Long Range Transportation Action Plan Update

September 2013

MMM GROUP

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EXECUTIVE SUMMARY

MMM Group was commissioned by the Municipality of Leamington to update the Long Range Transportation Action Plan originally prepared in 2007. The recommendations presented in the 2007 report were revisited in light of new population and employment forecasts for the year 2031 and to reflect new roads constructed in the Municipality since the original report was prepared.

The 2007 report included a travel demand model. This same model was updated to reflect the 2011 Census data for population in the Municipality and to incorporate population and employment forecasts for the Municipality, prepared by the County of Essex, for the year 2031. Additionally, new roads constructed in the Municipality since the year 2007 were incorporated into the model to develop a new base model of existing conditions. Most notable among these is the East Side Arterial Road (ESAR), also known as County Road 33. Population and employment forecasts were added to the base model and four alternative transportation scenarios, each with a different mix of future transportation improvements, were tested and evaluated using a multiple account evaluation framework in order to determine the preferred transportation scenario.

This report documents the development and evaluation of the future transportation scenarios and provides recommendations for short, medium and long term strategic transportation improvements. The transportation projects included in the recommended preferred transportation scenario are shown in **Table 1** below:

Table 1: Recommended Improvements

Improvement	Details	Timescale
Widen Oak Street East	Widen to a 3 lane cross-section by adding a Centre Two Way Left Turn lane from Victoria Avenue South to Plumbrook Drive	Short Term
Widen Erie Street	Widen to 4-lane cross-section from Oak Street to Askew Street	Short Term
Reconfigure Talbot Street / Oak Street / Fraser Road Intersection	Align Talbot Street (west of Fraser) with Oak Street. Curve Talbot Street (east of Fraser) to align with Fraser Road. Relocate the access to the Tim Horton's and adjacent plaza along Talbot Street away from the existing intersection. This is discussed further in **Section 7.6**.	Medium Term
West Side Arterial Road (WSAR)	Construct a new road to connect Highway 3 to Oak Street on the alternate alignment documented in **Section 7.5**.	Long Term

As highlighted in **Section 10.3**, the Sherk Street extension cannot be recommended at this time. As the land required for this extension includes the train station at the north end of MCR Drive, a designated heritage site, as well as property that is currently zoned for commercial development, there is insufficient justification for taking the measures required to protect this land for a future extension of Sherk Street.

1 INTRODUCTION

The Municipality of Leamington has retained MMM Group to conduct an update of its transportation plans. One of the key elements outlined in the Terms of Reference was to assist the Municipality in updating the Long Range Transportation Action Plan (LRTAP), originally produced in 2007, so that it can be used to refresh the associated Capital Improvement Program.

The LRTAP will be updated based on the identification and evaluation of the impacts of various transportation network improvements intended to address existing and future road network deficiencies. The updated LRTAP will guide the expansion and improvement of the area road network as the Municipality continues to grow. The development of the updated LRTAP will be compliant with Phases 1 and 2 of the Class Environmental Assessment process to satisfy the initial public consultation requirement as well as the need and justification component. Compliance with the EA process is discussed further in **Section 2**.

1.1 Study Objectives and Scope

As part of the Class EA process, it is essential that decisions be based on a solid foundation of facts and analysis. A travel demand forecasting model is an ideal analytical tool for arriving at informed decisions under the Class EA framework. The model is a computer program which allows for the projection of future travel demands and assessment of the impacts expected as a result of improvement of transportation infrastructure.

The long range travel demand model for the urban area (study area) of the Municipality was developed in 2007 using the EMME/2 platform. The main objectives in developing the model are to:

- Adequately reflect existing traffic patterns within the urban area;
- Provide a suitable dynamic tool for estimating the impacts of new road links and expansions; and
- Empower the Municipality with a tool that will allow them to quantify the impact of land use and transportation interaction.

As part of the scope of work for this LRTAP update, the model was used to analyze transportation conditions for the future horizon year 2031. This was undertaken for a range of scenarios dependent on which (if any) projects are selected for implementation.

The primary study area was defined by the urban area of the municipality with eleven external stations representing the rural countryside. The urban area is bounded by Highway 3 in the north, Point Pelee Drive in the south, the East Side Arterial Road in the east and Fraser Road in the west.

2 MUNICIPAL CLASS EA PROCESS

2.1 Integration with the Environmental Assessment Process

The Environmental Assessment (EA) Act defines a planning and design process that must be followed before undertaking any major infrastructure project. Adherence to the Act ensures that all environmental impacts are considered, and any effects of the project are appropriately mitigated, before the project proceeds to the implementation stage.

Adhering to the Municipal Class EA Planning and Design process has been an important part of this study. In assisting the Municipality of Leamington to prepare its Long Range Transportation Action Plan (LRTAP), it is important to outline how this study has followed the Class EA process in order to facilitate the work required to implement any recommended improvements.

Master plans, such as this Long Range Action Plan Update combined with the Short Term Action Plan Update, are required to complete Phases 1 and 2 of the five phases of the Municipal Class EA process. These required phases include:

Phase 1: the identification of a problem, deficiency or opportunity. The development of a clear statement of the issues that are to be addressed is also required.

Phase 2: the identification of reasonable alternative solutions that could be implemented to address the issues and/or deficiencies that have been identified. The establishment of a preferred solution is based on an assessment of the environmental impacts of the identified alternatives. This Phase also includes the consideration of stakeholder input as a mandatory requirement, through the use of an informative public consultation process.

Completion of Phases 1 and 2 of the Municipal Class EA process allows the municipality to move on to Phase 3 (Assessment of Design Alternatives) for the projects encompassed by this report, which fall under Schedule 'C' of the Class EA document. Further consultation will be required for any of these projects. Any Schedule 'B' projects, such as some of the minor road improvements recommended in the Short Term Transportation Action Plan update, will be able to proceed to implementation.

This report documents an assessment of future transportation conditions in the Municipality of Leamington for the 2031 future horizon. To satisfy the Phase 1 and 2 requirements of the Class EA process, **Sections 5-7** identify the deficiencies and opportunities associated with the Municipality's transportation network in the future horizon.

2.2 Problem Statement

A transportation master plan (TMP) must address Phases 1 and 2 of the Municipal Class Environmental Assessment. Phase 1 of the Municipal Class Environmental Assessment requires that the problem / deficiency or opportunity be identified. The problem statement reflects the theme of this TMP, which is to establish a strategic, connected and multimodal transportation system that meets the needs of residents, visitors and businesses. The following problem statement has been defined.

"The issues and opportunities facing the Municipality of Leamington over the next 20 years from a transportation perspective include:

- **Foster Economic Development though Mobility:** Congestion from vehicle traffic could affect the Municipality's attractiveness for business. The Municipality needs to plan for a safe and efficient transportation system to ensure smooth movement of goods and to create an environment conducive to business development;
- **Protect and Enhance the Quality of Life:** Residents of the Municipality enjoy a high quality of life. The transportation system should protect and enhance the quality of life by addressing localized traffic operational issues and identifying long-term solutions to meet future needs;
- **Evolving Downtown:** Circulation for pedestrians, cyclists and vehicles in the downtown can be optimized through strategic transportation improvements to increase safety and mobility; and
- **Growth and Land Use Changes:** The number of people and jobs in Leamington are expected to grow moderately through the year 2031. The Municipality has identified land to accommodate this growth. The Municipality needs to integrate land use planning with transportation planning though its short and long-term transportation action plans."

2.3 Public Consultation

With respect to the public consultation mechanism under Phase 2, the Municipal Class EA process identifies a number of mandatory points of contact between the proponent undertaking a municipal infrastructure project and the potentially affected or interested stakeholders specific to the project. This includes members of the general public, interest groups, regulatory review agencies and affected municipalities. Interaction and public consultation with these groups ensures that stakeholders are provided with sufficient opportunity to comment on proposed projects, and allows for an exchange of opinions, thoughts and ideas. An effective consultation program leads to better decision-making, and ensures compliance with all public policy and regulatory requirements.

A joint Notice of Study Commencement / Public Information Centre announcement was posted on the Municipality's website and printed in the *Leamington Southpoint Sun* on Wednesday, May 22 and 29, 2013. Stakeholders were sent the Notice directly. The Notice is included in **Appendix A**. The stakeholder contacted included:

- Caldwell First Nation;
- County of Essex;
- Essex Region Conservation Authority;
- H.J. Heinz Company of Canada;
- Leamington Chamber of Commerce;
- Leamington Uptown BIA;
- Migrant Worker Community Program;
- Ministry of Environment;
- Ministry of Transportation, Western Region;
- Municipality of Chatham-Kent;
- Ontario Greenhouse Vegetable Growers;

- Ontario Provincial Police Leamington Detachment;
- Point Pelee National Park; and
- Town of Kingsville.

The Public Information Centre was held in the main lobby of the Leamington Kinsmen Recreation Complex from 3pm to 5pm and 6pm to 8pm on Wednesday, May 29, 2013. Presentation boards, included in **Appendix B**, were set up and attendees and passersby were encouraged to review the material and provide comments directly on the boards, through written comment sheets and through oral comments. Over 50 people stopped to review the display boards during the PIC.

The theme of the comments focused on transportation alternatives to the personal automobile. The most comments were received to provide more facilities for cycling for both year-round residents in addition to the migrant workers. Paved shoulders, additional bike lanes, extending existing trails and building new trails, and pedestrian links (especially across Seacliff Drive to Seacliff Park) were the most common comments heard. Attendees also provided written and oral comments to increase public transit in town as well as link the town to other destinations, such as Windsor and Chatham-Kent. Almost all of the oral comments noted focused on providing additional bike lanes, trails and sidewalk links.

3 UPDATE OF THE TRAVEL DEMAND MODEL

This section documents the update of the Leamington travel demand model using the EMME/2 modeling software.

3.1 Traffic Analysis Zone (TAZ) Update

As per the 2007 LRTAP, the Municipality was divided into a total of 59 Traffic Analysis Zones (TAZs). These capture the varied land use and transportation infrastructure patterns within the study area. **Figure 1** shows the TAZ structure.

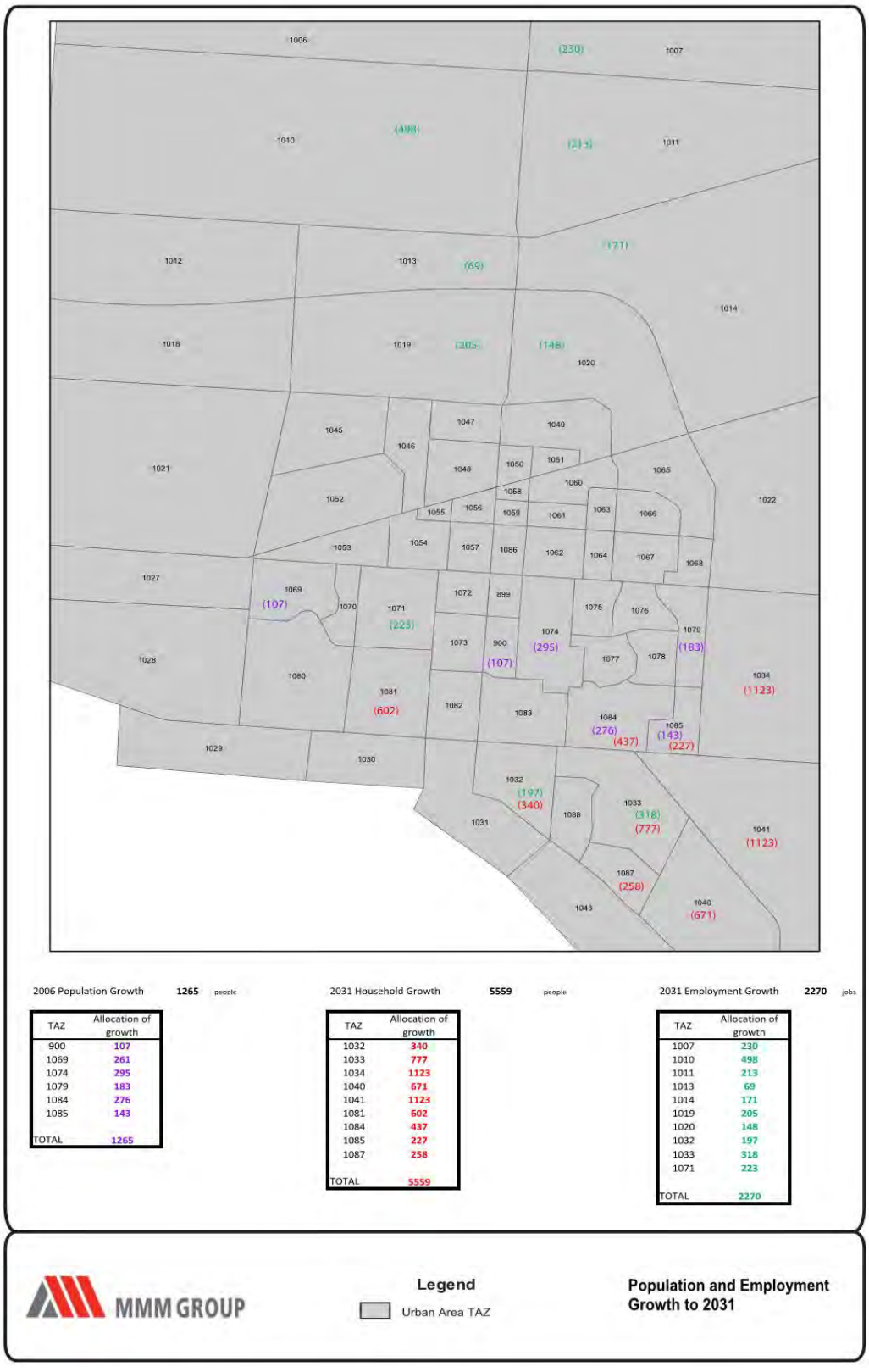
Figure 1: Base TAZ Structure

3.2 Population and Employment Growth

As this is an update of the 2007 report, the existing model was used again. It was updated only to reflect changes in population and employment, where data were available, and major improvements constructed since 2007. No changes were made to existing model parameters and no new model validation was conducted.

2006 population data were factored up to reflect the 2011 census data for Leamington. Data were distributed by TAZ based on the Municipal staff's local knowledge of recent residential development. 2031 was selected as the horizon year for analysis to correspond with the County of Essex's Official Plan Review Background Report (November 2012). Using the County's estimate of 2.66 persons per household by the year 2031, and the County's low household forecast (shown in Table 2 of the County's report) the growth in population to the year 2031 was projected. The employment forecasts were taken from Table 6 of the same report.

Once again, using the local knowledge of Municipal staff based on zoning and development applications, the predicted future population and employment growth were distributed across the TAZs in the municipality, with most of the population growth expected in the southeast portion of the municipality and most of the employment growth forecast for the northern portions of the municipality. The increase in population and employment by TAZ is shown in **Figure 2**.



TAZ	Allocation of growth
900	107
1069	261
1074	295
1079	183
1084	276
1085	143
TOTAL	1265

TAZ	Allocation of growth
1032	340
1033	777
1034	1123
1040	671
1041	1123
1081	602
1084	437
1085	227
1087	258
TOTAL	5559

TAZ	Allocation of growth
1007	230
1010	498
1011	213
1013	69
1014	171
1019	205
1020	148
1032	197
1033	318
1071	223
TOTAL	2270

Figure 2: Population and Employment Growth to 2031

3.3 Base Network Update

There are several improvements that have been made to the network in response to recommendations in the 2007 Long Range Transportation Action Plan (LRTAP). These have been incorporated into the updated base model.

3.3.1 East Side Arterial Road (ESAR)

As recommended by the 2007 LTRAP, an arterial road has been constructed from Talbot Street East at the Highway 3 bypass, extending south to intersect at Oak Street East and Seacliff Drive. It has now been designated as County Road 33.

The ESAR was intended to:

- Redirect through traffic currently traveling through the town core including large trucks;
- Assist in easing traffic congestion uptown, particularly on Erie Street, and along Danforth Avenue; and
- Provide capacity to accommodate new development in the eastern area of the town.

3.3.2 Seacliff Drive between Sherk Street and Erie Street

The 2007 LRTAP highlighted congestion issues on the west Seacliff Drive approach to the intersection at Erie Street that were caused by the single lane approach as well as the numerous residential driveways with direct access to Seacliff Drive between Sherk Street and Erie Street. As recommended by the report, a two-way centre left turn lane (TWCLTL) was implemented on Seacliff Drive between Sherk Street and Erie Street in order to improve the capacity of this two-lane section. The TWCLTL becomes a separate eastbound left turn lane at the Seacliff Drive/Erie Street intersection.

4 EVALUATION OF BASE YEAR (2011) CONDITIONS

This section describes the state of the existing transportation network with respect to current traffic volumes as determined in the travel demand model.

4.1 Level of Service

The capacity constraints are based on the link level of service (LOS) values obtained from the trip assignment. The roadway LOS is defined by six levels or grades of generalized traffic conditions based on volume to capacity (v/c) ratios. The volume to capacity ratio is a commonly used measurement that compares the projected traffic volume on a link with the theoretical capacity of the link. The LOS grades range from LOS A through LOS F. LOS A represents a condition of light traffic moving at free flow speed, while LOS F represents a condition of heavy traffic demand that far exceeds the roadway capacity, resulting in operational failure or traffic jams. LOS E represents the condition where the link operates at full capacity and low speeds.

For evaluating the performance of the transportation network under existing and future scenarios, LOS D was established as the threshold for acceptable roadway performance. The v/c ratio thresholds for LOS designation vary by speed, functional classification and area type. However, to simplify the analysis, the following composite LOS thresholds for all facilities and area types in the model network were adopted and are shown in **Table 2**.

Table 2: Level of Service Designations

Level Of Service	V/C Ratio
A	=< 0.26
B	>0.26 – 0.4
C	>0.4 - 0.6
D*	>0.6 - 0.8
E	>0.8 - 1.0
F	>1.0

* LOS D is the threshold for acceptable road performance

It is noted that the criteria used to determine the LOS for purposes of long term modeling is based on a different range of v/c ratios than is typically used in an operational assessment such as the analysis contained in the Short Term Action Plan (STAP). This is because the LOS for the LRTAP is based on a link v/c ratio compared to the STAP in which the LOS is based on the average delay vehicles are expected to experience at an intersection. **Table 3** shows the difference in the LOS thresholds for link and intersection based analysis.

Table 3: Level of Service Designations for Link and Intersection Based Calculations

Level Of Service	Intersection Based Delay (sec)	Link Based V/C Ratio
A	<= 10	=< 0.26
B	> 10 and <= 20	>0.26 – 0.4
C	> 20 and <= 35	>0.4 - 0.6
D	> 35 and <= 55	>0.6 - 0.8
E	> 55 and <= 80	>0.8 - 1.0
F	> 80	>1.0

4.2 Road Link Assessment

Figure 3 shows the base year model network with the existing v/c ratios as determined by the Travel Demand Model. The base year a.m. peak hour volumes as determined by the Travel Demand Model are shown in **Figure 4**.

The volume-to-capacity ratios shown in **Figure 3** indicate that traffic in the urban core of the municipality does not experience widespread congestion during the a.m. peak hour. Links showing a v/c ratio of 0.8 or over are confined to Oak Street westbound from the Heinz access to Danforth Avenue, as well as Erie Street northbound from Marlborough Street to Talbot Street and in both directions between Marlborough Street and Oak Street. Mitigating measures for links including these have been carried over to this study and are included in the basket of proposed projects listed in **Section 7**.

Traffic operations in Leamington are complicated by the fact there is effectively only one north-south arterial road (Erie Street) which provides a connection to Highway 401, hence it must accommodate through traffic including large trucks. Erie Street also contains the downtown area of Leamington with streetfront retail, on-street parking and significant pedestrian activity. This defines Erie Street's role as the historical downtown main street and tourist area which needs to provide parking as well as loading for downtown businesses. These two functions are often not compatible, leading to a number of transportation issues including: increased vehicular delays on Erie Street; infiltration of vehicle trips to local neighborhood streets; and large, commercial and agricultural vehicles operating in the downtown area. The construction of the East Side Arterial Road has alleviated some of these issues, however congestion on Erie Street remains a concern. Short-term issues are discussed in the STAP; the long range issues and opportunities are discussed in this report.

Figure 3: Base Volume-to-Capacity Ratios

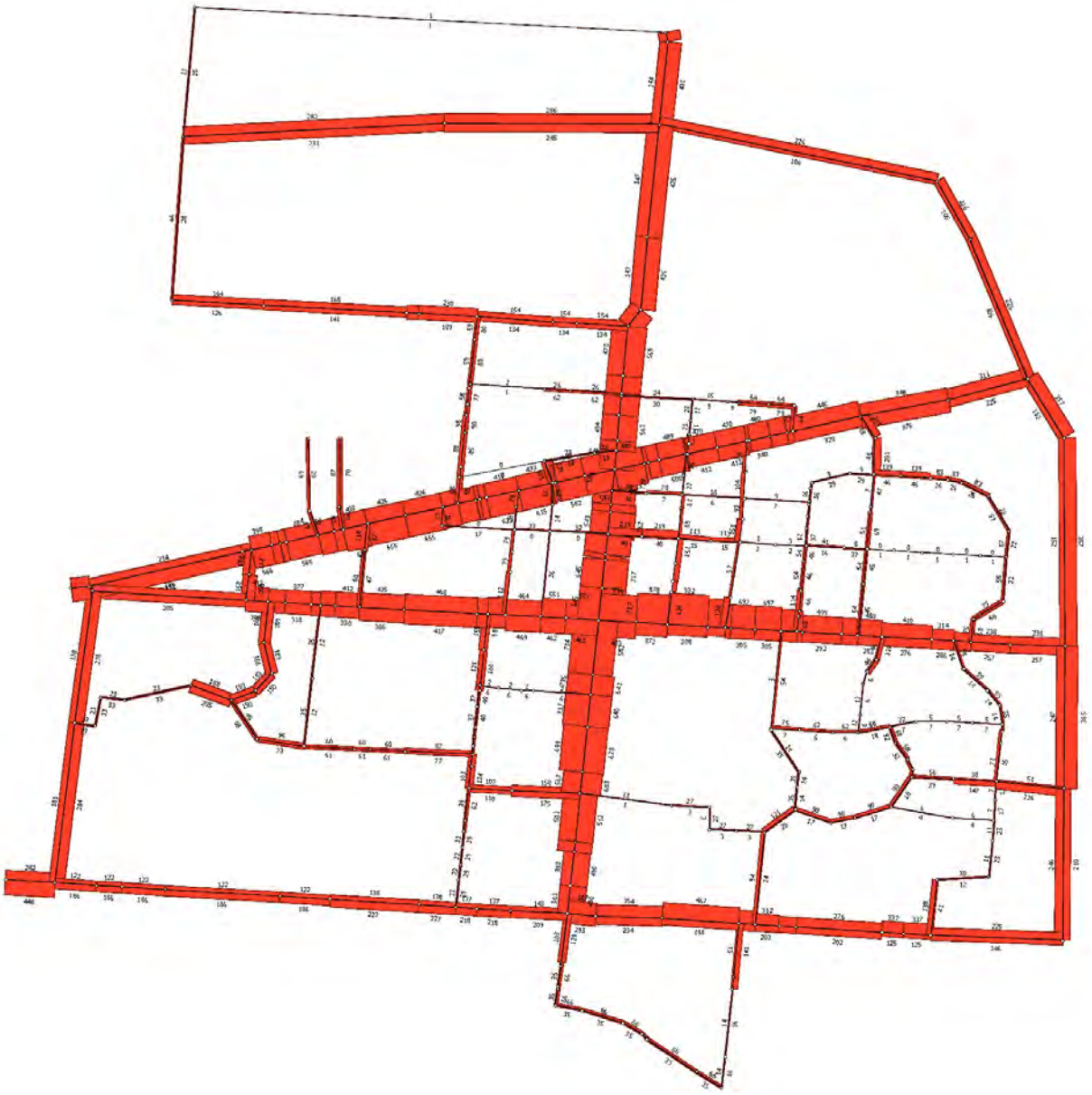


Figure 4: Base Traffic Volumes

5 2031 HORIZON: SCENARIO A ('DO NOTHING')

5.1 Network Volume Projections

As described in **Section 3.2**, the 2031 population and employment data was projected and run on the 2011 Base Network. This was to identify any deficiencies for Horizon 2031 assuming no network improvement projects since Horizon 2011. **Figure 5** shows the v/c ratios and **Figure 6** gives the volumes for the key links on the Horizon 2031 Base Network.

5.2 Transportation Network Deficiencies

The model results for the 2031 Base Network indicate that a number of links are expected to operate with a v/c ratio of 0.8 or worse. This equates to the Level of Service 'E' band, which is past the threshold for acceptable road performance.

The following links are affected:

- Talbot Street eastbound from Armstrong Drive to Johnson Avenue and from Princess Street to Elliott Street;
- Oak Street westbound from Erie Street to Danforth Avenue; and
- Erie Street between Oak Street and Wilkinson Drive.

With regard to the latter case, traffic volumes are expected to continue to grow on Erie Street (particularly northbound), Wilkinson Drive and Elliott Street. This is due to a new commercial/industrial business park in the area west of Erie Street and north of Wilkinson Drive.

Although Danforth Avenue is projected to operate with an acceptable Level of Service, there is local concern regarding perceived traffic infiltration along this route.

5.3 Scenario A Conclusions

If the Leamington road network is left unaltered between now and 2031, traffic congestion is predicted. Further study is required to identify alternative solutions comprising projects that will mitigate the increase in congestion anticipated in the aforementioned areas. A preferred strategy should then be determined in terms of the optimum combination of proposed improvement projects to be carried forward.

Figure 5: 2031 Projected Volume-to-Capacity Ratios - Scenario A

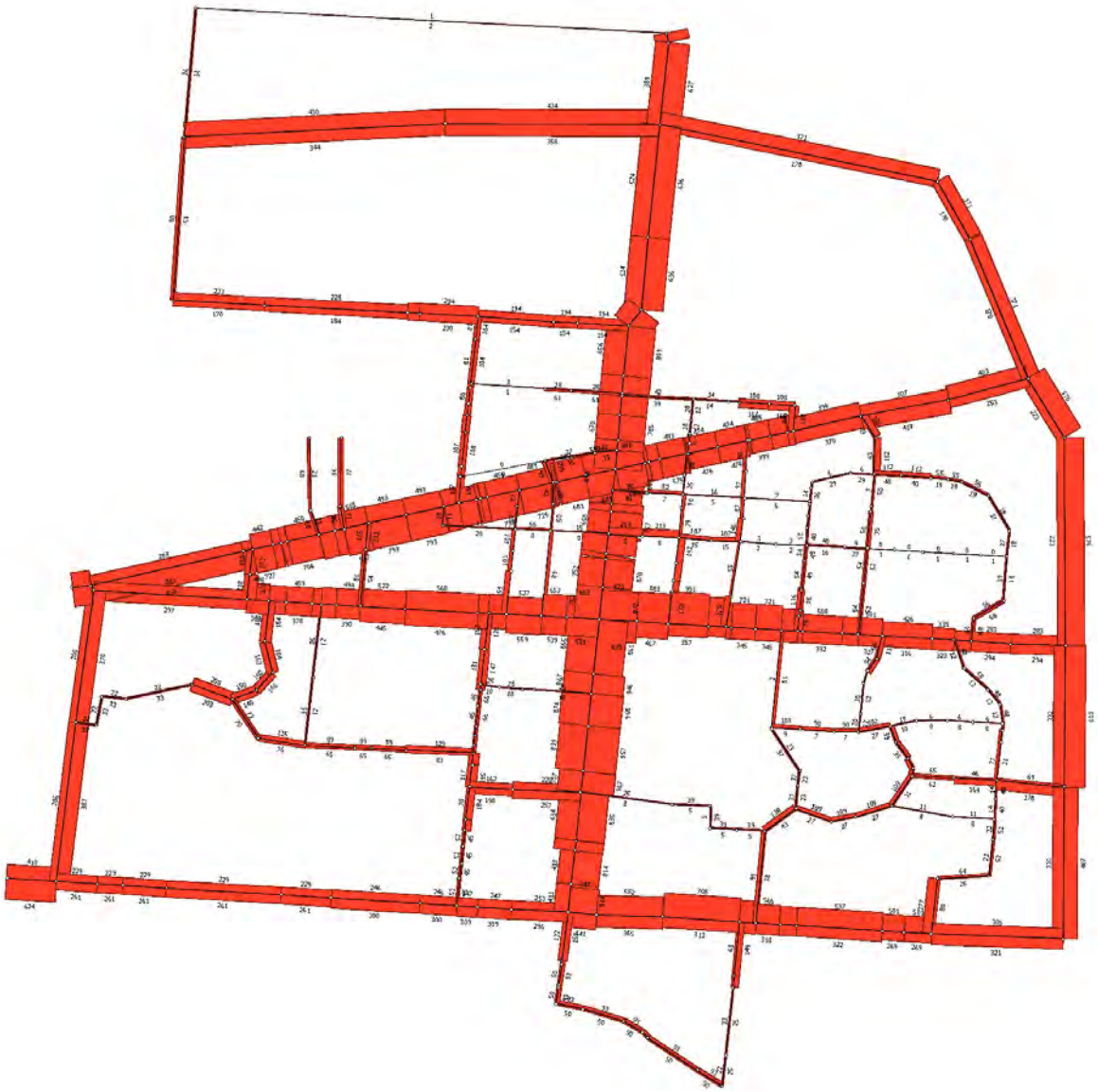


Figure 6: 2031 Projected Traffic Volumes - Scenario A

6 FUTURE HORIZON ASSESSMENT METHODOLOGY

The primary objective of the Long Range Transportation Plan is to assist the municipality in establishing a capital improvement program to guide future network improvements and expansions in a timely manner.

6.1 Identification of Alternative Solutions

Previous sections of this report detail how future traffic volumes were forecast using the travel demand model developed for this study and **Section 5.2** identifies network deficiencies based on quantified capacity constraints from the model.

The next steps are to identify and evaluate improvement opportunities to address identified deficiencies or achieve strategic growth objectives outlined in the Problem Statement in **Section 2.2**. A list of transportation network improvements can then be developed, including the associated "triggers" for their implementation.

6.2 Determination of the Preferred Strategic Alternative

A conceptual review was undertaken of the reasonable alternative solutions put forward in Phase 2 of the EA to address the issues or deficiencies identified in Phase 1.

Based on this, an initial list of projects was generated and incorporated into the 2031 base model. The revised model was run and the system metrics computed by the model were reviewed based on the following factors:

- Network Connectivity;
- Congestion;
- Environmental Impact; and
- Cost Effectiveness

The traffic volume and capacity outputs for each section of the network were also analyzed to assess the impact of the proposed projects on driver routing decisions and to identify pinch points where congestion is expected to occur.

An iterative process was then undertaken to refine the model and to determine the transportation projects for the preferred network. Transportation projects were added to the model to determine their effect on overall and localized network performance.

For this study, the available projects are listed in **Section 7** and summarized in **Table 4**. Three alternative scenarios were run, as described and evaluated in **Sections 8, 9 and 10**. The detailed methodology for the comparative assessment is given in **Section 11** and recommendations appear in **Section 12**.

7 2031 HORIZON: ALTERNATIVE SOLUTIONS

There are several improvement opportunities to address the deficiencies identified in **Section 5**.

7.1 Oak Street Improvements

Widening Oak Street between Victoria Avenue South and Plumbrook Drive to at least a three lane cross-section would allow for a continuous two-way centre left turn lane (TWCLTL) between Erie Street and the East Side Arterial Road (ESAR). This would increase the capacity to accommodate projected future traffic volumes since, under existing conditions, through traffic on Oak Street is impeded by any vehicles turning left. This is particularly prevalent at the six intersections or driveways between Erie Street and Danforth Avenue and the issue will be exacerbated as traffic volumes increase into the future.

The TWCLTL allows left turning vehicles to separate from through traffic, reduces the chance of rear end collisions and minimizes the amount of delay for through traffic. A TWCLTL also improves access to Oak Street for left turns from the numerous unsignalized intersections and driveways. Drivers are able to use the TWCLTL in order to make a two stage left turn (i.e. a northbound left turning vehicle can use a gap in eastbound traffic to access the TWCLTL and then find a gap in westbound traffic) rather than waiting for a simultaneous gap, which occurs less frequently.

7.2 Erie Street

Opportunities to improve traffic operations on Erie Street between Oak Street and Wilkinson Drive are limited. Erie Street may be widened to a four-lane cross-section between Oak Street and Askew Street. This is consistent with the cross-section south of Oak Street; however, as discussed previously, any widening for the remaining section is physically constrained by a limited right-of-way and financially constrained by significant property acquisition in order to widen the right-of-way.

7.3 Danforth Avenue

Feedback from residents suggests that there may be an infiltration issue on Danforth Avenue. It is perceived that residents who live to the south of Seacliff Drive are using Danforth Avenue as an alternate route to avoid the traffic signals and congestion on Erie Street between Oak Street and Seacliff Drive. In fact, a select link analysis indicates that the proportion of trips beginning and ending immediately to the south of Seacliff Drive is relatively minimal and that few connect to Oak Street.

Comparing current Danforth Avenue traffic volumes with those in the base scenario of the 2007 study shows a 75% drop following construction of the East Side Arterial Road (ESAR), now County Road 33, which provides a better north-south connection for traffic avoiding Erie Street. However, this project has been included to assess the impact of the traffic on the operation of Danforth Avenue and assess whether there would be any benefit to closing the road to vehicle traffic.

To prohibit through traffic from using Danforth Avenue as a shortcut to avoid congestion on Erie Street, turn restrictions would need to be implemented either operationally or physically at the Carolina Woods Crescent and Danforth Avenue intersection. The restriction would eliminate the connection of Danforth Avenue at Carolina Woods Crescent. This would effectively convert the section of Danforth Avenue between Carolina Woods Crescent and Seacliff Drive into a cul-de-

sac with access only to Seacliff Drive. This modification to the intersection would eliminate any through vehicle movement, while allowing only local traffic to access properties along this section of Danforth Avenue.

7.4 Sherk Street Extension

The Sherk Street Extension is shown conceptually in **Figure 7**. The extension of Sherk Street, from Oak Street to Talbot Street, has been considered in order to ease traffic congestion on Erie Street and reduce infiltration of through traffic on local streets. The extension provides an alternative to travel on Erie Street.

The ideal Sherk Street Extension would involve the redesign of the Oak Street intersection to provide a continuous connection across Oak Street. This would involve shifting the alignment of Sherk Street into the southwest quadrant of the existing Sherk Street/Oak Street intersection. Although this parcel is currently vacant, it is in the process of being rezoned to commercial and will be developed. The realignment of Sherk Street would have a significant impact on this development and make expropriation expensive. Also, the land required for this extension includes the train station at the north end of MCR Drive. This is a designated heritage site, hence the availability of this land is significantly restricted. Other options are considered below.

The MCR Drive Extension mentioned in the 2007 LRTAP would be similar to the Sherk Street Extension in that it creates a new road link between Oak Street and Talbot Street on the same basic alignment. However, the MCR Drive Extension would not directly connect with Sherk Street and would involve the installation of two closely-spaced roundabouts. For these reasons, the version referred to as the 'Sherk Street Extension' in the 2007 LRTAP is the preferred option.

Figure 7: Sherk Street Extension

7.5 West Side Arterial Road (WSAR)

The West Side Arterial Road is a potential future road link envisioned to provide a similar function on the west side of town to that which the ESAR provides on the east side. The original alignment was envisaged to connect Highway 3 through Wilkinson Drive (at the Morse Road intersection) to Seacliff Drive via Fraser Road. However, there are a number of significant issues associated with the alignment proposed for the WSAR including:

- The impact and expense of relocating the existing Tim Horton's and adjacent plaza located at the Talbot Street/Oak Street/Fraser Road intersection;
- The impact on the existing greenhouse operations located north of the plaza and Tim Horton's, as well as the existing greenhouse operations located south of the Morse Road/Highway 3 intersection; and
- The narrow right-of-way on Morse Road between the existing greenhouse operations.

As a result, in order for the WSAR to be feasible, another alignment option is required. The only open land on the north side of Talbot Street, between Elliot Street and Fraser Road, is located just west of Armstrong Drive. The alignment would intersect with Talbot Street just west of Armstrong Drive, extend north, to the west of the existing residential development to the north of Talbot Street, cross Wilkinson to the east of Morse Avenue and tie into the Highway 3 at Morse Avenue intersection. The conceptual alignment is shown in **Figure 8**.

Although this alternate alignment does not provide a direct connection between Highway 3 and Seacliff Drive, it does provide much needed additional north-south capacity to the west of Erie Street. Connections to the WSAR will also be possible from both Fraser Street and Sherk Street, which makes it a reasonable alternative to traveling along Erie Street through the downtown core. The revised alignment also has the advantage of being more feasible, both financially and physically, than the original WSAR alignment.

Figure 8: WSAR Conceptual Alignment

7.6 Talbot Street/Oak Street/Fraser Road Intersection

Talbot Street at Oak Street and Fraser Road is a five legged signalized intersection whose geometry presents challenges for safe and efficient traffic operations. A roundabout was considered as a solution for this intersection but was eliminated from further analysis. The intersection is not conducive to control by a roundabout due to unbalanced traffic volumes, land acquisition requirements and pedestrian volumes.

The preferred option is shown schematically in **Figure 9**. It would create a more typical four-legged intersection. The access to the Tim Horton's and plaza to the north of Talbot Street would be shifted east on Talbot and would no longer be included as part of the signal. With only four approaches, the traffic signal phasing could be simplified for the new intersection.

As a result the capacity of the intersection would increase since the signal would no longer serve five approaches. This new alignment was analyzed in the Leamington District Secondary School Transportation Impact Study (June 2013). Synchro modeling software was used to compare the performance of the intersection with its existing and proposed configurations in a 2021 future scenario which included the traffic forecast to be generated by the school. The results predicted a Level of Service of B in both peak periods, compared with the existing Level of Service of D and E in the AM and PM peak periods, respectively.

This option appears not to require property acquisition, however this should be confirmed before proceeding through a more detailed assessment of intersection and right-of-way requirements as well as property limits.

7.7 Summary

The projects available for implementation are summarized in **Table 4**. **Sections 8, 9 and 10** analyze the impact of three scenarios comprising combinations of these projects. **Section 11** features a quantitative comparison of these three scenarios and **Section 12** gives recommendations for implementation.

Figure 9: Talbot Street/Oak Street/Fraser Road Intersection Reconfiguration

Table 4: Available Improvement Options

Improvement	Details
Widen Oak Street East	Widen to a 3 lane cross-section by adding a Centre Two Way Left Turn lane from Victoria Avenue South to Plumbrook Drive
Widen Erie Street	Widen to 4-lane cross-section from Oak Street to Askew Street.
Closure of Danforth Avenue to infiltrating traffic	Cul-de-sac Danforth Avenue at Carolina Woods Crescent to restrict use by infiltrating traffic.
Sherk Street Extension	Extend Sherk Street to connect to Talbot Street via the existing MCR Drive approach.
West Side Arterial Road (WSAR)	Construct a new road to connect Highway 3 to Oak Street on the alternate alignment documented in **Section 7.5**. The recommended alignment is not continuous with Fraser Road but is more feasible since it avoids expensive property acquisitions and business relocations.
Reconfigure Talbot Street / Oak Street / Fraser Road Intersection	Align Talbot Street (west of Fraser) with Oak Street. Curve Talbot Street (east of Fraser) to align with Fraser Road. Relocate the access to the Tim Horton's and adjacent plaza along Talbot Street away from the existing intersection. This is discussed further in **Section 7.6**.

8 2031 HORIZON: SCENARIO B

8.1 Network Volume Projections

For this scenario, three of the improvement options outlined in **Table 4** of **Section 7.7** have been incorporated into the 2031 Base Network.

These are:

- The Oak Street widening from Victoria Avenue South to Plumbrook Drive;
- The Erie Street widening from Oak Street to Askew Street; and
- The reconfiguration of the Talbot Street / Oak Street / Fraser Road intersection.

This combination of projects was selected for the initial alternative run as the design work for the Oak Street and Erie Street widening is already nearing completion. The reconfiguration of the Talbot Street / Oak Street / Fraser Road intersection has been included as it is recommended by the Leamington District Secondary School Transportation Impact Study, as described in **Section 7.6**.

Figure 10 shows the v/c ratios and **Figure 11** gives the volumes for this scenario.

8.2 Transportation Network Deficiencies

The model results for the 2031 Base Network indicate that a number of links are expected to operate at LOS E or worse. These links are described as follows:

- Talbot Street eastbound from Armstrong Drive to Johnson Avenue and from Princess Street to Elliott Street;
- Oak Street westbound from Erie Street to Wigle Street; and
- Erie Street between Askew Street and Wilkinson Drive.

In the latter case, as in the 'Do Nothing' Scenario A, traffic volumes are expected to continue to grow due to a new commercial/industrial development in the area west of Erie Street and north of Wilkinson Drive.

8.3 Scenario B Conclusions

- Overall, the road sections with a volume-to-capacity ratio over 0.8 are the same as in the 'Do Nothing' Scenario A, with the exception of Erie Street between Oak Street and Askew Street, and Oak Street westbound between Wigle Street and Danforth Avenue.
- To some extent, the additional capacity generated on Oak Street and Erie Street by their widening is consumed by the greater traffic volumes attracted by those same improvements.
- The degree of traffic infiltration on Danforth Avenue is minimal, with no link showing a Level of Service worse than C. The highest volume is 126 vehicles on the southbound link between Carolina Woods Crescent and Hayward Street. This is less than the 233 eastbound vehicles on Clarence Avenue between the ESAR (County Road 33) and Bennie Avenue.

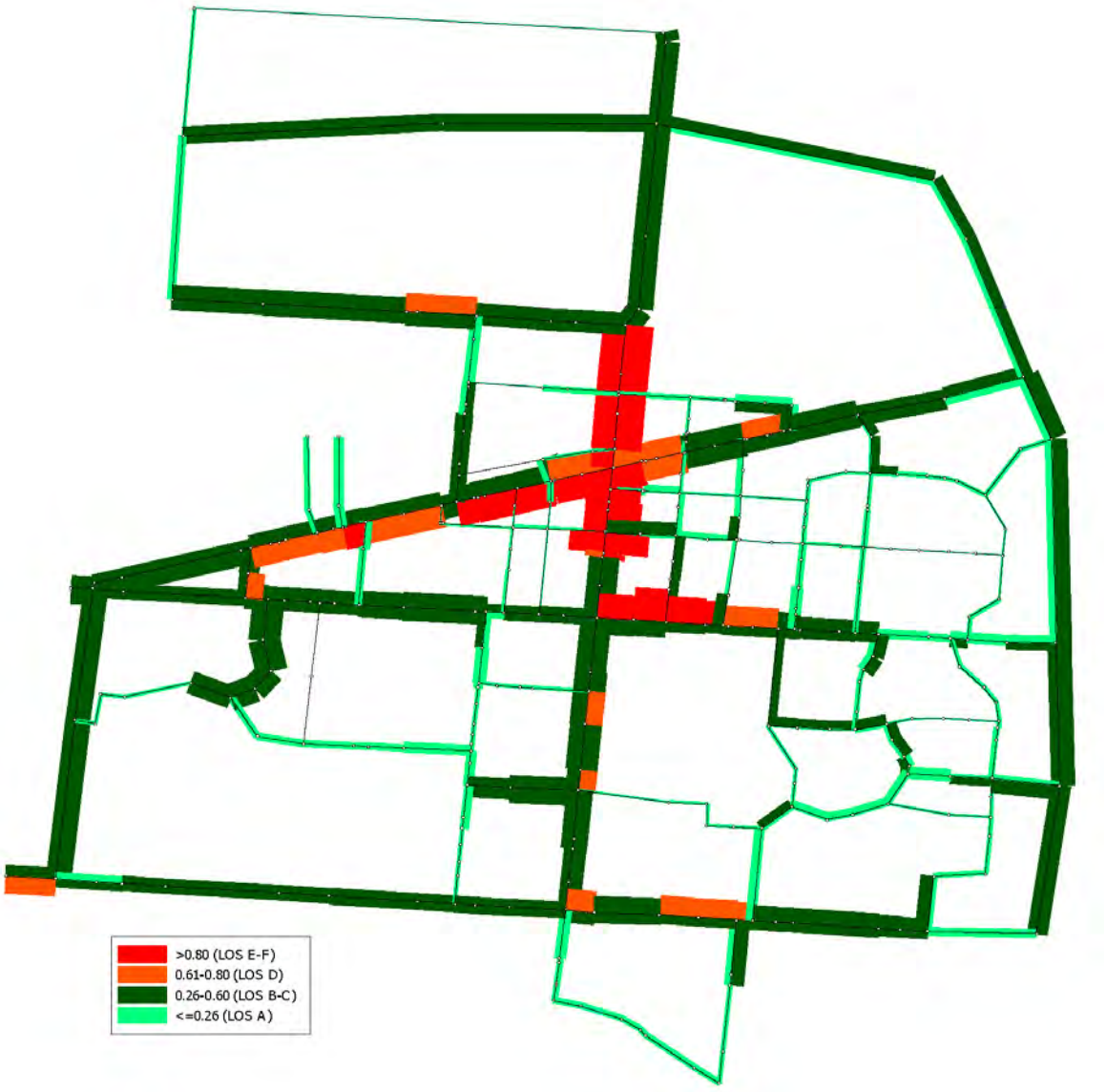


Figure 10: 2031 Projected Volume-to-Capacity Ratios - Scenario B

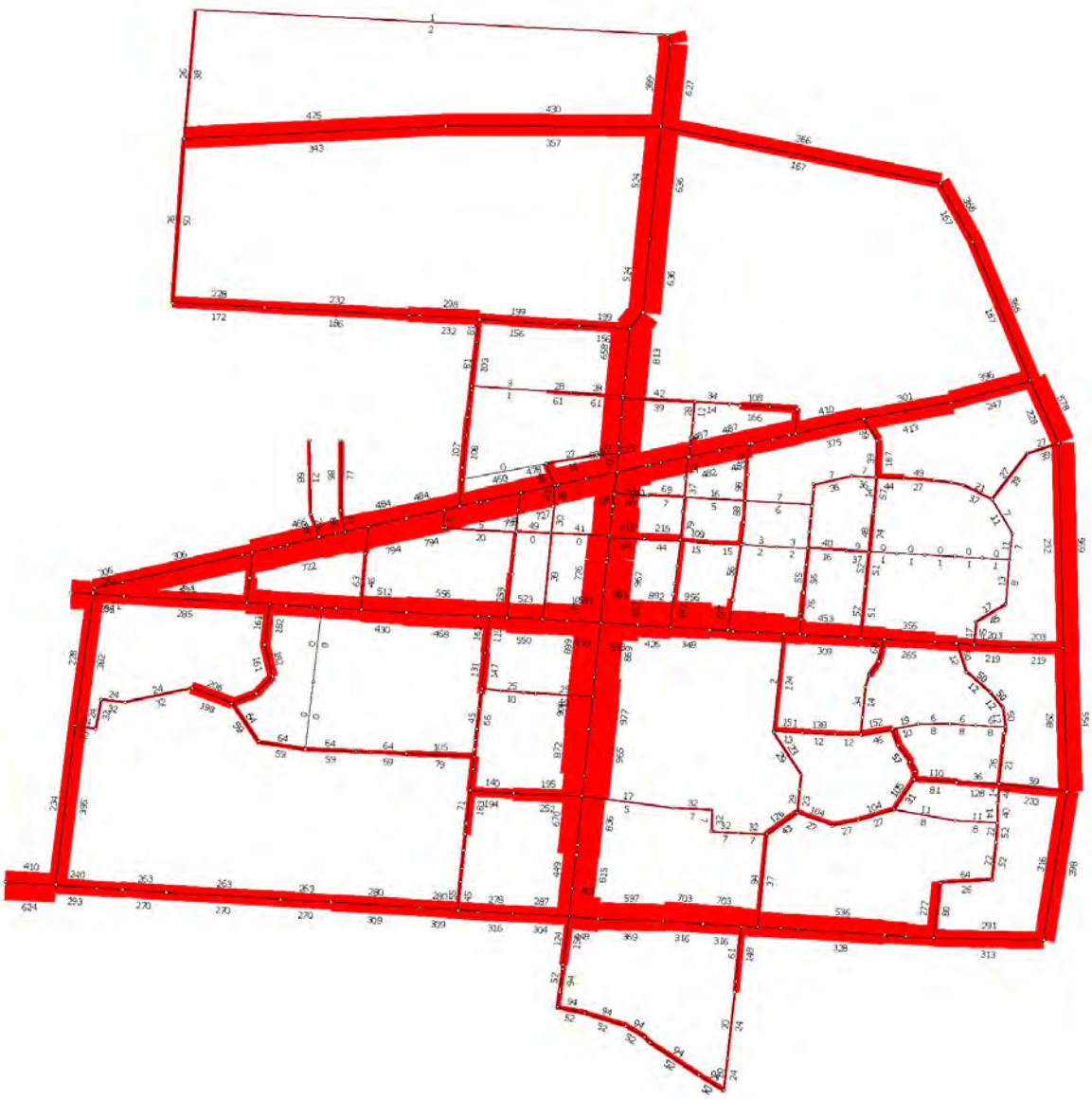


Figure 11: 2031 Projected Traffic Volumes - Scenario B

9 2031 HORIZON: SCENARIO C

9.1 Network Volume Projections

For this scenario, four of the improvement options outlined in **Table 4** of **Section 7.7** have been incorporated into the 2031 Base Network. These include the three projects incorporated into Scenario B, namely:

- The Oak Street widening from Victoria Avenue South to Plumbrook Drive;
- The Erie Street widening from Oak Street to Askew Street; and
- The reconfiguration of the Talbot Street / Oak Street / Fraser Road intersection.

In addition, for Scenario C it is assumed that the new West Side Arterial Road (WSAR) connecting Highway 3 to Oak Street will have been constructed.

Figure 12 shows the v/c ratios and **Figure 13** gives the volumes for this scenario.

9.2 Transportation Network Deficiencies

The model results for the 2031 Base Network indicate that a number of links are expected to operate at LOS E or worse. These include the following links that were also highlighted in Scenario B:

- Talbot Street eastbound from Chestnut Street to Lewis Lane and from Erie Street to Princess Street;
- Oak Street westbound from Erie Street to Wigle Street; and
- Erie Street northbound between Askew Street and Talbot Street, and southbound between Askew Street and Marlborough Street.

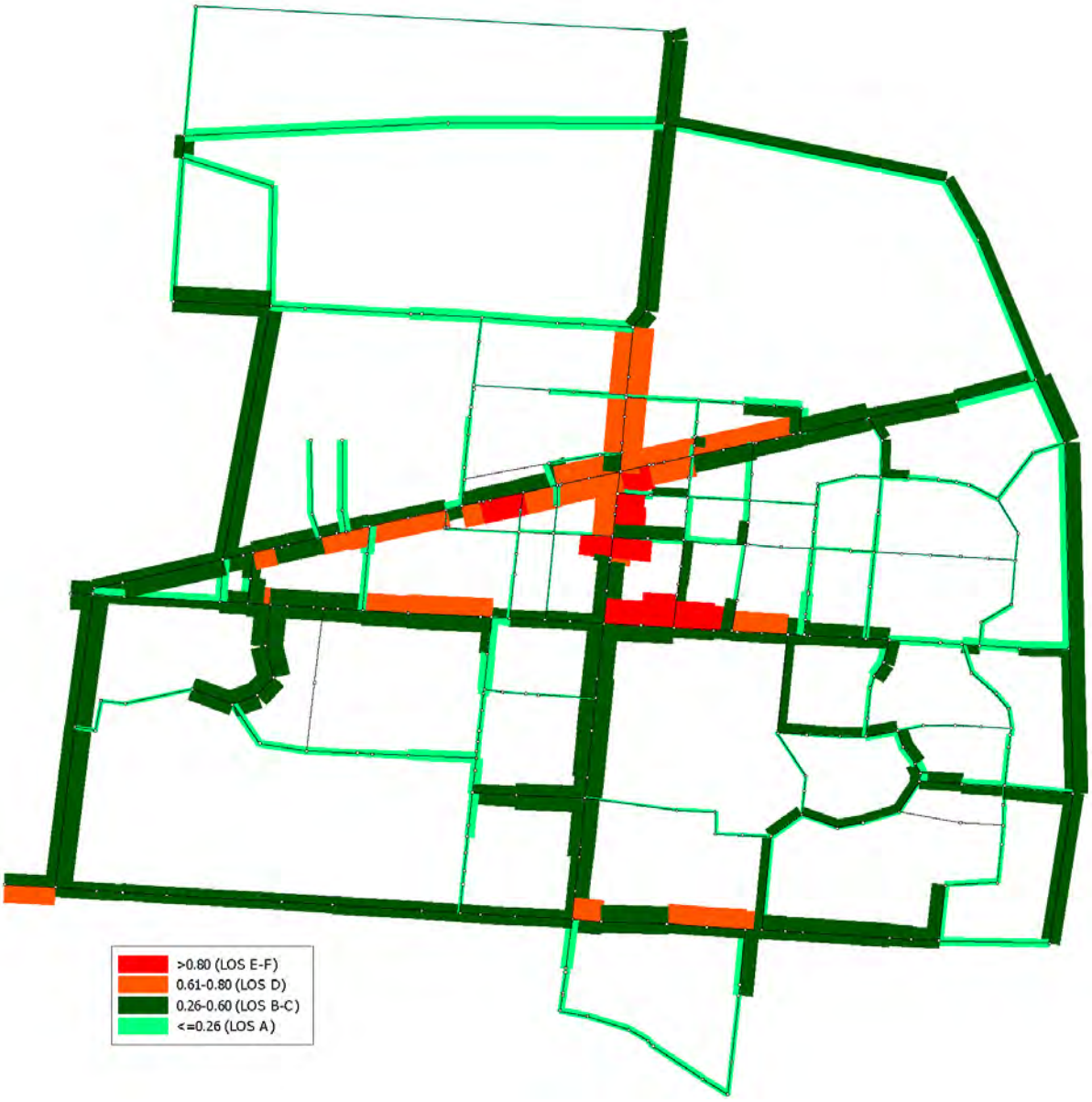


Figure 12: 2031 Projected Volume-to-Capacity Ratios - Scenario C

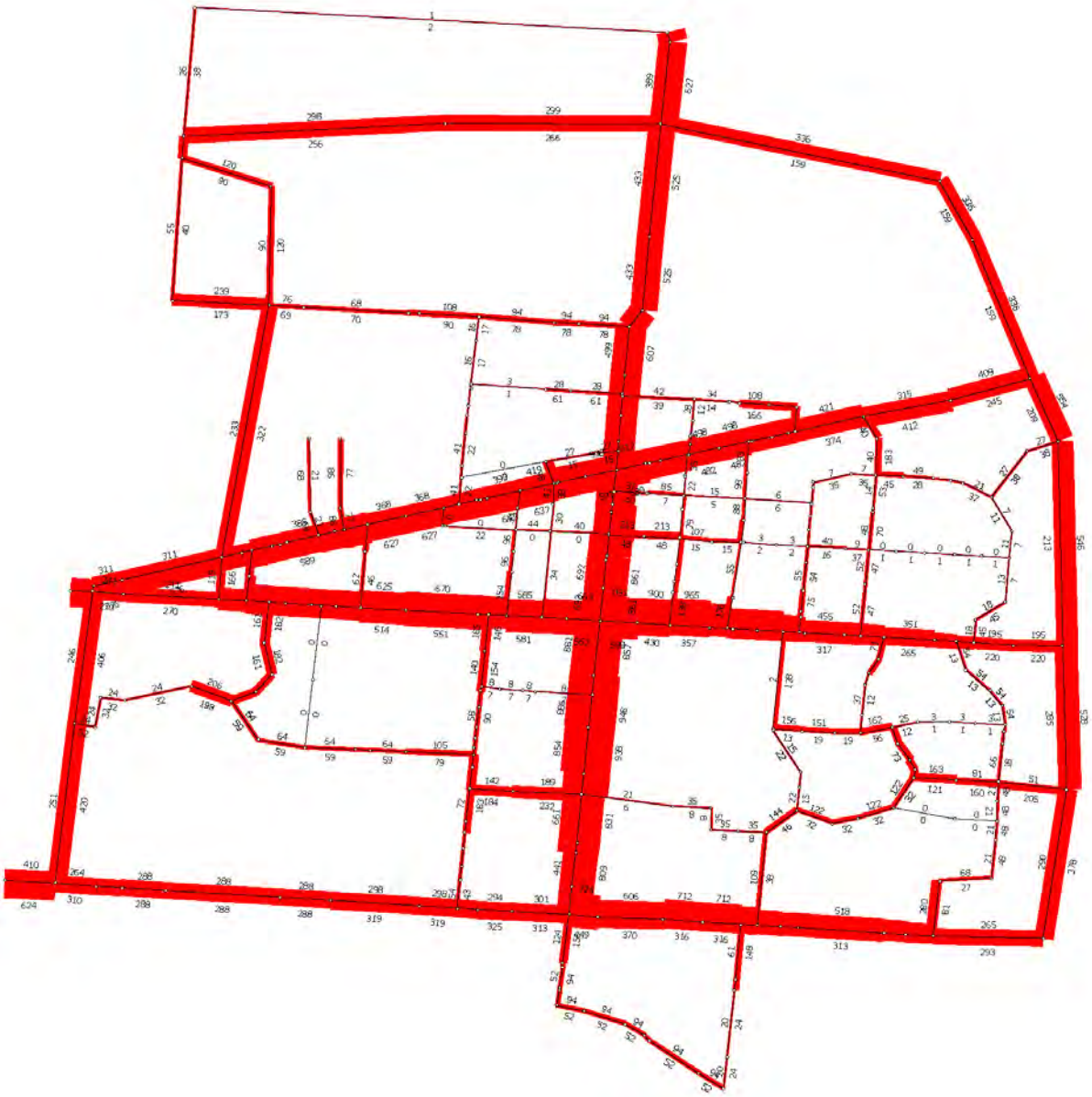


Figure 13: 2031 Projected Traffic Volumes - Scenario C

9.3 Scenario C Conclusions

- The provision of the West Side Arterial Road (WSAR) between the Wilkinson Road / Morse Road intersection and Oak Street significantly shortens the distance of travel for traffic between these two points. This journey is currently made via Wilkinson Road, Elliott Street and Talbot Street West; each of these roads show a corresponding drop in traffic flows.
- The volumes on Fraser Road are largely unchanged, indicating that the proposed construction of the WSAR would not attract additional volume to that route.
- In Scenario B (without the West Side Arterial Road) the section of Wilkinson Road to the west of Elliott Street was predicted to operate with a Level of Service of D. With the addition of the West Side Arterial Road, these links are predicted to operate at Level of Service A. The operation of Talbot Street West also improves.
- The reduction in volume on Erie Street between Talbot Street and Wilkinson Drive due to rerouting via the WSAR is enough to result in an acceptable Level of Service of D. This compares to Scenario B without the WSAR where the volume-to-capacity ratio is over the 0.8 threshold. On Elliott Street, volumes are projected to be up to 80% lower, resulting in a Level of Service of A.
- The degree of traffic infiltration on Danforth Avenue is minimal, with no link showing a Level of Service worse than C. The highest volume is 144 vehicles on the southbound link between Carolina Woods Crescent and Hayward Street. This is less than the 205 eastbound vehicles on Clarence Avenue between the ESAR (County Road 33) and Bennie Avenue.

10 2031 HORIZON: SCENARIO D

10.1 Network Volume Projections

In order to assess the impact of the remaining improvement options outlined in **Table 4** of **Section 7.7**, a final alternative scenario was run where all six proposed projects have been incorporated into the 2031 Base Network.

These are the projects included in Scenario C:

- The Oak Street widening from Victoria Avenue South to Plumbrook Drive;
- The Erie Street widening from Oak Street to Askew Street;
- The reconfiguration of the Talbot Street / Oak Street / Fraser Road intersection; and
- The West Side Arterial Road (WSAR) connecting Highway 3 to Oak Street;

plus:

- The Sherk Street extension; and
- The closure of Danforth Avenue to traffic south of Carolina Woods Crescent.

Figure 14 shows the v/c ratios and **Figure 15** gives the volumes for this scenario.

10.2 Transportation Network Deficiencies

The model results for this combination of improvements indicate that a number of links are expected to operate at LOS E or worse, including:

- Talbot Street eastbound from Erie Street to Princess Street;
- Oak Street westbound from Erie Street to Wigle Street;
- Erie Street northbound between Askew Street and Talbot Street, and southbound between Askew Street and Marlborough Street.

This is the same as Scenario C except for the short section of Talbot Street eastbound from Chestnut Street to Lewis Lane, which is predicted to have a Level of Service of D in this scenario.

Figure 14: 2031 Projected Volume-to-Capacity Ratios - Scenario D

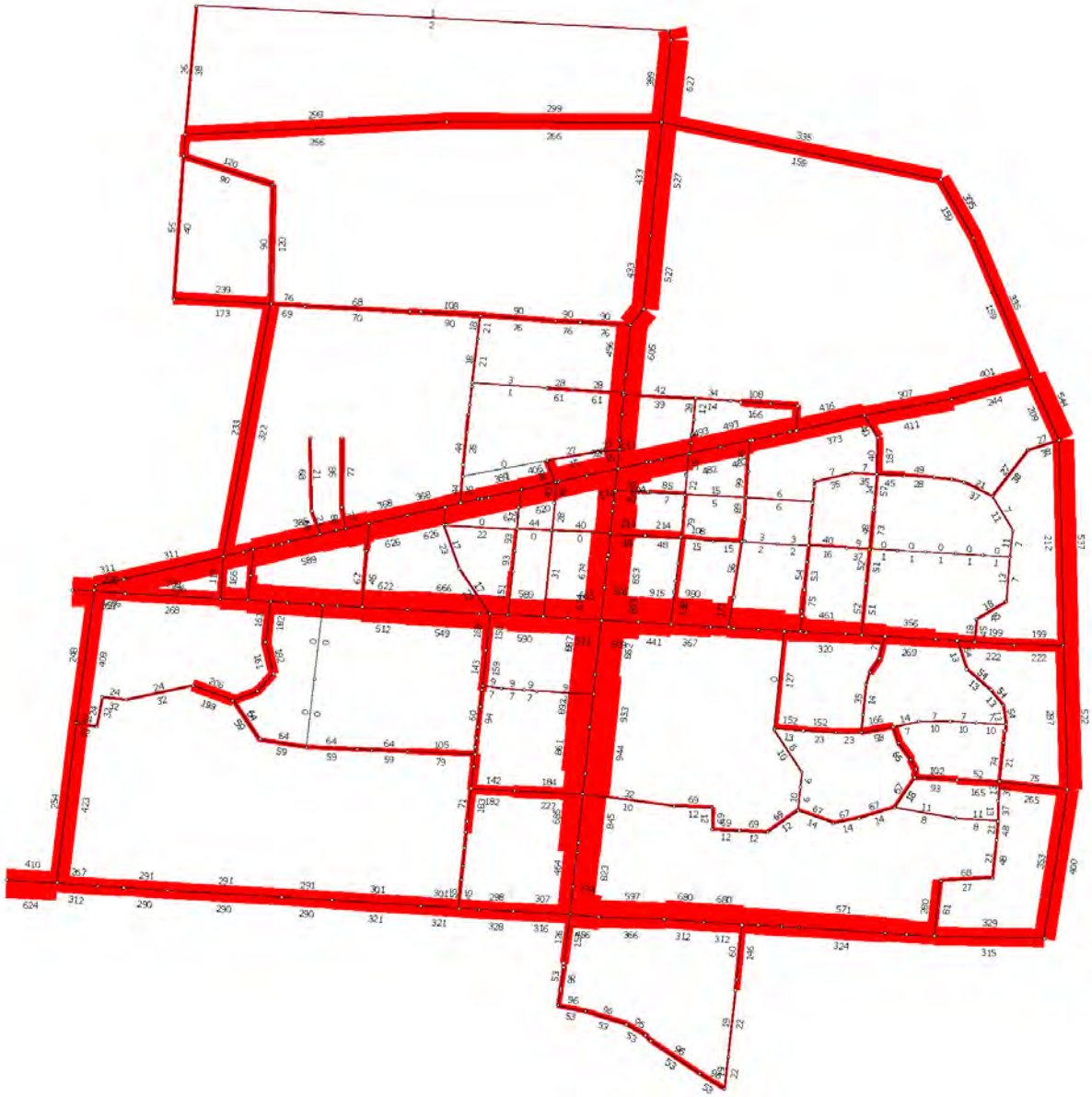


Figure 15: 2031 Projected Traffic Volumes - Scenario D

10.3 Scenario D Conclusions

The following conclusions from Scenario C also apply to Scenario D:

- The provision of the WSAR between the Wilkinson Road / Morse Road intersection and Oak Street redirects traffic flow from the existing longer route between these points via Wilkinson Road, Elliott Street and Talbot Street West.
- The volumes on Fraser Road are largely unchanged, indicating that the proposed construction of the WSAR would not attract additional volume to that route.
- In Scenario B (without the West Side Arterial Road) the section of Wilkinson Road to the west of Elliott Street was predicted to operate with a Level of Service of D. With the addition of the West Side Arterial Road, these links are predicted to operate at Level of Service A. The operation of Talbot Street West also improves significantly.
- The reduction in volume on Erie Street between Talbot Street and Wilkinson Drive due to rerouting via the WSAR is enough to give an acceptable Level of Service of D. This compares to Scenario B without the WSAR where the volume-to-capacity ratio is over the 0.8 threshold. On Elliott Street, volumes are projected to be up to 80% lower, resulting in a Level of Service of A.

Further conclusions can be drawn related to the Sherk Street extension and the Danforth Avenue closure, which are only proposed for this scenario:

- Given that there are several existing roads connecting Oak Street and Talbot Street, and that the Talbot Street / Oak Street / Fraser Road intersection is proposed to be reconfigured, the provision of the Sherk Street Extension attracts a limited amount of traffic flow between the centre and the northwest quadrant away from Erie Street.
- Although there may be a marginal local benefit to closing Danforth Avenue to through traffic, this does not prevent infiltration in the southeast quadrant. In all scenarios where Danforth Avenue is open, a higher two-way vehicle volume is shown on Clarence Avenue between the ESAR (County Road 33) and Bennie Avenue. That volume is over 30% higher in Scenario D compared to Scenario C where Danforth Avenue is closed and open, respectively.

This Long Range Transportation Action Plan focuses more on capacity than operational issues, which are discussed in the Short Term Action Plan at the sites identified for review. However, it should be noted that the feasibility of closing Danforth Avenue is compromised by the need to retain emergency and pedestrian access due to the cul-de-sac length that would result. Fire Services have expressed a preference for Danforth Avenue to remain open so as not to increase emergency vehicle response times.

The Danforth Avenue closure may also encourage drivers that are inclined to speed through the residential area to take the alternate route via Peter Avenue and Bennie Avenue. The lack of a single stop sign between Seacliff Road and Oak Street may make this an attractive route at off-peak times when there are fewer vehicles manoeuvring into and out of driveways. As an alternative to closure, traffic calming measures may be considered on Danforth Avenue. The potential need for speed-related provisions on Peter Avenue and Bennie Avenue should also be assessed.

11 COMPARATIVE ANALYSIS

In the previous sections, each 2031 scenario has been analyzed, with conclusions drawn as to the impact on sections of individual roads and corridors. In order to gauge the relative benefits of each basket of projects overall, a scoring system was devised.

11.1 Scoring Criteria

The following metrics were used for the assessment:

- **Network Connectivity:** increasing the number of routing options available such that the average distance travelled between given points in the network is reduced, as measured by the Vehicle Kilometres Travelled (VKT);
- **Congestion:** the relative ease of travel through the network, as measured by the percentage of lane kilometres with a volume-to-capacity ratio over 0.8.
- **Environmental Impact:** whether the footprint of the road network will spread to land that is currently untouched.
- **Cost Effectiveness:** although detailed costings are outside of the scope of this study, a "yes/no" comparison was undertaken against alternative options.

The score awarded for each criterion ranges from 0 to 2, where the lower score indicates a more favourable outcome.

11.2 Assessment

The aforementioned criteria were applied to each of the four metrics, with the following outcomes.

11.2.1 Network Connectivity and Congestion

Table 5 below shows the model outputs showing overall network performance for each scenario. As indicated above, these metrics were used to measure network connectivity and congestion. For each factor, the metric that was directly applied is shown in black text; related metrics and their outputs are shown in grey for informational purposes.

Table 5: Model Outputs

Factor	Metric	Scenario			
		A	B	C	D
Network Connectivity	Vehicle Kilometres Travelled (VKT)	24995	24961	24195	24253
	Vehicle Hours Travelled (VHT)	434	432	416	422
Congestion	Lane Km with v/c >0.8	4.21	3.46	1.25	1.1
	Total Lanes	112.03	112.88	116.68	117.38
	% of Lane Km with v/c>0.8	3.8%	3.1%	1.1%	0.9%

Vehicle kilometres travelled was chosen to represent network connectivity as it relates to the constant distance between two points on the network. In theory, it has less overlap with congestion than vehicle hours travelled, hence this minimizes double-counting. In practice, the ratio of VKT to VHT varied by less than 1% between scenarios so either metric could have been chosen.

The percentage of lane kilometres with a volume-to-capacity value of 0.8 was used to measure congestion. The number of lane kilometres varies between scenarios according to the construction projects included; adjusting for this minimizes double-counting between the congestion and network connectivity factors.

For Network Connectivity and Congestion, the scenario with the best result was given zero points, and the one with the worst result was given two points. As these factors were assessed on quantitative model outputs, the scores for the other scenarios were calculated on a sliding scale based on how close those outputs were to the best and worst values.

11.2.2 Environmental Impact

For Environmental Impact, projects were scored individually. For each scenario, the scores of the associated projects were averaged.

Where a project was judged to have a neutral environmental impact, a score of 1 was awarded; 2 points indicates that a negative impact is expected. Benefits associated with reduced congestion were ignored to avoid double counting with that criterion, hence no zero scores were awarded.

In this case, the Sherk Street Extension involves introducing a major roadway alongside an existing trail and the WSAR would pass through existing farmland with potential ecological impacts. Consequently, these two projects were given two points, with the remainder awarded one point each.

As the 'Do Nothing' scenario A does not include any project, a neutral score of 1 was given to the scenario. Although in this case no cost is expended directly, that does not necessarily relate to cost effectiveness; for some projects, the benefits will outweigh the costs and there may also be indirect costs associated with taking no action.

11.2.3 Cost Effectiveness

As was done for the Environmental Impact assessment, projects were scored individually for Cost Effectiveness. Where an alternative project with a similar objective would be more expensive, zero points were given; where cheaper options are available, two points were awarded. Where costs are comparable based on the information available, a neutral score of 1 was assigned. For each scenario, the scores of the associated projects were averaged.

The projects are listed in **Table 6**, along with the alternative options used for comparison purposes.

Table 6: Projects and Alternatives

Project #	Description	Alternative	Score
1	Widen Oak Street East	Widening of alternative east-west connections	1
2	Widen Erie Street	Widening of alternative north-south connections	1
3	Closure of Danforth Avenue to infiltrating	Traffic Calming	0
4	Sherk Street Extension	Do nothing, avoiding costs associated with appropriating developable and heritage protected land	2
5	West Side Arterial Road (WSAR)	Sherk Street extension and Elliott Street widening	2
6	Reconfiguration of Talbot Street / Oak Street / Fraser Road Intersection	Roundabout instead of multiple signalized intersections	0

11.3 Results

Table 7 below summarizes the projects involved in each scenario. The numbering is as per **Table 6** above. Scores are given for each factor and summed to represent the overall network performance for each scenario.

Table 7: Overall Evaluation

Scenario	Project						Factor				Overall Score
	1	2	3	4	5	6	Network Connectivity	Congestion	Environment	Cost Effectiveness	
A							2.00	2.65	1.00	1.00	6.65
B	✓	✓				✓	1.92	2.00	1.00	0.67	5.58
C	✓	✓			✓	✓	0.00	0.13	1.25	1.00	2.38
D	✓	✓	✓	✓	✓	✓	0.15	0.00	1.33	1.00	2.48

11.4 Conclusions

The worst-performing scenario is A, the 'Do Nothing' approach. This confirms that action should be taken to mitigate the growth in population and employment anticipated between now and the 2031 future horizon. The score for Scenario B is only marginally better, hence this option can also be discounted.

Based on this quantitative analysis for the overall network, the best-performing scenario is C. This is closely followed by scenario D, which includes all of proposed options. However, as identified in **Section 10.3**, neither of the two additional projects in scenario D (namely the Sherk Street extension and the Danforth Avenue closure) are recommended as individual proposals.

Scenario C shows a significant improvement in network performance compared to the 'Do Nothing' scenario. This, combined with the fact that the individual projects also bring local benefits, makes scenario C the preferred option.

12 SUMMARY OF RECOMMENDATIONS

The qualitative analysis undertaken in **Section 11** identifies Scenario C as having the optimum volume-to-capacity balance considering the overall network and individual links. It also brings a slightly greater benefit than Scenario D, which includes the Danforth Avenue closure and the Sherk Street extension. As highlighted in **Section 11.3**, neither of these projects is individually recommended. Consequently, Scenario C is the recommended alternative.

Scenario C, shown in **Table 8**, identifies the recommended transportation improvements that the Municipality should consider in order to maintain acceptable Levels of Service to the year 2031. Listed below is a summary of the capacity improvements and associated timescales for implementation:

Table 8: Recommended Improvements

Improvement	Details	Timescale
Widen Oak Street East	Widen to a 3 lane cross-section by adding a Centre Two Way Left Turn lane from Victoria Avenue South to Plumbrook Drive	Short Term
Widen Erie Street	Widen to 4-lane cross-section from Oak Street to Askew Street	Short Term
Reconfigure Talbot Street / Oak Street / Fraser Road Intersection	Align Talbot Street (west of Fraser) with Oak Street. Curve Talbot Street (east of Fraser) to align with Fraser Road. Relocate the access to the Tim Horton's and adjacent plaza along Talbot Street away from the existing intersection. This is discussed further in **Section 7.6**.	Medium Term
West Side Arterial Road (WSAR)	Construct a new road to connect Highway 3 to Oak Street on the alternate alignment documented in **Section 7.5**.	Long Term

As highlighted in **Sections 7.4 and 10.3**, there are issues with the Sherk Street extension which prevent it from being recommended at this time. As the land required for this extension includes the train station at the north end of MCR Drive, a designated heritage site, as well as property that is currently zoned for commercial development, there is insufficient justification for taking the measures required to protect this land for a future extension of Sherk Street.

Appendix A

Public Information Centre (PIC) Notice

MMM GROUP

Short and Long Term Transportation Action Plans Update

Notice of Study Commencement

HAVE YOUR SAY IN HOW YOU GET AROUND TOWN!

Public Information Centre

Wednesday, May 29, 2013

Leamington Kinsmen Recreation Complex, 249 Sherk Street

3:00 to 5:00pm and 6:00 to 8:00pm

Study Purpose

To update short term and long term transportation action plans developed in 2007 to reflect current conditions and to plan for future mobility in Leamington. This study is being conducted in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment, which is an approved process under the Environmental Assessment Act.

Purpose of the Meeting

1. To provide an overview of the Transportation Master Plan process
2. To give the public the opportunity to comment on existing issues with getting around town
3. To seek input on short term and long term solutions to improve travel in Leamington

Project staff will be on hand to explain material, answer questions and collect feedback.

For more information, please contact **John Pilmer**
phone: **(519) 326-5761** email: **engineering@leamington.ca**

Appendix B

Public Information Centre (PIC) Presentation Boards

MMM GROUP

Short and Long Term Transportation Action Plans Update

Notice of Study Commencement

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MMM GROUP

For more information, please contact **John Pilmer**
phone: **(519) 326-5761** email: **engineering@leamington.ca**

WHAT IS A TRANSPORTATION MASTER PLAN?

Study Objectives:

- Identify existing transportation deficiencies at 41 intersections
- Review operational issues at locations throughout the Municipality
- Review uncontrolled pedestrian crossings
- Review the policies for establishing posted speed limits
- Review general design and application guidelines for curb extensions
- Update the travel demand model for the year 2031
- Identify long tem transportation improvements to meet the population and employment forecasts
- Develop a priority list of short and long term transportation improvements
- Undertake a public consultation program that follows the Municipal Class Environmental Assessment process for master plans

Class Environmental Assessment Process

Problem or Opportunity

- Identify the problem or opportunity

Alternative Solutions

- Review existing environment
- Identify Alternative Solutions
- Recommended Draft Preferred Solution

Public & Stakeholder Consultation

Environmental Study Report

- Document summary of rationale, planning, design and consultation process and make available for public review and commentary.

WHY IS THE MUNICIPALITY PREPARING A TMP UPDATE?

Study Vision:

"The Municipality of Leamington will establish short and long term transportation action plans to address transportation safety and operational issues and to plan for a future transportation network that is efficient and that maintains and enhances the high quality of life."

Problem Statement:

Foster Economic Development though Mobility

Congestion from vehicle traffic could affect the Municipality's attractiveness for business. The Municipality needs to plan for a safe and efficient transportation system to ensure smooth movements of goods and to create an environment conducive to business development.

Protect and Enhance the Quality of Life

Residents of the Municipality enjoy a high quality of life. The transportation system should protect and enhance the quality of life by addressing localized traffic operational issues and identifying longterm solutions to meet future needs.

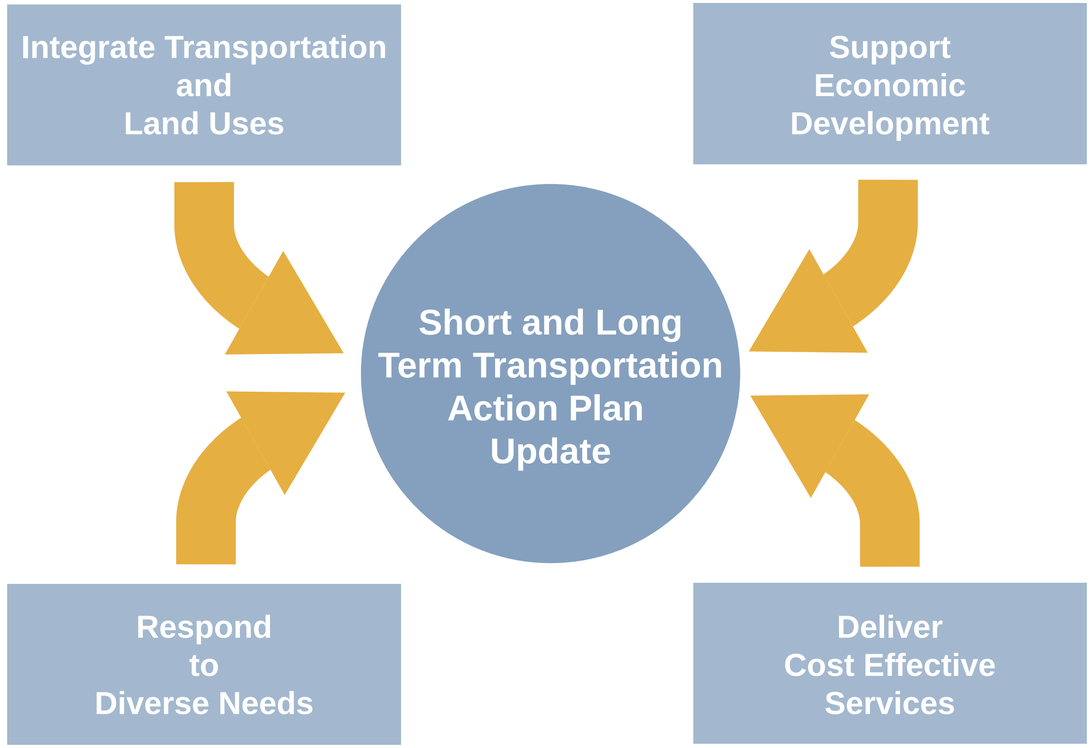
Evolving Downtown

Circulation for pedestrians, cyclists and vehicles in the downtown can be optimized through strategic transportation improvements to increase safety and mobility.

Growth and Land Use Changes

The number of people and jobs in Leamington are expected to grow moderately through the year 2031. The Municipality has identified land to accommodate this growth. The Municipality needs to integrate land use planning with transportation planning though its short and long term transportation action plans.

Principles:



WHAT IS SUSTAINABLE TRANSPORTATION?

Community Benefits of Developing Sustainable Transportation Facilities

Community Building

Brings communities together, builds community spirit and fosters enthusiasm.

Asset Management

Provides a means to appreciate and assist in protecting natural and cultural heritage resources.

Transportation

Provides residents and visitors with a choice of transportation options. Helps to reduce dependency on travel by personal automobile.

Community Health

Provides opportunities for physical activity, enables healthy, active lifestyles and makes our communities more liveable.

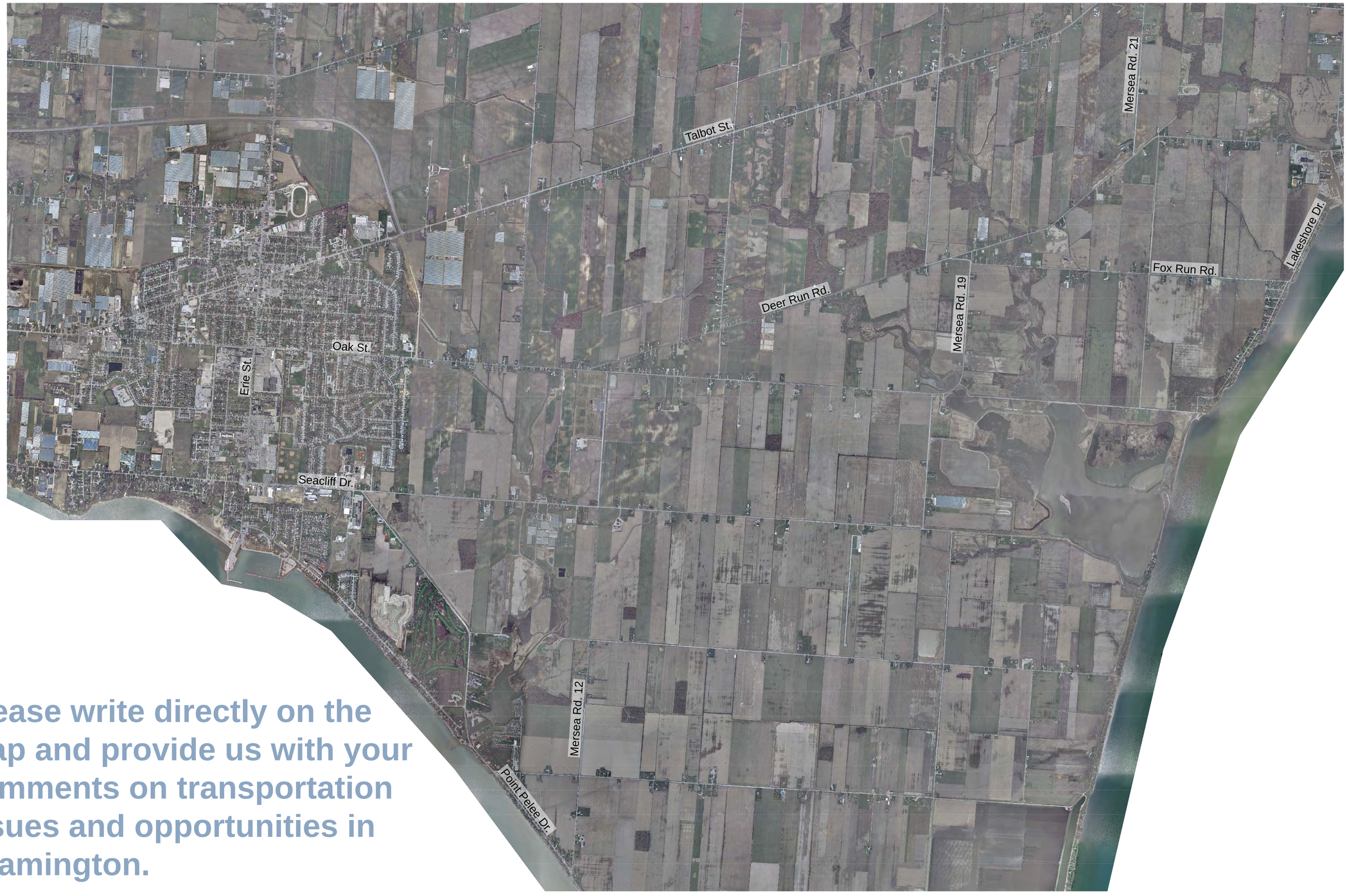
What is Active Transportation?

... Walking, Cycling, Running, Skateboarding and Snowshoeing

LEAMINGTON

Please write directly on the map and provide us with your comments on transportation issues and opportunities in Leamington.

LEAMINGTON



Please write directly on the map and provide us with your comments on transportation issues and opportunities in Leamington.

TRAFFIC CALMING

Traffic Calming Warrant Criteria

Warrant	Criterion	Requirement
Warrant 1: Petition	1.1 Petition	Consideration for physical traffic calming initiated by the local Councillor following a public meeting, or upon receipt of a petition signed by at least 25% of affected households, or by a survey conducted by the Councillor. Warrants #2 and #3 will not be considered until Warrant #1 is satisfied.
Impacts to Adjacent Streets		Should the Municipality anticipate that the proposed traffic calming will have significant traffic impact on adjacent streets, the review of the traffic calming proposal shall be modified to include the proposed street as well as adjacent streets where traffic is expected to divert.
Warrant 2: Safety Requirements (Both criteria must be satisfied to meet this warrant)	2.1 Sidewalks	There must be continuous sidewalks on at least one side of a local road and on both sides of a collector road. On roads with no sidewalks, installation of sidewalks on at lease on side of the road must have first been considered.
	2.2 Emergency Response	Consultation must be undertaken with Fire, Ambulance and Police services to verify that impacts to these services will not be significant.
Warrant 3: Technical Requirements (All four criteria must be satisfied to meet this warrant)	3.1 Road Classification	There must be continuous sidewalks on at least one side of a local road and on both sides of a collector road.
	3.2 Minimum Speed	The 85th percentile speed must be a minimum of 10 km/h over the posted speed limit. If the 85th percentile speed is more than 15km/h over the posted speed limit, there is no minimum volume requirement
	3.3 Minimum and Maximum Traffic Volume	Local Roads: Traffic volume must be between 1,000 - 8,000 vehicle per day. Collector Roads: Traffic volume must be between 2,500 - 8,000 vehicle per day.
	3.4 Minimum Block Length	On streets where mid-block traffic calming measures are proposed, the block length must exceed 120 metres.

Traffic Calming Ranking System

		Local Roads	Collector Roads
Ranking	**Speed** (0 - 25 points)	2 points for each km/h that the 85th percentile speed is above the minimum speed threshold used in Warrant 3.2	1 point for each km/h that the 85th percentile speed is above the minimum speed threshold used in Warrant 3.2
	Volume (0 - 25 points)	1 point of every 100 vehicles of daily traffic (0 - 2,500 vehicles per day)	1 point for every 200 vehicles of daily traffic over 2,500 (2,500 - 8,000 vehicles per day)
	Collisions (0 - 25 points)	• 5 points for 1 preventable collision recorded in the past 3 years; • 10 points for 2 or more preventable collisions recorded in the past 3 years; or • 10 points for 1 or more preventable collisions recorded resulting in personal injury in the past 3 years.	
	Pedestrian and Bicycling Factors (0 - 25 points)	• 5 points for each pedestrian generator (e.g. park, school, senior centre, recreation centre, church or other public institution) • 10 points for a signed bicycle route	

Types of Traffic Calming Measures

Vertical deflections including:

- Raised crosswalk
- Raised intersections
- Rumble strip
- Sidewalk extensions
- Speed hump
- Textured crosswalk

Horizontal deflections including:

- Chicane
- Curb extensions
- Curb radius reduction
- On-street parking
- Raised median island
- Traffic circle

Obstructions including:

- Directional closure
- Diverter
- Full closure
- Intersection channelization
- Raised median through intersection
- Right-in/right-out island

Signing including:

- Maximum speed
- Right (Left) turn prohibited
- One-way
- Stop
- Through traffic prohibited
- Traffic-calming neighbourhood
- Yield

DOWNTOWN IMPROVEMENTS

Curb Extensions

Curb extensions, sometimes refereed to as bulb outs, shorten pedestrian crossing distances and reduce pedestrians' exposure to motor vehicles. Curb extensions are most appropriate where on-street parking already exists or is planned to be constructed. Curb extensions offer benefits to both pedestrians and motorists. These benefits include:

- Better Visibility of both pedestrians and vehicles; and
- Shorter crossing distances for pedestrians, which equates to shorter crossing times and a decreased length of the pedestrian phase at traffic signals and shorter wait times for vehicles for pedestrians to cross at unsignalized intersections

Example of a Landscaped Curb Extension

Example of a Curb Extension at Mid-block Pedestrian Crossing

Appropriate locations for constructing curb extensions:

- Locations where residential streets meet arterial street at an obtuse angle;
- Locations on routes that are used by school children or the elderly; and
- Downtown shopping areas, such as along Erie Street.

On-street Parking

Below are two example locations where we recommend the removal of on-street parking from within intersections. The reasons for removing the parking include:

- Increased safety
- Reduced conflict points between vehicles

John Street and Erie Street

Area of parking to be removed

Russell Street and Erie Street

OUTLYING AREAS

Bevel Line at Seacliff Drive

Issue: Vehicles travelling Westbound on Seacliff Drive and Northbound on Bevel Line are required to stop. Vehicles travelling Eastbound on Seacliff Drive have no intersection control. Traffic operations are further complicated by the large unpainted paved area in the intersection that allows eastbound vehicles to turn onto Bevel Line with significant speed.

Recommendation: Remove stop sign for vehicles traveling Westbound on Seacliff Drive. Re-define intersection by removing excess pavement, curbing and painted travel lanes to slow drivers making a right turn from Seacliff Drive.

Mersea Road 19 and Deer Run Road

Issue: Traffic operations at the Mersea Road 19 and Deer Run Road intersection are problematic because of the awkward intersection angles at the west and north corners. The intersection layout also creates poor sight lines for vehicles accessing Deer Run Road from Mersea Road 19.

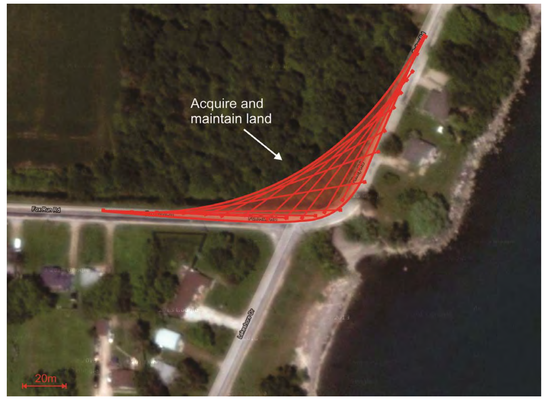
Recommendation: Designate the stretch of Fox Run Road that connects to Deer Run Road and Mersea Road 19 as one-way eastbound only.

Deer Run Road and Mersea Road 21

Issue: Both sections of Mersea Road 21 at Deer Run Road have shallow intersection angles that create sight line issues for vehicles turning from either the north or south.

Recommendation: Acquire land and maintain to improve sight lines.

Fox Run Road and Lakeshore Drive



Issue: This intersection was studied in the 2007 report where guide rails on both sides of the bridge, a “Hidden Intersection” sign and an improved alignment. Since 2007, curve signs, advisory speed limits and chevrons have been installed.

Recommendation: Acquire and maintain land to improve sight lines. Install “Hidden Intersection” sign on southbound approach. Install guard rails along both sides of the bridge.

Mersea Road 12 at Point Pelee Drive

Issue: Mersa Road 12 meets Point Pelee Drive at a shallow angle that creates sight line problems at the intersection. Traffic operations are further complicated by the large unpainted paved area in the intersection that does not guide drivers on a defined travel path, which can lead to diver confusion.

Recommendation: Re-define intersection by removing excess pavement, curbing and painted travel lanes to guide drivers.

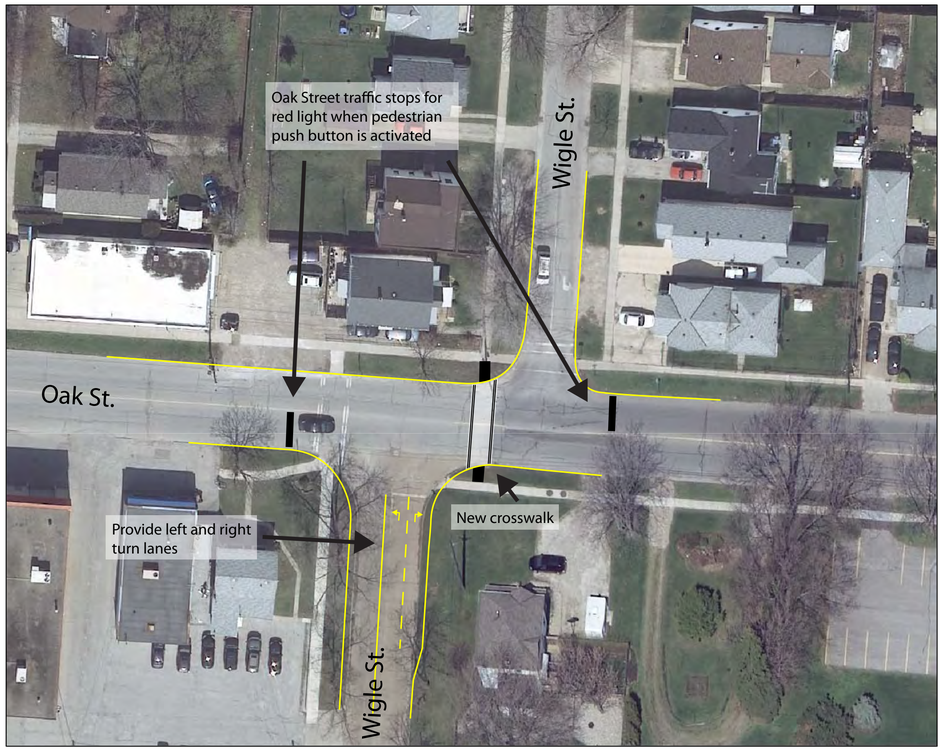
SOLUTIONS IN TOWN

Functional Redesign of the Erie Street Turnaround at the Leamington Dock

Issue: How can the access to the Leamington dock be enhanced for pedestrian and vehicular traffic?

Recommendation: Construct improvements shown on map

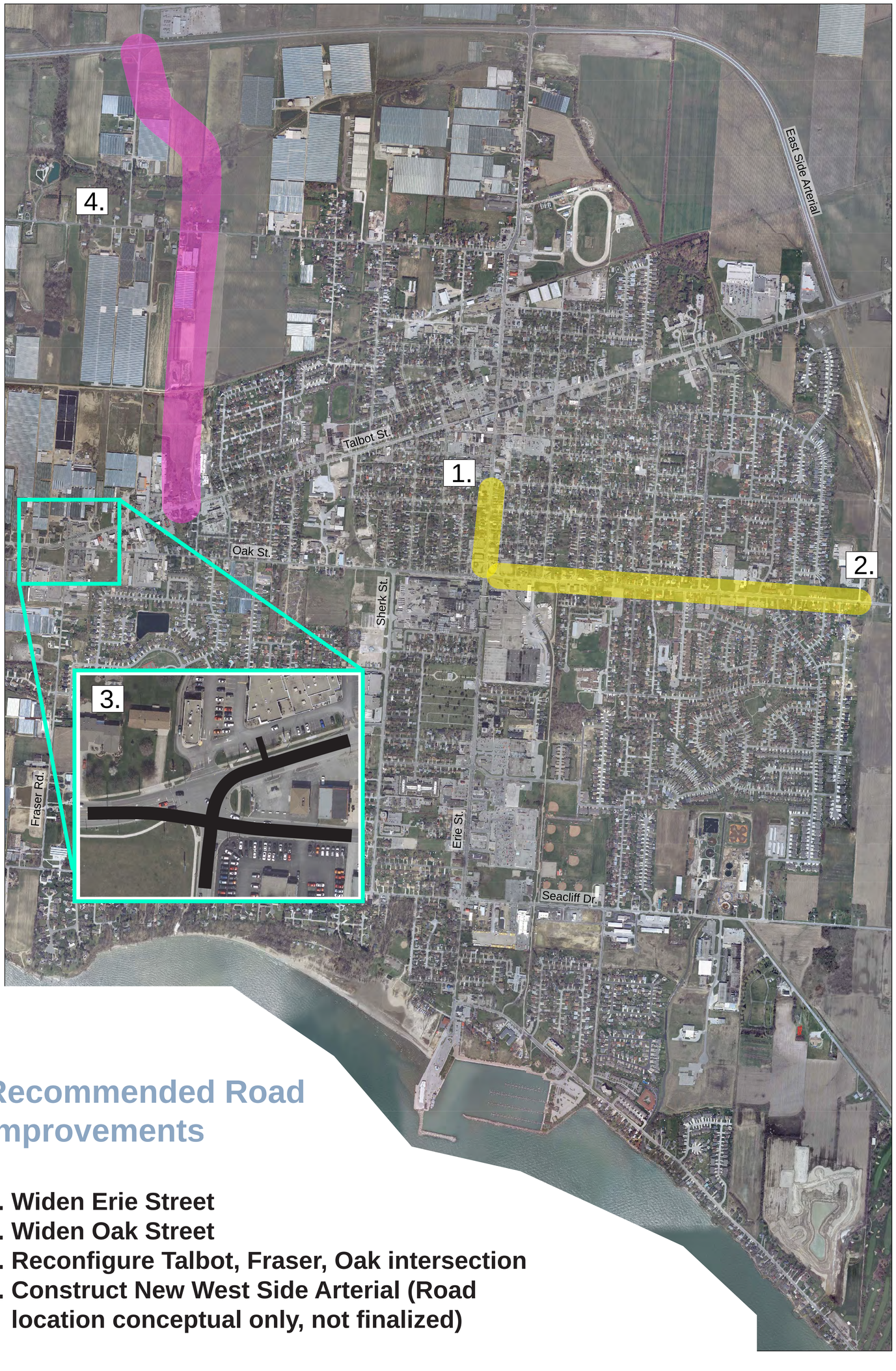
Pedestrian Half Signal for Oak Street at Wigle Street Intersection



Issue: How can pedestrian safety and vehicle traffic operations be optimized at the intersection of Oak Street and Wigle Street

Recommendation: Install pedestrian signal on Oak Street and provide new pedestrian crosswalk

DRAFT RECOMMENDED ROAD IMPROVEMENTS (2031)



Recommended Road Improvements

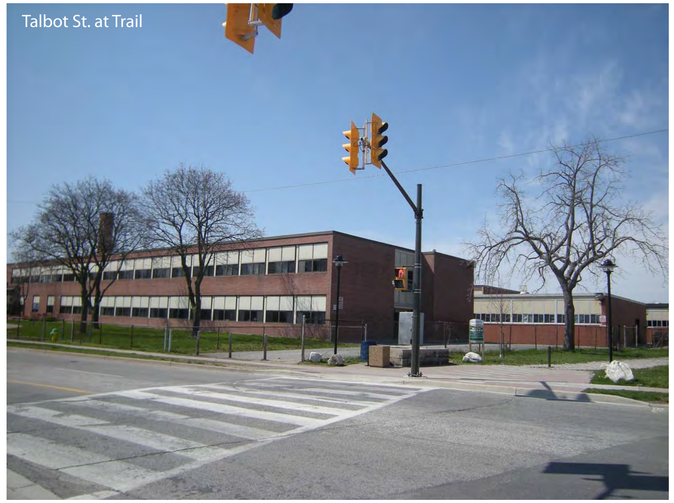
1. Widen Erie Street
2. Widen Oak Street
3. Reconfigure Talbot, Fraser, Oak intersection
4. Construct New West Side Arterial (Road location conceptual only, not finalized)

PEDESTRIAN CROSSINGS

Signalized

Recommendations:

1. Maintain signalized pedestrian crossings in short term
2. Conduct more detailed study to verify signals are warranted



Unsignalized Courtesy Crossings

Recommendations:

1. Remove pavement markings at Courtesy Crossings
2. Ensure signage is consistent for pedestrians and drivers
3. Post speed limit signs in vicinity of crossings
4. Conduct further study to verify most appropriate crossing controls

THANK YOU FOR PARTICIPATING!

MMM GROUP

For more information, please contact **John Pilmer**
phone: **(519) 326-5761** email: **engineering@leamington.ca**