TO: **Laura Dewar, Supervisor, Development Planning, City of Cambridge**

COPY TO: **Melissa Lachance, City of Cambridge**

FROM: **Lisa Li, Alessandra Reid and Douglas Herbrand, CIMA+**

DATE : **March 15, 2024**

SUBJECT: **102 Fountain Street South, Cambridge, ON: Transportation Impact Study and Parking Study – Peer Review**

1. Introduction

The City of Cambridge (the City) retained CIMA Canada Inc. (CIMA+) to undertake a Type 1 Peer Review of the Transportation Impact Study (TIS) and Parking Study (PS) – *102 Fountain Street South* dated October 2023 and prepared by Paradigm Transportation Solutions Limited (Paradigm). The scope of work includes an assessment of a proposed mixed-use development located in the City of Cambridge west of Fountain Street and King Street West.

The proposed development consists of three high-rise buildings including a 26, 25 and 22-storey residential buildings with a total of 753 residential units. The TIS/PS also mentions 420 m^2 of retail Gross Floor Area (GFA) but does not specify where on the site it will be located. The development is also proposing to supply 682 parking spaces on-site, which includes 14 retail use and 668 for residential use, although no accommodation for visitor parking for the residential units is mentioned in the report. The assessment prepared by Paradigm is intended to evaluate the site related traffic and subsequent traffic related impacts on the adjacent road network.

The following intersections within the study scope, outlined in the TIS/PS include:

- Fountain Street and King Street West (Signalized – Existing) / Site Access (Signalized – Future)
- Fountain Street and Right-In Driveway (Unsignalized – Future)
- Fountain Street and Right-Out Driveway (Unsignalized – Future)

Additionally, the TIS/PS report intends to review the proposed parking supply.

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2. Peer Review Process

CIMA+ conducted an "Initial Review of TIS". To assist in our review, a checklist was completed to ensure all required elements were assessed for compliance with the City of Cambridge and Region of Waterloo TIS Guidelines. The completed checklist can be found in **Appendix A**.

The results of our review have been compiled and are presented in the following section. This includes our findings of the documentation reviewed and items that we believe could benefit from additional review.

3. Peer Review Findings

It is our opinion that the subject TIS/PS examined and documented most of the standard components of a TIS (as outlined in the City of Cambridge and Region of Waterloo's TIS Guidelines), however we suggest that further revisions are recommended for the subject TIS/PS to be considered complete.

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

- Sign and stamp the TIS/PS by the Professional Engineer;
- Clarify whether the study area was agreed upon by the Region;
- Update the TIS to include an assessment of various site access configurations and identify any infrastructure modifications (local or regional) that may be required for each option;
- Include a safety analysis section that evaluates the sight distance at each of the proposed driveways;
- Include a safety analysis section that evaluates the on-site circulation;
- Provide justification for the 2% growth rate applied to the future background traffic volumes;
- Clarify whether other developments were considered in the background future traffic volumes;
- Review the In and Out distribution percentages used for the AM Site Trip Generations provided within Table 3.1 of the TIS;
- Provide clarification on the internal capture rate percentages for the Site Trip Generation;
- Provide further clarification of the pass-by trips for the retail space.

- Provide further clarification on how the trip distribution and trip assignment was determined;
- Provide a figure showing the trip distribution and follow the sample trip distribution table provided in the Region of Waterloo's TIS Guidelines;
- Clarify whether HCM was used for the Synchro analysis and include the outputs in Appendix B, C and D;
- Provide the parameters used for the Synchro analysis;
- Conduct SimTraffic queue analysis for all horizon years, and update Tables 2.1, 4.1 and 4.2 accordingly;
- Provide direct mitigation strategies for all critical LOS, v/c ratios and queuing metrics;
- Update the parking rate used from the ITE Parking Generation Manual and revise conclusions accordingly;
- Consider using more appropriate proxy developments to estimate the parking demand that can be expected for the proposed development;
- Clarify the construction timeline of the ION Light Rail Transit and revise the conclusions accordingly; and
- Include a 10-year horizon and a horizon year after full-build out.

In addition to our review, the City had also provided their comments. The full list of comments from the City can be found in **Appendix B** and are summarized below:

- Update the TIS to include an assessment of various site access configurations and identify any infrastructure modifications (local or regional) that may be required for each option;
- A 25% reduction in parking is acceptable but a minimum residential parking rate of 0.90 to maximum of 1.01 must be used;
- Where off-street parking spaces is required for visitor parking, the parking spaces must be clearly defined and identified as being reserved for the exclusive use of visitors;
- Provide a fire route diagram and show the fire route (with signage) on the site plan;
- Ensure accessible parking spaces are AODA compliant and provide accessible parking signs referenced on the site plans; and

- Provide a truck turning drawing showing how the internal road network will accommodate truck movements throughout the site.

3.2 Regulatory Requirements

The City and Region's TIS Guidelines both state that the TIS must be stamped by a Professional Engineer, but this was not observed in the subject TIS/PS.

The study area of the TIS/PS also did not seem to include all the Regional and Municipal intersections that this site would impact. In addition, the proximity to a nearby Highway 401 interchange and associated impacts may be of concern. Although there may have been consultation with MTO regarding this potential issue, the report does not document whether or not MTO was consulted to ensure that this interchange should or should not be included as part of this study. The Region's TIS Guidelines outlines that a study area must include all local, regional, and provincial roads, expressways, intersections, interchanges, etc. that will be affected by the proposed development.

Recommendation:

- Sign and stamp the TIS/PS by the Professional Engineer.
- Clarify whether the study area was agreed upon by the Region/Municipality.

3.3 Site Access and Circulation

In Section 3.1, the development description indicates that the site is accessed by three connections to Fountain Street, plus an access to Abraham Street that will be restricted to temporary and controlled usage when the Fountain Street accesses are unavailable. Section 8 of the Region's TIS Guidelines states that "access points should be located on minor roads where possible" and that "the number and location of access points should be reviewed to ensure that only the minimum number necessary are provided to serve the development adequately without negatively affecting the flow of traffic along the road network". In particular, the PM peak hour traffic operations at Fountain Street & King Street performs very poorly and site traffic access to the Regional road system via Jacob Street and/or Kitchener Road should be considered. The City has also requested that the TIS include an assessment of alternative site access configurations and indicate any infrastructure changes (local or regional) that may be necessary for each option to support the proposed access points. The site access points should be evaluated in terms of capacity, safety and adequacy of queue storage.

Section 3.9.3. of the City's TIS Guidelines also indicates that each proposed access and/or at each intersection where a new road is proposed, a sight distance evaluation must be completed. The sight distance requirements should be determined based on

Decision Sight Distance and Turning Sight Distance as identified in Transportation Association of Canada – 1999 Geometric Design Guide for Canadian Roads (TAC Manual).

Section 8 of the Region's TIS Guidelines indicates that on-site parking/circulation systems should be evaluated to demonstrate a high safety factor with respect to the possibility of queues backing onto Regional roads, and that proposed truck/courier loading facilities are adequately sized. Adequate access for emergency vehicles and garbage/recycling service should also be considered for on-site parking requirements. The City has also requested that a truck turning drawing and fire route diagram be provided at a later time during the Site Plan Review to demonstrate how the internal road network will accommodate these movements throughout the site.

Recommendation:

- Update the TIS to include an assessment of various site access configurations and identify any infrastructure modifications (local or regional) that may be required for each option.
- Include a safety analysis section that evaluates the sight distance at each of the proposed driveways.
- Include a safety analysis section that evaluates the on-site circulation.

3.4 Future Background Traffic Volumes

Section 4.1 indicates that a growth rate of 2% was applied to the existing traffic volumes to derive the 2028 background traffic volumes. However, there was no explanation to how the growth rate was determined or whether it was approved by the City or the Region. It is also unclear whether other nearby developments were reviewed and considered in the future background volumes.

Recommendation:

- Provide justification for the 2% growth rate applied to the future background traffic volumes.
- Clarify whether other developments were considered in the background future traffic volumes.

3.5 Site Traffic Generation

Section 3.2 outlines the site traffic generated and the land use codes (LUC) used to estimate the development's trip generation using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. However, upon the review of

Table 3.1, it was observed that there was a discrepancy between the ITE Trip Generation Manual and the In/Out percentages used for Land Use Code 222 during the AM Peak Hour. The AM Peak Hour calculation used an In/Out percentage of 24% and 76%, which could not be found within the manual for that LUC under any scenario.

Additionally, Table 3.1 contained internal capture rates for both LUC 222 and 822 but the TIS/PS does not provide any details on how these trip reduction rates were derived.

The table also includes a by-pass rate for the retail space based on the average pass-by rates for LUC 821 (Shopping Plaza (40-150k) however the proposed commercial area is substantially smaller than this, and there doesn't appear to be any documented justification to include pass-by trips.

Recommendation

- Review the In and Out distribution percentages used for the AM Site Trip Generations provided within Table 3.1 of the TIS.
- Provide clarification on the internal capture rate percentages for the Site Trip Generations.
- Provide further clarification of the pass-by trips for the retail space.

3.6 Site Traffic Distribution and Assignment

Section 3.3 of the TIS gives a breakdown of the trip distribution, however it does not discuss the methodology used to determine the trip distribution. Further discussion of the methodology, in particular, would assist in explaining why the trip distributions are the same for both the AM and PM peak periods. The Region's TIS Guidelines also state that the trip distribution table should also be accompanied by a trip distribution map.

Recommendation:

- Provide further clarification on how the trip distribution and trip assignment was determined.
- Provide a figure showing the trip distribution to accompany Table 3.2.

3.7 Synchro and Queuing Analysis

Section 2.4 describes the traffic operations analyses and states that the study area intersections were assessed using Synchro v11 but does not specify the methodologies used to generate the results. The City only accepts results calculated and reported using the Highway Capacity Manual methodology in Synchro, unless otherwise discussed and agreed to. A review of the Synchro output provided in Appendix C and D of the TIS shows that the HCM report was not provided for Fountain Street & King

Street West. It is also recommended that the Synchro model parameters used for the analysis be included in the report's body.

Appendix B, C and D provide queuing results using the Synchro 11 queue analysis. Although SimTraffic is not required by the City or the Region, using SimTraffic queue analysis would provide a more accurate assessment of applicable queue lengths.

Recommendation:

- Clarify whether HCM was used for the Synchro analysis and include the outputs in Appendix B, C and D.
- Provide the parameters used for the Synchro analysis.
- Conduct SimTraffic queue analysis for all horizon years, and update Tables 2.1, 4.1 and 4.2 accordingly.

3.8 Recommended Mitigation Measures

Section 4.3 presents the capacity analysis for future conditions and identified several critical movements (e.g., average control delay greater than 55 seconds and 95th percentile queues lengths are projected to exceed available storage space) at Fountain Street and King Street West/Site Access during the PM peak hour. According to the Region's TIS Guidelines, all critical intersections/individual movements identified should be discussed in terms of contribution of the development proposal to the situation, possible remedial measures, a recommended solution, and the effectiveness of the solution towards resolving the situation. The TIS report did not provide any proposed mitigation measures for the critical movements resulting from the addition of the proposed development volumes.

Recommendation:

- Provide direct mitigation strategies for all critical LOS, v/c ratios and queuing metrics and show analysis of traffic operations with mitigation measures included.

3.9 Parking Justification

Section 5.3.1 estimates the total parking demand of the development using the ITE Parking Generation Manual (5th Edition) and compares it to the parking supply that is proposed. The TIS report indicates that the average rates for LUC 222 (Multi-family Housing High-Rise) and LUC 820 (Shopping Center) were used to forecast the parking demand for the subject site. The location/setting of "Dense Multi-Use Urban (no nearby rail transit)" was used for LUC 222; however, we suggest the proponent reconsider this

classification given the proposed site is located in a predominantly suburban area. As such, we believe that the "General Urban/Suburban (no nearby rail transit)" location/setting is more appropriate. The average parking rate for "General Urban/Suburban (no nearby rail transit)" is 0.98 per dwelling unit, which is higher than the 0.55 rate used in the TIS/PS. The revised parking rate applied to the 753 residential units proposed would result in a potential parking demand of 738 spaces. With 668 parking spaces proposed for residential uses, this results in a shortfall of 70 spaces. This would also change the conclusions made in Section 5.5, as the average forecasted parking demand (based on the ITE parking rate, auto ownership rates and parking demand data from two proxy developments) for residential land uses is now 0.96, which is greater than the proposed parking rate of 0.89 spaces per unit.

The two proxy sites proposed in Section 5.3.3 to estimate parking demand are not considered to be representative of the proposed development. The existing development at 150 & 180 Greenbrier Road consists of two 6-storey apartment buildings containing 153 residential units, and the development at 45 Country Hill Drive is comprised of 104 units. Both sites are significantly smaller than the proposed development, which consists of a 26, 25 and 22-storey residential buildings with a total of 753 residential units. Consider using a more appropriate proxy site.

We also note that the development may qualify for parking reductions using the following policy and tools:

- As per the City Zoning Bylaw Section 2.2.2 (10), non-residential parking may be reduced by 25% and visitor parking does not have to be provided.
- Use of the City's Transportation Demand Management (TDM) Checklist and Parking Management Worksheet – allow for potential parking reductions in exchange for specific TDM measures.

Based on this, a 25% parking reduction could be acceptable for this development given the planned and future TDM measures for this site including unbundling the parking from residential units. However, considering the limited on-street parking in this area, distance to municipal parking lots, and other feedback received through the processing of this application, the City has recommended a minimum residential parking rate of 1.0 space per dwelling unit for residents, 0.08 per dwelling unit for visitors, and 2.5 spaces per 100 sq.m. of commercial floor area.

In Section 5.4.1 the TIS/PS discusses that residents will have access to the ION Light Rail Transit (LRT) system as part of their transportation demand management strategy. However, the City has indicated that the ION LRT is not expected to be constructed for at least 10 years, which is beyond the scope of the TIS/PS. It is therefore recommended to include a 10-year horizon to capture the LRT, and a horizon year after

full-build out (i.e., 5-years after) to ensure the TIS assumptions remain applicable for a realistic timeframe.

Recommendation:

- Update the parking rate used from the ITE Parking Generation Manual and revise the conclusions accordingly.
- Consider using more appropriate proxy developments to estimate the parking demand that can be expected for the proposed development.
- Clarify the construction timeline of the ION Light Rail Transit and revise the conclusions accordingly.
- Include a 10-year horizon and a horizon year after full-build out.

4. Summary of Recommendations

Based on the foregoing, CIMA+ provides the following recommendations that, in our opinion, will improve the analysis and reporting of TIS/PS titled: 102 Fountain Street South, Cambridge ON Transportation Impact Study & Parking Study:

- Stamp the TIS/PS by the Professional Engineer;
- Clarify whether the study area was agreed upon by the Municipality/Region/Province;
- Update the TIS to include an assessment of various site access configurations and identify any infrastructure modifications (local or regional) that may be required for each option;
- Include a safety analysis section that evaluates the sight distance at each of the proposed driveways;
- Include a safety analysis section that evaluates the on-site circulation;
- Provide justification for the 2% growth rate applied to the future background traffic volumes;
- Clarify whether other developments were considered in the background future traffic volumes;
- Review the In and Out distribution percentages used for the AM Site Trip Generations provided within Table 3.1 of the TIS;
- Provide clarification on the internal capture rate percentages for the Site Trip Generations;

- Provide further clarification of the pass-by trips for the retail space.
- Provide further clarification on how the trip distribution and trip assignment was determined;
- Provide a figure showing the trip distribution and follow the sample trip distribution table provided in the Region of Waterloo's TIS Guidelines;
- Clarify whether HCM was used for the Synchro analysis and include the outputs in Appendix B, C and D;
- Provide the parameters used for the Synchro analysis;
- Conduct SimTraffic queue analysis for all horizon years, and update Tables 2.1, 4.1 and 4.2 accordingly;
- Provide direct mitigation strategies for all critical LOS, v/c ratios and queuing metrics;
- Update the parking rates used from the ITE Parking Generation Manual and revise the conclusions accordingly;
- Consider using more appropriate proxy developments to estimate the parking demand that can be expected for the proposed development;
- Clarify the construction timeline of the ION Light Rail Transit and revise the conclusions accordingly; and
- Include a 10-year horizon and a horizon year after full-build out.

Sincerely,
CIMA Canada Inc.

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Appendix A
Checklist

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Check	Compliant?
Review of the overall approach to ensure that it is both complete and has been completed according to the City and Region's TIS guidelines.	Requires revisions
Review of the site plan/concept plan to ensure that it is consistent with the City and Region's policies.	Requires revisions
Review of the results of existing intersection operations (Synchro analysis files and/or Synchro reports).	Requires revisions
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 revisions
Review of the assumptions utilized in the assignment of traffic to the adjacent roadway network.	Requires clarifications
Review of the assumptions utilized in the development of background (growth) traffic for required horizons.	Requires clarifications
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.	Requires clarifications
Review of the use of various operational parameters such as saturation flow rate, peak hour factors, signal timing lengths, etc.	Requires clarifications
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).	Requires revisions
Review of the recommendations for improvements/mitigating measures to address any impact of the development with respect to traffic operations and safety.	Requires revisions
Review of recommendations related to transit services in accordance with local municipal policies/plans, including a review of any transit infrastructure improvements or enhancements warranted for the roadways in or adjacent to the subject property.	Yes
Review of the recommendations provided for pedestrian and cycling facilities in accordance with Regional policies.	Yes

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Appendix B
Comments from the City of Cambridge

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Transportation Engineering Comments:

Transportation Impact Study (TIS) and Parking Study Report

Transportation

- ❑ The TIS should be updated to include analysis of various site access options including identifying any infrastructure improvements (regional and local) that may be required to support each option.
- ❑ Section 3.1 of the TIS mentions that access to Abraham Street would be restricted to temporary and controlled usage when Fountain Street access is unavailable. More details about this are required and should be included in the analysis noted above.
- ❑ Confirmation and approval of 2% growth rate is required from the Region of Waterloo and should be noted in the TIS.
- ❑ Provide more details on the determination of trip distribution and trip assignment. City staff do not necessarily agree with TIS assumptions.
- ❑ Under total traffic operations there are several movements forecast to have a poor level of service, high v/c ratios and queuing issues. Remedial measures to address these issues should be included in the TIS.
- ❑ Clarify which other developments, if any, were included in the analysis.
- ❑ Include a 10-year horizon in the TIS to capture planned transportation system improvements such as LRT as well as a 5-year horizon after full build-out.
- ❑ Clarify access and use of the parking structure in the TIS.
- ❑ Confirm roadway directions are consistent throughout the report, specifically in Section 2.1.

Parking Justification

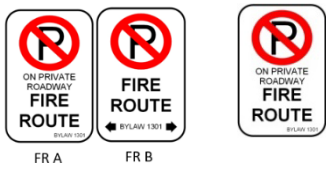
- ❑ Transportation has reviewed the proposed parking reduction for this application and based on the City's Zoning Bylaw and Transportation Demand Management Checklist and Parking Management Worksheet, a parking reduction of 25% could be acceptable for this application given planned and future TDM measures for this site.
- ❑ Update the TIS to include proxy sites that are more characteristic of the proposed development for the parking justification.

Future Site Planning Requirements

The following comments should be addressed through the formal Site Plan application should one be received:

- ❑ Show the fire route on the site plan.

- ❑ Show fire route signs and reference them on the site plan using the following sign design.



FR A FR B

- ❑ Fire route signs (FR A) are to be placed on both sides of each access on a 45 degree angle facing incoming traffic. Fire route signs (FR B) are to be placed along the fire route at a 45 degree angle facing approaching traffic. Show and label fire route signs on the Site Plan and Fire Route Diagram.
- ❑ Show accessible parking signs compliant with AODA and reference them on the site plan. One accessible parking sign is required in front of each accessible parking space.
- ❑ Accessible parking spaces must be AODA compliant, specifications can be found at http://gaates.org/DOPS/section_2_6_0.php. It is recommended that access aisles not exceed 2.0m in width unless bollards are used to prevent parking in the access aisle.
- ❑ Provide a Fire Route diagram in PDF format. The diagram must include the following elements:
    - North arrow
    - Property line
    - Adjacent municipal roads and sidewalks
    - Building outline
    - Parking and internal road layout
    - Fire Route (bolded or hatched for clarity)
    - Fire Route sign locations
    - Municipal address
    - No dimensioning is required on this diagram
- ❑ Provide a truck turning drawing showing how the internal road network will accommodate truck movements throughout the site including but not limited to: shipping and receiving (per appropriate design vehicle), waste collection and fire route access. Ensure waste collection vehicles have adequate access to the collection area while minimizing reversing movements. The truck turning drawing shall be at a scale of 1:250 or 1:500.
- ❑ Provide bicycle rack detail for both long-term and short-term parking.
- ❑ Provide capacity of stackers for long-term bike racks.
- ❑ Provide a phasing plan and number of proposed bicycle parking, including how many dwelling units will be available at the time of each phase.

- ❑ Additional detailed comments will be provided through the formal Site Plan application should one be received.