APPENDIX

7 Noise Impact Assessment

If technical reports are required in an alternative format for accessibility needs, please contact:

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Noise Impact Assessment

Thirty Road & Young Street Class EA

Re-Alignment and Intersection Improvements

Township of West Lincoln
Niagara Region

February 28, 2024
Project: 122-0250

Prepared for

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VALCOUSTICS
Canada Ltd.

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Version #	Date	Comments
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1.0 INTRODUCTION

Niagara Region plans to make transportation/safety improvements to the intersection of Thirty Road (Niagara Regional Road 14) and Young Street in the Township of West Lincoln. The improvements do not include widening of either Thirty Road or Young Street but are strictly re-alignment and intersection improvements to address traffic safety concerns.

This report summarizes the noise impact from road traffic that the existing residences will receive as a result of the proposed improvements. In addition, the need for noise mitigation is also evaluated. The assessment has been completed using the requirements of the Ministry of Transportation (MTO)/Ministry of the Environment, Conservation and Parks (MECP) protocol, the MTO Environmental Guide for Noise and those of Niagara Region.

2.0 ENVIRONMENTAL NOISE GUIDELINES

This section discusses the guidelines and criteria to be used in the noise impact assessment.

2.1 MECP/MTO PROTOCOL

The MECP does not have noise guidelines specifically relating to the retrofit of noise barrier walls along existing roadways. However, the MECP previously had a protocol with the MTO relating to Provincial Highway Projects (i.e. expansion of existing highways or construction of new highways). The MTO developed Quality & Standards Directive A-1 based on the requirements outlined in the above protocol. Directive A-1 stated that the primary objective is to achieve sound levels not exceeding 55 dBA or the preconstruction ambient sound level, whichever is higher, at outdoor receptor locations.

MTO has replaced the Quality and Standards Directive A-1 with the Environmental Guide for Noise. This guide indicates that noise mitigation needs to be considered where the sound level in the rear yard amenity area exceeds 65 dBA or the sound level change due to the proposed highway improvements is greater than 5 dBA. No mitigation is required where the sound level is 65 dBA or less and the sound level increase is 5 dBA or less. To be implemented, a sound barrier must be shown to provide at least 5 dBA of sound attenuation.

Based on the Environmental Guide for Noise, where an existing roadway is proposed to be modified/widened adjacent to a Noise Sensitive Area (NSA), the future noise levels without the proposed improvements are to be compared to the future noise levels with the proposed improvements. A private home is an example of a NSA. The assessment is done at the outdoor amenity area ("Outdoor Living Area" – OLA) (typically backyard) of each NSA. The provision of noise mitigation is to be investigated should the future noise level with the proposed improvements exceed 65 dBA or result in a greater than 5 dBA increase over the future noise level without the proposed improvements. If noise mitigation is provided, the objective is a minimum 5 dBA reduction. Mitigation will attempt to achieve sound levels as close to, or lower than, the 55 dBA objective level as is technically, economically and administratively feasible.

2.2 NIAGARA REGION

The Niagara Region Public Works Department Policy Manual includes a Noise Control Policy (ref.6). The sound level objective in an outdoor living area is 55 dBA, consistent with the MTO/MECP Protocol.

For new Regional Roads and for the widening of existing Regional Roads, the objective sound level in outdoor living areas is 55 dBA. For those instances where the existing road traffic noise level is higher than 55 dBA, the existing traffic noise level is the objective. No noise mitigation measures are required if the predicted Regional Road traffic noise exceeds the objective by 5 dBA or less. Mitigation is required if the predicted sound level exceeds the objective by more than 5 dBA.

3.0 NOISE SENSITIVE AREAS

Land uses designated as noise sensitive by the MECP/MTO consist of residential developments, hospitals, nursing/retirement homes, etc. Figure 3 identifies the receptor locations which were analyzed in detail. These residential dwellings are representative of the noise sensitive areas within the study area, in accordance with Section 6.3 of the MTO Noise Guide.

Receptor locations were identified on drawings provided by R.V. Anderson Associates Limited (RVA). The receptor locations were confirmed during a site visit to the study area.

4.0 NOISE IMPACT ASSESSMENT

4.1 TRAFFIC DATA

Existing and future traffic information for Thirty Road, Young Street and Clayson Road was obtained from the Detailed Transportation Assessment, dated May 30, 2023, prepared by RVA. AM and PM peak traffic volumes are presented in the RVA report. The 24-hour volumes were calculated by adding the AM and PM peak volumes and multiplying by 5. This assumes that approximately 10% of the total traffic volume occurs during the peak hour.

Information regarding the existing percentages of trucks for the AM and PM peaks is also in the RVA report. The average of the AM and PM peak truck percentage was used to complete the noise impact assessment. It was assumed that the percentage of trucks is evenly split between medium and heavy trucks. The existing truck percentages were applied to the future years.

The road traffic data is summarized in Table 1. Road traffic data from the RVA report is included as Appendix A.

4.2 PROCEDURE

Daytime sound levels were calculated using STAMSON V5.04-ORNAMENT, the computerized road traffic noise prediction model of the MECP. This is an accepted approach by the MTO, as outlined in their Environmental Guide for Noise.

Based on the traffic data, daytime sound levels were calculated at each receptor location. The receptor location was selected in the rear yard amenity area in accordance with the guideline requirements. The actual receptor location used in the analysis is as described in MECP Publication NPC-300, "Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning". The point of assessment is:

- 3 m from the rear facade of the dwelling;
- 1.5 m above grade; and
- aligned with the midpoint of the rear facade.

The rear yards are partially or fully screened from the road traffic on some of the roadways. The acoustical screening provided by the dwelling itself was included in our assessment. However, acoustical screening provided by other intervening buildings, such as a garage or a shed, was not included.

4.3 RESULTS

Table 2 shows, for each receptor, the existing (2022) and the future (2041) daytime sound levels. The existing daytime sound levels are at or below 55 dBA at all receptor locations. Due to increases in traffic volumes, the future (2041) daytime sound levels are 2 to 3 dBA higher than the existing daytime sound levels.

The impact of the proposed intersection improvements is very minor (i.e. a fraction of a dB) at each receptor. Since there are no significant volume changes as a result of the proposed intersection improvements, there are no predicted noise impacts at the receptors located outside of the study area.

Since the predicated noise impact due to the proposed improvements is less than 5 dBA and the future daytime sound levels are less than 60 dBA at all receptors, noise mitigation is not required in accordance with the Niagara Region and MTO requirements.

5.0 CONCLUSION

Future daytime sound levels at the existing dwellings in the vicinity of the Thirty Road and Young Street intersection are below 60 dBA. In addition, the predicted noise impacts due to the proposed intersection improvements are very minor. Thus, noise mitigation is not needed to reduce the daytime sound level in accordance with the policies of the MTO and Niagara Region.

6.0 REFERENCES

1. "MTO/MOE Protocol Dealing in Noise Concerns of New Highway Projects", Ontario Ministry of Transportation/Ontario Ministry of the Environment, 1986.

2. "Directive QST A-1 (Noise Policy and Acoustic Standards for Provincial Highways)", Ontario Ministry of Transportation, 1992.

3. "Environmental Guide for Noise", Ontario Ministry of Transportation, February 2022.

4. PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.

5. "Environmental Office Manual – Technical Areas – Noise", Ontario Ministry of Transportation, 1992.

6. "Regional Road Traffic Noise Control", Niagara Region Public Works Department Policy Manual Policy No: PW5.N01.0, November 1, 2006.

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TABLE 1 ROAD TRAFFIC VOLUME DATA

Road	Road Section	Existing 24 Hour Volume[1]	Future 24 Hour Volume[1]	% Trucks		Day/Night Split[3]	Posted Speed Limit (kph)
				Heavy[2]	Medium[2]		
Thirty Road	North of Clayson	3965	8275/8325	3.3	3.3	90/10	60
	Between Clayson & Young	3255	7135/8325	3.3	3.3	90/10	60
	South of Young	4320	8835/8825	3.3	3.3	90/10	60
Young Street	West of Thirty	3105	3290/3315	2.7	2.7	90/10	80
	Between Thirty and Clayson	665	1090/2255	3.4	3.4	90/10	80
	East of Clayson	1355	2210/2255	3.4	3.4	90/10	80
Clayson Road	Between Thirty and Young	710	1150/50	3.3[4]	3.3[4]	90/10	60[5]

Notes:

(1) Calculated from AM and PM Peak hour volumes provided by RVA. Existing volumes apply to 2022. Future volumes apply to 2041. Future volumes are without/with proposed intersection improvements.

(2) Existing truck percentages calculated from AM and PM Peak hour volumes and were applied to future volume. Total truck percentage was split evenly between heavy and medium trucks.

(3) Day is the percentage of road traffic that occurs between 0700 and 2300 hours. Night is the percentage of road traffic that occurs between 2300 and 0700 hours. The split was assumed based on typical traffic distribution patterns.

(4) Truck percentages for Clayson Road are assumed.

(5) Speed limit for Clayson Road is assumed since it is not posted.

TABLE 2 NOISE ASSESSMENT RESULTS(1)

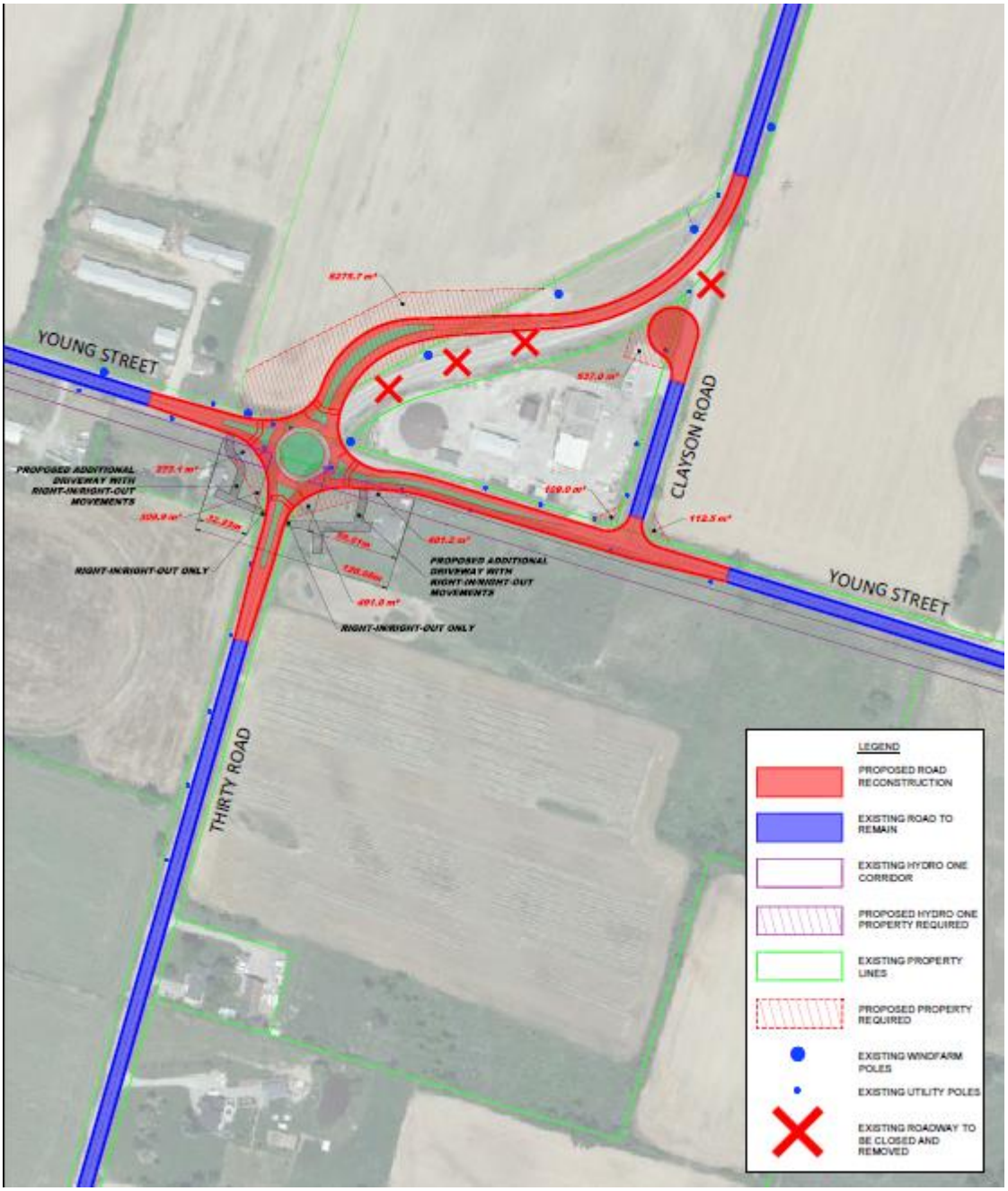
Location	Existing (2022) L_{eqDay} (dBA)	Future (2041) $L_{eq\ Day}$ (dBA)		
		Without Proposed Improvements	With Proposed Improvements	Noise Impact Due to Proposed Improvements(2)
R1	53	56	56	0
R2	55	57	57	0
R3	55	58	58	0
R4	50	53	53	0

Notes:

(1) Predicted sound levels in the outdoor amenity area for each receptor.

(2) Sound level difference between the future with and without proposed improvements scenarios.

VALCOUSTICS Canada Ltd.	Title Study Area	Date Feb. 28, 2024	Figure 1
	Project Name Thirty Road and Young Street Class EA	Project No. 122-0250	



VALCOUSTICS Canada Ltd.	Title Proposed Roadway Improvements	Date Feb. 28, 2024	Figure **2**
	Project Name Thirty Road and Young Street Class EA	Project No. 122-0250	

VALCOUSTICS Canada Ltd.	Title Receptor Locations	Date Feb. 28, 2024	Figure 3
	Project Name Thirty Road and Young Street Class EA	Project No. 122-0250	

APPENDIX A
ROAD TRAFFIC DATA

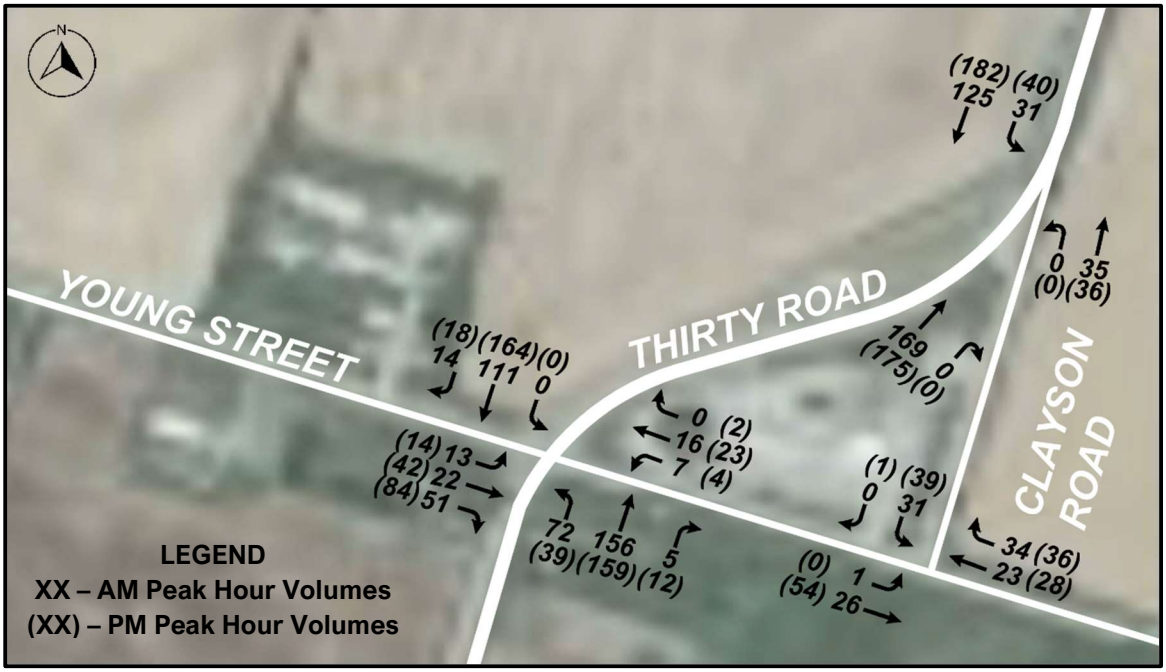


Figure 2.3 – Existing (2022) Traffic Volumes

2.4 Collision History (2017-2022)

The collision history at all three (3) study area intersections were reviewed as part of this study, inclusive of all collisions within a 5-year period of study commencement (Summer 2022). The earliest date recorded in this analysis occurred on August 3rd, 2017, and the most recent occurrence took place on June 29th, 2022. The collision data collected is presented in Appendix 2.

For Clayson Road & Young Street, a total of two (2) collisions took place in 2017, with one (1) involving a vehicle reversing into a stopped car, and the other involving a vehicle running off the road due to ice; neither collision resulted in a personal injury. Similarly, for Clayson Road and Thirty Road, one (1) collision took place in the 2017-2022 timeframe, with that collision involving a vehicle running off the road due to snow, with no personal injuries sustained as a result.

For Thirty Road & Young Street however, a total of 14 collisions took place in the 5-year period; the collision history is summarized in Table 2.1.

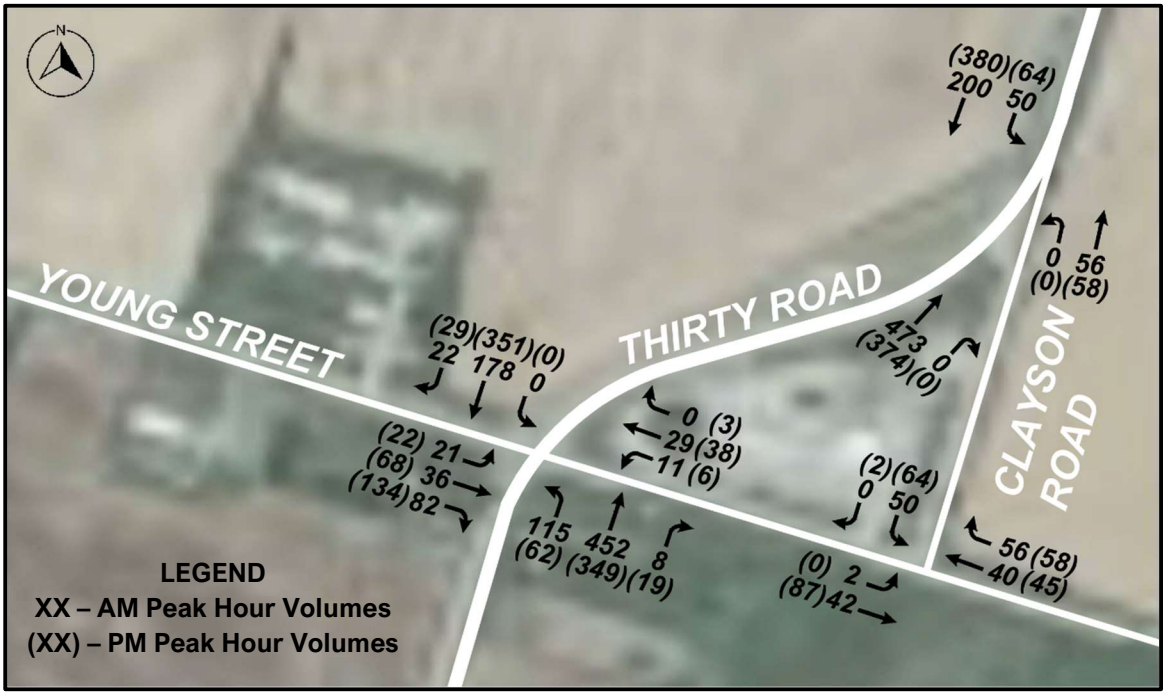


Figure 4.1 – Future (2041) Traffic Volumes – Do Nothing (Alternative #1)

It is concluded from the sensitivity analysis that the volumes shown in Figure 4.1 are more representative of the Thirty Road and Young Street intersection, especially in the event that the implementation of the new by-pass links are delayed. As a result, these volumes have been carried forward for future analysis.

The future (2041) traffic volumes in each of the proposed improvement alternatives are estimated based on the corresponding road closures in each of the proposed improvement alternatives. It should be noted that while there are significant differences in geometric characteristics for Alternatives 2, 4, and 5, the traffic distribution will be similar for each option.

The estimated future (2041) traffic volumes are discussed in the following sections.

4.1.1 Alternative 1: Do Nothing

The future (2041) traffic volumes in the Do-Nothing scenario are presented in Figure 4.1.

4.1.2 Alternatives 2, 4, and 5: Clayson Road Closure, and Extend Clayson Road south of Young Street Closure

The future (2041) traffic volumes in Alternatives #2, #4, and #5 is presented in Figure 4.2. It is important to note that Figure 4.2 reflects the Alternative #2 geometric alignment, and is

not reflective of the Alternative #4 and #5 geometric alignment. The figure should be referenced for traffic volumes only.

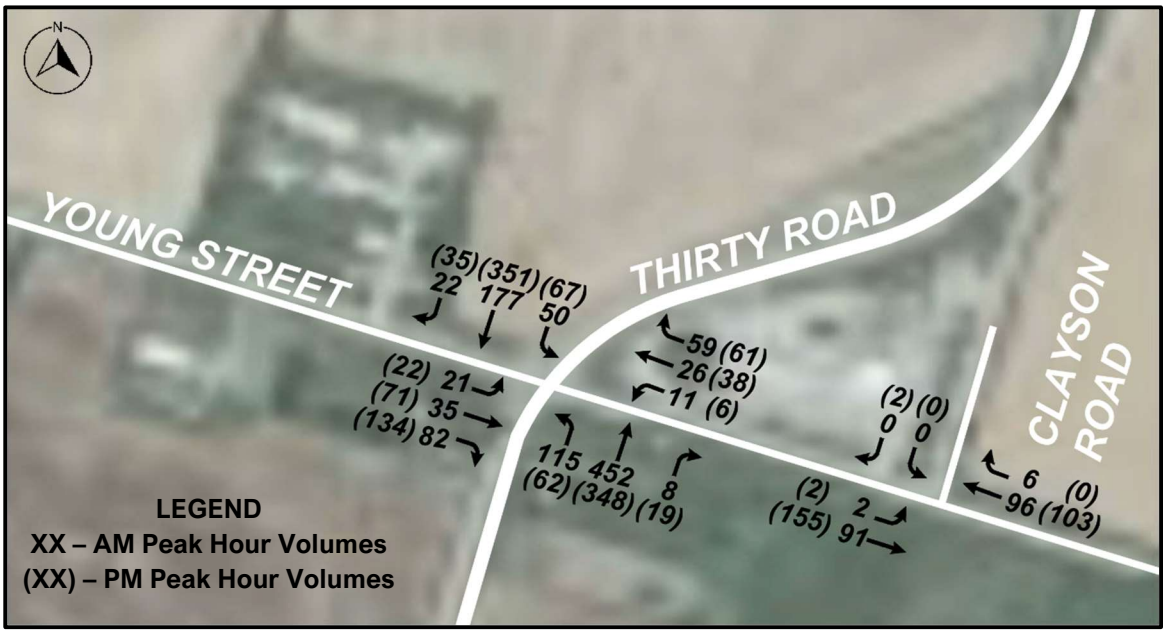


Figure 4.2 – Future (2041) Traffic Volumes – Clayson Road Closure (Alternatives #2 and 4) and Extend Clayson Road south of Young Street closure (Alternatives #5)

4.1.3 Alternatives 3: Thirty Road North Segment Closure

The future (2041) traffic volumes in Thirty Road north segment closure scenario is presented in Figure 4.3.

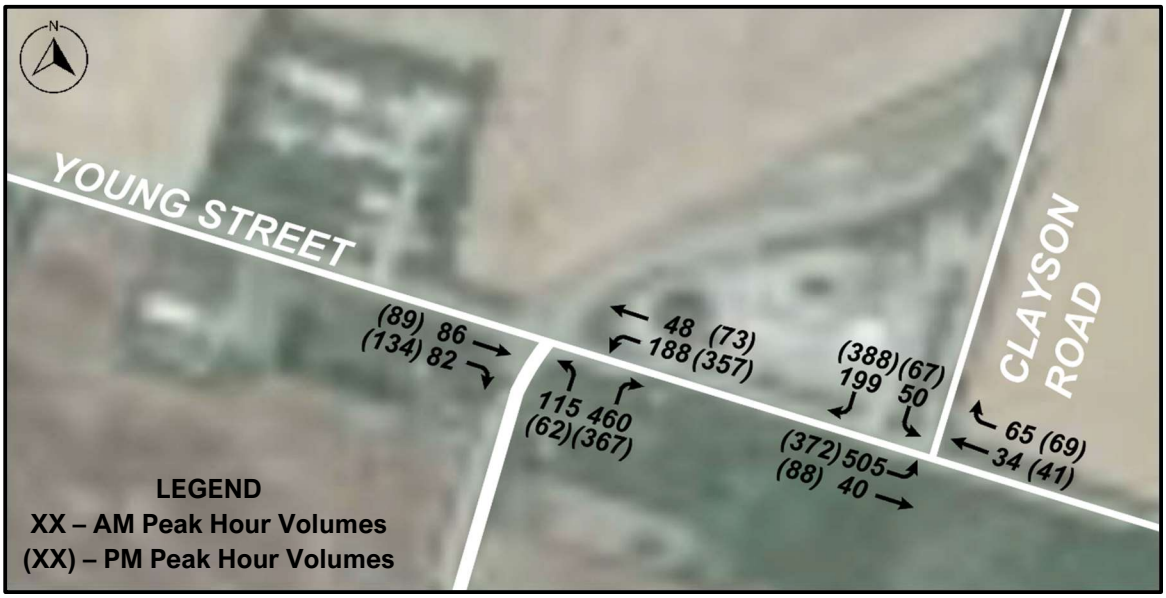


Figure 4.3 – Future (2041) Traffic Volumes – Thirty Road North Segment Closure (Alternatives #3)