



**The
The Corporation of the
Town of Tecumseh**

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: October 10, 2023

Report Number: PWES-2023-70

Subject: Lesperance Road (County Road 22 to Westlake Drive)
Traffic Operations Review

Recommendations

It is recommended:

That Report PWES-2023-70 entitled “Lesperance Road (County Road 22 to Westlake Drive) Traffic Operations Review” **be received.**

Background

Town Administration and Council have received multiple complaints regarding the traffic operation of the Lesperance Road / County Road 22 (CR22) intersection, i.e., lengthy queue lengths and delays, especially for northbound traffic flow on Lesperance Road. To determine whether improvements to the geometric design and/or traffic control operations of the intersection would alleviate queue lengths and traffic delays for motorists using the intersection, a traffic analysis would be required.

Future County Road 19 and County Road 22 Improvements

An Environmental Study Report (ESR) and Preliminary Design Report (PDR) was completed in November 2009 to detail the proposed improvements for the County Road 19 (Manning Road) and County Road 22 corridors. The ESR identified various

alternatives to improve the intersection of CR22 at Lesperance Road. The recommended alternative was a partial interchange that permits westbound traffic from Lesperance Road onto CR22 and allows eastbound traffic from CR22 to exit onto Sylvestre Drive that will eventually be extended westerly through Westlake Drive to Lesperance Road.

Although the timing of these improvements is not yet known, Administration recognized that an operational review of the existing traffic on Lesperance Road between CR22 and Westlake Drive would identify any deficiencies and provide recommendations for interim improvements in advance of the grade separated partial interchange as detailed within the ESR.

Comments

An operational review and traffic analysis was completed by R.C. Spencer Associates Inc. (R.C. Spencer) on Lesperance Road from CR22 to Westlake Drive to evaluate existing conditions and identify if improvements from a geometric and/or traffic control perspective are needed. As part of the review, it would be determined whether improvements to the intersections, such as stop controls at Lesperance Road and Westlake Drive and dedicated turn lanes at Lesperance Road and CR22, are warranted at this time based on existing traffic conditions.

On August 22, 2023, R.C. Spencer submitted their final report titled “Lesperance Road (CR22 to Westlake Drive), Tecumseh, ON Intersections Review” to the Town outlining the results of their traffic operations assessment (see Attachment 1). Future development within adjacent lands was not considered as part of this study, however, associated traffic impact studies from future developments (as applications are submitted to the Town) should have consideration for this review.

1. Lesperance Road at County Road 22

The current lane configuration and roadway conditions of the Lesperance Road at CR22 intersection can be summarized as follows:

- Four-legged, fully signalized intersection
 - Eastbound/Westbound: Left turn lane, right turn lane with 30m long raised median separating opposing movements, and two through lanes
 - Northbound: Left turn lane and a shared through / right turn lane
 - Southbound: Left turn lane, through lane, and a right turn lane.



Figure 1: Aerial View Existing Conditions at Lesperance Road and County Road 22 Intersection

As shown in Figure 1, the intersection retains a marked crosswalk to connect the sidewalk provided along the east side Lesperance Road. There are no visibility concerns. Land uses surrounding the intersection include residential on the northeast corner, commercial on the southeast and southwest corners, with St. Anne's Cemetery located on the northwest corner. Parking is not permitted on either road approaching this intersection.

2. Lesperance Road at Westlake Drive

Similarly, the existing lane configuration and traffic control operations of this intersection can be seen in Figure 2 below and are summarized as follows:

- Four-legged, two-way stop-controlled (eastbound and westbound) intersection
 - Eastbound and westbound: Two-way, single lane
 - Northbound: Dedicated left turn lane and shared through / right turn lane
 - Southbound: Two-way left turn lane and shared through / right turn lane



Figure 2: Aerial View of Existing Conditions at Lesperance Road and Westlake Drive Intersection

The intersection does not contain any marked crosswalks, although a sidewalk is provided on the north side of Westlake Drive west of Lesperance Road and on the south side of Westlake Drive east of Lesperance Road. Parking is only permitted on the north side of Westlake Drive east of Lesperance Road. The intersection provides for good visibility. Land uses surrounding the intersection are primarily commercial to the north and residential to the south.

Traffic Analysis

The operating performance of each intersection was analyzed based on existing traffic volumes. R.C. Spencer manually collected movement counts from each intersection in June 2023. Data was compiled to summarize the weekday AM and PM peak hour volumes, as shown in the figure below:

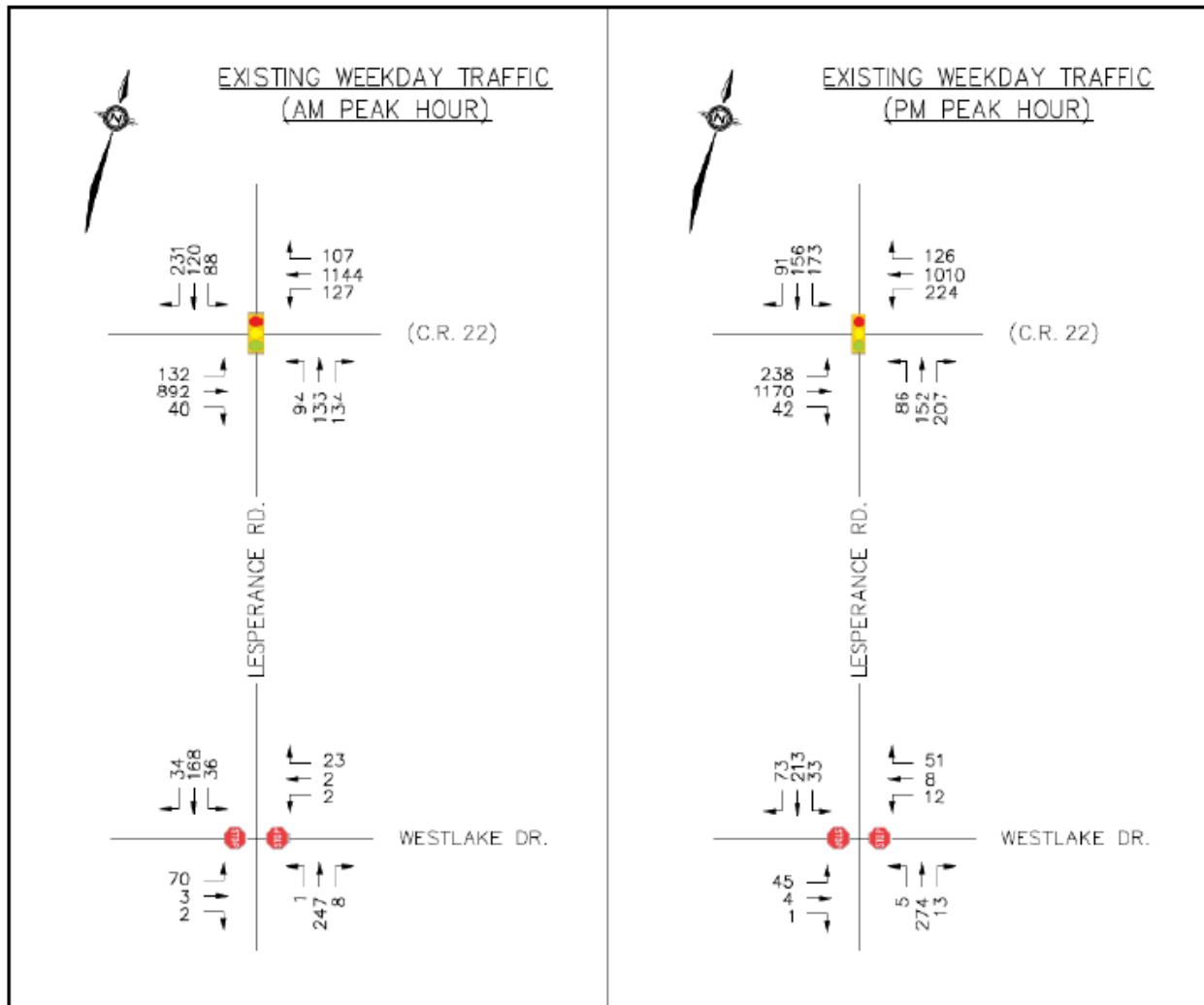


Figure 3: Existing Weekday Traffic Movement Counts (AM / PM Peak Hour)

The movement data collected from each intersection was input to a traffic operations analysis software, known as Synchro 11. This allowed for the generation of various parameters relating to the intersections' performance, including Level of Service (LOS), volume to capacity ratio (v/c), intersection capacity utilization (ICU), control delay, and estimated queue lengths, under the existing traffic control and intersection geometry. The detailed results of this Synchro analysis are provided in Appendix B of Attachment 1.

LOS is a qualitative measure used to relay the quality of motor vehicle traffic service. Industry standards are provided for signalized and unsignalized controlled intersection, which are primarily based on the average control delay experienced measured in seconds per vehicle (sec/veh). The highest possible rating is LOS 'A'. LOS 'A' to 'D' represents the acceptable operating conditions, while LOS 'E' reflects congested conditions and LOS 'F' reflects failure (i.e. long delays).

The tables illustrated below present the corresponding LOS by approach for each intersection, based on the data collection results on traffic movement.

Table 1: LOS Results for Lesperance Road at County Road 22 Intersection

Scenario	Lesperance Road at County Road 22							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing Traffic	D	E	D	B	F	E	D	C

The Synchro 11 analysis confirmed that the Lesperance Road at County Road 22 intersection is currently operating below critical level of service thresholds. Specifically, eastbound and westbound queues experience the most delay, and northbound is consistently at a lower level of service during the AM and PM peak hours.

During completion of the peak hour turning movement counts, it was observed that the northbound through / right turn lane occasionally extends past the intersection of Lesperance Road at Westlake Drive. This was confirmed through the results of the Synchro 11 analysis, which captured a 95th percentile queue length effectively equal to the distance between the intersections.

Table 2: LOS Results for Lesperance Road at Westlake Drive Intersection

Scenario	Westlake Drive at Lesperance Road							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing Traffic	C	B	A	A	C	B	A	A

The intersection of Westlake Drive at Lesperance Road currently operates above or at critical level of service thresholds, with eastbound traffic (through the intersection) experiencing the most delay between all approaches in both the AM and PM peak hours. There were no major delays experienced for commuters travelling through this intersection.

Potential Improvements – Town of Tecumseh

With the current operating conditions of each intersection understood, potential geometric and/or traffic control improvements can be developed and provided respectively. Guidance from the Ontario Ministry of Transportation (MTO) and Transportation Association of Canada (TAC) were referenced to determine the feasibility and extent of the improvements.

1. Lesperance Road at County Road 22

A dedicated right turn lane for motorists operating on the south end of the intersection, moving northbound is strongly recommended for improvement to the LOS of eastbound and westbound lanes. A primary consideration for this

improvement is to determine if sufficient storage length can be provided between intersections. The required storage length was determined by checking the traffic movement counts and peak hour cycle length against related guidance provided by the MTO and TAC.

The table below summarizes the required storage length for a northbound dedicated right turn lane approach.

Table 3: Northbound Right Turn Lane Storage Requirements

Peak Hour	Move ment	Volume	Cycle Length	Design Speed	% Trucks	Trucks	pcph (Veh. Eq.)	Required Storage Length
-	-	(veh/hr)	(sec)	(km/h)	(%)	(veh)	(pcph)	(m)
AM	NBR	134	120.8	60	0.7	1	135	51
PM	NBR	207	120.8	60	1	2	209	79

MTO provides a 200 vehicle / peak hour threshold for the implementation of a dedicated right turn lane. The movement count completed for this intersection in the PM peak hour observed 207 vehicles / hour, which exceeds the threshold. A corresponding 79 metre storage length would be required to accommodate the current capacity of vehicles under a 60km/h design speed, which was assumed for Lesperance Road.

Northbound through traffic volume was reviewed to ensure access to the dedicated right turn lane could be maintained during peak hours. Sufficient storage length of the through lane would need to be provided to avoid any additional queue length resulting from through traffic not being able to complete their movement. Similarly, the traffic movement count data and peak hour cycle length measured was checked against MTO and TAC guidance.

The following table summarizes the results of required storage length for a through lane approach.

Table 4: Northbound Through Lane Storage Requirements

Peak Hour	Move ment	Volume	Cycle Length	% Trucks	pcph	# Lanes	m Value	# Vehicles	Req. Storage Length
-	-	(veh/hr)	(sec)	(%)	(pcph)	(lanes)	(pcpC)	(veh)	(m)
AM	NBT	133	120.8	2.3	136	1	4.6	8	60
PM	NBT	152	120.8	0	152	1	5.1	9	68

The right turn lane design was completed in accordance with MTO guidelines, which provides taper and parallel lane lengths based on design speed. The result was checked against expected queue length based on the traffic movement count data to ensure the design would be sufficient to service peak hour demands. Ultimately, it was determined that a dedicated right turn lane would be appropriate across the

entire block length of Lesperance Road between County Road 22 and Westlake Drive. Functional design alternatives and their respective plans are appended in the report (Appendix C of Attachment 1).

Due to the existing right-of-way constraints, the sidewalk currently located on the east side of Lesperance Road (between CR22 and Westlake Drive) cannot be re-integrated into the proposed functional design alternatives without the acquisition of adjacent lands, and relocation of significant hydro and utility infrastructure (at an exorbitant cost).

The collected turning movement counts captured a total of seven pedestrians using the sidewalk over the peak eight-hour period, which was considered as low-use. Due to the low sidewalk usage, along with the planned construction of a multi-use trail on the west side of Lesperance Road in the Summer 2024, it was R.C. Spencer's opinion that the Town could forego the re-implementation of the easterly Lesperance Road sidewalk.

2. Lesperance Road at Westlake Drive

Book 5 of the Ontario Traffic Manual (OTM) was utilized to determine if this intersection requires all-way stop control. Lesperance Road operates as an Urban Arterial Road, which holds a particular conditional approach for warranting traffic control implementation. Three conditions are identified as thresholds for implementing an all-way stop control, which are as follows:

1. Total vehicle volume on all intersection approaches exceeds 500 vehicles per hour for each of the highest eight hours of the day.
2. Combined vehicle and pedestrian volume on the minor street exceeds 200 units per hour (all vehicles plus pedestrians wishing to enter the intersection) for each of the same eight hours as the total volume with average delay to all minor street traffic (vehicles and pedestrians) of greater than 30 seconds for the entire eight hour period.
3. Volume split does not exceed 70/30 (that is the minor street must not be less than 30% of the total volume entering the intersection) as measured over the entire eight-hour count period. Volume on the major street is defined as vehicles only. Volume on the minor street includes all vehicles plus any pedestrians wishing to cross the major roadway.

The traffic data counts obtained in June 2023 were reviewed against the prescribed conditions in OTM Book 5. It was confirmed that none of the criteria was met and therefore, an all-way stop control would not be an appropriate traffic measure at this intersection. R.C. Spencer advised that significant growth in the traffic volume at the intersection would be required to warrant implementation of an all-way stop control.

Review of Proposed Geometric Improvements

After review of the existing traffic conditions, it was determined that there is an inadequate level of service provided for motorists looking to move eastbound on the Lesperance Road and County Road 22 intersection, operating northerly. This was due to the through / right lane operating over capacity, causing excessive delays and queue lengths. Current traffic conditions do not provide warrant for traffic control improvements to Lesperance Road at Westlake Drive. Future development within adjacent lands and associated impacts to traffic volume received should be reviewed in conjunction with the information presented in the study.

The improvement involved the addition of a dedicated right turn lane to separate the through and right turn movements of motorists travelling northerly on the south end of the Lesperance Road and County Road 22 intersection. Three different configurations of the dedicated right turn lane were presented and can be understood as follows:

1. Non-channelized northbound right turn lane with permitted right turns on red.
2. Channelized northbound right turn lane (yield).
3. Channelized northbound right turn lane (yield) with acceleration lane.

To quantify the level of improvement provided by each option against existing conditions, existing traffic volumes were inputted in Synchro 11 under each improved scenario. Detailed results of the proposed geometric improvements are presented in Appendix D of Attachment 1.

The results of the analysis demonstrated a significant improvement to the overall traffic operations of the intersection by effectively reducing the 95th percentile queue length of northbound motorists to 53.9 metres, as opposed to 125.8 metres under existing conditions, in the PM peak hour. This was observed through improved LOS provided on all approaches (AM and PM peak hours) apart from a slight decrease in AM peak hour for southbound motorists.

R.C. Spencer determined that there was minimal benefit to utilizing a channelized right turn lane, considering the lack of overall improvement from a non-channelized approach. **Ultimately, the northbound stop control condition with permitted right turns on red would sufficiently manage the peak hour demands of northbound traffic and is the recommended right-turn lane alternative.**

Summary and Conclusions

This traffic operations review was completed exclusive from any specific land use development proposals but should be utilized when assessing the traffic impacts of the same. This study strictly examined the existing traffic conditions and operations of

Lesperance Road and its intersections with County Road 22 and Westlake Drive. Data collection was completed during weekday peak hours and input to software to generate a detailed traffic operations analysis. The following conclusions were made upon completion of the analysis:

- Northbound through / right turn queue of motorists using Lesperance Road at County Road 22 occasionally extends past the intersection of Lesperance Road at Westlake Drive.
- Existing traffic volumes at the intersection of Lesperance Road and Westlake Drive do not warrant implementation of an all-way stop control in replacement of the current eastbound / westbound two-way stop control.
- The current northbound peak hour traffic volume of the Lesperance Road at County Road 22 intersection provides warrant for installing a dedicated right turn lane and is therefore recommended.
- The existing distance between the intersections of Lesperance Road at County Road 22 and Lesperance Road at Westlake Drive should be utilized entirely to establish a dedicated right turn lane and efficiently service the northbound peak hour traffic demand.
- A dedicated northbound right turn lane effectively reduces the queue length of northbound traffic.
- The installation of a dedicated right turn lane will require removal of the existing sidewalk located on the east side of Lesperance Road, between Westlake Drive and County Road 22. Re-implementation of a 1.5 metre sidewalk outside of the existing utility pole corridor would require significant efforts and costs (i.e., land acquisition, private land removals, and public utility relocations).
- The new multi-use pathway along the west side of Lesperance Road, which includes the limits between Westlake Drive and County Road 22, when constructed (scheduled for Summer 2024) can be considered as an acceptable substitute for the loss of sidewalk on the east side. A Level 2, Type B pedestrian cross over can be considered to accommodate the proposed removal of sidewalk on the east side of Lesperance, north of Westlake Drive.

Next Steps

This traffic operations review forms the basis for which improvements to the intersections of Lesperance Road at County Road 22 and Westlake Drive can be considered. It also serves as the benchmark against associated traffic impacts resulting from adjacent future development, including study areas within the Tecumseh Hamlet

and Manning Road Secondary Planning Areas. Additional traffic analysis will be required as part of resulting future applications for a Plan of Subdivision(s).

Administration will include these recommended works as part of a future PWES Capital Works Plan.

Consultations

Development Services
Financial Services
County of Essex
R.C. Spencer & Associates

Financial Implications

The improvements recommended as part of this traffic operations review are estimated to cost approximately \$400,000 in total. This is comprised of geometric enhancements and traffic control works required to implement a dedicated northbound right turn lane at the intersection of Lesperance Road and County Road 22, with associated engineering design (i.e., lighting, wiring, line painting, signage, etc.), contract administration, and contingencies.

Link to Strategic Priorities

Applicable	2023-2026 Strategic Priorities
<input checked="" type="checkbox"/>	Sustainable Growth: Achieve prosperity and a livable community through sustainable growth.
<input type="checkbox"/>	Community Health and Inclusion: Integrate community health and inclusion into our places and spaces and everything we do.
<input checked="" type="checkbox"/>	Service Experience: Enhance the experience of Team Tecumseh and our citizens through responsive and respectful service.

Communications

Not applicable

Website

Social Media

News Release

Local Newspaper

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

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Chief Administrative Officer

Attachment Number	Attachment Name
1	Lesperance Road (CR22 to Westlake Drive) Intersections Review, Tecumseh, ON, August 2023