February 11, 2021

David N. Germain

Thomson, Rogers
390 Bay Street, Suite 3100
Toronto, Ontario

Attention: **David N. Germain**

RE: **TRAFFIC IMPACT STUDY PEER REVIEW: NELSON AGGREGATE COMPANY QUARRY EXTENSION TRAFFIC STUDY – HALTON REGION (CIMA+ File: B001166)**

Introduction

Halton Region (the Region) retained CIMA Canada Inc. (CIMA) to undertake a Peer review of the TIS prepared by Paradigm Transportation Solutions Limited (Paradigm) titled "Nelson Aggregate Company – Burlington Quarry Extension Traffic Report" in February 2020 and Appendix A (submitted for review in December 2020). This review follows a review of the Terms of Reference prepared by Paradigm on September 2019.

The Nelson Quarry is currently located in the City of Burlington and bounded by No. 2 Side Road on the south and Guelph Line on the east. The proposed extension is expected to take place on the south side of No. 2 Side Road (18.3 hectares) and in the area immediately west of the quarry (60 hectares).

Traffic Impact Study Report Peer Review Process

CIMA conducted a peer review of the provided TIS following the approach established for the Region. To assist in our review, a checklist was completed to ensure all required elements were assessed for compliance with the Region's guidelines. The completed checklist is included in **Appendix 1**.

Following the review, a list of results was compiled. This list includes our findings of the documentation reviewed and items that we believe could benefit from additional review.

Peer Review Findings

It is our opinion that the subject TIS examined and documented most of the elements identified as part of Paradigm's Terms of Reference, as well as the standard components of a TIS (as outlined in the Region of Halton's Traffic Impact Study Guidelines). However, revisions and additional information is required before the subject TIS can be considered completed.

The elements which we believe require completion and/or clarification include:

- Revision to PM peak hour selected;

- Region to request the shipping records from Appendix A[1];
- Provide justification for volumes of expected additional truck trips and justification for the trip distributions including different origin and destination points;
- Update Table 5.1 number of working days and calculations;
- Provide clarification in two-way truck traffic from AM peak to PM peak hour;
- Reference Region's Access Management Guidelines for the design of the South Extension's Access Road;
- Separate the Traffic Operational Analysis tables into signalized and unsignalized tables;
- Provide supporting documentation regarding 15-minute interval traffic counts for study area intersections in order to verify peak hour factor;
- Provide mitigation measures for movements that are expected to operate at or above capacity during future total traffic analysis attributable to the Quarry's operations;
- Clarify volumes used for traffic signal warrant at Guelph Line & No. 2 Sideroad and update as necessary.
- Provide mitigation measures for queue lengths that are expected to exceed the provided storage length during future total traffic analysis;
- Include a Safety Analysis section in the report to discuss potential safety or operational issues; and
- Complete a Haul Route Study as identified by the Region's report LPS08-20.

Travel Demand

Figure 2.1 shows that the highest traffic volumes during the PM peak occurs between 2pm and 3pm. This is confirmed by the statement in Section 2.2.3 that says: "Shipping actively begins to taper off around 3PM". However, the TMCs provided in Appendix B for the driveway site show that the highest PM peak hour occurs between 4:30 and 5:30 pm. Please confirm and update the report as necessary to be consistent.

Recommendation

Please update Sections 2.2.1 and 2.2.3 to a consistent PM peak hour with the TMCs.

If the PM peak hour at the site is the same as the Guelph Line peak hour, no changes in the traffic analysis are necessary. However, if the PM peak hour at the site occurs between 2 and 3 PM, it is recommended to conduct an additional PM peak operational analysis.

Trip Generation

In Section 2.2.3 the report provides details of heavy vehicle generation in recent years at the existing site. It is noted that the Nelson Quarry does not own or operate any trucks for the transportation of materials from the point of origin to the quarry or to an end use location; rather, it is the customer and their contractors, that transports material. Given the report examines the customers' truck fleet, outlines are given for typical truck sizes, trailer configurations and average net load per outgoing trip.

[1] A copy of the TIS Appendix A was provided by the consultant's proponent for review on December 15, 2020.

However, to determine the estimated truck trips generated by the proposed site expansion, the proponent's consultant conducted a review of detailed shipping records from 2014 to 2018. The report indicates that records used for the review are confidential and only available upon request.

Recommendation

The details provided in Section 2.2.3 of the report are satisfactory; however, a review of the detailed shipping records would be beneficial to provide more details on truck types and material loads to verify the typical truck sizes and load volumes to be expected as part of the Quarry's operations. As such, it is recommended that the Region should request the detailed shipping records from Appendix A. [2]

Trip Distribution

Future quarry activity estimates are based on the turning movement count done in October 2019 and factored to the maximum quarry production of 2.0 million tonnes per annum. The TMC data indicates 84 AM peak hour trips with 28 (98 passenger car equivalents (PCE)) two-way additional heavy vehicle trips and 15 PM peak hour trips with 1 (4 PCE) two-way addtional heavy vehicle trip. No justification is provided for the number of estimated additional two-way trips.

Additionately, the trip distributions shown in Figures 4.2A and 4.2B require further explanation or adjustments. For example, Figures 4.2A indicates 28 additional inbound trips are making southbouth right-turns from Guelph Line but there are only 21 outbound trips making an eastbound left-turn onto Guelph Line.

Recommendation

Please provide further justification for the number of additional trips estimated in Table 4.1. Additionally, update Figure 4.2A and 4.2B to reflect outbound trips returning on the same path as the inbound trips or provide justification for the different origin/destination points. Any changes to the future operations should be reflected in the future improvement scenario.

Access Road

In Section 5.2.1 the second bullet point for site operational assumptions indicates the expected number of working days per year will be 208. However, in Table 5.1 the number of operating days used for calculating average tonnage per year is 250.

Additionally, Table 5.1 shows the number of two-way truck trips is 24 per hour (84 PCE). However, the number of PCE vehicles per hour increase form 85 PCEs in the AM peak to 90 PCEs in the PM peak without any further background.

Finally, Section 5.2.1 mentions that the South Extension Access Road will be designed to accommodate the heavy truck design vehicle (CAT 775 70-tonne rock truck) and will be stop-controlled, however no reference to the requirements of Halton Region's "Access Management Guidelines" is presented as part of the report.

[2] See comments provided under the Traffic Impact Study Report Appendix A Peer Review Process section of this document.

Recommendation

Update Table 5.1 with the proper estimate for the working days per year and update the affected calculations.

Please provide clarification for the change in two-way truck traffic crossing Number 2 Side Road from the AM peak hour to PM peak hour.

Please refer to Region's Access Management Guidelines for the South Extension's Access Road design considerations.

Future Traffic Operations

Tables 4.2 and 4.3 show future traffic operations at all study area intersections. Signalized and unsignalized intersections are together in the same table. Signalized and unsignalized intersections should not be in the same table as the level of service for a stop-controlled intersection differs from a signalized intersection.

Recommendation

Please provide separate tables for signalized and unsignalized intersections for all traffic operational analyses.

Peak Hour Factor

The intersection of No. 2 Side Road and the Quarry driveway was the sole TMC to provide a 15-minute volume breakdown. CIMA was not able to verify the peak hour factor (PHF) for the other study area intersections due to the provided TMCs not having 15-minutes volume breakdowns.

Recommendation

Please provide the full TMC for all study area intersections in Appendix B.

Mitigation Measures – Future Operational Analysis

Various movements at intersections within the study area were identified as operating at or above capacity during Total Traffic Conditions. The report does not specifically identify how critical movements operating over capacity attributable to the proposed development can be improved. For example, eastbound and northbound through movements during the AM peak hour at Guelph Line and Dundas Street, are expected to operate above capacity. The eastbound through movement is expected to be addressed by the Dundas Street road widening outlined in the Region's Transportation Master Plan (TMP). However, no specific improvements are recommended for northbound movements on Guelph Line by the report or the Region's TMP.

Recommendation

Further information is required regarding proposed improvements for alleviating movements that are expected to operate at or above capacity attributable to the traffic generated by the proposed development.

Mitigation Measures – Traffic Signal Warrant

A traffic signal warrant analysis was undertaken for the intersection of Guelph Line & No. 2 Sideroad. The report mentions that the traffic signal was not warranted. However, the volumes used for the traffic signal warrant did not match those in Figures 4.3A/B (Total Traffic Conditions).

Recommendation

It is recommended to review the volumes used for the traffic signal warrant and update the analysis as necessary.

Mitigation Measures – Queue Lengths

Some of the 95th percentile queues reported are expected to exceed the available storage length (e.g., 2024 PM peak hour northbound and westbound left turning movements at Guelph Line & Dundas Street are expected to exceed available storage by 106 and 214 metres, respectively). The eastbound through movement is expected to be addressed by the Dundas Street road widening outlined in the Region's Transportation Master Plan (TMP) as previously mentioned; however, no mitigation measures are recommended to address the excessive northbound left queues.

Recommendation

Assess and provide mitigation measure to address the excessive 95th percentile queues that are expected to exceed available storage at Guelph Line & Dundas Street.

Safety Analysis

It is suggested for the terms of reference that a 'Safety Analysis' section will be included in the report to discuss potential safety or operational issues (per Region's TIS Guidelines, Section 3.6.2) in the study area. Even if there are no safety issues, a review should be completed and documented in the TIS report.

Recommendation

Include a Safety Analysis section in the report to discuss potential safety or operational issues.

Haul Route Study

Although the Report states that there are no changes to the proposed haul route and no new impacts to the road network are anticipated, the Report does not mention the preparation of a Haul Route Study. It should be noted that the request for a Haul Route Study was identified by the Region's report LPS08-20 – Proposed Expansion to the Burlington Quarry (Nelson), Pre-Consultation Meeting.

Recommendation

Complete a Haul Route Study following the requirements identified by the Region's Aggregate Resources Reference Manual for the preparation of a Transportation/Haul Route Study.

Traffic Impact Study Report Appendix A Peer Review Process

This review follows the information provided in Appendix A which contains Nelson Aggregate Company's quarry trucking details. The quarry trucking details were used to summarize the future site truck

volumes used in the TIS. CIMA conducted a peer review of the contents provided in Appendix A. The review details are provided in the following sections.

Paradigm Methodology

Paradigm reviewed the detailed shipping records, provided in Appendix A, that contain shipping details from 2014 to 2018. Based on the shipping details, they estimated trucking levels for a 2.0 tonnes per annum scenario. This scenario includes three distinct types of truck trips entering and exiting the quarry. The first distinct type, which accounts for all the outbound trips, is aggregate material that is mined and processed in the quarry. The second and third distinct types, which are incoming trips to the quarry, are clean fill and recycling materials. Estimates of approximately 50% to 58% of the incoming trucks with clean fill and recycling material between 2014 and 2017 also left with a load of aggregate. In 2018, the proportion these incoming trucks leaving with aggregate increased by about 23%. The estimates were used to calculate the annual inbound and outbound truck trips from 2014 to 2018.

Additionally, estimates of the future increase to truck volumes were calculated based on the details shipping records. The estimates were developed by adding the truck volumes from the October 2019 site driveway turning movement count to the volumes estimated from the average daily trucks served in 2018. The volumes from the TMC as well as the estimated volumes are shown in Table 4.1 of the TIS report.

Peer Review Findings

Based on the review of the detailed data provided in Appendix A, CIMA verified that the estimated 50% of the clean fill and recycling trips that left with aggregate, was used to calculate annual inbound and outbound truck trips from 2014 to 2017, while 77% was used for 2018.

Based on the review of the detailed 2018 data provide in Appendix A, the estimated total future truck levels shown in Table 4.1 of the subject TIS are appropriate estimates for the future peak hour truck volumes.

From Table 4.1, the future estimated truck volume is 29, which is added to the existing TMC volumes. To verify the estimated volumes CIMA examined the 2018 month-by-month total (aggregate, clean fills and recycling trips) average daily trucks served in 2018. The total average daily trucks served averaged for the year was 31 trucks (rounded up). The value is fairly close to the 29 total trucks estimated by Paradigm.

However, CIMA was unable to verify the distribution of the estimated 29 total trucks between the AM and PM peak hours. The subject TIS distributes 28 trucks (evenly distributed between inbound and outbound) to the AM peak hour and 1 outbound truck to the PM peak hour. Based on the TMC volumes shown in Table 4.1, 15% of the estimated 29 added trucks, or 4 trucks, should be allocated to the PM peak hour.

The TMC provided in Appendix B, does not include a detailed breakdown of the vehicles in the PM peak hour. A detailed breakdown of the vehicle types entering and exiting the site, such as the one for the AM peak hour, is needed to verify the added truck volumes in PM peak hour of the subject TIS.

In summary, the process used to estimate the added future truck volumes for both peak hours was verified; however, the distribution of the added truck volumes could not be verified.

Recommendation

It is recommended that a detailed breakdown of PM peak hour TMC data be provided, similar to the data provided for the AM peak hour.

Terms of Reference Review

CIMA+ also prepared a TIS Terms of Reference (TOR) Peer Review on April 2020 in support of the same study mentioned above. **Table 1** provides a list of the recommendations given in the TOR review, and whether the TIS report addressed the suggestions provided.

Table 1: Terms of Reference Review

Check	Compliant?
1. The terms of reference should indicate the roadways that are to be included in the study. It is suggested that the study area be consistent with the previous traffic impact studies from 2005 and 2009 for the Nelson Aggregate Quarry Extension prepared by Paradigm.	Yes
2. A map showing the proposed roadway network to be considered as part of the terms of reference will facilitate its review and discussion prior to preparation of the TIS.	Yes
3. The terms of reference should indicate what are the intended trip distribution assumptions (e.g. truck routes data collected from Nelson).	Yes
4. Traffic operation analysis for the surrounding roadways should include existing and expected queue lengths (per Region's TIS Guidelines, Section 3.6.1).	Yes
5. It is suggested for the terms of reference to indicate that a 'Safety Analysis' section will be included in the report to discuss potential safety or operational issues (per Region's TIS Guidelines, Section 3.6.2) in the study area. Even if there are no safety issues, a review should be completed and documented in the TIS report.	Requires clarification and/or revisions (see Checklist in Appendix 1 – item 12)

Check	Compliant?
6. The request for a Haul Route Study as identified by the Region's report LPS08-20 – Proposed Expansion to the Burlington Quarry (Nelson), Pre-Consultation Meeting. Also, the requirements identified by the Region's Aggregate Resources Reference Manual for the preparation of a Transportation/Haul Route Study.	Requires clarification and/or revisions (Report does not mention conducting a haul route study. Report states that there are no changes to the proposed haul route and no new impacts to the road network are anticipated

Summary of Recommendations

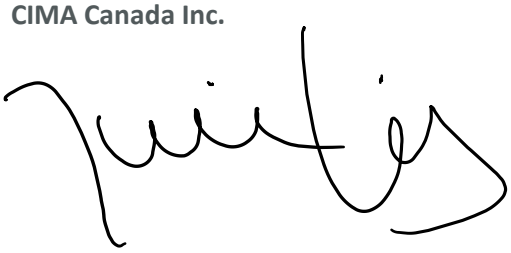
In summary, in our opinion, the following recommended steps should be taken to address identified information, analysis and reporting:

1. Update Sections 2.2.1 and 2.2.3 to a consistent PM peak hour;
    a. Conduct an additional PM peak operational analysis if necessary;
2. Provide justification for volumes of additional truck trips estimated in Table 4.1;
3. Provide a detailed breakdown of PM Peak hour TMC data similar to the data provided for the AM peak hour;
4. Update Figures 4.2A and 4.2B to reflect outbound trips returning on the same path as the inbound trips or provide justification for the different origin/destination points.
    a. Changes to the future operations should be reflected in the future improvement scenario.
5. Update the number of working days and calculation in Table 5.1;
6. Provide clarification for the change in two-way truck traffic crossing Number 2 Side Road from the AM peak hour to PM peak hour;
7. Refer to Region's Access Management Guidelines for the South Extension's Access Road design considerations;
8. Provide separate tables for signalized and unsignalized intersections for all traffic operational analyses;
9. Provide full TMCs, which include 15-minute volume breakdowns;
10. Provide mitigation measures for the movements that are expected to be over capacity that are not addressed by the Region's TMP;

11. Review the volumes used for the Guelph Line & Number 2 Side Road traffic signal warrant and update the analysis as necessary;
12. Provide mitigation measures for movements that are expected to have a queue that exceeds the available storage length;
13. Include a Safety Analysis section in the report to discuss potential safety or operational issues; and
14. Complete a Haul Route Study as identified by the Region's report LPS08-20.

Sincerely,

CIMA Canada Inc.



Jaime Garcia, P.Eng., Ph.D.
Senior Project Manager, Transportation
Jaime.Garcia@cima.ca

1

Appendix 1: Checklist

400–3027 Harvester Road, Burlington ON. L7N 3G7 T: 289-288-0287 F: 289-288-0285
cima.ca

	Check	Compliant?
1.	**Review of the overall approach to ensure that it is both complete and has been completed according to the industry best practices.**	Yes
2.	**Review of the site plan/concept plan to ensure that it is consistent with the industry best practices.**	Yes
3.	**Review of the results of existing intersection operations (Synchro analysis files and/or Synchro reports).**	Yes
4.	**Review of the estimation of travel demand including trip generation, trip distribution, internal trips, pass-by trips and modal split adjustment for required horizons.**	Requires clarification and/or revisions
5.	**Review of the assumptions utilized in the assignment of traffic to the adjacent roadway network.**	Yes
6.	**Review of the assumptions utilized in the development of background (growth) traffic for required horizons.**	Yes
7.	**Review of calculations performed for estimation of future background traffic, and total traffic for all required horizons, including traffic increases related to other new developments within each horizon.**	Yes
8.	**Review of the use of various operational parameters such as saturation flow rate, peak hour factors, signal timing lengths, etc.**	Requires clarification and/or revisions
9.	**Review of the results of the operational analysis for future background traffic conditions and future total traffic conditions for each of the required horizons (Synchro analysis files and/or Synchro analysis reports).**	Yes
10.	**Review of the recommendations for improvements/mitigating measures to address any impact of the development with respect to traffic operations and safety.**	Requires clarification and/or revisions
11.	**Review of the recommendations provided for pedestrian and cycling facilities in accordance with industry best practices.**	N/A
12.	**Review of potential safety and operational issues per Section 3.6.2 of the Halton Region TIS Guidelines**	Requires clarification and/or revisions