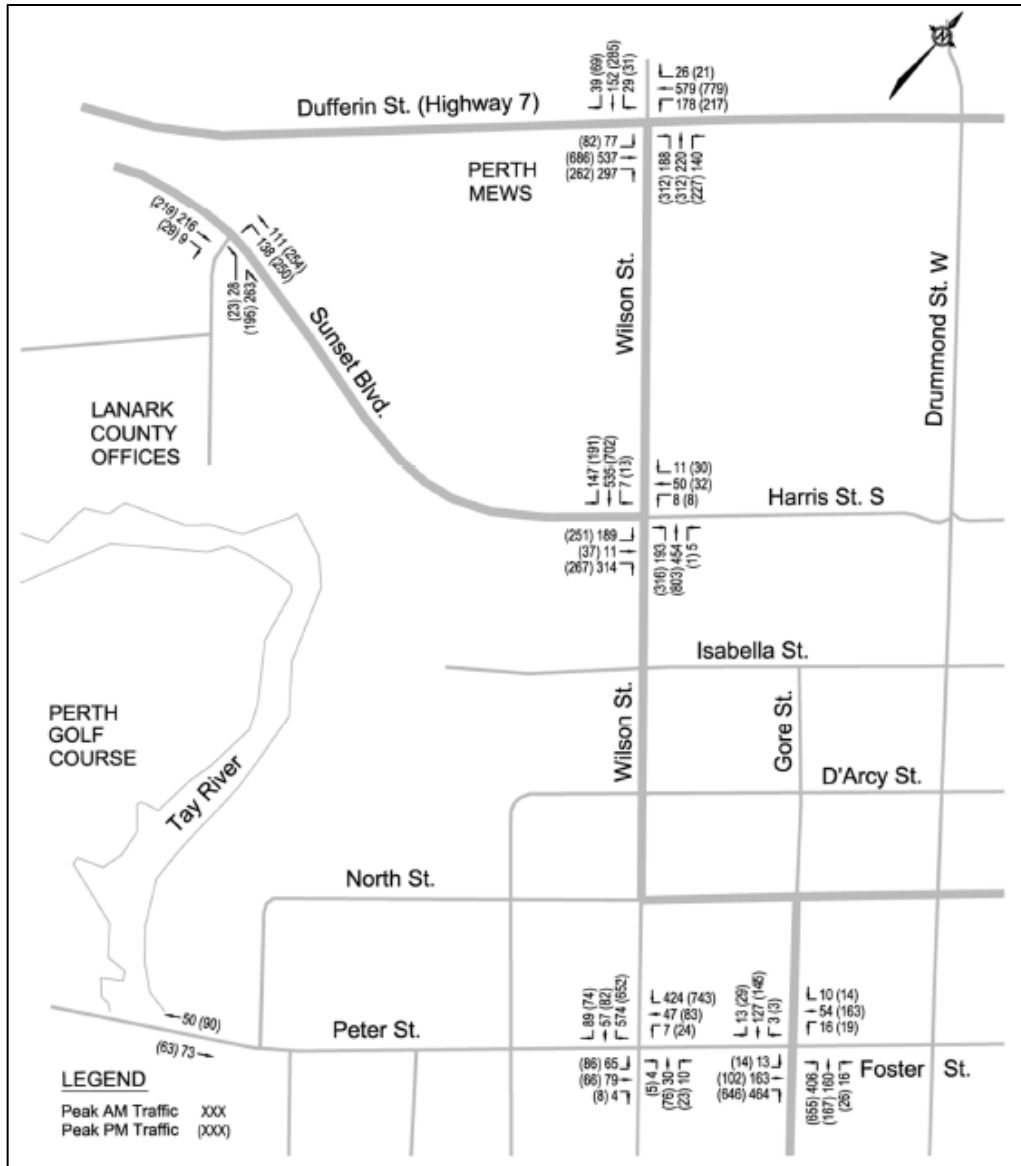


Figure 8: IMP Option 3 – 2041 Future Total Traffic Volumes



### 3.4 Evaluation of Options

Scoring criteria for the evaluation of transportation options was categorized by technical, environment, and socio-economic factors. Where the criteria were weighted equally, each option received a score of positive (indicated by a “+”), negative (indicated by a “-“) or neutral/not applicable (indicated by a “0”). The preferred option is indicated by a “P.” The scoring matrix for the transportation options has been reproduced for the subject Transportation Review in Table 3.

Table 3: IMP Transportation Option Evaluation

Criteria	Option 1 – Upgrade Existing Bridge	Option 2 – New Bridge Crossing at County Property for 35% of Site Traffic	Option 3 – New Bridge Crossing at County Property for [530 units]	Option 4 – New Bridge Crossing at North Street for 1-way in and Existing Bridge for 1-way out
<b>Technical</b>				
Feasibility	-	+	+	-
Compatibility	-	+	+	-
Constructability	0	+	+	0
Maintainability	+	0	0	0
<b>Environmental</b>				
GHG emissions	-	-	-	-
Terrestrial	0	-	-	-
Aquatic	0	0	0	-
Groundwater	0	0	0	0
Surface water	0	0	0	0
<b>Cultural Socio-economic</b>				
Displacement	0	0	0	-
Disruption	-	-	0	-
Aesthetics	0	0	0	0
Cultural Heritage	0	0	0	0
Adaptability	-	0	0	+
Planning objectives	-	0	0	+
Capital cost	+	0	0	0
Operating cost	+	0	0	0
<b>Summary of results</b>				
# Positives	3	3	3	2
# Negatives	6	[3]	2	7
Preference			P	

As noted above, Option 3 is preferred to Option 2 for the scoring difference on the “disruption” criterion. This disruption was described by the Infrastructure Master Plan as “impact on residents along Peter Street and surrounding neighbourhood.”

Of additional note within the Transportation Master Plan is that all options “would result in the same number of trips assigned to the Dufferin/Wilson intersection, and the same impact on the operations of the intersection.”

With respect to active transportation, Option 1 for a multi-use pathway system was chosen as the preferred alternative and Table 4 summarizes the results excerpted for the subject Transportation Review.

Table 4: IMP Active Transportation Option Evaluation Summary

Criteria	Option 1 – Multi-Use Pathway System	Option 2 – Limited Multi-Use Pedestrian and Separated Pathway System	Option 3 – Separated Pedestrian (Resident/Visitor) and Bicycle Pathway
<b>Summary of results</b>			
# Positives	8	4	5
# Negatives	2	2	6
Preference	P		

## 4 Updated Subdivision Review

### 4.1 Site Design

The proposed subdivision concept generally follows the one presented within the Infrastructure Master Plan. A 23.0-metre right-of-way collector road is proposed as a spine through the development from the proposed twinning of the Peter Street Bridge to the proposed bridge to the Lanark County Administration Building lands. Local roads are to access this collector in a pattern consistent with the revised development area.

Local road rights-of-way are proposed as being 18.5 metres where a sidewalk will be permitted on one side, and 16.8 metres for lower volume roadways. Both cross-sections can support 8.5-metre-wide roadways, permitting two 3.0-metre travel lanes and a 2.5-metre parking lane.

Consistent with the Town Transportation Master Plan, whose vision is of “a safe, sustainable, and multi-modal transportation system,” active facility connections will be provided from the subject lands to the surrounding town and downtown. These connections will have the goal of increasing the recreational opportunities for the residents, and importantly, ultimately enabling the reduction in auto traffic by providing opportunity for a higher portion of trips to be walking and cycling.

The active transportation facilities planned include a multi-use pathway along the collector road, between, and over each crossing. Importantly, these new facilities will enable connections to the pathway Tay River Trail which is planned for extension as discussed in Section 2.2.

Additionally included in the revised concept is a system of multi-use pathways surrounding the development area which will serve both a recreational function, and as a connection for residents in all areas of the development to the facilities crossing the bridges. Sidewalks on one side of key local roads and of the collector road are also proposed, to be extended across the two crossings.

The two decks of the twinned Peter Street crossing are proposed to comprise a total of two travel lanes, a sidewalk, and a MUP once completed. A concept for these improvements is provided in Appendix A.

### 4.2 Trip Generation

Traffic generation for the updated full subdivision build-out concept has been prepared using the vehicle trip rates for each residential dwelling type using the fitted curve equation rates from the ITE Trip Generation Manual 11<sup>th</sup> Edition (2021). Table 5 summarizes the vehicle trip rates for the proposed land uses.

*Table 5: Trip Generation Vehicle Trip Rates*

Dwelling Type	ITE Land Use Code	Peak Hour	Vehicle Trip Rate
Single Family Detached	210	AM	0.72
		PM	0.91
Multi-Family Low Rise	220	AM	0.43
		PM	0.52

Using the above vehicle trip rates, the total vehicle trip generation has been estimated. Table 6 below illustrates the total vehicle trip generation by dwelling type.



Table 6: Total Vehicle Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Family Detached	621	116	331	447	362	203	565
Multi-Family Low Rise	350	36	115	151	113	69	182
<b>Total</b>	<b>971</b>	<b>152</b>	<b>446</b>	<b>598</b>	<b>475</b>	<b>272</b>	<b>747</b>

As shown above, 598 new AM and 747 new PM peak hour two-way vehicle trips are projected as a result of the proposed development.

### 4.3 Comparison to Infrastructure Master Plan

The Infrastructure Master Plan’s preferred Option 3 will serve as the basis for comparison for the updated subdivision concepts’ traffic generation.

It is noted the methodology of the Halpenny TIS as presented in the Infrastructure Master Plan utilized vehicle trip rates from the ITE Trip Generation Manual 9<sup>th</sup> Edition (2012). The total trip generation forecasted within the Infrastructure Master Plan for the development based upon 650 detached single-family dwellings using the 2012 methodology was 465 new AM and 538 new PM peak hour two-way vehicle trips. The comparison of the trip generation forecasted within the Infrastructure Master Plan and the subject Transportation Review is summarized in Table 7.

Table 7: Vehicle Trip Comparison

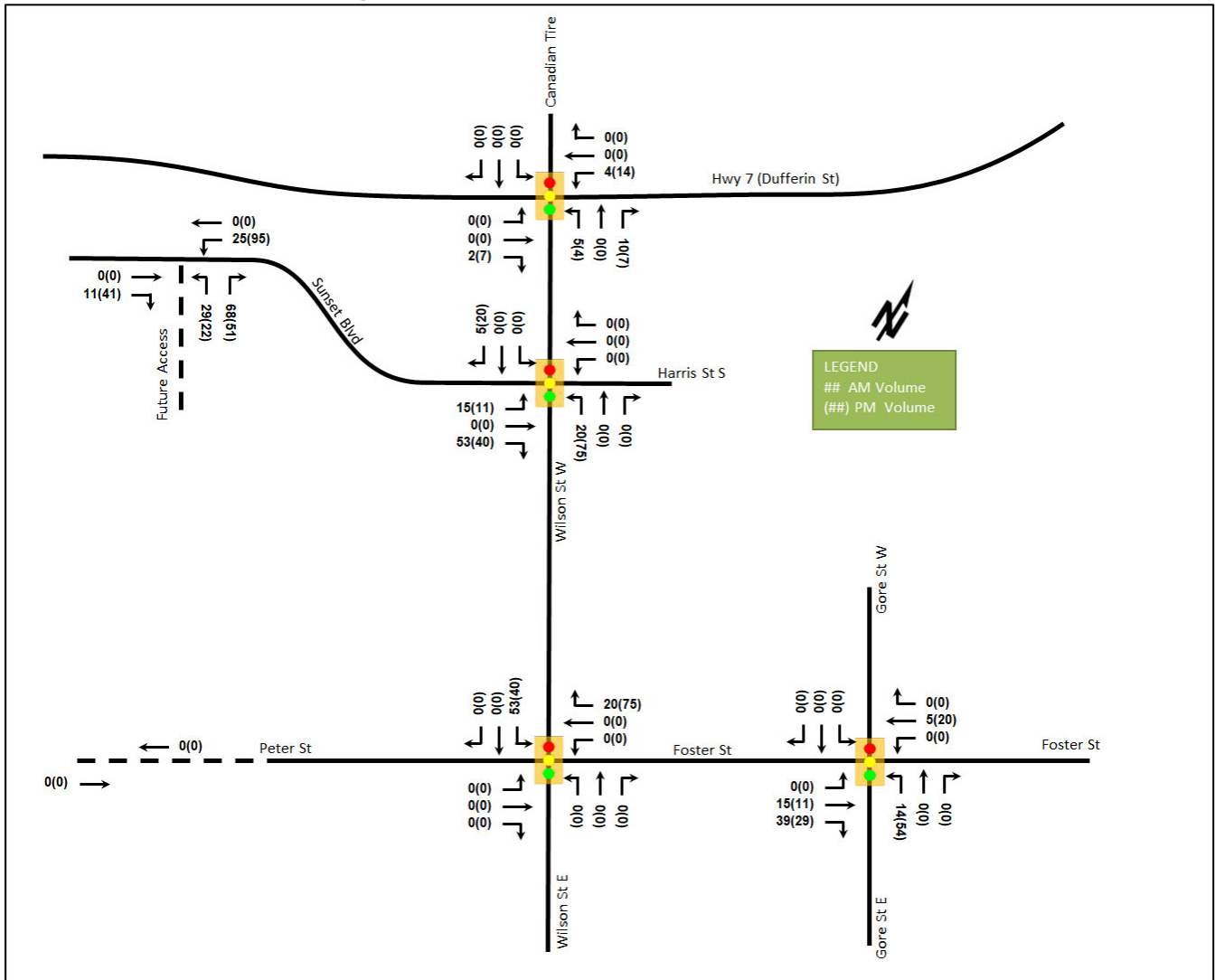
Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
IMP Option 3	116	349	465	339	199	538
Full Build-Out	152	446	598	475	272	747
<b>Difference</b>	<b>+36</b>	<b>+97</b>	<b>+133</b>	<b>+136</b>	<b>+73</b>	<b>+209</b>

As shown above, the forecasted trip generation based upon the updated unit count, housing typologies, and forecasting methodology results in an increase of 133 two-way AM and 209 two-way PM peak hour vehicle trips.

### 4.4 Trip Assignment

As Option 3 assumed a fixed number of trips at the Peter Street Access, the additional vehicle volumes associated with the updated plan will be assigned to the Sunset Boulevard access. The trip distribution proportionally travelling in each cardinal direction will be consistent with the Infrastructure Master Plan distribution summarized previously in Table 2 and the trip assignment is illustrated in Figure 9.

Figure 9: Full Subdivision Build-Out Increase in Auto Volumes



#### 4.5 Traffic Review

As the full subdivision build-out traffic is built upon the Infrastructure Master Plan Option 3 traffic, this option's traffic operations will be analyzed, presented, and discussed to provide context for the changes for the updated concept. The level of service (LOS) for signalized intersections will be based on Highway Capacity Manual (HCM) scoring of the percentile delay for the individual lane movements and overall intersection, and HCM 6<sup>th</sup> delay for unsignalized intersections. Synchro version 11 will be used to model the forecasted study area traffic operations.

HCM LOS scoring for signalized intersections is summarized in Table 8 and for unsignalized intersections is summarized in Table 9.

*Table 8: HCM LOS Scoring at Signalized Intersections*

<b>Level of Service (LOS)</b>	<b>Delay (seconds/vehicle)</b>
<b>A</b>	0 – 10 seconds
<b>B</b>	> 10 – 20 seconds
<b>C</b>	> 20 – 35 seconds
<b>D</b>	> 35 – 55 seconds
<b>E</b>	> 55 – 80 seconds
<b>F</b>	> 80 seconds

*Table 9: HCM LOS Scoring at Unsignalized Intersections*

<b>Level of Service (LOS)</b>	<b>Delay (seconds/vehicle)</b>
<b>A</b>	0 – 10 seconds
<b>B</b>	> 10 – 15 seconds
<b>C</b>	> 15 – 25 seconds
<b>D</b>	> 25 – 35 seconds
<b>E</b>	> 35 – 50 seconds
<b>F</b>	> 50 seconds

#### 4.5.1 IMP Option 3 2041 Future Peak Hour Travel Demand

Forecasted turning movement volumes from the Infrastructure Master Plan, previously referenced in Figure 8, have been reproduced in Figure 10. Signal timing for the study area intersections was inferred from the traffic model output summaries in ‘Appendix E’ of the Infrastructure Master Plan. The forecasted study area traffic operations are summarized in Table 10. The Synchro worksheets are provided in Appendix B.

Figure 10: IMP Option 3 2041 Traffic Counts

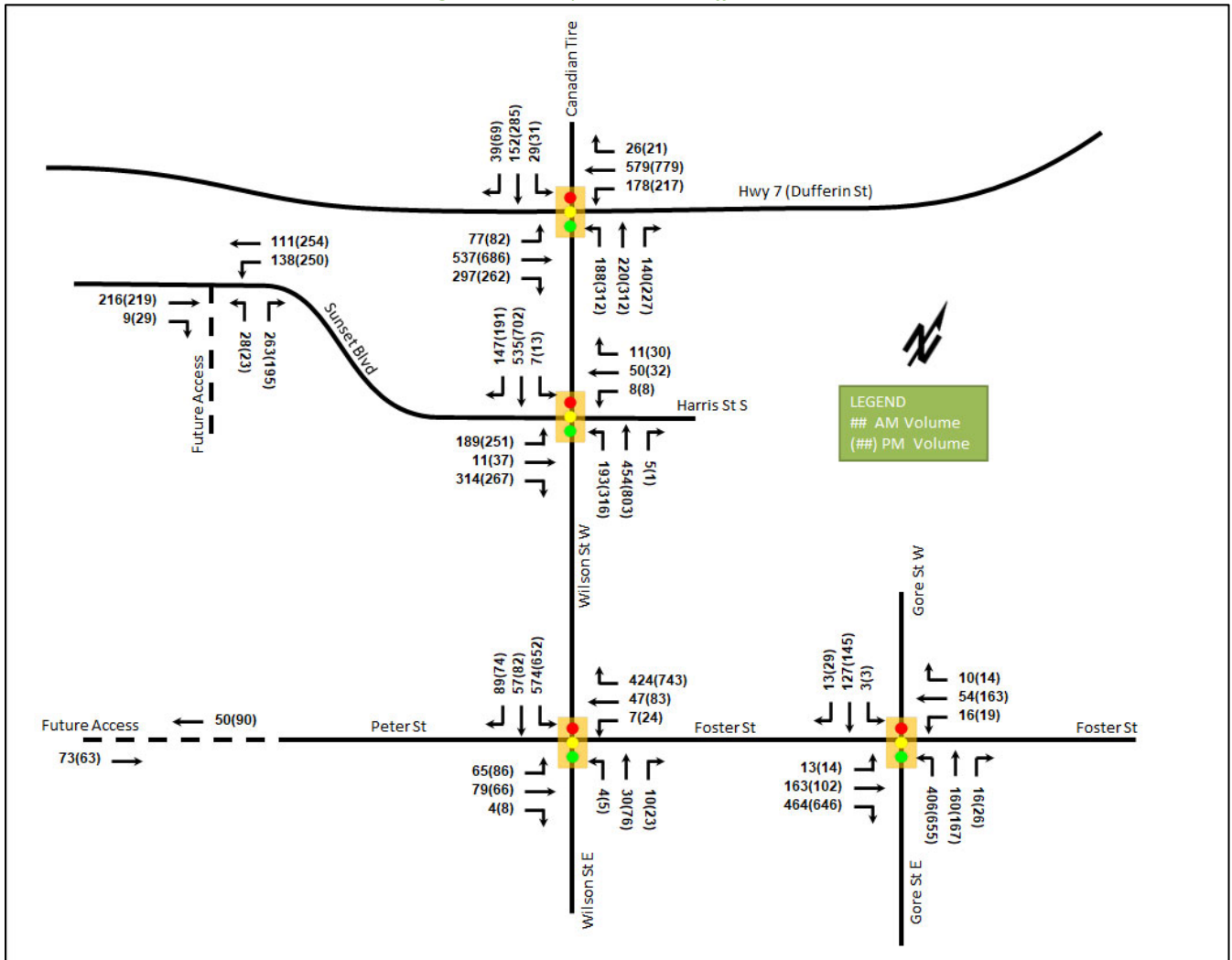


Table 10: IMP Option 3 Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
Wilson St W/Canadian Tire & Hwy 7 Signalized	EBL/T	C	0.60	22.4	48.5	C	0.68	24.6	88.3
	EBR	A	0.38	2.9	11.1	A	0.30	2.6	11.9
	WBL/T	C	0.82	31.0	69.2	D	0.95	45.8	#159.6
	WBR	A	0.04	0.1	0.0	A	0.03	0.0	0.1
	NBL/T	C	0.70	31.9	#127.0	F	1.77	386.1	#290.3
	NBR	A	0.20	4.6	12.2	A	0.34	5.1	16.7
	SBL/T	C	0.26	20.2	42.1	E	0.95	76.2	#130.1
	SBR	A	0.06	0.2	0.0	A	0.12	4.0	6.9
	Overall	C	-	22.5	-	F	-	101.0	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
<b>Wilson St W &amp; Sunset Blvd/Harris St S Signalized</b>	EBL/T	D	0.70	39.4	#57.9	E	0.92	67.8	#98.3
	EBR	A	0.53	7.0	18.9	A	0.47	7.0	18.8
	WB	C	0.17	20.1	17.2	B	0.17	18.3	15.6
	NBL	B	0.52	12.7	20.6	F	1.07	91.9	#88.9
	NBT/R	B	0.48	12.6	75.9	C	0.80	22.8	#200.1
	SBL	A	0.01	6.4	1.8	A	0.05	6.9	2.7
	SBT	C	0.78	25.9	93.7	D	0.91	40.2	#169.7
	SBR	A	0.23	3.4	8.8	A	0.26	3.1	10.5
<b>Overall</b>	<b>B</b>	-	<b>17.8</b>	-	<b>D</b>	-	<b>37.3</b>	-	
<b>Wilson St E/Wilson St W &amp; Peter St/Foster St Signalized</b>	EB	B	0.42	18.9	23.9	C	0.52	25.2	29.9
	WBL/T	B	0.14	14.6	10.2	B	0.30	20.0	20.2
	WBR	A	0.47	2.6	8.4	A	0.67	4.3	12.4
	NB	B	0.15	14.2	8.2	C	0.36	21.6	20.1
	SBL	B	0.73	15.3	#70.7	B	0.75	15.9	#112.7
	SBT/R	A	0.15	3.1	7.6	A	0.15	3.7	10.7
	<b>Overall</b>	<b>B</b>	-	<b>10.5</b>	-	<b>B</b>	-	<b>11.8</b>	-
<b>Gore St E/Gore St W &amp; Foster St Signalized</b>	EBL/T	B	0.42	16.7	24.1	B	0.28	14.8	16.7
	EBR	A	0.56	4.0	9.9	A	0.70	5.7	11.3
	WBL/T	B	0.18	13.8	11.3	B	0.43	16.7	24.8
	WBR	A	0.03	0.1	0.0	A	0.03	0.1	0.0
	NBL	B	0.65	14.2	31.5	D	0.94	40.3	#111.6
	NBT/R	A	0.21	5.8	12.1	A	0.19	5.9	15.3
	SBL/T	B	0.35	16.0	17.2	B	0.35	16.1	21.0
	SBR	A	0.04	0.2	0.0	A	0.07	0.4	0.1
<b>Overall</b>	<b>B</b>	-	<b>10.1</b>	-	<b>B</b>	-	<b>19.4</b>	-	
<b>Sunset Boulevard &amp; Site Access Unsignalized</b>	EBT/R	-	-	-	-	-	-	-	-
	WBL/T	A	0.10	8.0	2.3	A	0.19	8.4	5.3
	NBL/R	B	0.39	12.8	14.3	B	0.35	13.7	11.3
	<b>Overall</b>	<b>A</b>	-	<b>6.3</b>	-	<b>A</b>	-	<b>5.3</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00

v/c = volume-to-capacity ratio  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

Consistent with the analysis from the Infrastructure Master Plan, the study area intersections are forecasted to operate well during the AM peak hour and capacity and delay issues are anticipated to be present at the intersection of Wilson Street West at Highway 7 during the PM peak hour.

Where the traffic operations were assessed within the Infrastructure Master Plan/Halpenny TIS using Highway Capacity Software (HCS) version 7, analysis via Synchro version 11 yielded different results. The operational differences between the two methods are minor throughout much of the study area, however, the intersection of Wilson Street West and Sunset Boulevard during the PM peak hour is forecasted to operate at a reduced LOS from that previously modeled. At this peak hour and horizon when analyzed by Synchro 11, the northbound left movement is forecasted to operate over theoretical capacity with high delay and the eastbound shared left/through movement and southbound through movements are forecasted to be approaching theoretical capacity.

Furthermore, the Infrastructure Master Plan/Halpenny TIS did not include the proposed upgrades at the intersection of Wilson Street West at Highway 7. Given these two factors, operations at the intersections of Wilson Street West at Highway 7 and of Wilson Street West at Sunset Boulevard/Harris Street South can be modeled with

network changes and signal timing optimization. The new operations with these modifications are summarized in Table 11.

Table 11: Modified IMP Option 3 Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
<b>Wilson St W/Canadian Tire &amp; Hwy 7 Signalized</b>	EBL	C	0.31	31.1	24.0	D	0.54	53.7	34.0
	EBT	C	0.49	28.8	59.5	D	0.84	53.5	101.8
	EBR	A	0.44	5.6	18.2	A	0.48	7.5	20.4
	WBL	B	0.44	18.2	31.2	D	0.82	49.7	#67.4
	WBT	B	0.37	17.7	48.7	C	0.58	29.2	89.7
	WBR	A	0.04	0.1	0.0	A	0.03	0.1	0.0
	NBL/T	C	0.77	34.7	98.0	<b>F</b>	<b>1.20</b>	<b>137.0</b>	<b>#251.7</b>
	NBR	A	0.21	3.8	10.3	A	0.28	3.2	13.0
	SBL/T	B	0.29	19.5	35.8	C	0.46	23.4	74.6
	SBR	A	0.06	0.2	0.0	A	0.09	0.3	0.6
	<b>Overall</b>	<b>C</b>	-	<b>20.8</b>	-	<b>D</b>	-	<b>51.8</b>	-
<b>Wilson St W &amp; Sunset Blvd/Harris St S Signalized</b>	EBL/T	Not optimized during the AM peak hour				E	0.91	68.4	#102.0
	EBR					A	0.48	7.0	18.9
	WB					B	0.17	20.0	16.9
	NBL					D	0.92	53.3	#87.9
	NBT/R					C	0.76	21.0	#207.2
	SBL					A	0.05	7.8	2.9
	SBT					D	0.93	45.8	#191.7
	SBR					A	0.27	3.5	11.4
						<b>Overall</b>	<b>C</b>	-	<b>33.8</b>

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00

v/c = volume-to-capacity ratio  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

With the two modifications described above, Option 3 operations at the two study area intersections are improved. The northbound through movement at the intersection of Wilson Street West at Highway 7 is forecast to remain over theoretical capacity with high delays, however delay has been reduced by half on this movement, and additional capacity is available and reduced delay is noted at the intersection on the remaining movements.

At the intersection of Wilson Street West at Sunset Boulevard/Harris Street South, during the PM peak hour the northbound left, eastbound through, and southbound through movements are approaching theoretical capacity and extended queuing on the northbound, southbound, and eastbound approaches may be observed. The eastbound shared left/through movement is noted to be operating with a LOS of E. As presented within the Infrastructure Master Plan, analysis through the HCS7 software at this intersection during the PM peak hour yielded a maximum delay on any movement of 35.6 seconds. As analyzed with Synchro for the subject Transportation Review, three movements have a delay of over 45.8 seconds.

Throughout the study area, only the northbound shared left-turn/through movement is forecasted to operate with a level of service of 'F'. As stated in the Infrastructure Master Plan, this condition is a result of background traffic at the 2041 horizon and the subject development was anticipated to have a minor impact on this intersection's operation.

4.5.2 Full Subdivision Build-Out 2041 Future Peak Hour Traffic Demand

Superimposing the forecasted increase in traffic volumes illustrated in Figure 9 on the Infrastructure Master Plan Option 3 volumes illustrated in Figure 10, the forecasted study area traffic volumes for the full subdivision build-

out at the 2041 horizon have been projected. These volumes are illustrated in Figure 11 and the forecasted traffic operations are summarized in Table 12. Signal timing has been optimized at this horizon. The Synchro worksheets are provided in Appendix C.

Figure 11: Full Build-Out 2041 Future Total Traffic Counts

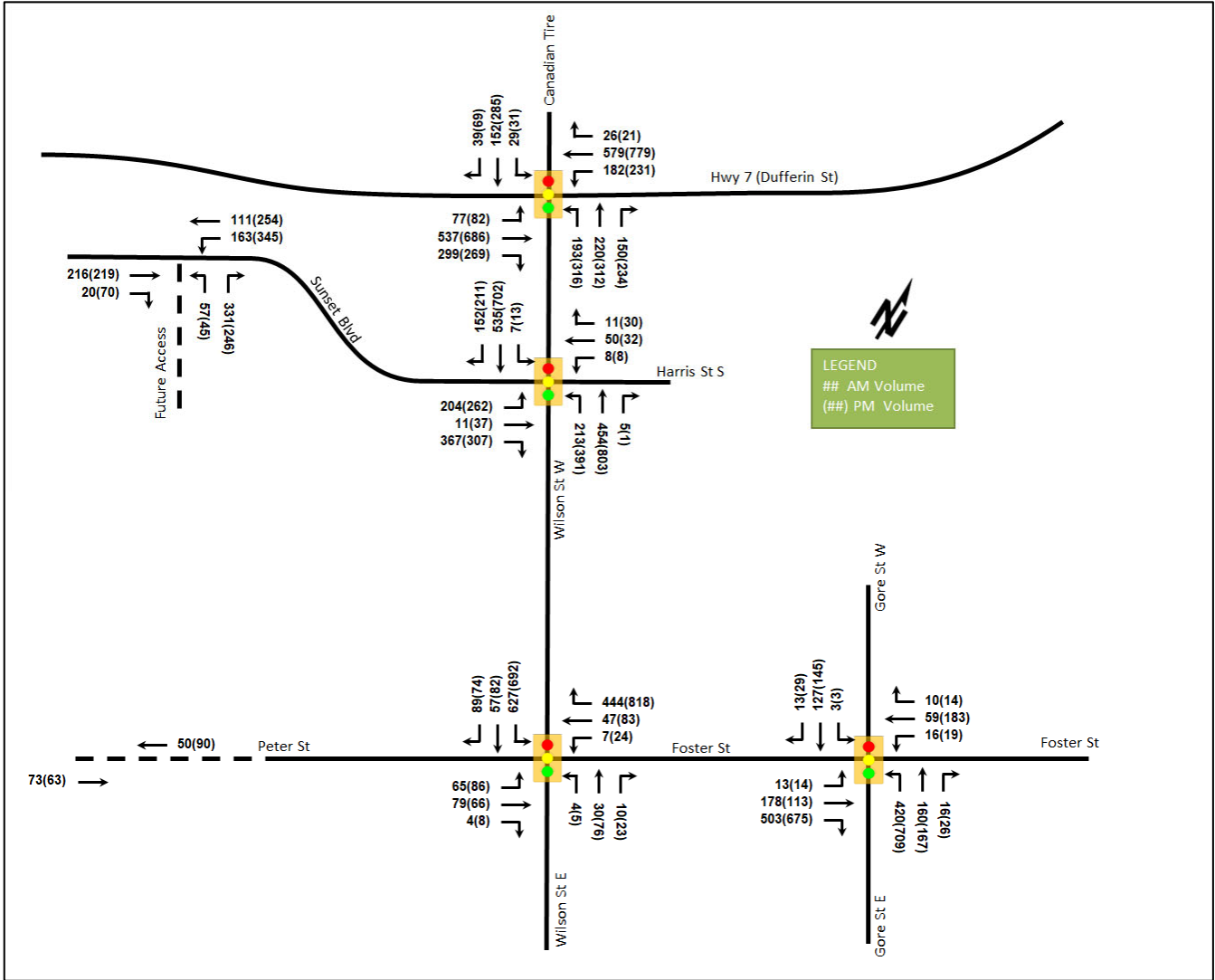


Table 12: Full Build-Out 2041 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
<b>Wilson St W/Canadian Tire &amp; Hwy 7 Signalized</b>	EBL	C	0.36	34.1	24.0	D	0.55	53.9	34.0
	EBT	C	0.56	32.2	59.5	D	0.85	53.8	101.8
	EBR	A	0.48	6.1	18.2	A	0.49	7.5	20.6
	WBL	C	0.54	23.4	33.5	E	0.87	56.6	#75.9
	WBT	B	0.39	19.2	48.7	C	0.58	29.2	89.7
	WBR	A	0.04	0.1	0.0	A	0.03	0.1	0.0
	NBL/T	C	0.72	30.8	99.2	<b>F</b>	<b>1.21</b>	<b>140.4</b>	<b>#254.3</b>
	NBR	A	0.21	3.7	10.7	A	0.29	3.2	13.1
	SBL/T	B	0.27	18.3	36.0	C	0.47	23.5	74.9
	SBR	A	0.05	0.2	0.0	A	0.09	0.3	0.6
<b>Overall</b>	<b>C</b>	-	<b>21.6</b>	-	-	<b>D</b>	-	<b>53.0</b>	-
<b>Wilson St W &amp; Sunset Blvd/Harris St S Signalized</b>	EBL/T	D	0.75	43.1	#61.4	E	0.95	76.9	#106.8
	EBR	A	0.62	9.9	28.3	A	0.53	7.3	20.7
	WB	B	0.17	20.0	16.6	B	0.17	19.8	16.9
	NBL	B	0.53	11.9	22.0	E	0.98	71.4	#120.6
	NBT/R	B	0.48	12.3	72.5	C	0.75	20.6	#207.2
	SBL	A	0.01	6.4	1.7	A	0.05	9.1	2.9
	SBT	C	0.80	28.0	95.5	E	<b>1.05</b>	79.5	#216.5
	SBR	A	0.24	3.6	9.2	A	0.32	5.5	16.3
	<b>Overall</b>	<b>B</b>	-	<b>18.9</b>	-	-	<b>D</b>	-	<b>45.8</b>
<b>Wilson St E/Wilson St W &amp; Peter St/Foster St Signalized</b>	EB	B	0.43	18.9	23.9	C	0.50	20.9	25.9
	WBL/T	B	0.14	14.6	10.2	B	0.28	16.4	17.6
	WBR	A	0.48	2.6	8.5	A	0.73	5.6	11.3
	NB	B	0.15	14.2	8.2	B	0.34	16.6	15.3
	SBL	B	0.79	19.3	#101.5	D	0.99	46.8	#117.6
	SBT/R	A	0.15	3.1	7.6	A	0.18	3.9	8.9
	<b>Overall</b>	<b>B</b>	-	<b>12.3</b>	-	-	<b>C</b>	-	<b>21.8</b>
<b>Gore St E/Gore St W &amp; Foster St Signalized</b>	EBL/T	B	0.44	16.9	25.9	B	0.34	18.2	20.5
	EBR	A	0.59	4.2	10.3	A	0.67	4.5	11.0
	WBL/T	B	0.19	13.8	12.0	C	0.53	21.7	#31.6
	WBR	A	0.03	0.1	0.0	A	0.04	0.2	0.0
	NBL	B	0.68	15.5	#33.1	D	0.98	45.6	#113.0
	NBT/R	A	0.21	5.9	12.1	A	0.21	5.0	12.3
	SBL/T	B	0.35	16.1	17.2	B	0.43	19.8	22.0
	SBR	A	0.04	0.2	0.0	A	0.09	0.5	0.0
<b>Overall</b>	<b>B</b>	-	<b>10.5</b>	-	-	<b>C</b>	-	<b>21.9</b>	-
<b>Sunset Boulevard &amp; Site Access Unsignalized</b>	EBT/R	-	-	-	-	-	-	-	-
	WBL/T	A	0.12	8.1	3.0	A	0.27	8.9	8.3
	NBL/R	C	0.56	16.6	26.3	C	0.62	24.0	30.8
	<b>Overall</b>	<b>A</b>	-	<b>8.6</b>	-	-	<b>A</b>	-	<b>8.5</b>

Notes: Saturation flow rate of 1800 veh/h/lane  
Queue is measured in metres  
Peak Hour Factor = 1.00

v/c = volume-to-capacity ratio  
m = metered queue  
# = volume for the 95th %ile cycle exceeds capacity

The study area intersections at the full build-out of the updated subdivision concept operate similarly to the Infrastructure Master Plan Option 3 conditions.

At the intersection of Wilson Street West and Sunset Boulevard/Harris Street South, the southbound through movement may be operating over theoretical capacity during the PM peak hour at this horizon and is anticipated



to operate with LOS of E. As analyzed, the intersection is considered to be at theoretical capacity at this analysis horizon. Given the pattern of delays noted within the Synchro analysis for the unmodified Option 3 volumes, the following discussion on mitigation will apply to both the Infrastructure Master Plan Option 3 conditions and updated subdivision full build-out conditions.

#### 4.6 Transportation Impacts and Mitigations

Potential traffic impacts implicit in the Infrastructure Master Plan Option 3 scenario at the intersection of Wilson Street West and Sunset Boulevard/Harris Street South and present in the updated full subdivision build-out horizon have been noted in Section 4.5. It is forecasted that the intersection of Wilson Street West and Sunset Boulevard/Harris Street South will reach its theoretical capacity as modelled at the full subdivision build-out horizon. Several factors may inherently mitigate this outcome, however, as discussed in Section 4.6.1.

Within the transportation component of the Infrastructure Master Plan, an auxiliary westbound left-turn lane on Sunset Boulevard at the Lanark County Administration Building access was found to meet volume warrants under Option 3. The recommended storage length for this lane was 25 metres. The storage length was obtained using the left-turn lane volume warrant nomograph. The recommended methodology for the calculation of storage length from the Geometric Design Guide for Canadian Roads (Transportation Association of Canada (TAC), 2017) is from equation 9.14.1. The calculated value by this method for Option 3 would correspond to a design storage length of 60 metres and would increase to 90 metres with the additional volumes from the updated concept. From the operational analysis, however, it is noted that the 95<sup>th</sup> percentile queue for the 2041 future total horizon at full subdivision build-out would be less than 10 metres during both peak hours, and thus a 15-metre storage length is adequate from an operational perspective.

##### 4.6.1 Mitigating Factors

###### 4.6.1.1 Active Mode Trips

The trip generation employed within the Infrastructure Master Plan and the subject Transportation Review represent industry-standard methods for directly forecasting auto trips based upon land use types. What is not captured at this level of analysis is the site-specific potential for auto trips to be converted to walking or cycling trips based upon local travel characteristics, local land use context, and the presence, quality, and connectivity of active mode infrastructure.

The development concept includes high quality active mode connections to the surrounding network across the two crossing locations. Many employment and commercial destinations in town, including the downtown, are within walking distance of the community. Where these trips in other community contexts would be made via personal auto, the subject community may meet a higher active mode share than would otherwise be inherent to the typical values.

###### 4.6.1.2 Emerging Trends

Another factor which would reduce the site trip generation from the values forecasted, are emerging social and technological trends such as virtual travel.

Virtual travel describes all of the trips that were previously made by auto travel and other modes being captured by internet and telecommunication technologies. These trips include those reduced by work from home, either full-time or part-time, online services such as fitness, banking, medical, or consultation appointments, and e-commerce which converts retail trips often made during the peak hours into off-peak deliveries.

#### 4.6.2 Mitigation Options

The updated subdivision concept already includes robust active mode connectivity, and thus further mitigation to shift travel towards walking and cycling is not required.

To take advantage of the shift from auto travel towards virtual travel, infrastructure connectivity solutions should be explored. The Town of Perth has high quality fibre-optic internet infrastructure whose extension to the subject community could increase the community’s potential for remote activities to supplant physical ones. Not only would such connectivity serve to shift subject development traffic towards virtual travel, however, but as adoption of virtual travel increases and as further employment and commercial activities go online, some proportion of background traffic may shift towards this new “mode” as well.

## 5 First Phase Subdivision Review

### 5.1 Site Design and Phasing

The first phase of construction is anticipated to include the first portion of the internal collector road, and some number of local roads or portions of future local roads. Active facilities along the collector will be constructed and the twinning of the Peter Street Bridge will be operational in advance of occupancies.

The first phase of development is anticipated to comprise 200 units with an anticipated 50-50 split between single detached dwellings and townhouses. The timeline of implementation for the construction of the proposed bridge to the Lanark County Administration Building lands is undetermined at the time of this review. The first full phase will be constructed in advance of the new bridge construction and the impacts of this interim scenario will be evaluated.

While Phase 1 is anticipated to be built out by 2029, the traffic analysis for the first phase will be conducted at the 2041 horizon with the Golf Course Lands traffic removed. Using this horizon accounts for all other area development traffic, providing a conservative analysis and harmonizing the evaluation with the existing area traffic work.

### 5.2 Phase 1 Development Generated Travel Demand

#### 5.2.1 Trip Generation

The traffic generation for Phase 1 has been prepared using the vehicle trip rates for single dwellings using the fitted curve rates from the ITE Trip Generation Manual 11<sup>th</sup> Edition (2021). Table 13 summarizes the vehicle trip rates for the proposed land uses.

*Table 13: Trip Generation Vehicle Trip Rates*

Dwelling Type	ITE Land Use Code	Peak Hour	Vehicle Trip Rate
Single Family Detached	210	AM	0.78
		PM	1.04
Multi-Family Low Rise	220	AM	0.63
		PM	0.77

Using the above vehicle trip rates, the total vehicle trip generation has been estimated. Table 14 below illustrates the total vehicle trip generation by dwelling type.

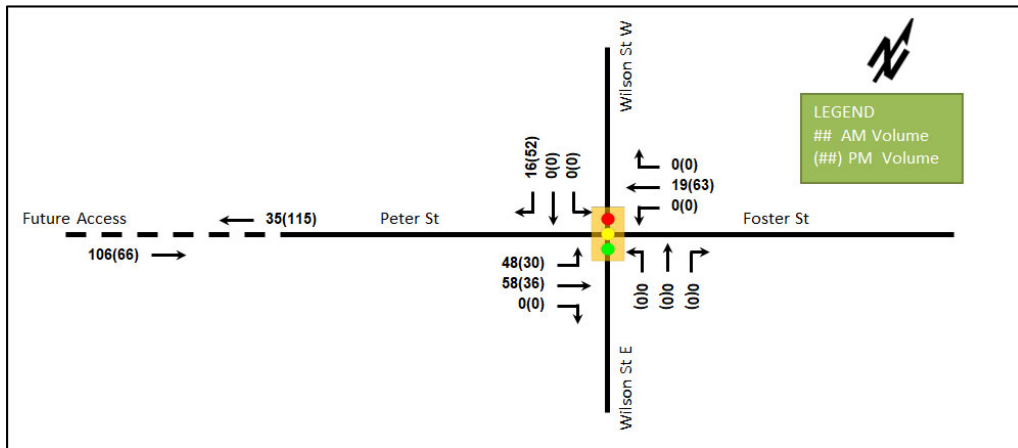
Table 14: Phase 1 Total Vehicle Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Family Detached	100	20	58	78	67	37	104
Multi-Family Low Rise	100	15	48	63	48	29	77
<b>Total</b>	<b>200</b>	<b>35</b>	<b>106</b>	<b>141</b>	<b>115</b>	<b>66</b>	<b>181</b>

As shown above, 141 new AM and 181 new PM peak hour two-way vehicle trips are projected as a result of the first phase of the proposed development.

The resulting volumes at the Peter Street access are illustrated in Figure 12.

Figure 12: Phase 1 Peter Street Auto Volumes



### 5.2.2 Infrastructure Master Plan Peter Street Traffic Operations

As illustrated in Figure 7, Option 2 of the IMP included higher volumes from the Peter Street access than are proposed as part of Phase 1 and no capacity issues were noted as a result of those traffic volumes. The reason that Option 2 was not preferred was disruption along Peter Street. As such, an analysis will be performed to gauge the expected operations on Peter Street during this interim condition before the second crossing is constructed. As a basis of comparison for the impacts on Peter Street associated with Phase 1, the IMP Option 3 scenario's volumes, with the volumes associated with the second crossing removed from the network, will be evaluated as a background condition. These volumes are illustrated in Figure 13, and the forecasted traffic operations are summarized in Table 15. The Synchro intersection worksheets are provided in Appendix D.

Figure 13: IMP Option 3 Peter Street Traffic Only 2041 Future Total Auto Volumes

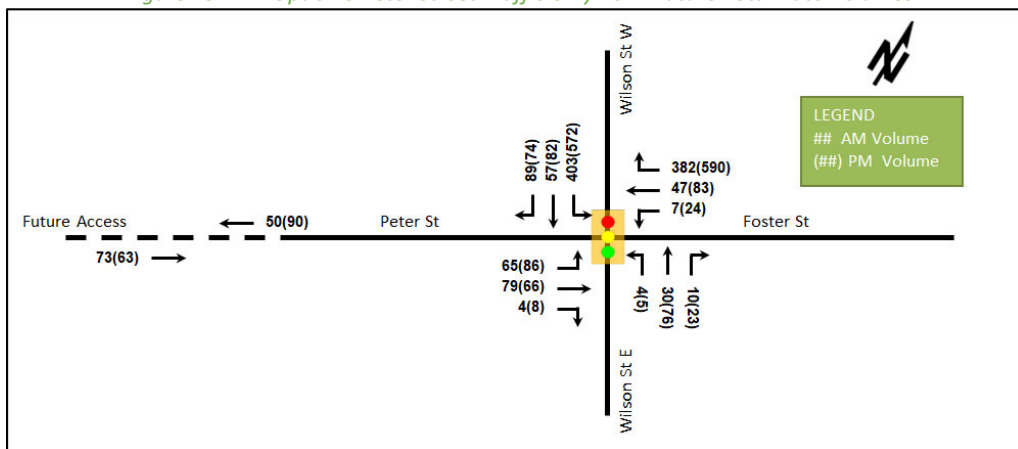


Table 15: IMP Option 3 Peter Street Traffic Only 2041 Future Total Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
Wilson St E/Wilson St W & Peter St/Foster St Signalized	EB	B	0.42	18.7	23.9	C	0.50	20.9	25.9
	WBL/T	B	0.14	14.6	10.2	B	0.28	16.4	17.6
	WBR	A	0.44	2.5	8.0	A	0.59	3.4	9.7
	NB	B	0.15	14.2	8.2	B	0.34	16.6	15.3
	SBL	A	0.52	8.8	33.3	C	0.82	21.0	#72.2
	SBT/R	A	0.15	3.1	7.6	A	0.18	3.9	8.9
	<b>Overall</b>	<b>A</b>	-	<b>7.7</b>	-	<b>B</b>	-	<b>12.7</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00

v/c = volume-to-capacity ratio  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

The intersection of Wilson Street East/Wilson Street West at Peter Street/Foster Street is forecast to operate well with the IMP Option 3 traffic associated with the Peter Street access applied to the 2041 horizon. During the AM peak hour, all movements operate with LOS B or better, and during the PM peak hour, all movements operate with LOS C or better. The southbound left-turn movement may experience extended queues that do not clear every single cycle.

5.2.3 Phase 1 Peter Street Traffic Operations

Removing the volumes associated with both the Peter Street and second crossing accesses from the IMP Option 3 and adding the Phase 1 volumes illustrated in Figure 12, the 2041 future total volumes for the Phase 1 analysis horizon has been compiled. These volumes are illustrated in Figure 14, and the forecasted traffic operations are summarized in Table 16. The Synchro intersection worksheets are provided in Appendix E.

Figure 14: Phase 1 Peter Street Future Total Volumes

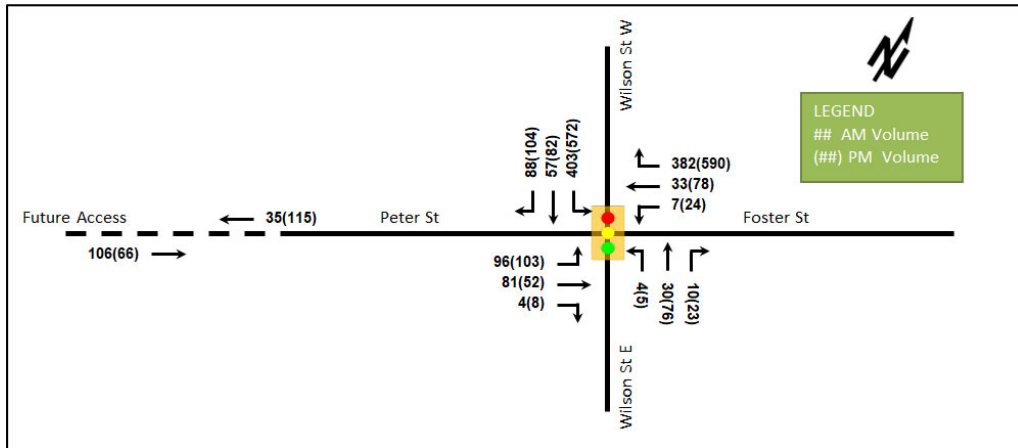


Table 16: Phase 1 Peter Street Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )	LOS	V/C	Delay (s)	Q (95 <sup>th</sup> )
Wilson St E/Wilson St W & Peter St/Foster St <i>Signalized</i>	EB	C	0.50	20.2	29.2	C	0.51	21.4	26.9
	WBL/T	B	0.09	13.9	8.3	B	0.26	16.1	17.0
	WBR	A	0.42	2.3	8.0	A	0.59	3.3	9.7
	NB	B	0.17	14.8	8.2	B	0.34	16.7	15.3
	SBL	B	0.59	11.0	33.3	C	0.83	21.9	#72.5
	SBT/R	A	0.18	3.4	7.6	A	0.22	3.6	9.4
	<b>Overall</b>	<b>A</b>	-	<b>8.9</b>	-	<b>B</b>	-	<b>12.8</b>	-

Notes: Saturation flow rate of 1800 veh/h/lane  
Queue is measured in metres  
Peak Hour Factor = 1.00

v/c = volume-to-capacity ratio  
m = metered queue  
# = volume for the 95th %ile cycle exceeds capacity

The intersection of Wilson Street East/Wilson Street West at Peter Street/Foster Street is forecast to operate well with the Phase 1 traffic applied to the 2041 horizon, and similarly to the baseline with the IMP Option 3 volumes. All movements are expected to operate with LOS C or better during both peak hours.

### 5.3 Analysis and Mitigation

#### 5.3.1 Potential Transportation Impacts

The traffic conditions associated with Peter Street after the build-out of Phase 1 are similar to those in Option 3 from the Infrastructure Master Plan, and as shown in the preceding section, negligible operation impacts are anticipated from the additional traffic. Table 17 summarizes the difference in forecasted auto trips between these two scenarios by direction and peak hour.

Table 17: Phase 1 Peter Street Vehicle Trip Comparison

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
IMP Option 3	50	73	123	90	63	153
Phase 1	35	106	141	115	66	181
Difference	-15	+33	+18	+25	+3	+28

As shown above, vehicle trips are anticipated to increase by 18 vehicles in the AM peak hour and 28 vehicles in the PM peak hour above the IMP Option 3 traffic. This increase in traffic equates to fewer than one vehicle on Peter Street every two minutes during either peak hour.

While no mitigation is required for the intersection operations or for an increase in mainline traffic of this magnitude, community sensitivity about the amount of traffic on Peter Street has been documented within the IMP. As such, general traffic management measures will be discussed for the neighbouring community as part of this study.

#### 5.3.2 Context for Impacts

Peter Street is classified as a collector road. It is noted that the future projected Phase 1 total volumes are roughly half of the typical maximum values for collector roads from Chapter 2 of The Geometric Design Guide for Canadian Roads manual (Transportation Association of Canada (TAC), 2017). As such, the volumes are considered appropriate from the perspective of the network function and road classification.

Notwithstanding the network considerations, the character of Peter Street is of a slow residential road where houses fronting onto it include narrow setbacks and all private driveways to these dwellings access the roadway. Given these conditions, Peter Street is considered to be traffic calmed in the existing conditions.

### 5.3.3 Proposed Monitoring Program for Future Mitigation

The existing mitigating factors described in Section 4.6.1 and the discussion concerning them are also applicable to the first phase of development. It is possible that the trip generation for Phase 1 presented in Section 5.2.1 ultimately proves conservative as the community is being designed to include a high uptake of active modes and virtual travel.

It is noteworthy that impacts associated with development traffic using a single point of access is an interim condition that will be present only until the second bridge is constructed. However, should unanticipated issues like higher volumes or unsafe operations develop, mitigation measures, such as additional traffic calming, for this interim condition may provide either temporary or permanent benefit to the surrounding community based upon their design characteristics.

On this basis, a monitoring exercise is recommended to be conducted after the construction of Phase 1, where the needs for, and appropriate selection of, mitigation measures can be accurately and responsively assessed. The monitoring program is recommended to comprise the semi-annual collection of turning movement data at the intersections of Peter Street at Lustre Lane and Peter Street at Rogers Road after an initial pre-construction collection. Through this exercise, which would be proposed to terminate once the second crossing is constructed, it may also be identified if additional traffic could be supported on the corridor beyond the 200 units, through consultation with the Town.

In keeping with the recommendations from the Infrastructure Master Plan at full-build-out, no mitigation measures are considered to be necessary to support Phase 1 at its build-out.

## 6 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

### **Proposed Development and Background**

- An Infrastructure Master Plan was commissioned by the Town to study the addition of the Western Annex Lands to the Urban Settlement Boundary, an area separated into the Tayview Lands and the Golf Course Lands
- The Golf Course Lands, the subject of this Transportation Review, were initially planned to include 650 detached single dwellings
- Caivan (Perth GC) Ltd. is seeking the approvals to develop these lands, and as part of this process, refinements to the concept are proposed
- This Transportation Review is prepared in reference to the IMP and the updates to the concept
- This Transportation Review is in support of a zoning by-law amendment, official plan amendment, draft plan of subdivision application, and a Municipal Class Environmental Assessment
- The proposed development comprises 621 single detached dwellings and 350 townhome units
- Consistent with the IMP, access is proposed via the existing Peter Street crossing and a proposed bridge across the Tay River to share the Lanark County Administration Building access on Sunset Boulevard
- The first phase of development is planned to comprise 200 units and to make exclusive use of the Peter Street crossing
- The existing Peter Street crossing is proposed as being twinned to support the first phase of development

### Existing and Planned Conditions

- Highway 7 is a provincial freeway in the study area, Christie Lake Road, Sunset Boulevard, Wilson Street, Gore Street, and Foster Street are arterial roads, and Peter Street and Harris Street South are collector roads
- Consistent with the IMP, the study area will comprise the intersections of:
  - Wilson Street W at Highway 7 (Dufferin Street)
  - Wilson Street W at Sunset Boulevard / Harris Street S
  - Wilson Street W / Wilson Street E at Peter Street / Foster Street
  - Gore Street W / Gore Street E at Foster Street
- The Lanark County Administration Building Access at Sunset Boulevard/Christie Lake Road will be a Phase 2+ site access and additionally be examined
- Sidewalks are provided on both sides of Wilson Street, Foster Street, North Street, Peter Street east of Rogers Road, on the north side of Peter Street between Rogers Road and Lustre, on the west side of Rogers Road and an asphalt pathway is provided along the south side of Sunset Boulevard
- Bike lanes are provided on both sides of Wilson Street W between Harris Sunset Boulevard and Leslie Street
- Highway 7 is planned to be reconstructed through the study area, and include dedicated left-turn lanes on the eastbound and westbound approaches at intersections
- The Tay River Trail is planned for extension within the study area from the Lanark County Administration Buildings to Leslie Street

### IMP Summary

- The IMP assumed four transportation options for site access with a collector road serving a spine through the development
  - Option 1 assumed all traffic used the Peter Street Bridge
  - Option 2 assumed 65% of all site traffic used the Peter Street Bridge and 35% used the proposed bridge
  - Option 3 assumed the traffic volume generated by 120 units used the Peter Street Bridge and the remainder used the proposed bridge
  - Option 4 assumed a one-way couplet for Peter Street and North Street with a second bridge from North Street to the subject lands
- Three active transportation options were proposed to service the site
  - Option 1 consisted of a multi-use pathway system
  - Option 2 consisted of a limited multi-use pedestrian and separated pathway system
  - Option 3 consisted of a separated pedestrian (resident/visitor) and bicycle pathway
- The development of 650 single detached dwellings was forecasted to generate 465 new AM and 538 new PM peak hour two-way trips
- The distribution of is 50% to/from the south, 25% to/from the east and 25% to/from the west
- The IMP recommended Transportation Option 3 based upon an evaluation of technical, environment, and socio-economic factors
- Transportation Option 2 was scored similarly to Option 3, but had one additional negative point awarded due to disruption along Peter Street and to the surrounding community

- Operational constraints were identified at the intersection of Highway 7 at Wilson Street West, and all options were found to have the same impacts at this intersection
- Active Transportation Option 1 was selected as the preferred option

#### **Updated Subdivision Review**

- The subdivision layout is functionally similar to the IMP concept with a 23.0-metre right-of-way collector route forming a spine through the subdivision between the proposed twinned Peter Street crossing and the second crossing to the County lands
- Local road rights-of-way are proposed as being 18.5 metres where a sidewalk will be permitted on one side, and 16.8 metres for lower volume roadways, each supporting 8.5-metre roadways with two 3.0-metre travel lanes and a 2.5-metre parking lane
- A mixed-use path is proposed along the collector road and a network of mixed-use paths are proposed surrounding the development areas, providing active network connections as well as recreational potential
- A sidewalk along one side of the collector road is proposed and along key local roads, with all collector road active facilities being extended across the two crossings to the surrounding active transportation network
- The two decks of the twinned Peter Street crossing are proposed to comprise a total of two travel lanes, a sidewalk, and a MUP once completed
- The updated subdivision concept is forecasted to generate 598 total AM and 747 total PM peak hour two-way auto trips
- The increase in auto traffic above the IMP is 133 two-way AM and 209 two-way PM peak hour auto trips
- The additional auto trips from the updated subdivision concept were assigned from the Sunset Boulevard access using a distribution consistent with the IMP

#### **Traffic Review for Full Subdivision Build-Out**

- The IMP Option 3 traffic operations at the study area intersections were assessed at the 2041 horizon
- Differences in modelling software between the IMP and subject Transportation Review yielded differences in forecasted operations and the IMP did not incorporate the changes associated with the Highway 7 reconstruction
- Accounting for the reconstruction and optimizing the signal timing within the study area, operational constraints were noted in the study area on the northbound through/left movement at the intersection of Wilson Street West and Highway 7, and higher delays than previously modeled were noted on the eastbound left/through movement, northbound left movement, and southbound through movement at the intersection of Wilson Street West at Sunset Boulevard/Harris Street South
- Adding the volume difference for the updated subdivision concept to the IMP Option 3 volumes, the future total 2041 traffic volumes for the full subdivision build-out have been forecasted
- Operations for the updated subdivision concept full build-out are similar to those of the IMP Option 3, where the pattern of delays on the three movements previously referenced at the intersection of Wilson Street West at Sunset Boulevard/Harris Street South persist at this horizon and the southbound through movement may operate over theoretical capacity and the intersection may be at theoretical capacity each during the PM peak hour
- The updated subdivision concept proposes robust active mode connections to the surrounding network, and many destinations are within walking distance of the site, including the downtown, and as such,



personal auto travel may ultimately be lower than forecasted as people choose to walk or bike to and from their destinations

- Emerging technological and social trends such as virtual travel are anticipated to shift addition trips otherwise taken by the auto mode, and the availability of fibre-optic internet in Perth and the connection to that infrastructure will create the opportunity for further such shift

#### **First Phase Subdivision Review**

- The first phase of the subdivision will involve the construction of the first portion of the collector road and its active facilities, some number of local roads or portions of future local roads, and will comprise 200 units anticipated to be split between single detached dwellings and townhouses
- The timing of the proposed bridge construction to the Lanark County Administration Building lands is presently undetermined and the first phase will utilize the twinned Peter Street Bridge
- Phase 1 is anticipated to generate 141 two-way AM and 181 two-way PM peak hour vehicle trips utilizing the Peter Street crossing
- The impacts of this level of traffic making exclusive use of the Peter Street crossing was compared to the impacts of the IMP Option 3 traffic assigned to the Peter Street crossing
- Traffic operations at the intersection of Wilson Street East/Wilson Street West at Peter Street/Foster Street are anticipated to be good with both the IMP Option 3 Peter Street traffic and the Phase 1 traffic
- The first phase is forecast to be associated with an increase of traffic on Peter Street of fewer than one car ever two minutes during either peak hour above the amount resultant from the IMP Option 3
- The operational and mainline traffic impacts of the first phase of development above the IMP Option 3 are negligible and no mitigation is required
- The mitigating factors presented for full subdivision build-out are expected to operate at the Phase 1 horizon and the trip generation may prove conservative
- The volumes forecasted on Peter Street are consistent with the road classification and network context, but the street context is a narrow slow residential street and this character provides traffic calming
- The impacts associated with the development using a single point of access is an interim condition until the second crossing is constructed
- A monitoring program is recommended to evaluate the pre- and post-construction traffic on Peter Street and assess the needs for mitigation measures and potential for additional traffic capacity beyond the volumes from the first 200 units
- In keeping with the recommendations from the Infrastructure Master Plan at full build-out, no mitigation measures are considered to be necessary to support Phase 1 at its build-out

## 7 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:



John Kingsley  
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Reviewed By:







Christopher Gordon, P.Eng.  
Senior Transportation Engineer

# Appendix A

Peter Street Twinning Concept

Notes:

LEGEND	
	MULTI USE PATHWAY
	SIDEWALK
	ROAD WIDENING/NEW ROAD
	BRIDGE WIDENING / NEW BRIDGE

REV	DESCRIPTION	BY	DATE
04	Issued for Review	JK	2024-04-25
03	Issued for Review	BB	2023-09-14
02	Issued for Review	BB	2022-11-21
01	Issued for Review	BB	2022-11-09

CGH Transportation  
 6 Plaza Court  
 OHIOVA, OH  
 43170  
 (345) 799-9117

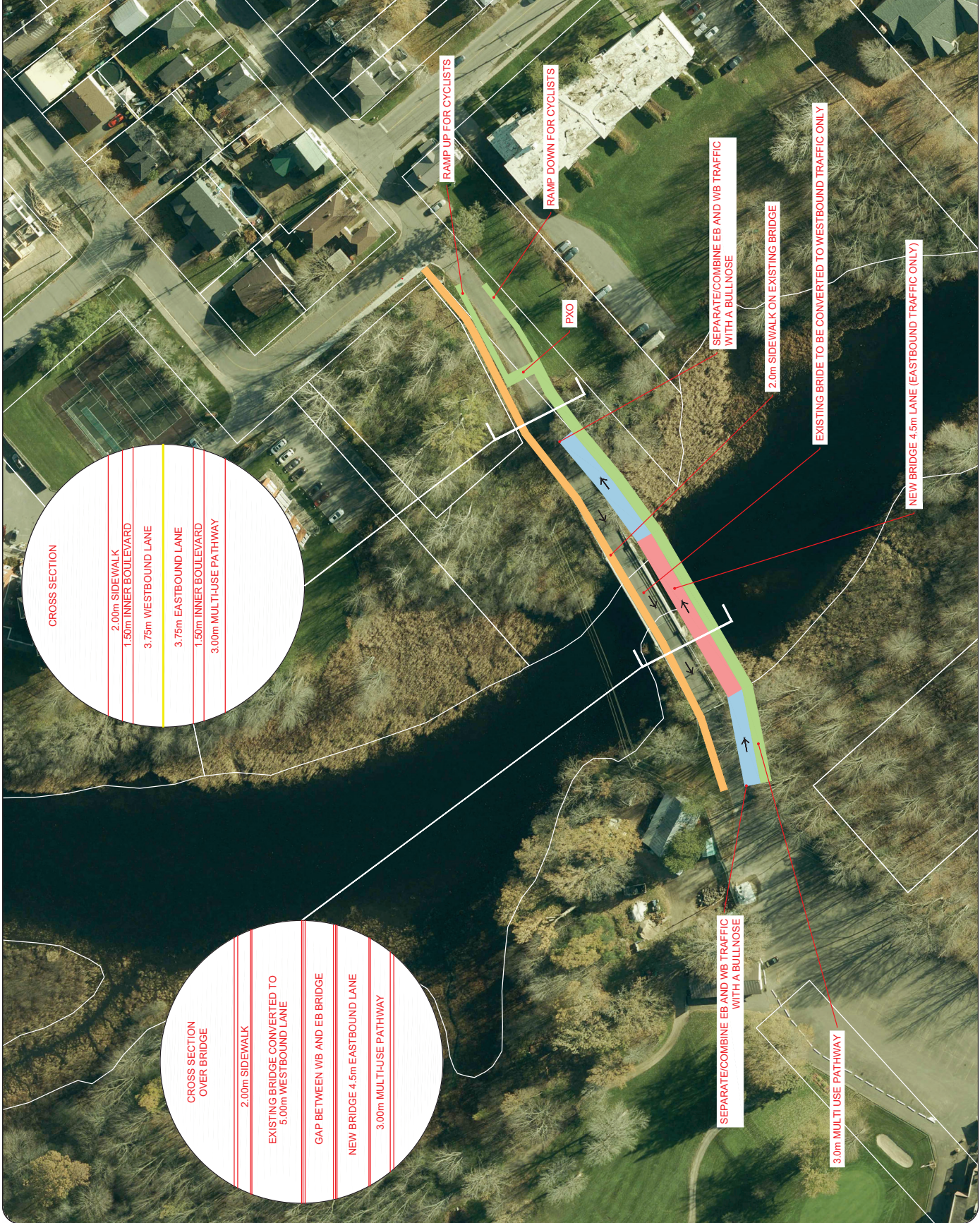
CLIENT: Caivan Communities  
 2934 Baseline Road, Suite 302  
 Ohiova, OH  
 43182

ARCHITECT: Caivan Perith

TITLE: Peter Street Bridge  
 Twinning Concept

SCALE AT AS	DATE	DRAWN	CHECKED
NIS	2024-04-25	BB	JK

PROJECT NO.	DRAWING NO.	REVISION
2021-117	007	04



**CROSS SECTION**

- 2.00m SIDEWALK
- 1.50m INNER BOULEVARD
- 3.75m WESTBOUND LANE
- 3.75m EASTBOUND LANE
- 1.50m INNER BOULEVARD
- 3.00m MULTI-USE PATHWAY

**CROSS SECTION OVER BRIDGE**

- 2.00m SIDEWALK
- EXISTING BRIDGE CONVERTED TO 5.00m WESTBOUND LANE
- GAP BETWEEN WB AND EB BRIDGE
- NEW BRIDGE 4.5m EASTBOUND LANE
- 3.00m MULTI-USE PATHWAY

RAMP UP FOR CYCLISTS

RAMP DOWN FOR CYCLISTS

PXO

SEPARATE/COMBINE EB AND WB TRAFFIC WITH A BULLNOSE

2.0m SIDEWALK ON EXISTING BRIDGE

EXISTING BRIDGE TO BE CONVERTED TO WESTBOUND TRAFFIC ONLY

NEW BRIDGE 4.5m LANE (EASTBOUND TRAFFIC ONLY)

SEPARATE/COMBINE EB AND WB TRAFFIC WITH A BULLNOSE

3.0m MULTI-USE PATHWAY

# Appendix B

Synchro Intersection Worksheets – IMP Option 3

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

2041 IMP Op3 AM Peak Hour  
Perth Golf Course Lands

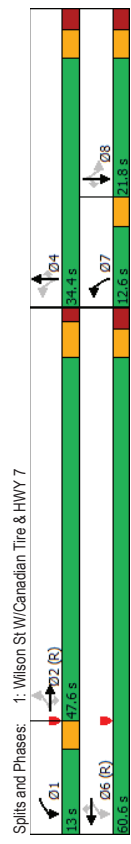
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	77	537	297	178	579	26	188	220	140	29	152	39
Traffic Volume (vph)	77	537	297	178	579	26	188	220	140	29	152	39
Future Volume (vph)	0	614	297	0	757	26	0	408	140	0	181	39
Lane Group Flow (vph)	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Turn Type	2	2	2	1	6	6	4	4	4	8	8	8
Protected Phases	2	2	2	1	6	6	7	4	4	8	8	8
Detector Phase	2	2	2	1	6	6	7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	50	50	50	50	50	50	50	50	50	50	50	50
Minimum Split (s)	26.8	26.8	26.8	8.3	21.8	21.8	8.3	22.8	22.8	21.8	21.8	21.8
Total Split (s)	47.6	47.6	47.6	13.0	60.6	60.6	12.6	34.4	34.4	21.8	21.8	21.8
Total Split (%)	50.1%	50.1%	50.1%	13.7%	63.8%	63.8%	13.3%	36.2%	36.2%	22.9%	22.9%	22.9%
Maximum Green (s)	41.8	41.8	41.8	9.7	54.8	54.8	9.3	28.6	28.6	16.0	16.0	16.0
Yellow Time (s)	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.6	1.6	1.6	0.0	2.5	2.5	0.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
Flash Dont Walk (s)	16.0	16.0	16.0	11.0	11.0	11.0	12.0	12.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	20	20	20	10	10	10	20	20	10	10	10	10
Act Effr Green (s)	41.3	41.3	41.3	41.3	41.3	41.3	42.1	42.1	42.1	42.1	42.1	42.1
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.60	0.38	0.82	0.04	0.70	0.20	0.70	0.20	0.26	0.26	0.06	0.06
Control Delay	22.4	2.9	31.0	0.1	31.9	4.6	20.2	0.2	20.2	0.2	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	2.9	31.0	0.1	31.9	4.6	20.2	0.2	20.2	0.2	0.0	0.0
LOS	C	A	C	A	C	A	C	A	C	A	C	A
Approach Delay	16.0			30.0			24.9			16.6		
Approach LOS	B			C			C			B		
Queue Length 50th (m)	44.1	0.0	62.5	0.0	58.3	0.0	20.2	0.0	20.2	0.0	0.0	0.0
Queue Length 95th (m)	48.5	11.1	69.2	0.0	#127.0	12.2	42.1	0.0	42.1	0.0	0.0	0.0
Internal Link Dist (m)	185.3			284.2			633.6			52.6		
Turn Bay Length (m)	1098	825	1223	843	586	705	694	697	694	697	694	697
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.36	0.62	0.03	0.70	0.20	0.26	0.06	0.26	0.06	0.06	0.06

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

2041 IMP Op3 AM Peak Hour  
Perth Golf Course Lands

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 22.5
Intersection LOS: C
Intersection Capacity Utilization 94.0%
IOU Level of Service F
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

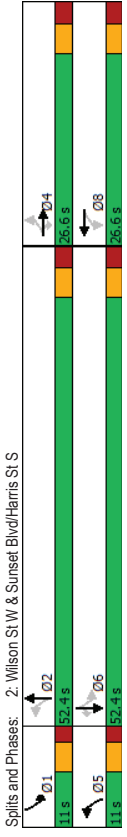


Lanes, Volumes, Timings  
2: Wilson St W & Sunset Blvd/Harris St S

Lanes, Volumes, Timings  
2: Wilson St W & Sunset Blvd/Harris St S

EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
189	11	314	8	50	193	454	7	535	147
189	11	314	8	50	193	454	7	535	147
Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	Perm
4	4	4	8	8	8	8	2	6	6
4	4	4	8	8	8	8	2	6	6
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20.8	20.8	20.8	20.8	10.0	20.7	10.0	20.7	20.7	20.7
26.6	26.6	26.6	26.6	26.6	11.0	52.4	11.0	52.4	52.4
29.6%	29.6%	29.6%	29.6%	12.2%	58.2%	12.2%	58.2%	58.2%	58.2%
20.8	20.8	20.8	20.8	6.0	46.7	6.0	46.7	46.7	46.7
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
2.5	2.5	2.5	2.5	1.7	2.4	1.7	2.4	2.4	2.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.8	5.8	5.8	5.0	5.7	5.0	5.7	5.7	5.7	5.7
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
None	None	None	None	None	Min	None	Min	Min	Min
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
10	10	10	10	10	10	10	10	10	10
16.2	16.2	16.2	16.2	37.3	35.6	32.5	25.9	25.9	25.9
0.25	0.25	0.25	0.25	0.57	0.54	0.50	0.40	0.40	0.40
0.69	0.63	0.17	0.53	0.49	0.01	0.78	0.23	0.23	0.23
38.7	6.9	20.3	12.9	12.8	6.6	26.0	3.4	3.4	3.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.7	6.9	20.3	12.9	12.8	6.6	26.0	3.4	3.4	3.4
D	A	C	B	B	A	C	A	A	A
19.3	20.3	20.3	12.8	21.0	21.0	21.0	21.0	21.0	21.0
B	C	C	C	C	C	C	C	C	C
22.0	0.0	5.6	10.1	29.8	0.3	55.0	0.0	0.0	0.0
#57.5	18.8	17.3	20.6	76.1	1.8	93.7	8.8	8.8	8.8
888.9		283.0		716.4		633.6			
300.0		300.0		25.0		20.0			
387	686	541	367	1294	503	1296	1085	1085	1085
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0.52	0.46	0.13	0.53	0.35	0.01	0.41	0.14	0.14	0.14

Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 17.7  
 Intersection LOS: B  
 ICU Level of Service D  
 Intersection Capacity Utilization 73.1%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
4	4	8	8	8	2	2	1	6
4	4	8	8	8	2	2	1	6
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
17.3	17.3	17.3	17.3	16.8	16.8	16.8	16.8	16.8
17.3	17.3	17.3	17.3	16.0	46.7	16.0	62.7	62.7
21.6%	21.6%	21.6%	21.6%	20.0%	58.4%	20.0%	78.4%	78.4%
12.5	12.5	12.5	11.2	41.9	11.2	57.9	57.9	57.9
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
None	None	None	None	None	None	None	None	None
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
20	20	20	20	20	20	20	20	20
10.0	9.5	19.4	9.5	19.4	7.3	23.9	25.4	25.4
0.25	0.24	0.48	0.18	0.59	0.63	0.15	0.15	0.15
0.42	0.14	0.47	0.15	0.73	0.15	0.15	0.15	0.15
18.9	14.6	2.6	14.2	15.3	3.1	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.9	14.6	2.6	14.2	15.3	3.1	0.0	0.0	0.0
B	B	A	B	B	A	B	A	A
18.9	3.9	4.8	14.3	12.8	12.8	12.8	12.8	12.8
B	A	None	B	B	B	B	B	B
9.0	3.1	0.0	2.2	25.3	1.7	25.3	1.7	1.7
23.9	10.2	8.4	8.2	#70.7	7.6	#70.7	7.6	7.6
494.3	110.6	110.6	117.1	117.1	716.4	716.4	716.4	716.4
460	534	915	1519	793	1504	1504	1504	1504
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0.32	0.10	0.46	0.03	0.72	0.10	0.72	0.10	0.10

04-12-2022 JK  
CGH Transportation Page 5

Maximum v/c Ratio: 0.73  
Intersection Signal Delay: 10.5  
Intersection LOS: B  
Intersection Capacity Utilization: 63.4%  
ICU Level of Service B  
Analysis Period (min): 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 4: Wilson St E/Wilson St W & Peter St/Foster St

04-12-2022 JK  
CGH Transportation Page 6





2041 IMP Op3 AM Peak Hour  
Perth Golf Course Lanus

9: Christie Lake Rd/Sunset Blvd

Int Delay, s/veh 6.3

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	216	9	138	111	28	263
Traffic Vol, veh/h	216	9	138	111	28	263
Future Vol, veh/h	216	9	138	111	28	263
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	25	-	0	-
Veh in Median Storage, #	0	-	0	0	0	-
Grade, %	0	-	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	9	138	111	28	263
Major/Minor	Major1	Major2	Minor1	Minor1		
Conflicting Flow All	0	0	225	0	608	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	387	-
Critical Hwy	-	-	4.12	-	6.42	6.22
Critical Hwy Stg 1	-	-	-	-	5.42	-
Critical Hwy Stg 2	-	-	-	-	5.42	-
Follow-up Hwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1344	-	459	819
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	686	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1344	-	412	819
Mov Cap-2 Maneuver	-	-	-	-	412	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	615	-
Approach	EB	WB	NB	NB		
HCM Control Delay, s	0	4.4	12.8			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	748	-	-	1344	-	
HCM Lane V/C Ratio	0.389	-	-	0.103	-	
HCM Control Delay (s)	12.8	-	-	8	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %ile Q(veh)	1.9	-	-	0.3	-	

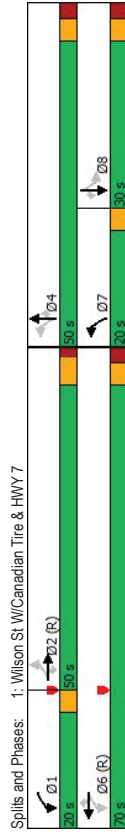
2041 IMP Op3 PM Peak Hour  
Perth Golf Course Lanus

1: Wilson St W/Canadian Tire & HWY 7

Intersection	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4
Traffic Volume (vph)	82	686	262	217	779	21	312	227
Future Volume (vph)	82	686	262	217	779	21	312	227
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases	2	2	1	6	7	4		
Permitted Phases	2	2	2	6	6	4	4	8
Detector Phase	2	2	2	1	6	7	4	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.8	26.8	26.8	9.5	21.8	21.8	9.5	22.8
Total Split (s)	50.0	50.0	50.0	20.0	70.0	20.0	50.0	50.0
Total Split (%)	41.7%	41.7%	41.7%	16.7%	58.3%	16.7%	41.7%	41.7%
Maximum Green (s)	44.2	44.2	44.2	16.7	64.2	16.7	44.2	44.2
Yellow Time (s)	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.6	1.6	1.6	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	16.0	16.0	16.0	11.0	11.0	12.0	12.0	11.0
Pedestrian Calls (#/hr)	20	20	20	10	10	20	20	10
Act Effort Green (s)	63.1	63.1	63.1	63.1	63.1	45.3	45.3	45.3
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.38	0.38	0.38	0.38
v/c Ratio	0.68	0.30	0.95	0.03	1.77	0.34	0.95	0.12
Control Delay	24.6	2.6	45.8	0.0	386.1	5.1	76.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	2.6	45.8	0.0	386.1	5.1	76.2	4.0
LOS	C	A	D	A	F	A	E	A
Approach Delay	19.0	44.9	284.5				63.3	
Approach LOS	B	D					E	
Queue Length 50th (m)	66.1	0.0	110.2	0.0	~221.7	0.8	72.6	0.0
Queue Length 95th (m)	88.3	11.9	#159.6	0.1	#290.3	16.7	#130.1	6.9
Internal Link Dist (m)	185.3		284.2		633.6		52.6	
Turn Bay Length (m)	80.0	868	30.0	774	362	668	90.0	50.0
Base Capacity (vph)	1130	868	1066	774	362	668	332	594
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.30	0.93	0.03	1.77	0.34	0.95	0.12
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 90 (75%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green								
Natural Cycle: 80								

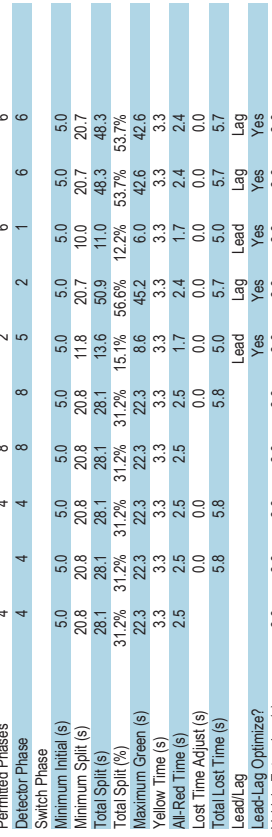
Lanes, Volumes, Timings  
 1: Wilson St W/Canadian Tire & HWY 7

Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.77  
 Intersection Signal Delay: 101.0 Intersection LOS: F  
 Intersection Capacity Utilization 124.4% ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
 2: Wilson St W & Sunset Blvd/Harris St S

Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.77  
 Intersection Signal Delay: 101.0 Intersection LOS: F  
 Intersection Capacity Utilization 124.4% ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
 2041 IMP Op3 PM Peak Hour  
 Perth Golf Course Lanus

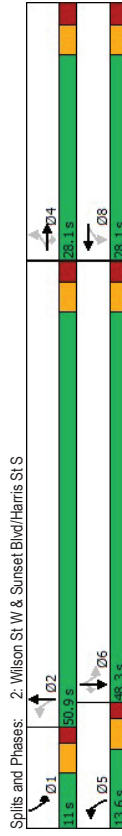
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	251	37	267	8	32	316	803	13	702	191
Future Volume (vph)	251	37	267	8	32	316	803	13	702	191
Lane Group Flow (vph)	0	288	267	0	70	316	804	13	702	191
Turn Type	Perm	NA	Perm	NA	pm-pt	NA	pm-pt	NA	NA	Perm
Protected Phases	4	4	4	8	5	2	1	6		
Permitted Phases	4	4	4	8	8	5	2	1	6	6
Detector Phase										
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.8	20.8	20.8	20.8	11.8	20.7	10.0	20.7	20.7	20.7
Total Split (s)	28.1	28.1	28.1	28.1	13.6	50.9	11.0	48.3	48.3	48.3
Total Split (%)	31.2%	31.2%	31.2%	31.2%	15.1%	56.6%	12.2%	53.7%	53.7%	53.7%
Maximum Green (s)	22.3	22.3	22.3	22.3	8.6	45.2	6.0	42.6	42.6	42.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	1.7	2.4	1.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.7	5.7	5.7	5.7	5.7
Lead/Lag										
Lead-Lag Optimize?										
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	10	10	10	10	10	10	10	10	10	10
Act Effort Green (s)	22.3	22.3	22.3	22.3	51.4	49.1	44.0	37.5	37.5	37.5
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.60	0.58	0.52	0.44	0.44	0.44
v/c Ratio	0.92	0.47	0.17	1.07	0.80	0.05	0.91	0.26	0.26	0.26
Control Delay	67.8	7.0	18.3	91.9	22.8	6.9	40.2	3.1	3.1	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	7.0	18.3	91.9	22.8	6.9	40.2	3.1	3.1	3.1
LOS	E	A	A	B	F	C	A	D	D	A
Approach Delay	38.5		18.3		42.3		31.9			
Approach LOS	D		B		D		C			
Queue Length 50th (m)	48.9	0.5	5.3	-36.0	87.5	0.8	102.8	0.0	0.0	0.0
Queue Length 95th (m)	#98.3	18.8	15.6	#68.9	#200.1	2.7	#169.7	10.5	10.5	10.5
Internal Link Dist (m)	888.9		283.0		716.4		633.6			
Turn Bay Length (m)	300.0		300.0		25.0		20.0			
Base Capacity (vph)	316	573	426	294	1031	272	878	804	804	804
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.47	0.16	1.07	0.78	0.05	0.80	0.24	0.24	0.24
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 85.1										
Natural Cycle: 90										
Control Type: Actuated-Uncoordinated										

Lanes, Volumes, Timings  
2: Wilson St W & Sunset Blvd/Harris St S

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

Maximum v/c Ratio: 1.07  
 Intersection Signal Delay: 37.3  
 Intersection LOS: D  
 ICU Level of Service F  
 Intersection Capacity Utilization 94.6%  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Perth Golf Course Lands  
 2041 IMP Op3 PM Peak Hour  
 Perth Golf Course Lands

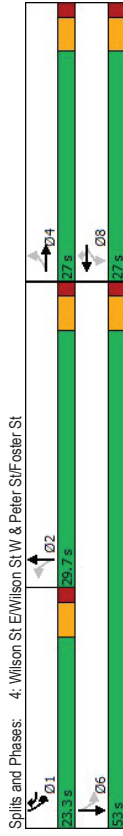


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	86	66	24	83	743	5	76	662
Future Volume (vph)	86	66	24	83	743	5	76	662
Lane Group Flow (vph)	0	160	0	107	743	0	104	662
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	4	4	8	8	1	2	1	6
Permitted Phases	4	4	8	8	2	2	1	6
Detector Phase	4	4	8	8	1	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	17.3	17.3	17.3	17.3	9.8	16.8	9.8	16.8
Total Split (s)	27.0	27.0	27.0	27.0	23.3	29.7	23.3	23.3
Total Split (%)	33.8%	33.8%	33.8%	33.8%	29.1%	37.1%	29.1%	29.1%
Maximum Green (s)	22.2	22.2	22.2	22.2	18.5	24.9	18.5	48.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Lead/Lag								
Lead/Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	20	20	20	20	20	20	20	20
Act Effort Green (s)	11.7	11.3	27.7				8.5	32.0
Actuated g/c Ratio	0.23	0.23	0.55				0.17	0.64
v/c Ratio	0.52	0.30	0.67				0.36	0.75
Control Delay	25.2	20.0	4.3				21.6	15.9
Queue Delay	0.0	0.0	0.0				0.0	0.0
Total Delay	25.2	20.0	4.3				21.6	15.9
LOS	C	B	A				C	B
Approach Delay	25.2	6.3	4.8				21.6	13.6
Approach LOS	C	A	A				C	B
Queue Length 50th (m)	13.3	8.5	1.7				7.3	34.1
Queue Length 95th (m)	29.9	20.2	12.4				20.1	#112.7
Internal Link Dist (m)	494.3	110.6					117.1	716.4
Turn Bay Length (m)			15.0					
Base Capacity (vph)	618	754	1123				873	888
Starvation Cap Reductn	0	0	0				0	0
Spillback Cap Reductn	0	0	0				0	0
Storage Cap Reductn	0	0	0				0	0
Reduced v/c Ratio	0.26	0.14	0.66				0.12	0.73

Intersection Summary  
 Cycle Length: 80  
 Actuated Cycle Length: 50  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

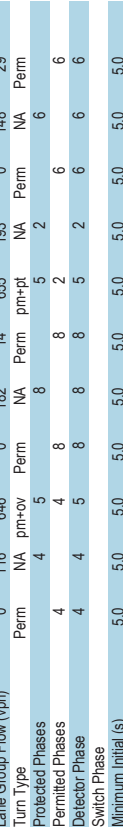
Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 80.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Splits and Phases: 4: Wilson St E/Wilson St W & Peter St/Foster St

Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

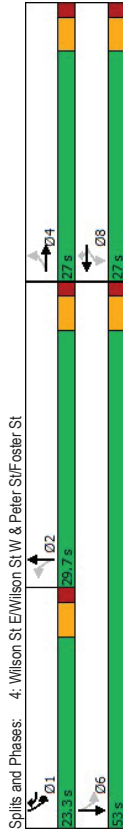
Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 80.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Splits and Phases: 6: Gore St E/Gore St W & Foster St

Lanes, Volumes, Timings  
2041 IMP Op3 PM Peak Hour  
Perth Golf Course Lands

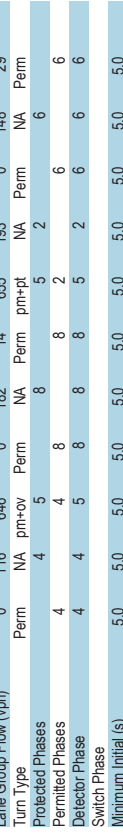
Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 80.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Splits and Phases: 2041 IMP Op3 PM Peak Hour

Lanes, Volumes, Timings  
2041 IMP Op3 PM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 80.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

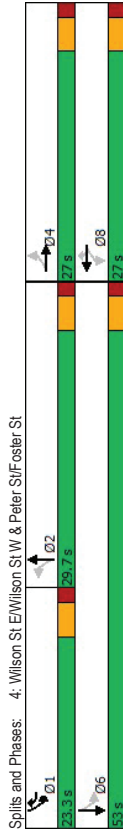


Splits and Phases: 2041 IMP Op3 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	14	102	646	19	163	14	655	167	3	145	29
Future Volume (vph)	14	102	646	19	163	14	655	167	3	145	29
Lane Group Flow (vph)	0	116	646	0	182	14	655	193	0	148	29
Turn Type	Perm	NA	pm+ov	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	4	4	5	8	8	8	5	2	6	6	6
Permitted Phases	4	4	4	8	8	8	5	2	6	6	6
Detector Phase	4	4	5	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.4	15.4	10.0	15.4	15.4	15.4	10.0	17.0	17.0	17.0	17.0
Total Split (s)	23.0	23.0	11.0	23.0	23.0	23.0	11.0	57.0	46.0	46.0	46.0
Total Split (%)	28.8%	28.8%	13.8%	28.8%	28.8%	28.8%	13.8%	71.3%	57.5%	57.5%	57.5%
Maximum Green (s)	18.0	18.0	6.0	18.0	18.0	18.0	6.0	52.0	41.0	41.0	41.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	5.4	5.4	5.4	5.4	5.4	5.4	5.4	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	30	30	30	30	30	30	30	30	30	30	30
Act Effort Green (s)	9.5	14.0		9.8	9.8	21.0	22.6		9.2	9.2	
v/c Ratio	0.25	0.37	0.26	0.26	0.26	0.56	0.60	0.35	0.25	0.25	0.25
Control Delay	14.8	5.7	16.7	0.1	40.3	5.9	16.1	0.4	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	5.7	16.7	0.1	40.3	5.9	16.1	0.4	0.0	0.0	0.0
LOS	B	A	B	A	D	A	D	A	B	A	A
Approach Delay	7.1	15.5		15.5		32.5		13.5			
Approach LOS	A	B		B		C		B			
Queue Length 50th (m)	6.3	0.0	10.4	0.0	~33.6	5.5	8.4	0.0	0.0	0.0	0.0
Queue Length 95th (m)	16.7	11.3	24.8	0.0	#111.6	15.3	21.0	0.1	0.0	0.0	0.0
Internal Link Dist (m)	110.6		119.1		270.3		108.0				
Turn Bay Length (m)	25.0		8.0		8.0		167.4		127.1		
Base Capacity (vph)	826	917	840	705	695	1683	1674	1271	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.70	0.22	0.02	0.94	0.11	0.09	0.02			
<b>Intersection Summary</b>											
Cycle Length: 80											
Actuated Cycle Length: 37.5											
Natural Cycle: 60											
Control Type: Actuated-Uncoordinated											

Lanes, Volumes, Timings  
2041 IMP Op3 PM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 11.8  
 Intersection Capacity Utilization 80.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Splits and Phases: 2041 IMP Op3 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	14	102	646	19	163	14	655	167	3	145	29
Future Volume (vph)	14	102	646	19	163	14	655	167	3	145	29
Lane Group Flow (vph)	0	116	646	0	182	14	655	193	0	148	29
Turn Type	Perm	NA	pm+ov	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	4	4	5	8	8	8	5	2	6	6	6
Permitted Phases	4	4	4	8	8	8	5	2	6	6	6
Detector Phase	4	4	5	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.4	15.4	10.0	15.4	15.4	15.4	10.0	17.0	17.0	17.0	17.0
Total Split (s)	23.0	23.0	11.0	23.0	23.0	23.0	11.0	57.0	46.0	46.0	46.0
Total Split (%)	28.8%	28.8%	13.8%	28.8%	28.8%	28.8%	13.8%	71.3%	57.5%	57.5%	57.5%
Maximum Green (s)	18.0	18.0	6.0	18.0	18.0	18.0	6.0	52.0	41.0	41.0	41.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	5.4	5.4	5.4	5.4	5.4	5.4	5.4	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	30	30	30	30	30	30	30	30	30	30	30
Act Effort Green (s)	9.5	14.0		9.8	9.8	21.0	22.6		9.2	9.2	
v/c Ratio	0.25	0.37	0.26	0.26	0.26	0.56	0.60	0.35	0.25	0.25	0.25
Control Delay	14.8	5.7	16.7	0.1	40.3	5.9	16.1	0.4	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	5.7	16.7	0.1	40.3	5.9	16.1	0.4	0.0	0.0	0.0
LOS	B	A	B	A	D	A	D	A	B	A	A
Approach Delay	7.1	15.5		15.5		32.5		13.5			
Approach LOS	A	B		B		C		B			
Queue Length 50th (m)	6.3	0.0	10.4	0.0	~33.6	5.5	8.4	0.0	0.0	0.0	0.0
Queue Length 95th (m)	16.7	11.3	24.8	0.0	#111.6	15.3	21.0	0.1	0.0	0.0	0.0
Internal Link Dist (m)	110.6		119.1		270.3		108.0				
Turn Bay Length (m)	25.0		8.0		8.0		167.4		127.1		
Base Capacity (vph)	826	917	840	705	695	1683	1674	1271	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.70	0.22	0.02	0.94	0.11	0.09	0.02			
<b>Intersection Summary</b>											
Cycle Length: 80											
Actuated Cycle Length: 37.5											
Natural Cycle: 60											
Control Type: Actuated-Uncoordinated											

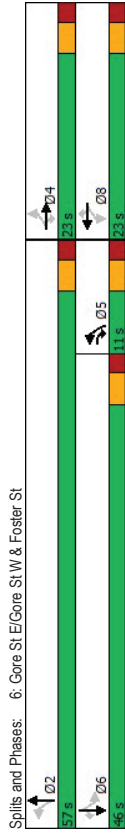
Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

HCM 6th TWSC  
9: Christie Lake Rd/Sunset Blvd

2041 IMP Op3 PM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.94  
Intersection Signal Delay: 19.4  
Intersection LOS: B  
ICU Level of Service D  
Analysis Period (min) 15  
~ Volume exceeds capacity, queue is theoretically infinite.  
# 95th percentile volume exceeds capacity, queue may be longer.  
~ Queue shown is maximum after two cycles.

Int Delay, s/veh 5.3  
Movement EBT EBR WBL WBT NBL NBR  
Lane Configurations  
Traffic Vol, veh/h 219 29 250 254 23 195  
Future Vol, veh/h 219 29 250 254 23 195  
Conflicting Peds. #/hr 0 0 0 0 0 0  
Sign Control Free Free Free Free Stop Stop  
RT Channelized - None - None - None  
Storage Length - - 25 - 0 -  
Veh in Median Storage, # 0 - - 0 0 -  
Grade, % 0 - - 0 0 -  
Peak Hour Factor 100 100 100 100 100 100  
Heavy Vehicles, % 2 2 2 2 2 2  
Mvmt Flow 219 29 250 254 23 195



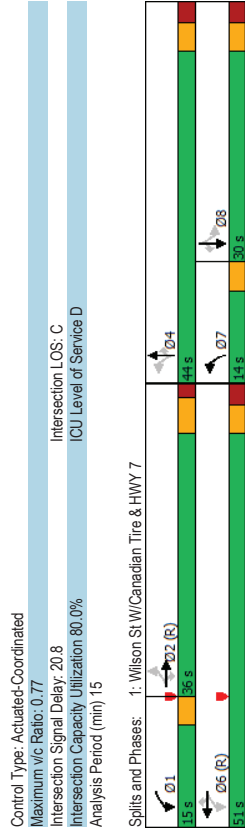
Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	988
Stage 1	-	-	234
Stage 2	-	-	754
Critical Hdwy	-	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	3.518
Pot Cap-1 Maneuver	-	-	274
Stage 1	-	-	805
Stage 2	-	-	465
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	222
Mov Cap-2 Maneuver	-	-	222
Stage 1	-	-	805
Stage 2	-	-	377
Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	13.7
HCM LOS	B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	630	-	1318
HCM Lane V/C Ratio	0.346	-	0.19
HCM Control Delay (s)	13.7	-	8.4
HCM Lane LOS	B	-	A
HCM 95th %ile Q(veh)	1.5	-	0.7

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	77	537	297	178	579	26	188	220	140	29	152	39
Traffic Volume (vph)	77	537	297	178	579	26	188	220	140	29	152	39
Future Volume (vph)	77	537	297	178	579	26	188	220	140	29	152	39
Lane Group Flow (vph)	77	537	297	178	579	26	0	408	140	0	181	39
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	1	6	6	4	4	4	8	8	8
Permitted Phases	2	2	2	1	6	6	7	4	4	8	8	8
Detector Phase	2	2	2	1	6	6	7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.8	26.8	8.3	21.8	21.8	8.3	22.8	22.8	21.8	21.8	21.8	21.8
Total Split (s)	36.0	36.0	36.0	15.0	51.0	51.0	44.0	44.0	44.0	30.0	30.0	30.0
Total Split (%)	37.9%	37.9%	37.9%	15.8%	53.7%	53.7%	14.7%	14.7%	14.7%	46.3%	31.6%	31.6%
Maximum Green (s)	30.2	30.2	30.2	11.7	45.2	45.2	10.7	38.2	38.2	24.2	24.2	24.2
Yellow Time (s)	4.2	4.2	4.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.6	1.6	1.6	0.0	2.5	2.5	0.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	3.3	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	16.0	16.0	16.0	11.0	11.0	11.0	12.0	12.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	20	20	20	10	10	10	20	20	10	10	10	10
Act Effr Green (s)	31.2	31.2	31.2	47.4	44.9	44.9	38.5	38.5	38.5	38.5	38.5	38.5
Actuated G/C Ratio	0.33	0.33	0.33	0.50	0.47	0.47	0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	31.1	28.8	5.6	18.2	17.7	0.1	34.7	3.8	3.8	19.5	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	28.8	5.6	18.2	17.7	0.1	34.7	3.8	3.8	19.5	0.2	0.2
LOS	C	C	A	B	B	A	C	C	A	B	B	A
Approach Delay	21.5			17.2			26.8			16.1		
Approach LOS	C			B			C			B		B
Queue Length 50th (m)	11.1	43.7	0.0	18.6	36.3	0.0	60.0	0.0	0.0	20.7	0.0	0.0
Queue Length 95th (m)	24.0	59.5	18.2	31.2	48.7	0.0	98.0	10.3	35.8	35.8	0.0	0.0
Internal Link Dist (m)	185.3			284.2			633.6			52.6		
Turn Bay Length (m)	40.0	80.0	30.0	30.0	30.0	30.0	90.0	90.0	90.0	63.5	648	648
Base Capacity (vph)	262	1163	683	417	1641	734	557	682	682	635	648	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.46	0.43	0.43	0.35	0.04	0.73	0.21	0.21	0.29	0.06	0.06

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	



Control Type	Actuated-Coordinated
Maximum v/c Ratio	0.77
Intersection Signal Delay	20.8
Intersection LOS	C
IOU Level of Service D	
Intersection Capacity Utilization	60.0%
Analysis Period (min)	15



Control Type	Actuated-Coordinated
Maximum v/c Ratio	0.77
Intersection Signal Delay	20.8
Intersection LOS	C
IOU Level of Service D	
Intersection Capacity Utilization	60.0%
Analysis Period (min)	15

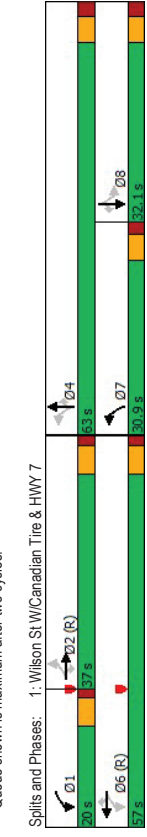
Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
82	686	262	217	779	21	312	312	227	31	285	69
82	686	262	217	779	21	312	312	227	31	285	69
82	686	262	217	779	21	0	624	227	0	316	69
Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
2	2	2	6	6	6	4	4	4	8	8	8
2	2	2	1	6	6	7	4	4	8	8	8
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
26.8	26.8	26.8	10.4	23.7	23.7	10.6	32.1	32.1	32.1	32.1	32.1
37.0	37.0	37.0	20.0	57.0	57.0	30.9	63.0	63.0	63.0	63.0	63.0
30.8%	30.8%	30.8%	16.7%	47.5%	47.5%	25.8%	52.5%	52.5%	26.8%	26.8%	26.8%
31.2	31.2	31.2	14.6	51.2	51.2	25.3	56.9	56.9	26.0	26.0	26.0
4.2	4.2	4.2	4.2	4.2	4.2	3.7	3.7	3.7	3.7	3.7	3.7
1.6	1.6	1.6	1.2	1.6	1.6	1.9	2.4	2.4	2.4	2.4	2.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.8	5.8	5.8	5.4	5.8	5.8	6.1	6.1	6.1	6.1	6.1	6.1
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
12.0	12.0	12.0	12.0	12.0	12.0	21.0	21.0	21.0	21.0	21.0	21.0
20	20	20	10	10	10	20	20	20	10	10	10
29.5	29.5	29.5	49.3	48.9	48.9	59.2	59.2	59.2	59.2	59.2	59.2
0.25	0.25	0.25	0.41	0.41	0.41	0.49	0.49	0.49	0.46	0.46	0.49
0.54	0.84	0.48	0.82	0.82	0.82	1.20	1.20	1.20	0.46	0.46	0.09
53.7	53.5	7.5	49.7	29.2	0.1	137.0	3.2	23.4	0.3	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53.7	53.5	7.5	49.7	29.2	0.1	137.0	3.2	23.4	0.3	0.0	0.0
D	D	A	D	C	A	F	A	C	A	A	A
41.8			33.0			101.3			19.3		
D			C			F			B		
16.5	79.6	0.0	32.9	71.1	0.0	~183.1	0.0	49.4	0.0		
34.0	101.8	20.4	#67.4	89.7	0.0	#251.7	13.0	74.6	0.6		
185.3			284.2			633.6					
40.0	80.0	30.0	30.0	30.0	30.0	90.0	90.0	90.0	50.0		
160	862	558	272	1414	643	520	818	684	776		
0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0		
0.51	0.80	0.47	0.80	0.55	0.03	1.20	0.28	0.46	0.09		

Intersection Summary  
Cycle Length: 120  
Actuated Cycle Length: 120  
Offset: 90 (75%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
Natural Cycle: 90

Control Type: Actuated-Coordinated	Intersection LOS: D
Maximum v/c Ratio: 1.20	ICU Level of Service G
Intersection Signal Delay: 51.8	
Intersection Capacity Utilization: 106.5%	
Analysis Period (min): 15	
Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Splits and Phases: 1: Wilson St W/Canadian Tire & HWY 7



Lanes, Volumes, Timings  
2: Wilson St W & Sunset Blvd/Harris St S

2041 IMP Op3 - Modified PM Peak Hour  
Perth Golf Course Lands

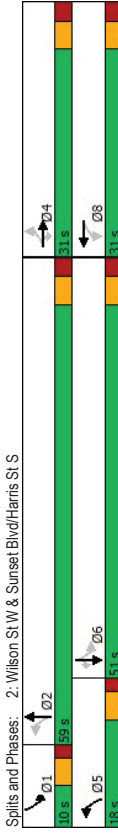
	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	37	267	8	32	316	803	13	702	191	191
Traffic Volume (vph)	251	37	267	8	32	316	803	13	702	191
Future Volume (vph)	251	37	267	8	32	316	803	13	702	191
Lane Group Flow (vph)	0	288	267	0	70	316	804	13	702	191
Turn Type	Perm	NA	Perm	Perm	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	4	4	4	8	8	5	2	1	6	6
Permitted Phases	4	4	4	8	8	5	2	1	6	6
Detector Phase	4	4	4	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.8	20.8	20.8	20.8	11.8	20.7	10.0	20.7	20.7	20.7
Total Split (s)	31.0	31.0	31.0	31.0	31.0	18.0	59.0	10.0	51.0	51.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	18.0%	59.0%	10.0%	51.0%	51.0%	51.0%
Maximum Green (s)	25.2	25.2	25.2	25.2	13.0	53.3	5.0	45.3	45.3	45.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	1.7	2.4	1.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.0	5.7	5.0	5.7	5.7	5.7
Lead/Lag										
Lead-Lag Optimize?										
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	10	10	10	10	10	10	10	10	10	10
Act Effr Green (s)	24.0	24.0	24.0	24.0	60.0	57.4	46.9	41.1	41.1	41.1
Actuated g/C Ratio	0.25	0.25	0.25	0.63	0.60	0.49	0.43	0.43	0.43	0.43
v/c Ratio	0.91	0.48	0.17	0.92	0.76	0.05	0.93	0.27	0.27	0.27
Control Delay	68.4	7.0	20.0	53.3	21.0	7.8	45.8	3.5	3.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	7.0	20.0	53.3	21.0	7.8	45.8	3.5	3.5	3.5
LOS	E	A	B	D	C	A	D	A	D	A
Approach Delay	38.9		20.0		30.1		36.3			
Approach LOS	D		B		C		D			
Queue Length 50th (m)	54.3	0.0	6.0	36.2	96.7	0.8	120.9	0.0	0.0	0.0
Queue Length 95th (m)	#102.0	18.9	16.9	#87.9	#207.2	2.9	#191.7	11.4		
Internal Link Dist (m)	888.9		283.0		716.4		633.6			
Turn Bay Length (m)	300.0		300.0		25.0		20.0			
Base Capacity (vph)	337	580	432	342	1080	270	840	775		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.46	0.16	0.92	0.74	0.05	0.84	0.25		

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 94.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Lanes, Volumes, Timings  
2: Wilson St W & Sunset Blvd/Harris St S

2041 IMP Op3 - Modified PM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.93	Intersection LOS: C
Intersection Signal Delay: 33.8	ICU Level of Service F
Intersection Capacity Utilization 94.6%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



# Appendix C

Synchro Intersection Worksheets – Full Build-Out 2041 Future Total Conditions

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

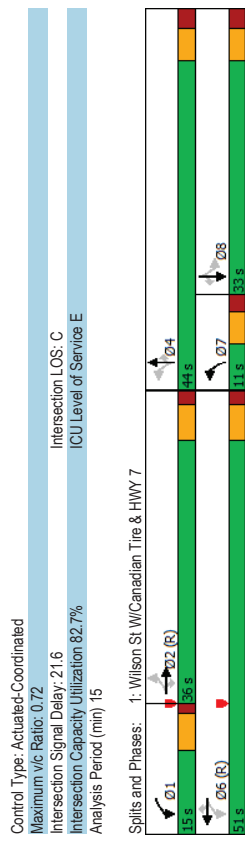
2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	77	537	299	182	579	26	193	220	150	29	152	39
Traffic Volume (vph)	77	537	299	182	579	26	193	220	150	29	152	39
Future Volume (vph)	77	537	299	182	579	26	193	220	150	29	152	39
Lane Group Flow (vph)	77	537	299	182	579	26	0	413	150	0	181	39
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	2	2	2	1	6	6	7	4	4	8	8	8
Permitted Phases	2	2	2	1	6	6	7	4	4	8	8	8
Detector Phase	2	2	2	1	6	6	7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.8	22.8	22.8	10.4	22.8	10.6	32.1	32.1	32.1	32.1	32.1	32.1
Total Split (s)	36.0	36.0	36.0	15.0	51.0	11.0	44.0	44.0	44.0	33.0	33.0	33.0
Total Split (%)	37.9%	37.9%	37.9%	15.8%	53.7%	11.6%	46.3%	46.3%	46.3%	34.7%	34.7%	34.7%
Maximum Green (s)	30.2	30.2	30.2	9.6	45.2	5.4	37.9	37.9	37.9	26.9	26.9	26.9
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.2	1.6	1.6	1.9	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.4	5.8	5.8	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	20	20	20	10	10	10	20	20	20	10	10	10
Act Effr Green (s)	27.4	27.4	27.4	42.7	42.3	42.3	40.8	40.8	40.8	40.8	40.8	40.8
Actuated G/C Ratio	0.29	0.29	0.29	0.45	0.45	0.45	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio	34.1	32.2	6.1	23.4	19.2	0.1	30.8	3.7	18.3	0.2	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	32.2	6.1	23.4	19.2	0.1	30.8	3.7	18.3	0.2	0.0	0.0
LOS	C	C	A	C	B	A	C	A	B	A	B	A
Approach Delay	23.8			19.5			23.6			15.1		
Approach LOS	C			B			C			B		
Queue Length 50th (m)	12.2	48.1	0.0	22.1	40.2	0.0	54.8	0.0	18.7	0.0		
Queue Length 95th (m)	24.0	59.5	18.2	33.5	48.7	0.0	99.2	10.7	36.0	0.0		
Internal Link Dist (m)	185.3			284.2			633.6		52.6			
Turn Bay Length (m)	40.0	80.0	30.0	30.0	30.0	30.0	90.0	90.0	90.0	50.0		
Base Capacity (vph)	247	1096	668	341	1605	735	581	712	673	713		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.31	0.49	0.45	0.53	0.36	0.04	0.71	0.21	0.27	0.05		

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	

Lanes, Volumes, Timings  
1: Wilson St W/Canadian Tire & HWY 7

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands



Control Type: Actuated-Coordinated  
Maximum v/c Ratio: 0.72  
Intersection Signal Delay: 21.6  
Intersection LOS: C  
ICU Level of Service E  
Intersection Capacity Utilization 82.7%  
Analysis Period (min) 15

Lanes, Volumes, Timings  
 2: Wilson St W & Sunset Blvd/Harris St S

Lanes, Volumes, Timings  
 2: Wilson St W & Sunset Blvd/Harris St S

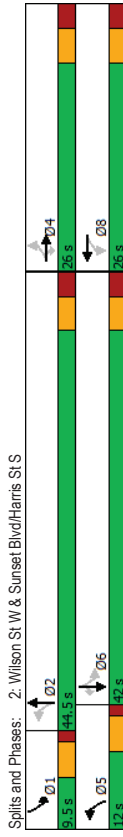
2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	204	11	367	8	50	213	454	7	535	152
Future Volume (vph)	204	11	367	8	50	213	454	7	535	152
Lane Group Flow (vph)	0	215	367	0	69	213	459	7	535	152
Turn Type	Perm	NA	Perm	NA	pm-pt	NA	pm-pt	NA	Perm	Perm
Protected Phases	4	4	4	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	2	2	6	6	6
Detector Phase	4	4	4	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.8	20.8	20.8	20.8	20.8	9.5	20.7	9.5	20.7	20.7
Total Split (s)	26.0	26.0	26.0	26.0	26.0	12.0	44.5	9.5	42.0	42.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	15.0%	55.6%	11.9%	52.5%	52.5%
Maximum Green (s)	20.2	20.2	20.2	20.2	20.2	7.5	38.8	5.0	36.3	36.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	1.0	2.4	1.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.5	5.7	4.5	5.7	5.7
Lead/Lag						Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Min	None	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	10	10	10	10	10	10	10	10	10	10
Act Effr Green (s)	16.3	16.3	16.3	16.3	16.3	38.6	36.1	31.7	25.3	25.3
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.59	0.55	0.48	0.38	0.38
v/c Ratio	0.74	0.62	0.17	0.54	0.48	0.01	0.80	0.01	0.80	0.24
Control Delay	42.4	9.8	19.9	12.1	12.4	6.4	28.2	3.6	28.2	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	9.8	19.9	12.1	12.4	6.4	28.2	3.6	28.2	3.6
LOS	D	A	B	B	B	A	C	A	C	A
Approach Delay	21.8	19.9	19.9	12.3	22.6					
Approach LOS	C	B	B	B	C					
Queue Length 50th (m)	24.7	4.0	5.7	11.7	31.3	0.3	58.3	0.0	58.3	0.0
Queue Length 95th (m)	#61.4	28.3	16.6	22.0	72.5	1.7	95.5	9.2	95.5	9.2
Internal Link Dist (m)	888.9		285.8		658.7		633.6		633.6	
Turn Bay Length (m)	300.0				25.0		20.0		20.0	
Base Capacity (vph)	371	671	519	397	1085	476	995	872	995	872
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.55	0.13	0.54	0.42	0.01	0.54	0.17	0.54	0.17

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 65.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.80	Intersection LOS: B
Intersection Signal Delay: 18.8	ICU Level of Service D
Intersection Capacity Utilization 75.7%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Splits and Phases: 2: Wilson St W & Sunset Blvd/Harris St S

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

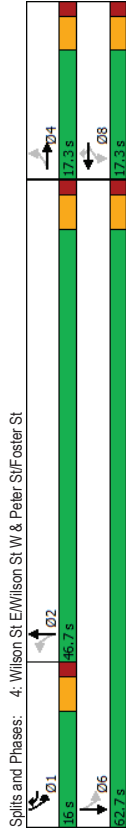
EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
4	4	8	8	8	2	2	1	6
4	4	8	8	8	2	2	1	6
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
17.3	17.3	17.3	17.3	16.8	16.8	16.8	16.8	16.8
17.3	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
21.6%	21.6%	21.6%	21.6%	20.0%	58.4%	58.4%	20.0%	78.4%
12.5	12.5	12.5	11.2	41.9	41.9	11.2	57.9	57.9
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
None	None	None	None	None	Min	None	Min	Min
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
20	20	20	20	20	20	20	20	20
10.0	9.5	19.6			7.3	24.1	25.5	
0.25	0.23	0.48			0.18	0.60	0.63	
0.43	0.14	0.48			0.15	0.79	0.15	
18.9	14.6	2.6			14.2	19.3	3.1	
0.0	0.0	0.0			0.0	0.0	0.0	
18.9	14.6	2.6			14.2	19.3	3.1	
B	B	A			B	B	A	
18.9	3.9	4.8			14.3	16.2		
B	A				B	B	B	
9.0	3.1	0.0			2.2	29.1	1.7	
23.9	10.2	8.5			8.2	#101.5	7.6	
494.3	110.6				117.1		33.7	
456	530	923			1519	792	1504	
0	0	0			0	0	0	
0	0	0			0	0	0	
0	0	0			0	0	0	
0.32	0.10	0.48			0.03	0.79	0.10	

Intersection Summary	
Cycle Length:	80
Actuated Cycle Length:	40.5
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.79  
Intersection Signal Delay: 12.3  
Intersection LOS: B  
Intersection Capacity Utilization 66.5%  
ICU Level of Service C  
Analysis Period (min) 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

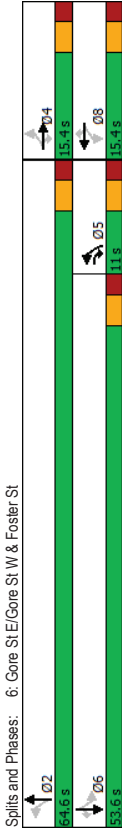


Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	8	8	8	5	2	6	6	6
Traffic Volume (vph)	13	178	503	16	59	10	420	160	3	127	13
Future Volume (vph)	13	178	503	16	59	10	420	160	3	127	13
Lane Group Flow (vph)	0	191	503	0	75	10	420	176	0	130	13
Turn Type	Perm	NA	pm+ov	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	4	4	5	8	8	8	5	2	6	6	6
Detector Phase	4	4	5	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.4	15.4	10.0	15.4	15.4	15.4	10.0	17.0	17.0	17.0	17.0
Total Split (s)	15.4	15.4	11.0	15.4	15.4	15.4	11.0	64.6	53.6	53.6	53.6
Total Split (%)	19.3%	19.3%	13.8%	19.3%	19.3%	19.3%	13.8%	80.8%	67.0%	67.0%	67.0%
Maximum Green (s)	10.4	10.4	6.0	10.4	10.4	10.4	6.0	59.6	48.6	48.6	48.6
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	5.4	5.4	5.4	5.4	5.4	5.4	7.0	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	30	30	30	30	30	30	30	30	30	30	30
Act Effr Green (s)	10.1	16.1	10.1	10.1	10.1	19.5	19.5	8.4	8.4	8.4	8.4
Actuated g/C Ratio	0.26	0.41	0.26	0.26	0.26	0.49	0.49	0.21	0.21	0.21	0.21
v/c Ratio	0.44	0.59	0.19	0.03	0.68	0.21	0.35	0.04	0.35	0.04	0.04
Control Delay	16.9	4.2	13.8	0.1	15.5	5.9	16.1	0.2	16.1	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	4.2	13.8	0.1	15.5	5.9	16.1	0.2	16.1	0.2	0.2
LOS	B	A	B	A	B	A	B	A	B	B	A
Approach Delay	7.7	12.2	12.2	12.2	12.2	12.6	14.7				
Approach LOS	A	B	B	B	B	B	B				
Queue Length 50th (m)	10.6	0.0	3.9	0.0	17.2	5.4	7.6	0.0	7.6	0.0	0.0
Queue Length 95th (m)	25.9	10.3	12.0	0.0	#33.1	12.1	17.2	0.0	17.2	0.0	0.0
Internal Link Dist (m)	110.6		119.1		270.3		108.0				
Turn Bay Length (m)	25.0		8.0		8.0		10.0				
Base Capacity (vph)	445	861	409	408	618	1702	1725	1308			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.59	0.18	0.02	0.68	0.10	0.08	0.01	0.08	0.01	0.01
<b>Intersection Summary</b>											
Cycle Length: 80											
Actuated Cycle Length: 39.6											
Natural Cycle: 50											
Control Type: Actuated-Uncoordinated											

Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 10.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 64.1%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
 9: Christie Lake Rd/Sunset Blvd

HCM 6th TWSC  
 9: Christie Lake Rd/Sunset Blvd

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	↔	←	←	↔
Traffic Volume (vph)	216	163	111	57
Future Volume (vph)	216	163	111	57
Lane Group Flow (vph)	236	163	111	388
Sign Control	Free	Free	Free	Stop

**Intersection Summary**  
 Control Type: Unsignalized  
 Intersection Capacity Utilization 57.7%  
 Analysis Period (min) 15

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
Int'l Delay, s/veh	8.6					
Movement	↔	↔	←	←	↔	↔
Lane Configurations	↔	↔	←	←	↔	↔
Traffic Vol. veh/h	216	20	163	111	57	331
Future Vol. veh/h	216	20	163	111	57	331
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	25	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	20	163	111	57	331

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	236
Stage 1	-	-	226
Stage 2	-	-	437
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	6.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1331
Stage 1	-	-	426
Stage 2	-	-	812
Platoon blocked, %	-	-	651
Mov Cap-1 Maneuver	-	-	1331
Mov Cap-2 Maneuver	-	-	374
Stage 1	-	-	374
Stage 2	-	-	812
Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	16.6
HCM LOS	C		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	693	-	1331
HCM Lane V/C Ratio	0.56	-	0.122
HCM Control Delay (s)	16.6	-	8.1
HCM Lane LOS	C	-	A
HCM 95th %tile Q(veh)	3.5	-	0.4

Lanes, Volumes, Timings  
 1: Wilson St W/Canadian Tire & HWY 7

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	82	686	269	231	779	21	316	312	234	31	285	69
Future Volume (vph)	82	686	269	231	779	21	316	312	234	31	285	69
Lane Group Flow (vph)	82	686	269	231	779	21	0	628	234	0	316	69
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	1	6	6	7	4				8
Permitted Phases	2	2	2	1	6	6	7	4	4	4	8	8
Detector Phase												
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.8	22.8	22.8	10.4	22.8	10.6	32.1	32.1	32.1	32.1	32.1	32.1
Total Split (s)	37.0	37.0	37.0	20.0	57.0	57.0	30.9	63.0	63.0	32.1	32.1	32.1
Total Split (%)	30.8%	30.8%	30.8%	16.7%	47.5%	47.5%	25.8%	52.5%	52.5%	26.8%	26.8%	26.8%
Maximum Green (s)	31.2	31.2	31.2	14.6	51.2	51.2	25.3	56.9	56.9	26.0	26.0	26.0
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.2	1.6	1.6	1.9	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.4	5.8	5.8	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	2.0	2.0	2.0	10.0	10.0	10.0	20.0	20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	29.3	29.3	29.3	49.3	48.9	48.9	59.2	59.2	59.2	59.2	59.2	59.2
Act Effr Green (s)	0.24	0.24	0.24	0.41	0.41	0.41	0.49	0.49	0.49	0.49	0.49	0.49
Actuated G/C Ratio	0.55	0.85	0.49	0.87	0.58	0.03	1.21	0.29	0.47	0.09	0.09	0.09
v/c Ratio	53.9	53.8	7.5	56.6	29.2	0.1	140.4	3.2	23.5	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	53.8	7.5	56.6	29.2	0.1	140.4	3.2	23.5	0.3	0.3	0.3
LOS	D	D	A	E	C	A	F	A	C	A	C	A
Approach Delay												
Approach LOS												
Queue Length 50th (m)	16.5	79.6	0.0	35.3	71.1	0.0	~185.2	0.0	49.4	0.0	49.4	0.0
Queue Length 95th (m)	34.0	101.8	20.6	#75.9	89.7	0.0	#254.3	13.1	74.9	0.6	74.9	0.6
Internal Link Dist (m)							633.6					
Turn Bay Length (m)	40.0	80.0	80.0	30.0	30.0	30.0	90.0	90.0	90.0	50.0	50.0	50.0
Base Capacity (vph)	160	862	564	272	1414	643	520	821	678	775	775	775
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.80	0.48	0.85	0.55	0.03	1.21	0.29	0.47	0.09	0.09	0.09

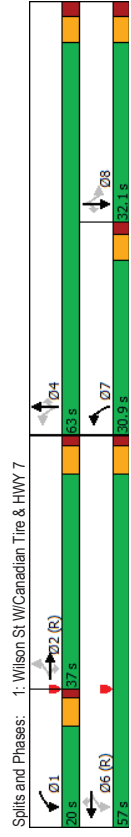
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90

Lanes, Volumes, Timings  
 1: Wilson St W/Canadian Tire & HWY 7

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 53.0
Intersection LOS: D
ICU Level of Service G
Intersection Capacity Utilization 107.6%
Analysis Period (min) 15
Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.





Lanes, Volumes, Timings  
 2: Wilson St W & Sunset Blvd/Harris St S

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

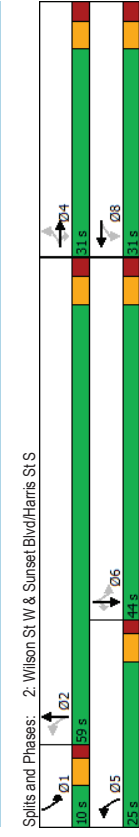
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	262	37	307	8	32	391	803	13	702	211
Future Volume (vph)	262	37	307	8	32	391	803	13	702	211
Lane Group Flow (vph)	0	299	307	0	70	391	804	13	702	211
Turn Type	Perm	NA	Perm	NA	pm-pt	NA	pm-pt	NA	Perm	NA
Protected Phases	4			8	5	2	2	1	6	
Permitted Phase	4	4	4	8	8	2	2	1	6	6
Detector Phase	4	4	4	8	8	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	20.8	20.8	20.8	20.8	10.0	20.7	10.0	20.7	20.7	20.7
Total Split (s)	31.0	31.0	31.0	31.0	25.0	59.0	10.0	44.0	44.0	44.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	25.0%	59.0%	10.0%	44.0%	44.0%	44.0%
Maximum Green (s)	25.2	25.2	25.2	25.2	20.0	53.3	5.0	38.3	38.3	38.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	1.7	2.4	1.7	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.0	5.7	5.0	5.7	5.7	5.7	5.7
Lead/Lag				Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Min	None	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	10	10	10	10	10	10	10	10	10	10
Act Effr Green (s)	24.9	24.9	24.9	24.9	64.0	61.3	44.0	38.3	38.3	38.3
Actuated g/C Ratio	0.25	0.25	0.25	0.64	0.61	0.44	0.38	0.38	0.38	0.38
v/c Ratio	0.95	0.53	0.17	0.98	0.75	0.05	1.05	0.32	0.32	0.32
Control Delay	76.9	7.3	19.8	71.4	20.6	9.1	79.5	5.5	5.5	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	7.3	19.8	71.4	20.6	9.1	79.5	5.5	5.5	5.5
LOS	E	A	B	E	C	A	E	A	E	A
Approach Delay	41.7		19.8		37.2		61.6			
Approach LOS	D		B		D		E			
Queue Length 50th (m)	56.9	0.0	6.0	62.0	96.7	0.8	~149.2	2.2	2.2	2.2
Queue Length 95th (m)	#106.8	20.7	16.9	#120.6	#207.2	2.9	#16.5	16.3	16.3	16.3
Internal Link Dist (m)	888.9		283.0		639.2		633.6			
Turn Bay Length (m)	300.0			25.0			20.0			
Base Capacity (vph)	320	584	408	397	1073	275	670	658	658	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.53	0.17	0.98	0.75	0.05	1.05	0.32	0.32	0.32

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 99.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	

Lanes, Volumes, Timings  
 2: Wilson St W & Sunset Blvd/Harris St S

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Maximum v/c Ratio: 1.05
Intersection Signal Delay: 45.8
Intersection LOS: D
Intersection Capacity Utilization 99.7%
ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

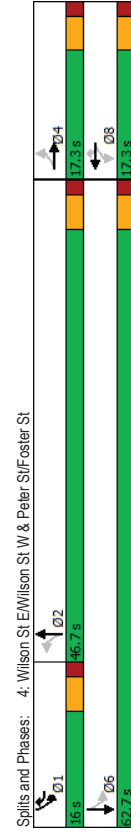
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	86	66	24	83	818	5	76	692	82
Future Volume (vph)	86	66	24	83	818	5	76	692	82
Lane Group Flow (vph)	0	160	0	107	818	0	104	692	156
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	1	2	2	1	6
Permitted Phases	4	4	8	8	1	2	2	1	6
Detector Phase	4	4	8	8	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	17.3	17.3	17.3	17.3	9.8	16.8	16.8	9.8	16.8
Total Split (s)	17.3	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
Total Split (%)	21.6%	21.6%	21.6%	21.6%	20.0%	58.4%	58.4%	20.0%	78.4%
Maximum Green (s)	12.5	12.5	12.5	11.2	41.9	11.2	41.9	11.2	57.9
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Min	Min	None	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	20
Pedestrian Calls (#/hr)	20	20	20	20	20	20	20	20	20
Act Effr Green (s)	11.0	11.0	22.3			7.9	24.1	24.1	24.1
Actuated G/C Ratio	0.25	0.25	0.50	0.28	0.73	0.18	0.54	0.54	0.54
v/c Ratio	0.50	0.50	0.28	0.73	0.34	0.34	0.99	0.18	0.18
Control Delay	20.9	16.4	5.6	16.6	46.8	3.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	16.4	5.6	16.6	46.8	3.9			
LOS	C	C	B	A	B	D	A	A	A
Approach Delay	20.9	6.8	6.8	16.6	16.6	38.9			
Approach LOS	C	A	A	B	B	D			
Queue Length 50th (m)	10.3	6.6	0.0	5.7	~40.3	2.8			
Queue Length 95th (m)	25.9	17.6	11.3	15.3	#117.6	8.9			
Internal Link Dist (m)	494.3	110.6	110.6	117.1		53.2			
Turn Bay Length (m)			15.0						
Base Capacity (vph)	367	441	1119	1543	698	1556			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.44	0.24	0.73	0.07	0.99	0.10			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 44.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.99
Intersection Signal Delay: 21.8
Intersection Capacity Utilization: 85.4%
Analysis Period (min): 15
Intersection LOS: C
ICU Level of Service E
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

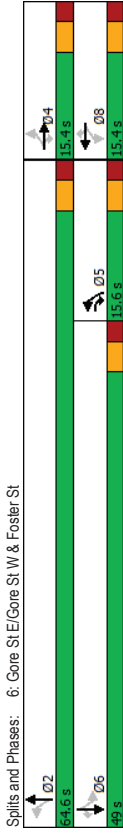
Lanes, Volumes, Timings  
6: Gore St E/Gore St W & Foster St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	8	8	8	5	2	6	6	6
Traffic Volume (vph)	14	113	675	19	183	14	709	167	3	145	29
Future Volume (vph)	14	113	675	19	183	14	709	167	3	145	29
Lane Group Flow (vph)	0	127	675	0	202	14	709	193	0	148	29
Turn Type	Perm	NA	pm+ov	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	4	4	5	8	8	8	5	2	6	6	6
Permitted Phases	4	4	4	8	8	8	5	2	6	6	6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.4	15.4	10.0	15.4	15.4	15.4	10.0	17.0	17.0	17.0	17.0
Total Split (s)	15.4	15.4	15.6	15.4	15.4	15.4	15.6	64.6	49.0	49.0	49.0
Total Split (%)	19.3%	19.3%	19.5%	19.3%	19.3%	19.3%	19.5%	80.8%	61.3%	61.3%	61.3%
Maximum Green (s)	10.4	10.4	10.6	10.4	10.4	10.4	10.6	59.6	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	30	30	30	30	30	30	30	30	30	30	30
Act Effr Green (s)	10.4	21.0	10.4	10.4	10.4	24.7	24.7	9.0	9.0	9.0	9.0
Actuated g/C Ratio	0.23	0.47	0.23	0.23	0.23	0.55	0.55	0.20	0.20	0.20	0.20
v/c Ratio	0.34	0.67	0.53	0.04	0.98	0.21	0.43	0.09	0.43	0.09	0.09
Control Delay	18.2	4.5	21.7	0.2	45.6	5.0	19.8	0.5	19.8	0.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	4.5	21.7	0.2	45.6	5.0	19.8	0.5	19.8	0.5	0.5
LOS	B	A	C	A	D	A	D	A	B	A	A
Approach Delay	6.7	20.3	20.3	36.9	16.6						
Approach LOS	A	C	C	D	B						
Queue Length 50th (m)	8.3	0.0	13.9	0.0	37.8	5.6	10.3	0.0	10.3	0.0	0.0
Queue Length 95th (m)	20.5	11.0	#31.6	0.0	#13.0	22.0	22.0	0.0	22.0	0.0	0.0
Internal Link Dist (m)	110.6		119.1		270.3	108.0					
Turn Bay Length (m)	25.0		8.0		8.0	10.0					
Base Capacity (vph)	379	1006	383	370	721	1683	1674	1271	1674	1271	1271
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.67	0.53	0.04	0.98	0.11	0.09	0.02	0.09	0.02	0.02

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 45.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98	Intersection LOS: C
Intersection Signal Delay: 21.9	ICU Level of Service D
Intersection Capacity Utilization 82.0%	
Analysis Period (min): 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes, Volumes, Timings  
 9: Christie Lake Rd/Sunset Blvd

HCM 6th TWSC  
 9: Christie Lake Rd/Sunset Blvd

2041 Future TotalPM Peak Hour  
 Perth Golf Course Lands

Lane Group	EBT	WBL	WBT	NBL
Lane Configurations	219	345	254	45
Traffic Volume (vph)	219	345	254	45
Future Volume (vph)	289	345	254	291
Lane Group Flow (vph)	Free	Free	Free	Stop

**Intersection Summary**  
 Control Type: Unsignalized  
 Intersection Capacity Utilization 65.5%  
 Analysis Period (min) 15

Intersection	EBT	EBR	WBL	WBT	NBL	NBR
In/Delay, s/veh	8.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	219	70	345	254	45	246
Traffic Vol. veh/h	219	70	345	254	45	246
Future Vol. veh/h	219	70	345	254	45	246
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	25	-	0	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	219	70	345	254	45	246

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	289
Stage 1	-	-	254
Stage 2	-	-	944
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1273	205
Stage 1	-	-	788
Stage 2	-	-	378
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1273	149
Mov Cap-2 Maneuver	-	-	149
Stage 1	-	-	788
Stage 2	-	-	276

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	24
HCM LOS		C	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	473	-	-	1273	-
HCM Lane V/C Ratio	0.615	-	-	0.271	-
HCM Control Delay (s)	24	-	-	8.9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	4.1	-	-	1.1	-

# Appendix D

IMP Option 3 Peter Street Traffic Only

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

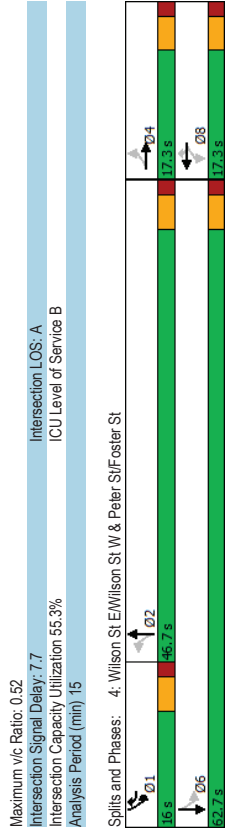
Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	65	79	7	47	382	4	30	403	57
Future Volume (vph)	65	79	7	47	382	4	30	403	57
Lane Group Flow (vph)	0	148	0	54	382	0	44	403	146
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	pm+pt	NA
Protected Phases	4	8	8	1	2	2	1	6	6
Permitted Phases	4	4	8	8	1	2	2	1	6
Detector Phase	4	4	8	8	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	17.3	17.3	17.3	17.3	16.8	16.8	16.8	16.8	16.8
Total Split (s)	17.3	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
Total Split (%)	21.6%	21.6%	21.6%	21.6%	20.0%	58.4%	58.4%	20.0%	78.4%
Maximum Green (s)	12.5	12.5	12.5	11.2	41.9	41.9	11.2	57.9	57.9
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	20	20	20	20	20	20	20	20	20
Pedestrian Calls (#/hr)	10.0	9.5	18.6			7.4	23.4	25.0	
Act Effr Green (s)	0.25	0.24	0.47			0.19	0.59	0.63	
Actuated G/C Ratio	0.42	0.14	0.44			0.15	0.52	0.15	
Control Delay	18.7	14.6	2.5	14.2	8.8	3.1			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	14.6	2.5	14.2	8.8	3.1			
LOS	B	B	A	B	A	B	A	A	A
Approach Delay	18.7	4.0		14.2	7.3				
Approach LOS	B	A		B	A				
Queue Length 50th (m)	9.0	3.1	0.0	2.2	15.2	1.7			
Queue Length 95th (m)	23.9	10.2	8.0	8.2	33.3	7.6			
Internal Link Dist (m)	494.3	110.6		117.1		34.0			
Turn Bay Length (m)			15.0						
Base Capacity (vph)	474	551	903	1520	795	1504			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.31	0.10	0.42	0.03	0.51	0.10			

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 39.7	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	



Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

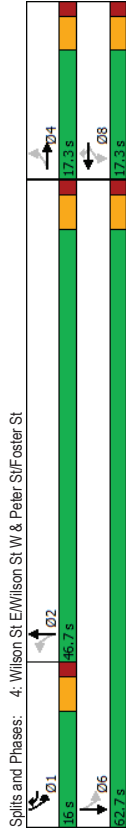
EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
86	66	24	83	590	5	76	572	82
86	66	24	83	590	5	76	572	82
0	160	0	107	590	0	104	572	156
Perm	NA	Perm	NA	pm+ov	Perm	NA	pm+ov	NA
Protected Phases	4	8	8	1	2	2	1	6
Permitted Phases	4	8	8	1	2	2	1	6
Detector Phase	4	8	8	1	2	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	17.3	17.3	17.3	17.3	16.8	16.8	9.8	16.8
Total Split (s)	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
Total Split (%)	21.6%	21.6%	21.6%	20.0%	58.4%	58.4%	20.0%	78.4%
Maximum Green (s)	12.5	12.5	12.5	11.2	41.9	41.9	11.2	57.9
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Lead/Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	None	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	20	20	20	20	20	20	20	20
Act Effr Green (s)	11.0	11.0	22.2	7.9	24.0	24.0	24.0	24.0
Actuated G/C Ratio	0.25	0.25	0.50	0.18	0.54	0.54	0.54	0.54
v/c Ratio	0.50	0.28	0.59	0.34	0.82	0.18	0.82	0.18
Control Delay	20.9	16.4	3.4	16.6	21.0	3.9	21.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	16.4	3.4	16.6	21.0	3.9	21.0	3.9
LOS	C	B	A	B	C	A	C	A
Approach Delay	20.9	5.4	16.6	16.6	17.3	17.3	17.3	17.3
Approach LOS	C	A	B	B	B	B	B	B
Queue Length 50th (m)	10.3	6.6	0.0	5.7	28.7	2.8	28.7	2.8
Queue Length 95th (m)	25.9	17.6	9.7	15.3	#72.2	8.9	#72.2	8.9
Internal Link Dist (m)	494.3	110.6	110.6	117.1	117.1	117.1	54.7	54.7
Turn Bay Length (m)			15.0					
Base Capacity (vph)	368	441	1005	1543	698	1556	698	1556
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.24	0.59	0.07	0.82	0.10	0.82	0.10

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 44.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 12.7  
 Intersection LOS: B  
 ICU Level of Service C  
 Intersection Capacity Utilization 70.5%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



# Appendix E

Phase 1 Peter Street Traffic



Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

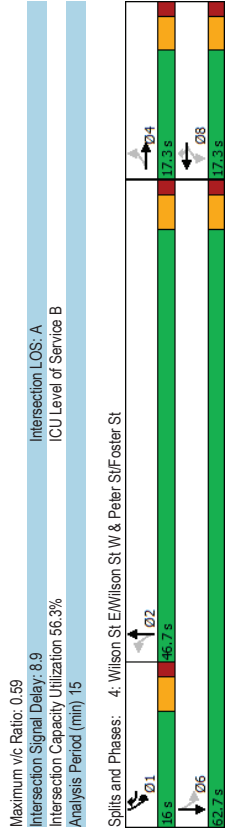
Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	96	81	7	33	382	4	30	403	57
Future Volume (vph)	96	81	7	33	382	4	30	403	57
Lane Group Flow (vph)	0	181	0	40	382	0	44	403	145
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	1	2	2	1	6
Permitted Phases	4	4	8	8	1	2	2	1	6
Detector Phase	4	4	8	8	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	17.3	17.3	17.3	17.3	16.8	16.8	16.8	16.8	16.8
Total Split (s)	17.3	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
Total Split (%)	21.6%	21.6%	21.6%	21.6%	58.4%	58.4%	20.0%	20.0%	78.4%
Maximum Green (s)	12.5	12.5	12.5	11.2	41.9	41.9	11.2	57.9	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	20
Pedestrian Calls (#/hr)	20	20	20	20	20	20	20	20	20
Act Effr Green (s)	11.6	11.6	22.2		7.2	22.7	22.7	22.7	22.7
Actuated G/C Ratio	0.26	0.26	0.51		0.16	0.52	0.52	0.52	0.52
v/c Ratio	0.50	0.09	0.42		0.17	0.59	0.18	0.59	0.18
Control Delay	20.2	13.9	2.3		14.8	11.0	3.4	11.0	3.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	13.9	2.3		14.8	11.0	3.4	11.0	3.4
LOS	C	B	A		B	B	A	B	A
Approach Delay	20.2	3.4			14.8		9.0		
Approach LOS	C	A			B		A		
Queue Length 50th (m)	11.4	2.3	0.0		2.4	18.1	2.0	18.1	2.0
Queue Length 95th (m)	29.2	8.3	8.0		8.2	33.3	7.6	33.3	7.6
Internal Link Dist (m)	494.3	110.6			117.1		34.0		
Turn Bay Length (m)			15.0						
Base Capacity (vph)	392	467	922		1487	690	1504		
Starvation Cap Reductn	0	0	0		0	0	0		
Spillback Cap Reductn	0	0	0		0	0	0		
Storage Cap Reductn	0	0	0		0	0	0		
Reduced v/c Ratio	0.46	0.09	0.41		0.03	0.58	0.10		

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 43.9	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	



Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
4	4	8	8	8	2	2	1	6
4	4	8	8	8	2	2	1	6
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
17.3	17.3	17.3	17.3	16.8	16.8	16.8	16.8	16.8
17.3	17.3	17.3	17.3	16.0	46.7	46.7	16.0	62.7
21.6%	21.6%	21.6%	21.6%	20.0%	58.4%	58.4%	20.0%	78.4%
12.5	12.5	12.5	11.2	41.9	41.9	11.2	57.9	57.9
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
None	None	None	None	None	Min	Min	None	Min
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
20	20	20	20	20	20	20	20	20
11.5	11.5	22.7	11.5	22.7	7.9	24.0	24.0	24.0
0.25	0.25	0.50	0.25	0.50	0.18	0.53	0.53	0.53
0.51	0.51	0.59	0.26	0.59	0.34	0.83	0.22	0.22
21.4	21.4	16.1	3.3	16.7	21.9	3.6	3.6	3.6
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.4	21.4	16.1	3.3	16.7	21.9	3.6	3.6	3.6
C	C	B	A	B	C	A	A	A
21.4	21.4	5.2	17.4	17.4	17.4	17.4	17.4	17.4
C	C	A	B	B	B	B	B	B
10.6	10.6	6.3	0.0	5.8	29.8	3.0	3.0	3.0
26.9	26.9	17.0	9.7	15.3	#72.5	9.4	9.4	9.4
494.3	494.3	110.6	117.1	117.1	117.1	54.7	54.7	54.7
349	349	435	1008	1530	689	1522	1522	1522
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0.47	0.47	0.23	0.59	0.07	0.83	0.12	0.12	0.12

Cycle Length: 80
Actuated Cycle Length: 45.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Lanes, Volumes, Timings  
4: Wilson St E/Wilson St W & Peter St/Foster St

2041 Future TotalPM Peak Hour  
Perth Golf Course Lands

Maximum v/c Ratio: 0.83  
Intersection Signal Delay: 12.8  
Intersection LOS: B  
Intersection Capacity Utilization 70.6%  
ICU Level of Service C  
Analysis Period (min) 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

