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Transportation Impact Study Addendum

PROPOSED INDUSTRIAL DEVELOPMENT

3054 Homestead Drive, 9174 & 9166 Airport Road W
HAMILTON, ONTARIO

February 2023
Project No: NT-21-087

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

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nexTrans CONSULTING ENGINEERS
NextEng Consulting Group Inc.

February 28, 2023

Attention: Mr. Anthony Girolami

Fengate Homestead Holdings LP
2275 Upper Middle Road East, Suite 700
Oakville, ON L6H 0C3

Re: Transportation Impact Study Addendum
Proposed Industrial Development
3054 Homestead Drive, 9174 & 9166 Airport Road W, City of Hamilton
Our Project No. NT-21-087

Nextrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study Addendum for the above noted site in support of Official Plan Amendment, Zoning By-law Amendment and proposed Draff Plan of Subdivision applications for a proposed industrial development.

The purposes of this Study Addendum are to address the City comments and assess the latest development proposal statistics and draft plan of subdivision layout. The subject site is located at 3054 Homestead Drive, 3054 Homestead Drive, 9174 & 9166 Airport Road W, (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton. The proposed development is located within the proposed Airport Employment Growth District (AEGD) Secondary Plan.

Nextrans has prepared a comprehensive Transportation Impact Study dated November, 2021 in support the previous development proposal, which includes five industrial buildings with a total gross floor area of 141,600.92 m^2 (or 1,504,180 ft^2). The current development proposal includes four industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2), which is about 9,974.92 m^2 less than the previous development proposal. The proposed development will provide an independent access to Airport Road to service the site.

The Transportation Impact Study Update has been prepared in accordance with the City of Hamilton and Ontario Ministry of Transportation approved terms of reference. The Transportation Impact Study concludes that the proposed development has negligible impacts on the road network and therefore does not trigger any major improvements. The analysis indicates that the proposed development can adequately be accommodated by the existing transportation network and the recommended localized improvements provided this report.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

Prepared by:

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Report Submission Record

Identification	Date	Description of issued and/or revision
Final Report	February 28, 2022	For Final Submission

CITY OF HAMILTON COMMENTS

The following comments were received from the City of Hamilton in the Comment Letter dated April 22, 2022, and appropriate responses are provided:

Comments related to TIS

1. As a condition of approval, prior to grading, a Transportation Impact Study shall be submitted to the satisfaction and approval of the Manager, Transportation Planning.

   Response: Noted. A Transportation Impact Study Addendum is provided.

2. Figure 6 – Existing Traffic Volumes, the provided existing traffic volumes are dated from 2019, a 2% growth rate should be applied to bring the volumes up to the excepted 2022 volumes.

   Response: As per comment 3 below, Nextrans has updated the traffic turning movement counts on Wednesday June 15, 2022. It should be noted that there are no pandemic related restrictions or major construction during this time that may impact the turning movement counts. Therefore, the turning movement counts are considered normal and capture all new developments in the area.

3. 2.4 Existing Traffic Volumes, traffic volumes collected for the intersection of Airport Road at East Cargo Road are out of date, there has been significant development on the airport lands that has increased traffic volumes. New counts are required to be collected and TIS revised accordingly to the new volumes.

   Response: Nextrans has updated the traffic turning movement counts on Wednesday June 15, 2022. It should be noted that there are no pandemic related restrictions or major construction during this time that may impact the turning movement counts. Therefore, the turning movement counts are considered normal and capture all new developments in the area.

4. 5.3 Site Trip Distribution, further clarification is required for the proposed site trip distribution for trucks generated by the proposed development. The trip distribution has utilized TTS 2016 data; however, it appears only 10% of the trips have been assigned to Highway 6. It is Transportation Planning's opinion that majority of heavy vehicle trips should be assigned to Highway 6 as it is the most logical route.

   Response: A higher percentage of trips has been assigned to Highway 6 and reflected in the analysis.

5. 6.1 Future Total Traffic Assessment, based on Figure 15 it appears the traffic volumes have not been balanced between intersections. The TIS is required to be updated accordingly to balance traffic volumes through the network model to ensure accuracy in the results and recommendations.

   Response: As indicated above, Nextrans has updated new traffic counts for all intersections in the study area and these counts were conducted on the same day and at the same time. Therefore, the analysis for all future horizon will be balanced.

6. Synchro Analysis, the intersection of East Cargo Road at Airport Road is currently under design review with the City of Hamilton for the implementation of traffic signals. The proposed design is to have eastbound, westbound, and northbound left-turn lane storage measurements of 15 metres, 50 metres and 45 metres respectively as outlined in the terms of reference. The geometric conditions used within the Synchro Analysis for the left-turn lanes differ then the City of Hamilton. The Applicant is to prepare a scenario with the City of Hamilton lane storage outlined above to determine the impacts between the proposed configuration within the TIS. Additional storage length requirements and recommendations at the intersection shall also be commented on within the revised TIS.

Response: Noted. The analysis has reflected the City's proposed improvements to this intersection. Nextrans also recommend additional improvements based on the finding of this Study Addendum.

7. Synchro Analysis, based on the City of Hamilton TIS Guidelines "Peak hour factor (PHF) is to be 0.92 unless a calculation based on actual traffic counts demonstrates another value is more appropriate." The TIS is to be updated to provide justification for the PHF used within the synchro analysis.

   Response: The PHF utilized in the Synchro analysis reflects the actual field collected data under the existing conditions. This is more realistic and appropriate than the default Synchro parameter, which is generic and usually applied to a new intersection that will be constructed in the future.

   It should be noted that in the future, as the traffic conditions in the area will be more balance (equilibrium), the PHF will be closer to 1.0 as the arrival rate will be uniform as the drivers are familiar with the area and know the routes and intersection operations. They will avoid the critical movement and use the underutilized movement.

   For the purposes of this assessment and consistent with the industry best practices, the actual field collected PHF will be utilized for the existing conditions and carried forward to the future conditions.

8. The Applicant will require approval from the Ministry of Transportation of Ontario as it's within their corridor permit control area and proximity of their interchange at Airport Road & Highway 6. The Applicant is advised to circulate the Transportation Impact Study to the Ministry of Transportation of Ontario for review and approval.

   Response: Nextrans has reached out to the Ministry of Transportation (MTO) staff and they have indicated that the terms of reference are acceptable and they will review the TIS.

   It is Nextrans' understanding that circulation of the TIS to MTO and HAA would be the responsibility of the City of Hamilton along with the complete OPA/ZBLA package.

   However, the project team will circulate the Transportation Impact Study Addendum to both agencies for their review.

9. Based on the City of Hamilton TIS Guidelines the most recent version of the ITE Trip Generation Manual (11th Edition) it to be used. Without setting a precedent, Transportation Planning will accept the use of the 10th Edition.

   Response: Noted. As part of the analysis, Nextrans has provided trip generation for the proposed development using both the 11th and 10th Edition, and use the higher rates to be conservative.

10. 8.0 Parking Assessment, the Applicant is to note that Transportation Planning does not review or comment on justification for parking reduction. Further comments may be forthcoming regarding the parking assessment.

    Response: Noted.

11. It is recommended the Applicant circulate the Transportation Impact Study to the Hamilton Airport Authority as the proposed development will require all generated traffic to circulate through East Cargo Road which is a private road owned and maintained by the HAA.

    Response: As indicated in Comment #8 above, it is Nextrans' understanding that circulation of the TIS to MTO and HAA would be the responsibility of the City of Hamilton along with the complete OPA/ZBLA package.

    However, the project team will circulate the Transportation Impact Study Addendum to both agencies for their review.

Comments for Future Site Plan Applications

12. The Applicant shall provide cycling facilities along Street 'A' in the form of a multi-use trail or cycle track along one side of the roadway. Cycling facilities are required to connect to future facilities along Dickenson Road West following completion of the environmental assessment for Dickenson Road West. The facilities shall be indicated, illustrated and dimensioned on all subsequent plans.

    Response: Noted.

13. The Applicant shall explore the option of a pedestrian connection through a dedicated trail to homestead drive to improve pedestrian connectivity throughout the proposed development.

    Response: Noted.

14. Transportation Planning recommends that the future Owner for individual blocks within the proposed subdivision register for Hamilton SMART commute program in order to promote sustainable modes of transportation for employees. Additional information can be found at https://www.smartcommute.ca.

    Response: Noted.

15. Any design, road work and modifications to the related municipal infrastructure will be fully at the expense of the Applicant. The Applicant is advised that should any modifications be required to the traffic signals and/or pavement markings and/or signage because of this development, they must be completed by a qualified traffic signal/pavement markings design consultant and fully at the expense of the Applicant. The City will review and approve the engineering design and provide the final design detail requirements. It is the Applicant's responsibility to contact trafficops@hamilton.ca for information regarding the City's design standards and drawing format. The email subject line is to be 3054 Homestead Drive (Ward 11) Traffic Signal/Pavement Markings.

    Response: Noted. Engineering Design will be designed and reflected the City's standards and will be submitted for approval once the City approves the intersection location and lane configurations in principle.

16. The northern limits of Street 'A' indicated in the Draft Plan submitted shall terminate in a temporary cul-de-sac with a collector road requirement of 20.75 metre radius and 15.0 metre pavement radius to be contained completely within the subject property limits, until time in which a connection to the north will be established through the development, the road connection will ultimately lead to Upper James Street.

    Response: Noted.

17. Transportation Planning require the Applicant to urbanize East Cargo Road and provide sidewalk connection to Street A due to the proximity to the bus stop along Airport Road and the required pedestrian connection to the proposed development.

    Response: Noted. This comment will be addressed where appropriate.

18. The Applicant shall note that the proposed connection of Street 'A' to the lands to the north is subject to the build-out and development of those lands which are unknown at this time. The Applicant/Owner of the subject lands should coordinate with the Applicant/Owner of the lands to the north to potentially determine future timelines for any possible connections/extensions. Due to the size of the proposed development and the volumes generated, an additional access through the north connecting to Upper James will be required once the lands to the north redevelop.

    Response: Noted.

19. Approximately 26.213 metres are to be dedicated to the right-of-way on proposed 'Street A', as per the Council Approved Urban Official Plan: Chapter C - City Wide Systems and Designations, 4.5 Road Network Functional Classification, 4.5.2. Local Roads (proposed Street A) are to be 26.213 metres in designated Employment Areas. A survey conducted by an Ontario Land Surveyor and at the Applicant's expense will determine the ultimate dimensions for the right-of-way widening(s).

    Response: Noted.

20. Based on the proposed application, the Applicant does not require to provide lands for the creation of a daylighting triangle as 'Street A' does not intersect with another municipal road.

    Response: Noted.

21. Driveways accesses are not permitted within sharp curves, 90-degree bends or intersections. Proposed driveway access into Building B is currently proposed within a curve, for motorist safety the location of the driveway is required to be relocated outside of the road curve.

    Response: Noted.

22. Proposed access to Building A is currently located within a cul-de-sac for proposed Street A. The Applicant is to note that the terminus of Street A is a temporary condition and will be extended in the future, the proposed access may be impacted through future development of Street A.

    Response: Noted.

23. For two-way operation onto municipal road, the driveway access width(s) must be minimum 9.0 metres at the ultimate property line and curve radii minimum 9.0 metres for heavy vehicles. For two-way operation onto municipal road, the driveway access width(s) must be 7.5 metres at the ultimate property line and curve radii minimum 7.0 metres for passenger vehicles. All shall be identified and dimensioned on the future site plan applications.

    Response: Noted.

24. 5.0 metres x 5.0 metres visibility triangles must be provided for each driveway access. They must be illustrated, dimensioned and identified on the site plan. Visibility triangles are between the driveway limits and the ultimate property line (right-of-way limit) and no object or mature vegetation can exceed a height of 0.6 metres above the corresponding perpendicular centreline elevation of the adjacent street.

    Response: Noted.

25. Reversing of vehicles onto the right-of-way is not permitted, and a turning plan will be required to be provided for future site plan applications in order to demonstrate a vehicle can enter the site in a forward manner, turn around on private property, and exit in a forward manner.

    Response: Noted.

26. Transportation Planning notes that all Transportation Demand Management features will be reviewed at the site plan stage and shall generally be consistent with what is provided within the Transportation Impact Study.

    Response: Noted.

27. The municipal sidewalk must be continuous through the driveway approach and any driveway curbing must end behind the municipal sidewalk.

    Response: Noted.

EXECUTIVE SUMMARY

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Fengate Homestead Holdings LP (the 'Client') to undertake a Transportation Impact Study Addendum in support of Official Plan Amendment, Zoning By-law Amendment and proposed Draff Plan of Subdivision applications for a proposed industrial development.

The subject site is located at 3054 Homestead Drive, 9174 & 9166 Airport Road W, (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton. The proposed development is located within the proposed Airport Employment Growth District (AEGD) Secondary Plan.

Nextrans has prepared a comprehensive Transportation Impact Study dated November, 2021 in support the previous development proposal, which includes five industrial buildings with a total gross floor area of 141,600.92 m^2 (or 1,504,180 ft^2). The purposes of this Study Addendum are to address the City comments and assess the latest development proposal statistics. The subject site is located at 3054 Homestead Drive (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton, Ontario.

In summary, the Transportation Impact Study concludes that the proposed development has minimal impacts on the road network and therefore does not trigger the intersection improvements for the intersections along Airport Road W. It should be noted that the majority of the required intersection improvements are identified in the 2028 future background traffic conditions, especially the double left turn at the intersection of Airport Road W and Homestead Drive. Under the existing conditions, there are already over 300 vehicles making eastbound left turn at this intersection. In addition, the double left turn lanes are also triggered by the significant amount of background residential and commercial development applications in the area. The analysis indicates that these improvements should be implemented by the City of Hamilton, or by the proposed development that are directly fronting on Airport Road W. It should be noted that the subject development has no frontage onto this intersection, therefore it has no control over the improvements at this intersection.

The proposed development protects for an interconnection from Street A to 2876 Upper James Street proposed development to the north. Although the analysis indicates that this connection is not required to accommodate the proposed development, however, it will provide an alternative access option for both developments.

The analysis indicates conclude that the proposed development can adequately be accommodated by the existing transportation network and the recommended localized improvements provided this report, for the Airport Road W/Street 'A' intersection and no traffic signals are required under the horizon year considered.

Proposed Development

The current development proposal includes four industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2), which is about 9,974.92 m^2 less than the previous development proposal. The detailed development statistics are included below:

- Building 'A' – 33,325.64 m^2 (or 358,714 ft^2)
- Building 'B' – 26,562.68 m^2 (or 285,918 ft^2)
- Building 'C' – 38,268.75 m^2 (or 411,921 ft^2)
- Building 'D' – 33,468.93 m^2 (or 360,257 ft^2)

From a transportation planning perspective, the proposed development is important as it will bring jobs and economic activities to the City of Hamilton and the area. It gives the existing and future residents in the City of Hamilton area to work closer to home without driving longer distance to other jurisdictions outside the City of Hamilton. During the good weather conditions, the residents can walk or bicycle to work instead of driving a private car.

Proposed Development Access

Under the current proposed concept plan, the proposed development accesses will be provided via the proposed Street

"A", which will be connected directly to Airport Road. Therefore, the main site external intersection will be the Street A/Airport Road W intersection. The terminus of Street "A" (i.e. cul-de-sac) is also protected for a potential future connection with the Rice Group proposed development to the north, if desired and appropriate. However, the technical analysis indicates that this connection is not required for the subject site development.

The analysis indicates the Street "A"/Airport Road W intersection is expected to operate at acceptable levels of service with minimum delay and queue. The recommended lane configurations and traffic control for this intersection include:

- One eastbound exclusive left turn lane and one through lane on Airport Road W;
- One westbound shadow lane and a shared through/right lane on Airport Road W;
- One southbound exclusive left turn lane and one exclusive right turn lane on Street "A"; and
- The intersection will be stop-controlled on Street "A', with free-flow on Airport Road W

Based on Nextrans' technical review of the internal accesses, it is indicated that:

- The proposed access locations for Building "A" are appropriate with no potential sightline issues as Street "A" is relative flat with no horizon curves in the vicinity of the site accesses.
- The proposed access locations for Building "B" are also appropriate. The City has indicated that the access should not be located within the horizon curve. However, given that the access for Building "B" is located on the outside of the horizon curve, there are no potential sightline issues as the sightlines are not being obstructed by the curves or buildings.
- The proposed access locations for Building "C" are appropriate with no potential sightline issues as Street "A" is relative flat with no horizon curves in the vicinity of the site accesses.
- The proposed access locations for Building "D" are also appropriate. The sight distance to the horizontal curve is approximately 105m, which is much greater than the stopping sight distance of 66m for 50 km/h design speed with 3% downgrade (assumed worst-case scenario).

Capacity Analysis

The proposed development is expected to generate 480 total two-way auto trips (390 inbound and 90 outbound) and 480 total two-way auto trips (100 inbound and 380 outbound) during the morning and afternoon peak hours, respectively.

In addition, the proposed development is anticipated to generate a total of 15 two-way truck trips (10 inbound and 5 outbound) and 20 two-way truck trips (5 inbound and 15 outbound) during the morning and afternoon peak hours, respectively. It should be noted that most truck trips to and from the site will avoid peak hours to save gas and travel time, therefore, the trip generation is reflective of this provision.

Auto Mode Assessment

Based on the intersection capacity analysis, under the existing, all intersections considered are expected to operate at acceptable levels of service. Under the 2028 future background and future total conditions, all intersections considered in the analysis will need improvements due to the significant background developments in the area, including the developments related to the existing Hamilton International Airport and subject development. Below are the descriptions of the required improvements. A detailed intersection improvement and traffic control plan is illustrated in **Figure E1**.

- Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
    - Westbound left turn lane and shared through/right (current pavement width is 10 m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length can be a minimum of 45 m.
    - Eastbound double left and a shared through/right lane ((current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median). The eastbound double left turn lane storage length can be approximately 50 m.

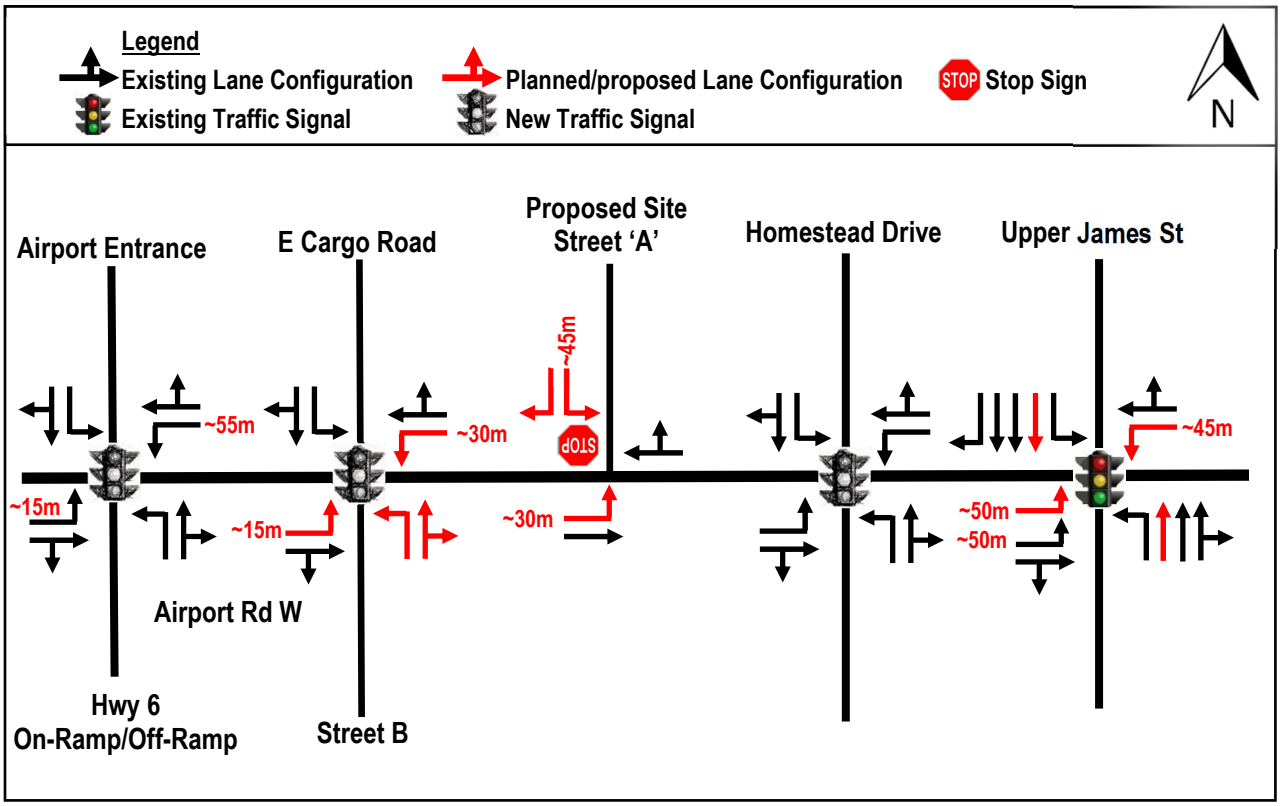
- An additional lane for the northbound and southbound direction as per the Paradigm TIS dated October 2022 prepared on behalf of 2876 Upper James Street.

- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. However, the intersection pavement markings should be restriped to delineate left turn lane and shared through/right lane.
- Airport Road W at E Cargo Road – installation of new traffic signals and eastbound and westbound exclusive left turn lanes on Airport Road W. It is Nextrans' understanding that this traffic signal has been planned and recently installed. However, it was not energized at the time of this Study.
- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with the existing lane configurations.

The analysis indicates that these improvements should be implemented prior or by 2028 horizon. It is Nextrans' understanding that some of these improvements have been identified in the Paradigm TIS dated December 2016 by 2026 horizon with the proposed background development in the area, without the subject development at 3054 Homestead Drive. However, Paradigm TIS did not recommend any physical improvements at the Airport Road W/Upper James Street and signalization of the Airport Road W/Hamilton International Airport access.

Based on the analysis findings, the proposed development has minimal impacts on the road network and therefore does not trigger the improvements for the intersections along Airport Road W, with the exception of the localized improvements at the Airport Road W/Street 'A' intersection to service the site. The majority of the required intersection improvements, especially the double left turn at the intersection of Airport Road W and Homestead Drive, are required under the existing conditions as there already over 200 vehicles making eastbound left turn at this intersection. In addition, the double left turn lanes are also triggered by the significant amount of background residential and commercial development applications in the area. The analysis indicates that these improvements should be implemented by the City of Hamilton, or by the proposed development that are directly fronting on Airport Road W. It should be noted that the subject development has no frontage onto this intersection, therefore it has no control over these intersection improvements. **Figure E 1** illustrates the 2028 horizon proposed/recommended intersections for the study area intersections.

Figure E1 – 2028 Horizon Proposed and Recommended Intersection Improvements



Active Transportation Mode Assessment

Sidewalk

The analysis indicates that sidewalk is currently provided on south side only on Airport Road W from Homestead Dr to Mt Hope Public School. On Homestead Drive, sidewalks are provided on the east side north of Airport Rd, and on the west side south of Airport Rd. Sidewalk are not currently provided on Upper James Street and E Cargo Road. The analysis indicates that sidewalk on the south side of Airport Road W should be extended from the existing Mt Hope Public School to E Cargo Road/Future Street "B" so that the future residents south of Airport Road W can walk to the existing school.

In addition, sidewalk should also be extended to the Hamilton Airport to support transit and employees who work for the airport authority. This provision should be included in the City's capital projects as this provision is beyond the scope of this Study. As part of the proposed development, sidewalk will be provided on one side of Street 'A' within the entire length of Street 'A' from the proposed intersection with Airport Road W to the cul-de-sac.

Bicycle

Currently, there are no dedicated bike lanes or multi-use path in the immediate area. The existing Chippawa Rail Trail is located almost 3 km to the east of the site. It is Nextrans' understanding that the City of Hamilton is planning to construct bicycle lanes along Airport Road W and multi-use trail along Upper James Street/Homestead Drive in the area in the future. The analysis indicates that these facilities are important for the community and businesses in the area. **Figure 15** illustrates the future planned cycling network.

Through the comments provided in the previous submission, the City staff asked for a multi-use path along one side of Street 'A'. Nextrans has reviewed the context of the area and the proposed development to determine the most appropriate active transportation facilities for the proposed development.

Nextrans recommends that a 3.0 m wide multi-use path (MUP) be provided on the west to north side of Street 'A' as there are less driveway interruptions, with sidewalk be provided on the east to south side of Street 'A'. As pedestrians can also walk on the MUP, there is no need to provide sidewalk on both sides of Street 'A'. The MUP will be paved with asphalt, while the sidewalk will be constructed with concrete.

Transit Mode Assessment

If a 10% modal is applied to the proposed development site generated trips, the proposed development is expected to generate 48 two-way transit trips (10 inbound and 38 outbound) and 48 two-way transit trips (39 inbound and 9 outbound) during the morning and afternoon peak hours, respectively.

The analysis indicates that the closest bus stops to the proposed development are the Bus Route 20 stops located at the Airport Road W/Canadian Warplane Heritage Museum driveway, which is about 700 m (about 10-minute walk). The service frequency is about 15-25 minutes (or about 3-4 buses) during the morning and afternoon peak periods.

Given that the transit passenger demands generated by the proposed development per transit vehicle is low (at most 10 passengers per transit vehicle per hour). Therefore, the proposed development impact on transit service is negligible and no improvements are required. In reality, some passengers could be bunched together during the peak 15 minutes, instead of spreading during the entire peak hour. Even if this is the case, the estimates indicate that the demand per vehicle is low and can be accommodated without the need for additional transit vehicles or improvements during both the morning and afternoon peak periods.

Vehicle Parking Review

Based on the City's By-Law No. 05-200, a total of 845 vehicle parking spaces are required for the proposed development, which include 220 parking spaces for office component and 625 spaces for the industrial/warehouse component. The

proposed development will provide approximately 887 vehicle parking spaces. Therefore, the proposed development just slightly exceeds the minimum Zoning By-law requirement.

It should also be noted that the proposed development will provide 245 truck level doors and 30 trailer parking spaces. These are to accommodate the demand for the proposed anticipated industrial land uses.

Bicycle Parking Review

Based on the City's By-Law No. 05-200, bicycle parking spaces are not required for industrial use. However, to support active transportation and TDM, Nextrans recommends that the proposed development provide 5 short-term bicycle parking spaces (bicycle rack) near the front entrance of each proposed building.

Transportation Demand Management Measures and Incentives

The Report identifies and recommends appropriate Transportation Demand Management measures and incentives to support active transportation and transit, to meet the objectives and requirements in the City of Hamilton's TDM for Development Report (June, 2015).

Loading Requirement

Given the proposed land use, the proposed development will provide sufficient or exceed the loading space requirements to accommodate the proposed industrial uses. For illustration purposes, the vehicle turning templates for TAC-WB19 has been provided as part of this Study. More detailed vehicle track templates will be provided using AutoTURN software as part of the future site plan submission for each proposed building.

Study Conclusions and Recommendations

Based on the findings of this Study, the following recommendations are provided:

- The City of Hamilton approves the proposed development as the proposed development will create jobs and economic activities for the City and immediate area. The proposed development will accommodate opposite direction traffic flow of the proposed background residential developments in the area, therefore, the proposed development is not expected to contribute to significant directional flow of traditional residential traffic. The proposed development will also attract some of the existing and future residents to work close by and these residents can walk or cycle to work instead of driving private vehicles;
- The proposed development to construct the intersection of Airport Road W/Street 'A' with the recommended lane configurations and traffic control. The intersection will be constructed based on the City's standards and TAC Geometric Design Guide for Canadian Roads once the functional design is approved in principle;
- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- The proposed development provides the recommended active transportation facilities as provided in this Study;
- The proposed development to join Smart Commute (contact smartcommute@hamilton.ca) programs;
- The City of Hamilton monitors and considers the following improvements for the area intersection by 2028 (as illustrated in **Figure E1**)
    - Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
        - Westbound left turn lane and shared through/right (current pavement width is 10 m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length

can be a minimum of 45 m.

- Eastbound double left and a shared through/right lane ((current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median). The eastbound double left turn lane storage length can be approximately 50 m.
- An additional lane for the northbound and southbound direction as per the Paradigm TIS dated October 2022 prepared on behalf of 2876 Upper James Street.

- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. The intersection pavement markings should be restriped to delineate left turn lane and shared through/right lane.
- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with existing lane configurations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

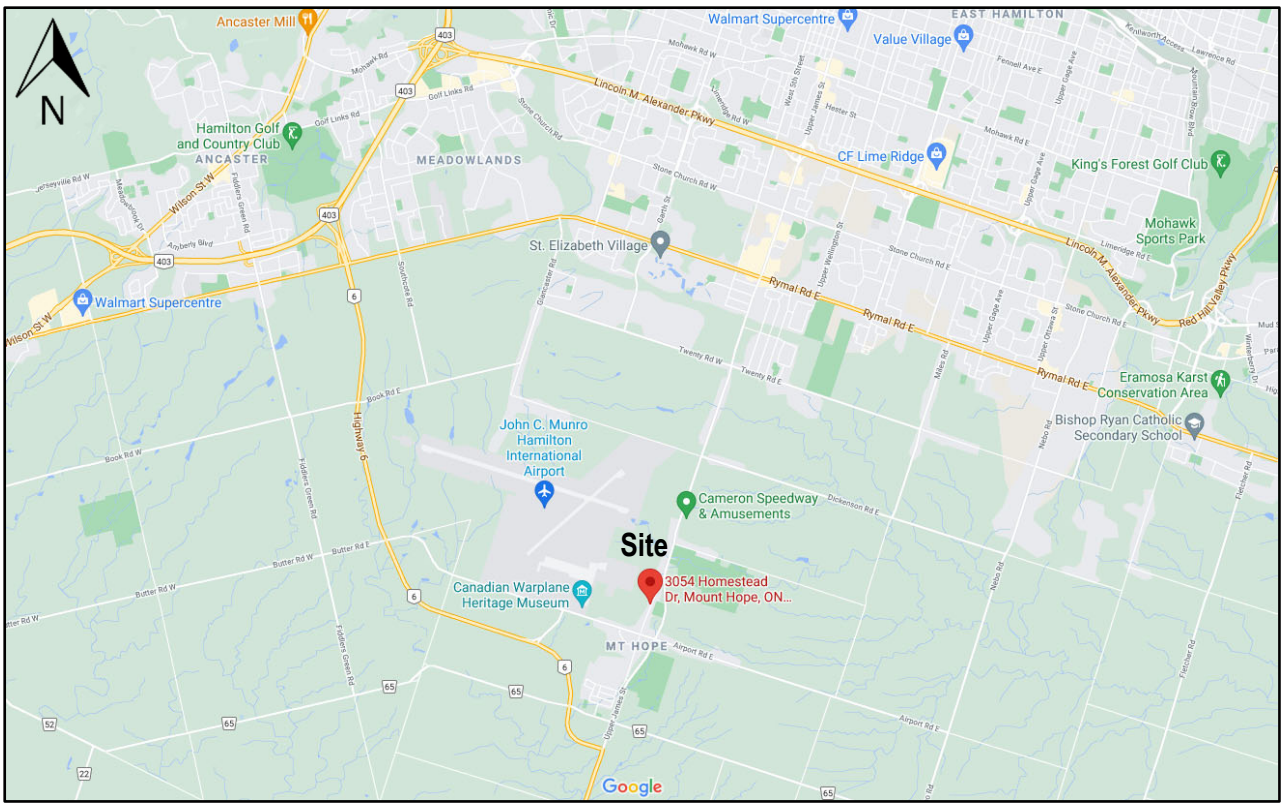
1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Fengate Homestead Holdings LP (the 'Client') to undertake a Transportation Impact Study Addendum in support of Official Plan Amendment, Zoning By-law Amendment and proposed Draff Plan of Subdivision applications for a proposed industrial development.

The subject site is located at 3054 Homestead Drive, 3054 Homestead Drive, 9174 & 9166 Airport Road W, (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton. The proposed development is located within the proposed Airport Employment Growth District (AEGD) Secondary Plan. The location of the proposed development is illustrated in **Figure 1**. Nextrans has prepared a comprehensive Transportation Impact Study dated November, 2021 in support the previous development proposal, which includes five industrial buildings with a total gross floor area of 141,600.92 m^2 (or 1,504,180 ft^2).

The purposes of this Study Addendum are to address the City comments and assess the latest development proposal statistics and draft plan of subdivision layout. The subject site is located at 3054 Homestead Drive (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton, Ontario.

Figure 1 – Proposed Development Location



Source: Google Map

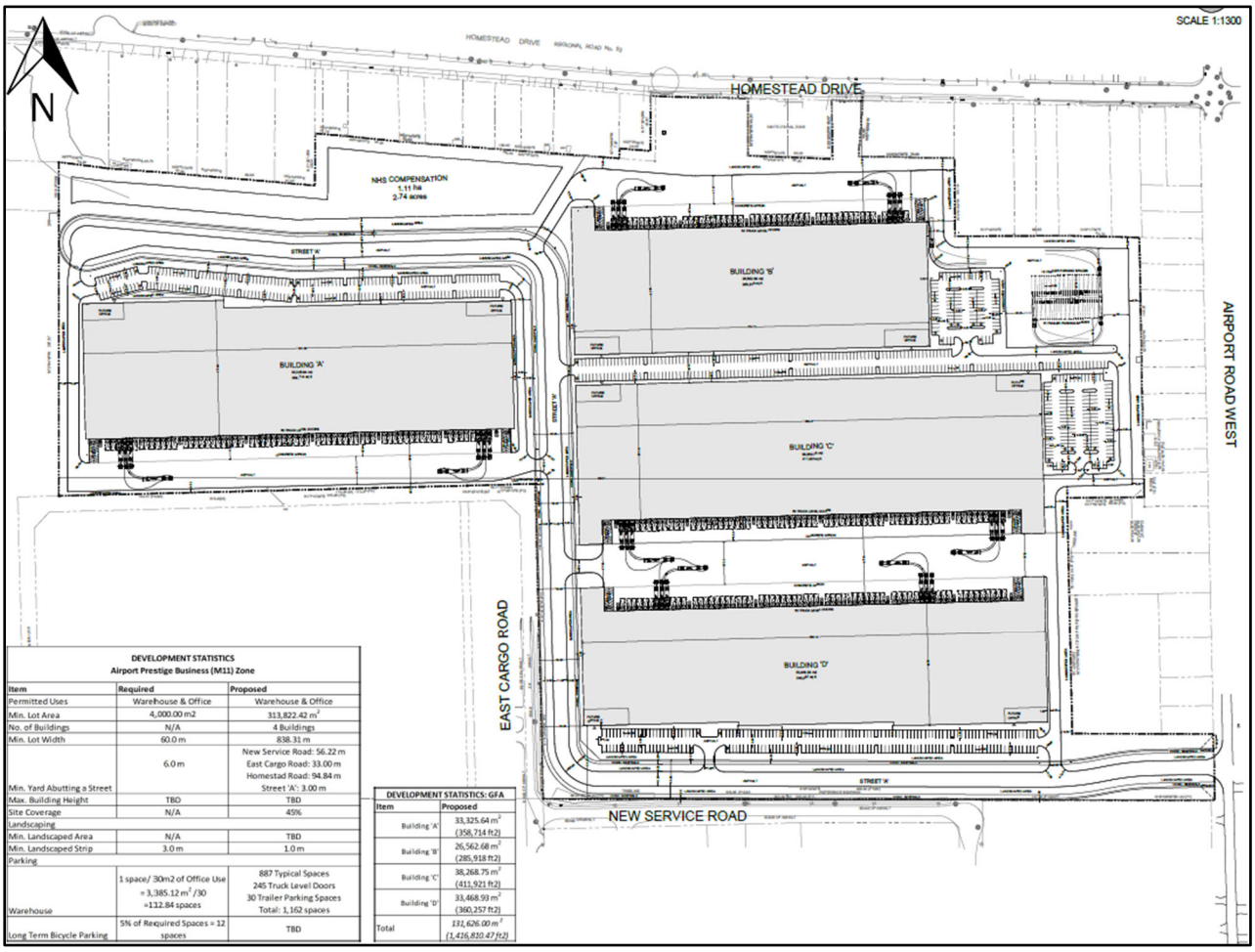
The subject site is currently vacant. The current development proposal includes four industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2), which is about 9,974.92 m^2 less than the previous development proposal. The detailed development statistics are included below:

- Building 'A' – 33,325.64 m^2 (or 358,714 ft^2)
- Building 'B' – 26,562.68 m^2 (or 285,918 ft^2)
- Building 'C' – 38,268.75 m^2 (or 411,921 ft^2)
- Building 'D' – 33,468.93 m^2 (or 360,257 ft^2)

From a transportation planning perspective, the proposed development is important as it will bring jobs and economic activities to the City of Hamilton and the area. It gives the existing and future residents in the City of Hamilton area to work closer to home without driving longer distance to other jurisdictions outside the City of Hamilton. During the good weather conditions, the residents can walk or bicycle to work instead of driving a private car.

Under the current proposed concept plan, the proposed development accesses will be provided via the proposed Street "A", which will be connected directly to Airport Road. Therefore, the main site external intersection will be the Street A/Airport Road W intersection. The terminus of Street "A" (i.e. cul-de-sac) is also protected for a potential future connection with the Rice Group proposed development to the north, if desired and appropriate. **Figure 2** illustrates the proposed development site plan.

Figure 2 – Proposed Concept Site Plan



The Transportation Impact Study has been prepared in accordance with the City of Hamilton and Ontario Ministry of Transportation approved terms of reference, where appropriate. The study proposed terms of reference are included in **Appendix A**.

2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

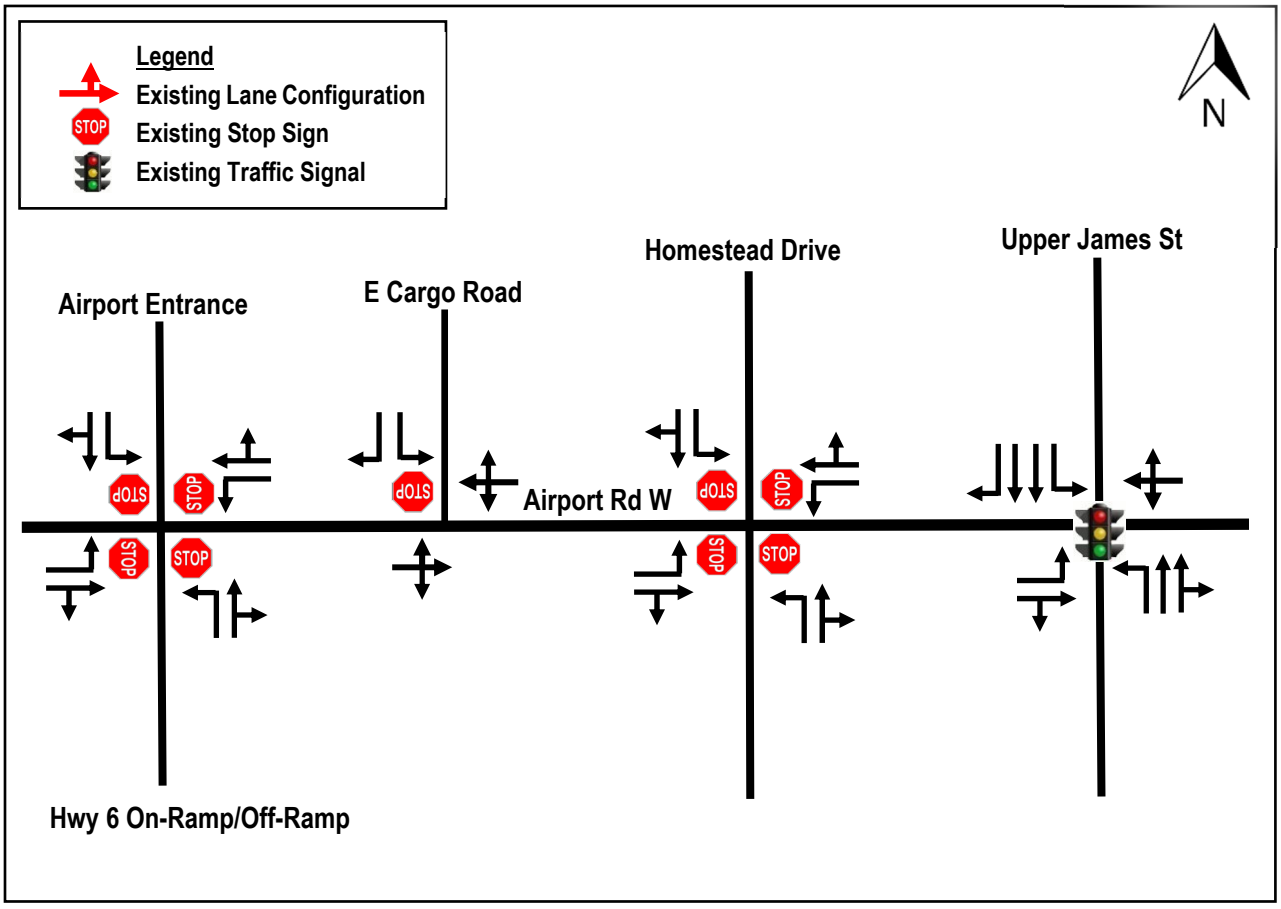
As indicated, the subject site is located at 3054 Homestead Drive (immediately east of John C. Munro Hamilton International Airport), north of Airport Road W, east of E Cargo Road, and west of Homestead Drive, in the City of Hamilton, Ontario. The description of the existing road network in the study area is summarizes in **Table 1** below.

Table 1 – Summary of the Existing Road Network in the Study Area

Road Name	Jurisdiction	Number of Lanes	Speed	Road Type	Sidewalk/Cycling
Airport Road West	City of Hamilton	2	50 km/h (posted)	Minor Arterial	Sidewalk on south side only from Homestead Dr to Mt Hope Public School No cycling facility
Homestead Drive	City of Hamilton	2	50 km/h (posted)	Collector	Sidewalk on east side north of Airport Rd, and on the west side south of Airport Rd No cycling facility
Upper James Street	City of Hamilton	4	80 km/h (unposted)	Major Arterial	No sidewalk or cycling facility
E Cargo Road	City of Hamilton	2	40 km/h	Local	No sidewalk or cycling facility
Hwy 6	MTO	2	80 km/h	Highway	No sidewalk or cycling facility

Figure 3 illustrates the existing lane configurations and traffic control devices for the intersections considered in the analysis.

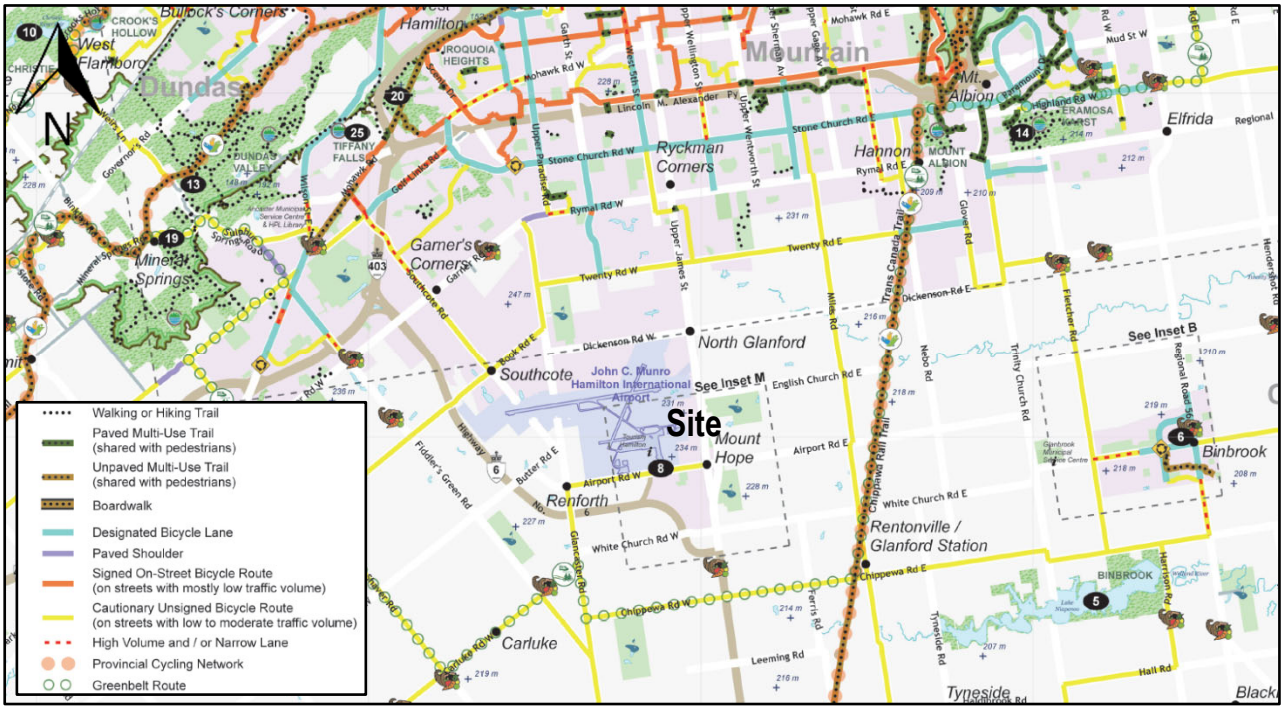
Figure 3 – Existing Lane Configuration and Traffic Control



2.2. Existing Active Transportation Network

Figure 4 illustrates the existing active transportation network in the study area.

Figure 4 – Existing Active Transportation Network in the Study Area



Source: Google Map/City of Hamilton Cycling Map

2.3. Existing Active Transportation Assessment

Sidewalk

Sidewalk is currently provided on south side only on Airport Road W from Homestead Dr to Mt Hope Public School. On Homestead Drive, sidewalks are provided on the east side north of Airport Rd, and on the west side south of Airport Rd. Sidewalk are not currently provided on Upper James Street and E Cargo Road.

The analysis indicates that sidewalk on the south side of Airport Road W should be extended from the existing Mt Hope Public School to E Cargo Road/Future Street "B" so that the future residents south of Airport Road W can walk to the existing school.

Bicycle

Currently, there are no dedicated bike lanes or multi-use path in the immediate area. The Chippawa Rail Trail is located almost 3 km to the east of the site.

It is Nextrans' opinion that the cycling network in the area could be improved in the future, especially along Airport Road W, Homestead Drive and Upper James Street, to encourage more cycling trips to and from this area. These cycling facilities can be implemented as part of the future capital projects by the City of Hamilton. These facilities are beyond the scope of this Study.

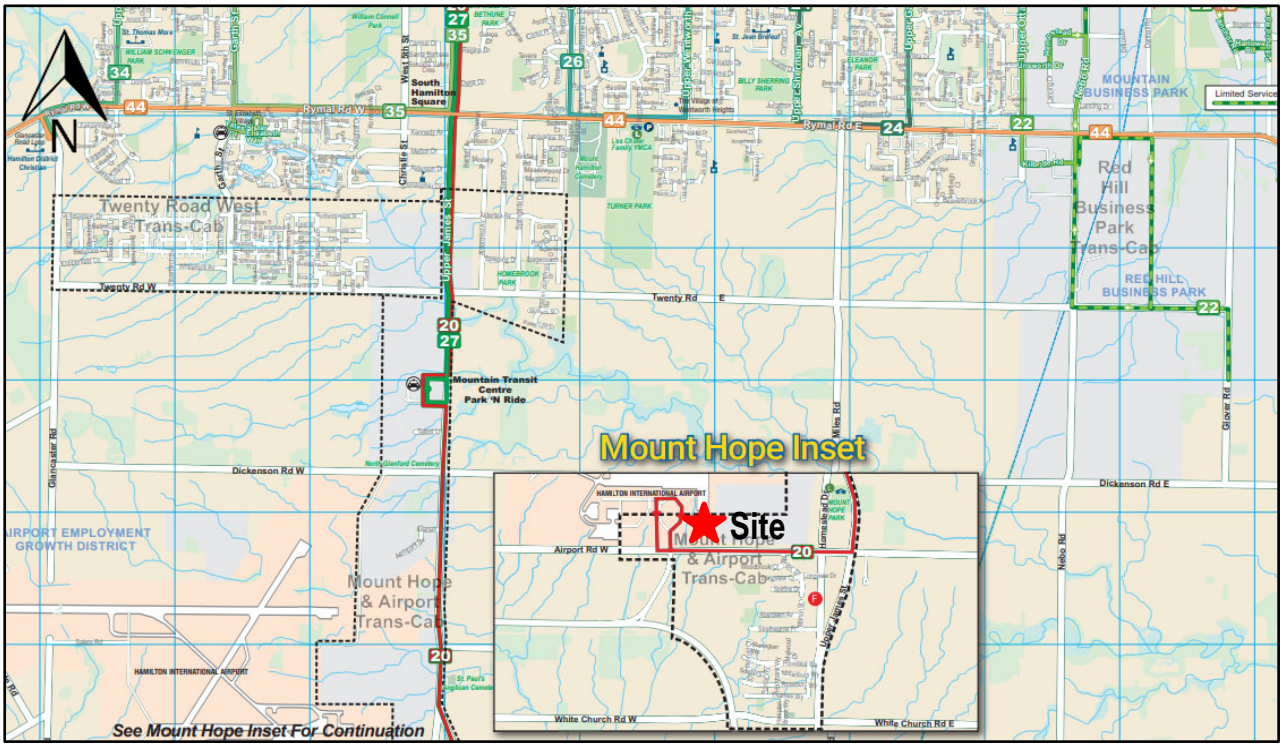
2.4. Existing Hamilton Transit (HSR) System

The area is current serviced by the existing HSR Transit Bus Route 20 (A Line Express). **Figure 5** illustrates the existing HSR Transit Bus Routes in the study area.

The closest bus stops to the proposed development are the Bus Route 20 stops located at the Airport Road W/Canadian Warplane Heritage Museum driveway, which is about 700 m (about 10-minute walk). Below are the bus route descriptions based on the information provided on the Hamilton Transit Website (https://www.hamilton.ca/hsr-bus-schedules-fares):

Route 20 – A Line Express: is a north-south express route that travels from downtown Hamilton to the Hamilton International Airport. The route also stops on the Fennell campus of Mohawk College. Service runs weekdays only from early morning to early evenings. This service is not available on the weekend or holiday service. The service frequency is about 15-25 minutes during the morning and afternoon peak periods.

Figure 5 – Existing Hamilton Transit Network in the Study Area



Source: Hamilton Transit website

2.3. Existing Area Context

Nextrans has conducted a comprehensive review of the area. The proposed development is located adjacent to the existing Hamilton International Airport, with a significant area of vacant lands for future employment development, as well as some existing low-rise development located along Homestead Drive north and south of Airport Road W.

2.4. Existing Traffic Volumes

Existing traffic volumes at the study area intersections were obtained from:

- The City of Hamilton for the Airport Road W/Upper James Street and Airport Road W/Hamilton Airport Entrance intersections - Tuesday June 4, 2019 and Wednesday March 20, 2019, respectively, during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods; and
- Spectrum for the Airport Road W/Homestead Drive and Airport Road W/E Cargo Road intersections – Thursday September 12, 2019 during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods.

Turning movement counts are summarized in **Appendix B**. The existing volumes are illustrated in **Figure 6.**

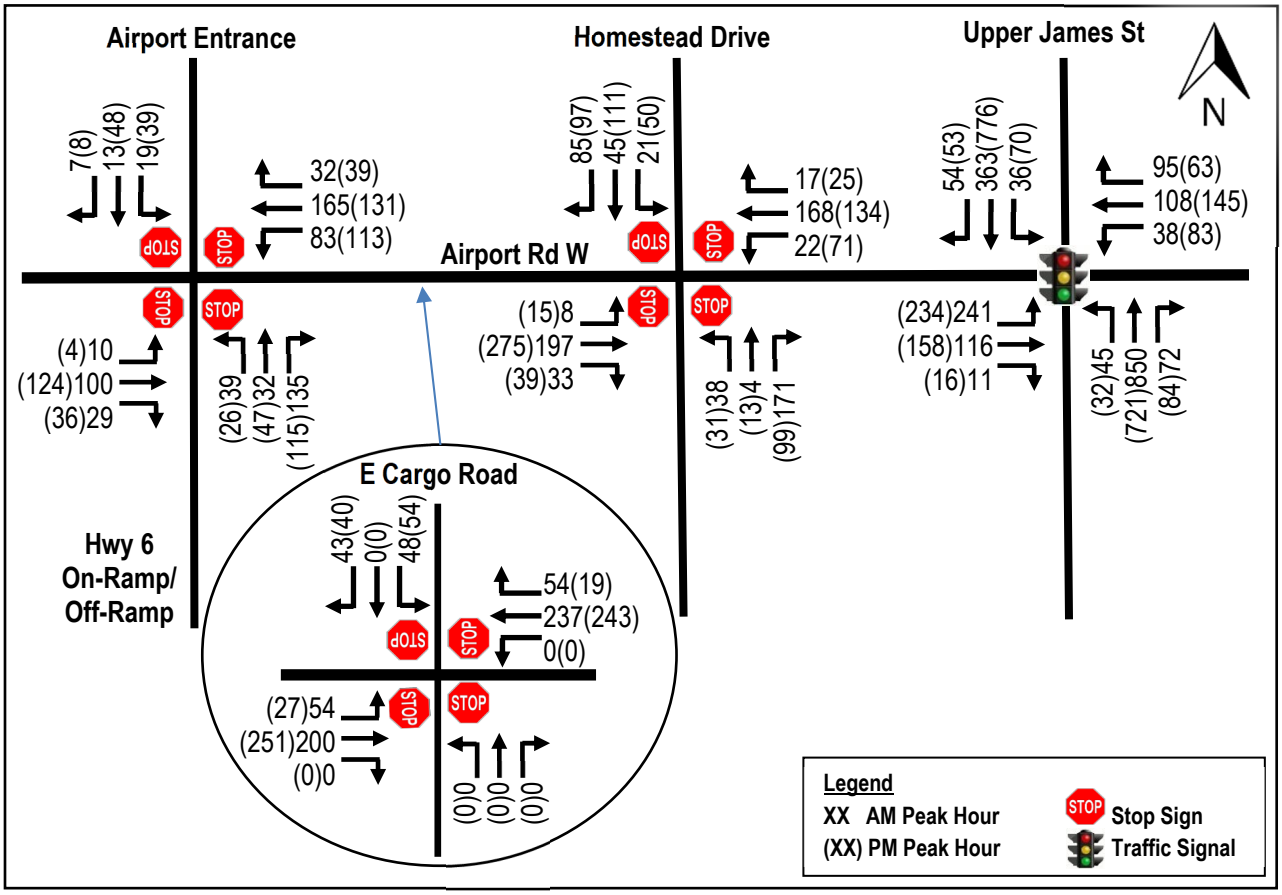
2.5. Existing Traffic Assessment

The existing volumes in **Figure 6** were analyzed using Synchro Version 10 software. It should be noted that the printouts for unsignalized intersections are based on HCM 2000 outputs and the results for signalized intersections are based on

Synchro Lanes, Volumes and Timings so that queues and more detailed information are provided.

The signal timing plans for the signalized intersections were obtained from the City of Hamilton and incorporated into the analysis. The results are provided in **Appendix C** and summarized in **Table 2**.

Figure 6 – Existing Traffic Volumes (2022 TMC – Balanced)



Based on the intersection capacity analysis, under the existing traffic conditions, all the intersections considered are currently operating at acceptable levels of service.

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Existing Land Use Context and Amenities

As indicated in the previous section of this Study, the proposed development is located adjacent to the existing Hamilton International Airport. The area surrounding the proposed development is mostly vacant and zoned for future employment uses. There are some existing low-rise developments along Homestead Drive, north and south of Airport Road W, and some future residential developments along Airport Road W to the east of the existing Airport.

3.2. Transportation Planning Context

Currently, the area is well-serviced by Airport Road W, Highway 6, Upper James Street and Homestead Drive for car and truck traffic. Hamilton Transit Bus Route 20 express route that provides service between downtown Hamilton to the Hamilton International Airport. The route also stops on the Fennell campus of Mohawk College. Service runs weekdays only from early morning to early evenings. This service is not available on the weekend or holiday service. The service frequency is about 15-25 minutes during the morning and afternoon peak periods. The area currently has limited active

transportation facilities, especially the cycling facilities. There are some existing sidewalks, but mostly along Airport Road W east of the site and some along Homestead Drive.

Table 2 – Existing Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Airport Rd W/ Upper James St/ (Signalized)	**Overall**	**C (0.71)**	**22**		**C (0.75)**	**24**		
	EB – L	C (0.62)	23	46	C (0.58)	21	44	30
	EB – TR	B (0.21)	17	26	B (0.26)	17	34	220
	WB – LTR	C (0.68)	32	56	D (0.75)	37	73	200
	NB – L	A (0.09)	10	10	B (0.10)	13	9	135
	NB – TR	C (0.71)	23	108	C (0.67)	26	100	260
	SB – L	B (0.14)	11	8	B (0.24)	14	16	120
	SB – T	B (0.28)	17	37	C (0.60)	23	96	300
	SB – R	A (0.09)	1	2	A (0.09)	1	2	80
Airport Rd W/ Homestead Dr/ (Unsignalized)	EB – L	B (0.02)	8	-	C (0.03)	9	-	30
	EB – TR	A (0.41)	12	-	A (0.59)	16	-	800
	WB – L	B (0.04)	9	-	B (0.15)	10	-	30
	WB – TR	A (0.34)	11	-	A (0.31)	11	-	220
	NB – L	A (0.08)	9	-	A (0.07)	10	-	30
	NB – TR	A (0.29)	9	-	A (0.21)	10	-	260
	SB – L	A (0.04)	9	-	B (0.11)	10	-	30
	SB – TR	A (0.23)	9	-	B (0.40)	12	-	550
Airport Rd W/ Hamilton Airport Entrance/Hwy 6 (Unsignalized)	EB – L	A (0.02)	8	-	A (0.01)	8	-	30
	EB – TR	A (0.22)	9	-	A (0.28)	10	-	160
	WB – L	A (0.15)	9	-	A (0.22)	10	-	30
	WB – TR	A (0.31)	10	-	A (0.29)	10	-	320
	NB – L	A (0.07)	9	-	A (0.06)	10	-	30
	NB – TR	A (0.26)	9	-	A (0.28)	10	-	135
	SB – L	A (0.04)	9	-	A (0.08)	9	-	30
	SB – TR	A (0.03)	8	-	A (0.10)	9	-	90
Airport Rd W/ E Cargo Dr/ (Unsignalized)	EB – LTR	A (0.06)	2	2	A (0.02)	1	1	320
	WB – LTR	A (0.22)	0	0	A (0.18)	0	0	840
	SB – L	A (0.17)	14	5	B (0.12)	12	3	310

3.3. Airport Employment Growth District Secondary Plan

The proposed development is located within the Airport Employment Growth District Secondary Plan.

Based on the information obtained from the City of Hamilton website (www.hamilton.ca), the Airport Employment Growth District (AEGD) is a planned development area of 551 net developable hectares of employment land per the Secondary Plan. The Secondary Plan is bounded by Garner Road East and Twenty Road West to the north; Upper James Street to the east, Whitechurch Road West to the south and Fiddler's Green Road to the west.

The AEGD provides the opportunity to create a new employment area which improves live-work opportunities and helps meet provincial employment targets for the City. It supports the existing John C. Munro Hamilton International Airport as important infrastructure and as an economic driver, supports long-term prosperity, contributes to quality of life, and establishes a gateway for economic and goods movements for the City.

In particular, the AEGD is intended to offer a range of employment and employment-related land uses in the context of an eco-industrial park, which provides for prestige industrial, light industrial, airport-related business and institutional development as well as an environmental footprint that is managed through a range of urban design and eco-friendly sustainable design techniques. All of which allows for the development of land uses consistent with the character of surrounding lands.

It is Nextrans' understanding that the proposed development meets the directions and objectives of the AEGD Secondary Plan.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

As indicated, the proposed development consists of several industrial buildings. Therefore, the proposed development could be built in several phases or all at once based on market demands. For the purposes of this assessment, the 2028 horizon year has been carried out for the study analysis. This provision is consistent with the City of Hamilton's Traffic Impact Study Guidelines and previous assessment. It should be noted that MTO has indicated that they have no comments or further requirements on the terms of reference regarding the horizon year for analysis.

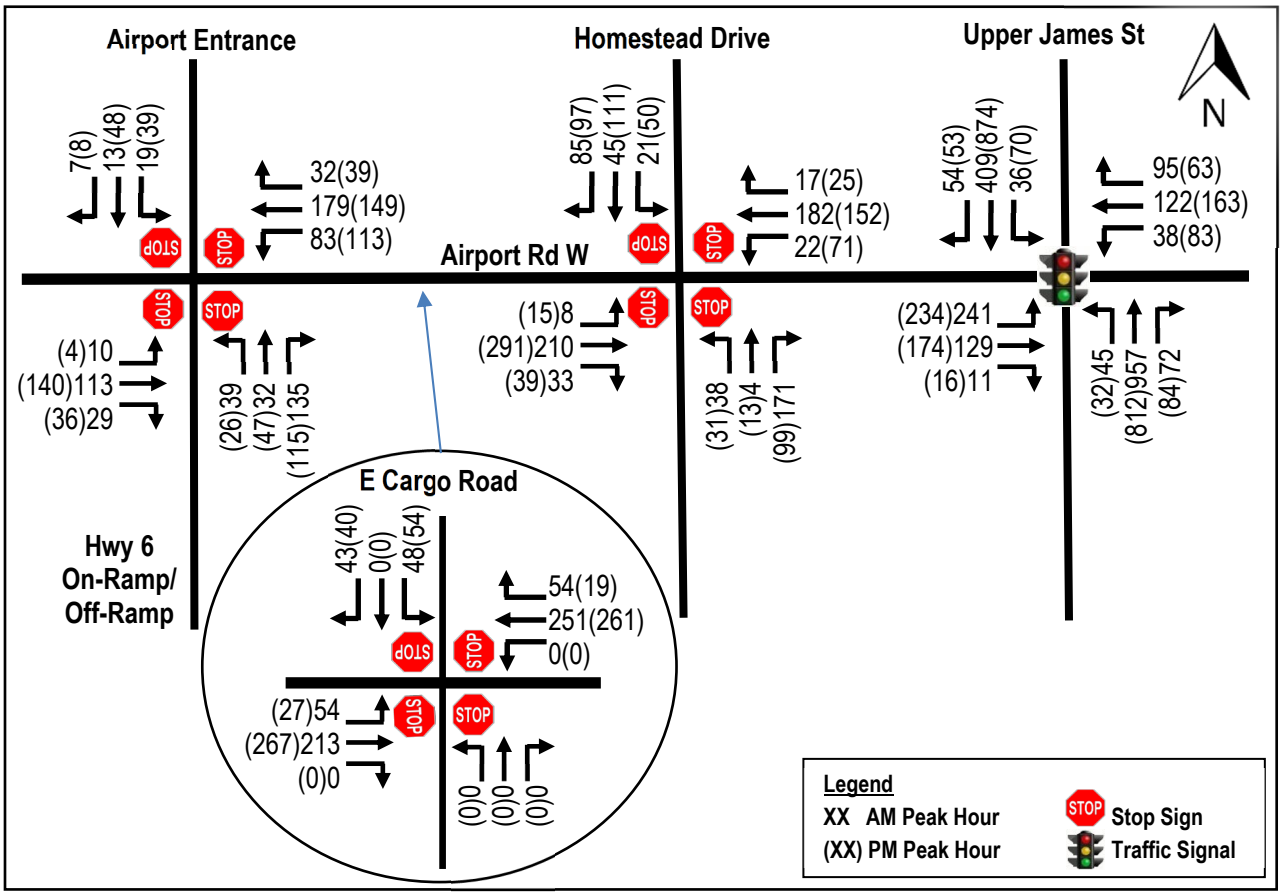
4.2. Future Background Corridor Growth

Based on the City of Hamilton's requirement, a 2% per annum compounded growth rate will be applied to the existing road network for the horizon year indicated above. This is equivalent to 12% total growth from 2022 to 2028 for background traffic.

Given that Nextrans will include the background development traffic requested by the City staff, as well as the area is quite stable with mostly through traffic that are passing by the area and/or to destine to the Hamilton International Airport, the background growth rate should be applied to the through movement only in order to avoid over estimating the turning movements and unnecessary physical improvements. This is consistent with other approved background transportation impact studies conducted in the area.

Figure 7 illustrates the 2028 for the future background traffic growth for the area intersections considered in the analysis.

Figure 7 – 2028 Background Corridor Growth Traffic Volumes



4.3. Background Development Applications

A comprehensive review of the active developments located within the study area was conducted based on the information extracted from the City of Hamilton development application portal (https://www.hamilton.ca/develop-property/planning-applications/development-applications-mapping).

In addition, based on the submitted terms of reference, the City has indicated that the following two background developments should be included in the analysis:

- 8521-8527 Airport Road W – the proposed development consists of 119 m^2 of convenience store together with an 87 m^2 drive-thru and take out restaurant, as well as a gas bar and carwash (based on DA-17-147)
- 9255 Airport Rd W – the proposed development consists of approximately 434 residential units, 58,244 ff^2 of commercial, as well as 60,000 ft^2 of an elementary school or 228 townhomes (Block 367) – Transportation Impact Study prepared by Paradigm Transportation Solutions Limited dated December 2016.
- 2876 Upper James Street – proposed 1,025,132 ft^2 of warehouse building – Transportation Impact Study prepared by Paradigm Transportation Solutions Limited dated October 2022.

Based on Nextrans' review of the proposed 8521-8527 Airport Road W development, the proposed development is contemplating a drive-thru restaurant and a convenient store with gas bar and carwash, therefore, the anticipated trips generated by this proposed development will be mostly pass-by traffic because these are not major destination such as sit-down restaurants or a supermarket.

Therefore, the trips generated by this proposed development is already on the road, they just stopping by temporarily and continue on their ways and most likely the same direction of their original journey. The transportation analysis for this type of development is more appropriate when assessing the proposed development accesses, however, this type of development will have negligible impact on the existing road network as most if not all is related to by-pass trips.

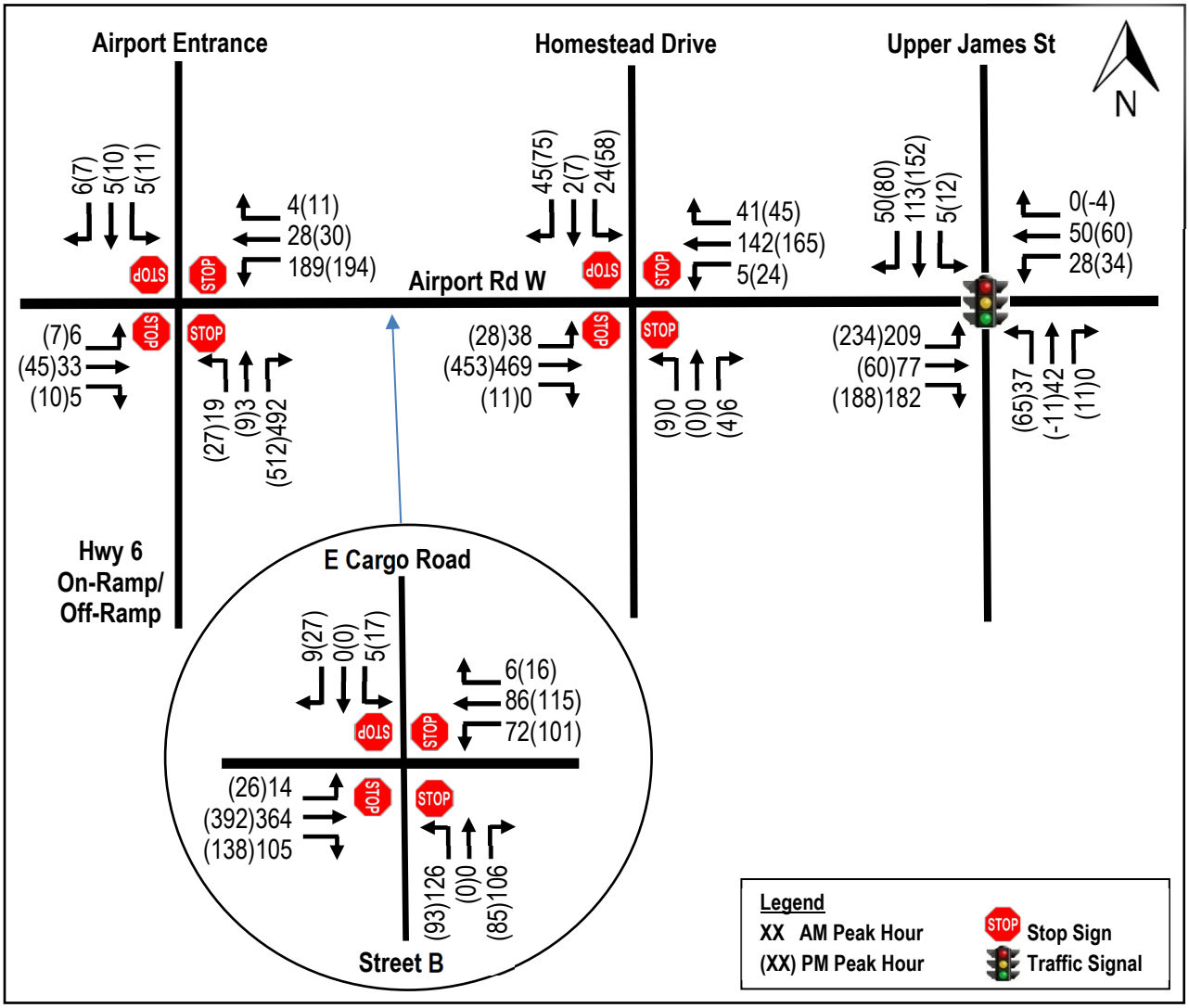
To be consistent with the Paradigm TIS dated December 2016 and to be conservative, the 9255 Airport Road W site traffic will be included in the analysis for the 2023 horizon. Although, the proposed full-built out of this site may not happen until 2026 (as per the Paradigm TIS), therefore, this analysis is conservative.

Based on Nextrans' review of the Transportation Impact Study prepared by Paradigm Transportation Solutions Limited dated December 2016 on behalf of Mountaingate development, it appears that this Study also include some of the background developments in the area up to 2026 horizon full build out. Therefore, other background developments will be included for the 2028 horizon.

As for the 2876 Upper James Street, the site traffic forecast from the Paradigm Traffic Impact Study dated October 2022 will be reflected in the future background traffic conditions.

The background development site traffic volumes are illustrated in **Figure 8** for the 2028 background development traffic**.** The details background site traffic excerpts are included in **Appendix D**.

Figure 8 – Background Development Traffic Volumes



4.4. Future Background Traffic Assessment

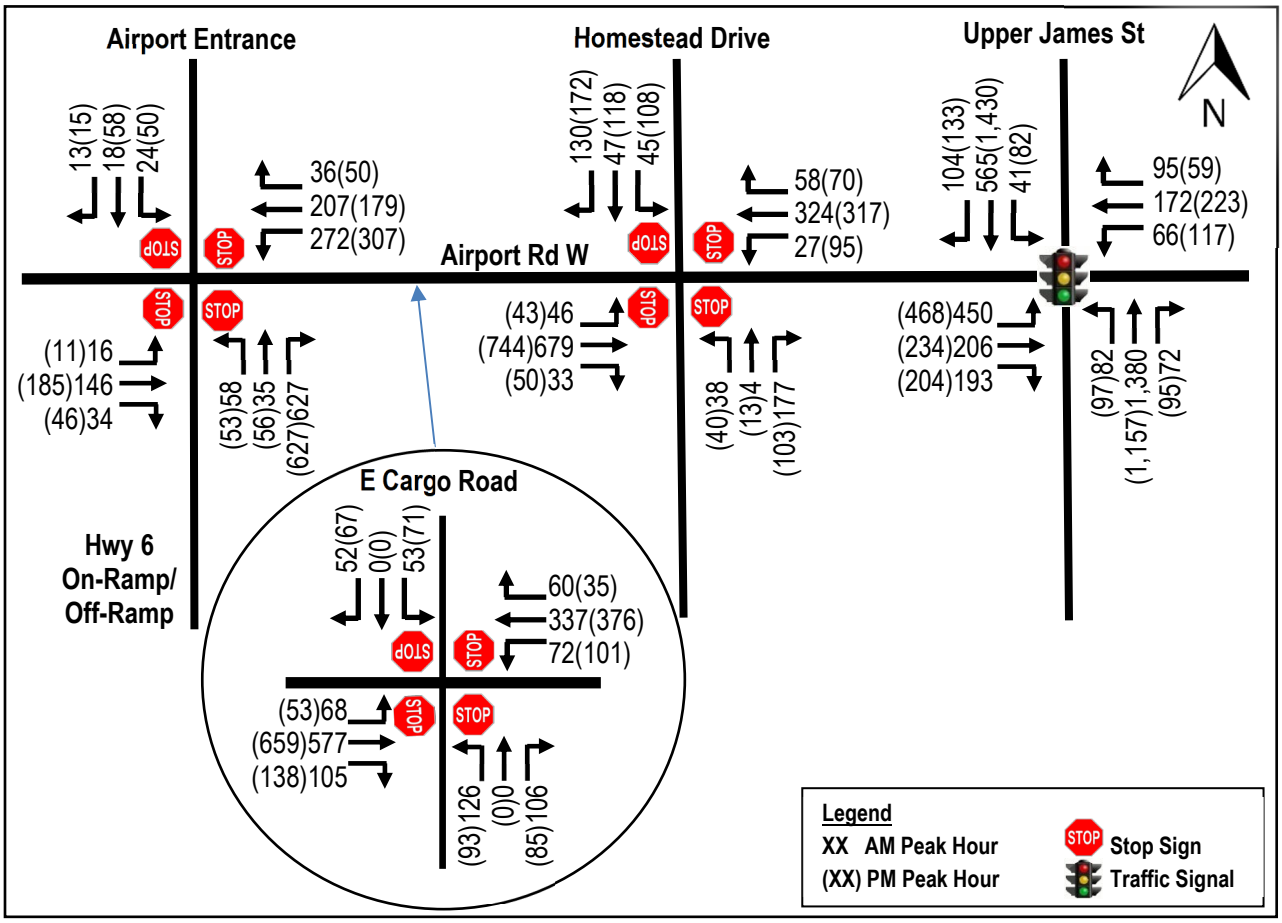
The estimated 2023 and 2028 future background traffic volumes are illustrated in **Figure 9** and were analyzed using Synchro Version 10 software. The detailed calculations are provided in **Appendix E** and summarized in **Table 3**. Under the 2028 future background conditions, all intersections considered in the analysis will need improvements due to the significant background developments in the area, including the developments related to the existing Hamilton International Airport, Airport Employment Growth District Secondary Plan and other background developments in the area. Below are the descriptions of the required improvements:

- Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
    - Westbound left turn lane and shared through/right (current pavement width is 10m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length can be a minimum of 15 m.
    - Eastbound double left and a shared through/right lane. Current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m

each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median. The eastbound double left turn lane storage length can be approximately 60 m.

- It should be noted that the detailed signal timing plans will be provided under the future total conditions.

Figure 9 – 2028 Future Background Traffic Volumes



- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. However, the intersection should be restriped to delineate left turn lane and shared through/right lane. The detailed signal timing plans will be provided under the future total conditions.
- Airport Road W at E Cargo Road – installation of new traffic signals and eastbound and westbound exclusive left turn lanes on Airport Road W. The exclusive eastbound and westbound lane can be 70 m and 30 m storage length, respectively. It is Nextrans' understanding that this traffic signal has been planned and will be installed within this horizon year. The detailed signal timing plans will be provided under the future total conditions.
- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with existing lane configurations. The detailed signal timing plans will be provided under the future total conditions.

The analysis indicates that these improvements should be implemented prior or by 2028 horizon. It is Nextrans' understanding that some of these improvements have been identified in the Paradigm TIS dated December 2016 by 2026 horizon with the proposed background development in the area, without the subject development at 3054 Homestead Drive. However, Paradigm did not recommend any physical improvements at the Airport Road W/Upper James Street and signalization of the Airport Road W/Hamilton International Airport access in the same TIS. The latest Paradigm TIS dated October, 2022 prepared for 2878 Upper James Street identified the improvements for the Airport Road W/Upper James Street intersection and Nextrans concurs with the proposed/recommended improvements identified in the Paradigm TIS. **Table 4** summarizes the intersection levels of service with the recommended improvements, with **Figure 10** illustrates the recommended intersection improvements prior or by 2028 with the required

storage length. These recommended improvements will be carried out to the 2028 future total conditions and intersection capacity analysis with the proposed development site traffic.

Table 3 – 2028 Future Background Levels of Service (No Improvements)

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Airport Rd W/ Upper James St/ (Signalized)	**Overall**	**E (1.20)**	**78**		**F (1.36)**	**121**		
	EB – L	F (1.13)	108	147	F (1.07)	83	154	30
	EB – TR	C (0.61)	20	78	B (0.55)	18	85	220
	WB – LTR	D (0.80)	40	87	D (0.91)	54	137	200
	NB – L	B (0.23)	15	20	C (0.44)	22	22	135
	NB – TR	F (1.20)	124	274	F (1.20)	130	223	260
	SB – L	B (0.19)	16	11	C (0.38)	21	19	120
	SB – T	C (0.51)	25	72	F (1.36)	198	264	300
	SB – R	A (0.20)	6	12	A (0.26)	10	20	80
Airport Rd W/ Homestead Dr/ (Unsignalized)	EB – L	F (0.10)	10	-	F (0.11)	11	-	30
	EB – TR	F (1.53)	265	-	F (1.86)	411	-	800
	WB – L	D (0.06)	10	-	E (0.24)	12	-	30
	WB – TR	A (0.83)	36	-	E (0.90)	47	-	220
	NB – L	B (0.10)	11	-	B (0.11)	12	-	30
	NB – TR	A (0.40)	14	-	B (0.29)	13	-	260
	SB – L	B (0.12)	12	-	C (0.28)	14	-	30
	SB – TR	A (0.40)	14	-	C (0.68)	24	-	550
Airport Rd W/ Hamilton Airport Entrance/Hwy 6 (Unsignalized)	EB – L	B (0.04)	10	-	C (0.03)	10	-	30
	EB – TR	A (0.41)	13	-	C (0.56)	19	-	160
	WB – L	C (0.63)	18	-	C (0.75)	31	-	30
	WB – TR	A (0.50)	13	-	C (0.52)	17	-	320
	NB – L	F (0.13)	10	-	F (0.15)	13	-	30
	NB – TR	F (1.24)	72	-	F (1.43)	224	-	135
	SB – L	B (0.06)	11	-	B (0.13)	12	-	30
	SB – TR	B (0.07)	10	-	B (0.18)	12	-	90
Airport Rd W/ E Cargo Dr/ Provident Way (Unsignalized)	EB – LTR	A (0.09)	2	2	F (1.54)	268	-	320
	WB – LTR	A (0.10)	3	3	F (0.94)	50	-	840
	NB – L	F (2.32)	755	108	B (0.24)	13	-	30
	NB - TR	C (0.30)	18	10	B (0.19)	11	-	100
	SB – L	F (1.56)	487	55	B (0.18)	12	-	60
	SB – TR	B (0.13)	13	3	B (0.15)	11	-	310

Figure 10 – 2028 Horizon Planned Intersection Improvements

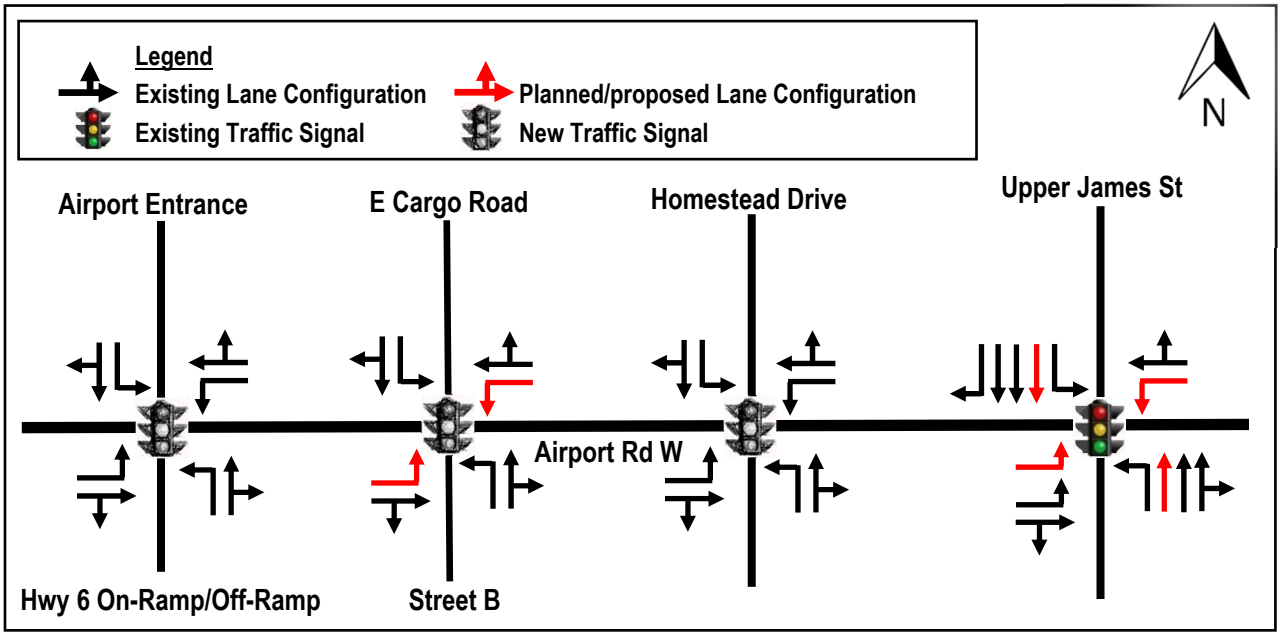


Table 4 – 2028 Future Background LOS with Recommended Intersection Improvements

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Airport Rd W/ Upper James St/ (Signalized)	**Overall**	**D (0.92)**	**36**		**D (0.96)**	**38**		
	EB – LL	E (0.92)	74	93	F (0.96)	82	99	120
	EB – TR	C (0.68)	32	102	C (0.67)	31	109	220
	WB – L	D (0.42)	47	28	E (0.67)	59	47	15
	WB – TR	D (0.76)	54	86	D (0.76)	54	92	200
	NB – L	C (0.21)	23	26	C (0.49)	25	28	135
	NB – TR	C (0.70)	30	153	C (0.64)	30	128	260
	SB – L	C (0.25)	23	14	B (0.38)	19	21	120
	SB – T	C (0.29)	22	49	C (0.73)	33	166	300
	SB – R	A (0.17)	5	11	A (0.21)	7	18	80
Airport Rd W/ Homestead Dr/ (Signalized)	**Overall**	**B (0.61)**	**11**		**B (0.79)**	**19**		
	EB – L	A (0.07)	3	3	A (0.08)	7	5	30
	EB – TR	B (0.61)	10	150	B (0.73)	18	174	800
	WB – L	A (0.08)	4	4	B (0.40)	13	21	30
	WB – TR	A (0.33)	5	36	A (0.37)	7	45	220
	NB – L	D (0.39)	41	15	D (0.42)	39	16	30
	NB – TR	B (0.52)	10	17	A (0.30)	9	15	260
	SB – L	D (0.49)	48	17	C (0.48)	34	32	30
	SB – TR	B (0.57)	17	25	D (0.79)	36	62	550
Airport Rd W/ Hamilton Airport Entrance/Hwy 6 (Signalized)	**Overall**	**B (0.87)**	**12**		**B (0.85)**	**13**		
	EB – L	A (0.02)	7	4	A (0.02)	8	3	30
	EB – TR	A (0.18)	6	23	A (0.24)	8	30	160
	WB – L	A (0.43)	7	37	B (0.51)	11	44	30
	WB – TR	A (0.22)	4	18	A (0.23)	6	20	320
	NB – L	C (0.27)	27	16	C (0.32)	27	17	30
	NB – TR	B (0.87)	16	43	B (0.85)	14	57	135
	SB – L	C (0.27)	31	9	D (0.59)	50	20	30
	SB – TR	B (0.10)	16	8	B (0.19)	19	17	90
Airport Rd W/ E Cargo Dr/ Provident Way (Signalized)	**Overall**	**B (0.74)**	**13**		**A (0.62)**	**9**		
	EB – L	A (0.17)	5	6	A (0.09)	4	3	15
	EB – TR	B (0.74)	13	106	A (0.62)	8	119	320
	WB – L	B (0.25)	10	15	A (0.28)	8	17	15
	WB – TR	A (0.42)	9	52	A (0.32)	6	51	840
	NB – L	D (0.58)	39	36	D (0.49)	38	28	15
	NB - TR	A (0.24)	1	0	A (0.19)	1	0	100
	SB – L	C (0.31)	31	17	C (0.37)	35	22	60
	SB – TR	A (0.11)	0	0	A (0.11)	0	0	310

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the current development proposal includes four industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2), which is about 9,974.92 m^2 less than the previous development proposal. The detailed development statistics are included below:

- Building 'A' – 33,325.64 m^2 (or 358,714 ft^2)
- Building 'B' – 26,562.68 m^2 (or 285,918 ft^2)
- Building 'C' – 38,268.75 m^2 (or 411,921 ft^2)
- Building 'D' – 33,468.93 m^2 (or 360,257 ft^2)

From a transportation planning perspective, the proposed development is important as it will bring jobs and economic activities to the City of Hamilton and the area. It gives the existing and future residents in the City of Hamilton area to

work closer to home without driving longer distance to other jurisdictions outside the City of Hamilton. During the good weather conditions, the residents can walk or bicycle to work instead of driving a private car.

The 2016 Transportation Tomorrow Survey (TTS) and the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) and information was reviewed to estimate the trip distribution and trip generation for the proposed development.

5.2. Site Trip Generation

The trip generation forecasts were undertaken using the information contained in the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE). For the purposes of this assessment, the ITE Land Use Code (LUC) 130 "Industrial Park" will be utilized in this Study. It should be noted that since fitted curve equations are not provided, therefore average rates will be utilized. **Table 5** summarizes the site trip generation.

For the purposes of this assessment, the anticipated truck volumes during the peak hours are estimated based on the Appendix A of the ITE Trip Generation Handbook. The anticipated truck percentage is approximately 3% of the total site trips. **Table 6** summarizes the anticipated truck trips to be generated by the proposed development. Instead of converting to passenger car equivalent (PCE), the 3% truck percentage will be reflected in the Synchro analysis as Synchro will use this percentage to convert and estimate the impact of queues and intersection operations.

Table 5 – Site Traffic Trip Generation

ITE Land Use Industrial Park LUC 130	Magnitude	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Building A	358,714	Average Trip Rates	0.28	0.06	0.34	0.07	0.27	0.34
		New Auto Trips	99	23	122	26	96	122
Building B	285,918	Average Trip Rates	0.28	0.06	0.34	0.07	0.27	0.34
		New Auto Trips	79	18	97	20	77	97
Building C	411,921	Average Trip Rates	0.28	0.06	0.34	0.07	0.27	0.34
		New Auto Trips	113	27	140	29	111	140
Building D	360,257	Average Trip Rates	0.28	0.06	0.34	0.07	0.27	0.34
		New Auto Trips	99	23	122	26	96	122
Total New Auto Trips			***390***	***90***	***480***	***100***	***380***	***480***

Table 6 – Site Truck Trip Generation

ITE Land Use Industrial Park LUC 130	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
Truck Trips - Building A	3	1	4	1	4	5
Truck Trips - Building B	2	1	3	1	3	4
Truck Trips - Building C	3	1	4	2	4	6
Truck Trips - Building D	2	2	4	1	4	5
Total Truck Trips	**10**	**5**	**15**	**5**	**15**	**20**

The proposed development is expected to generate 480 total two-way auto trips (390 inbound and 90 outbound) and 480 total two-way auto trips (100 inbound and 380 outbound) during the morning and afternoon peak hours, respectively. It should be noted that the trip numbers are rounded to the nearest 5.

In addition, the proposed development is anticipated to generate a total of 15 two-way truck trips (10 inbound and 5 outbound) and 20 two-way truck trips (5 inbound and 15 outbound) during the morning and afternoon peak hours, respectively. It should be noted that most truck trips to and from the site will avoid peak hours to save gas and travel

time, therefore, the trip generation is reflective of this provision. It should also be noted that the trip numbers are rounded to the nearest 5.

5.3. Proposed Development Access

Under the current proposed concept plan, the proposed development accesses will be provided via the proposed Street "A", which will be connected directly to Airport Road. Therefore, the main site external intersection will be the Street A/Airport Road W intersection. The terminus of Street "A" (i.e. cul-de-sac) is also protected for a potential future connection with the Rice Group proposed development to the north, if desired and appropriate. However, the technical analysis indicates that this connection is not required for the subject site development.

For the purposes of this assessment, the anticipated lane configurations and traffic control for this proposed intersection include:

- One eastbound exclusive left turn lane and one through lane on Airport Road W;
- One westbound shadow lane and a shared through/right lane on Airport Road W;
- One southbound exclusive left turn lane and one exclusive right turn lane on Street "A"; and
- The intersection will be stop-controlled on Street "A', with free-flow on Airport Road W

The traffic control type and storage length will be determined through intersection capacity analysis outlined in Section 6 of this Addendum Study.

5.4. Site Trip Distribution Based on 2016 TTS Data for Residential Component

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for Traffic Zones 5008, 5016, 5020 and 5038 in order to estimate the general trip distribution for the proposed development. The detailed 2016 TTS analysis is included in **Appendix F**.

Table 7 summarizes general distribution based on the 2016 TTS data for the proposed development, with **Table 8** summarizing the site traffic assignment. It should be noted that the auto site trip distribution and assignment have been taken into consideration the TTS information, existing intersection operations and logical routes, where appropriate.

Table 7 – General Trip Distribution

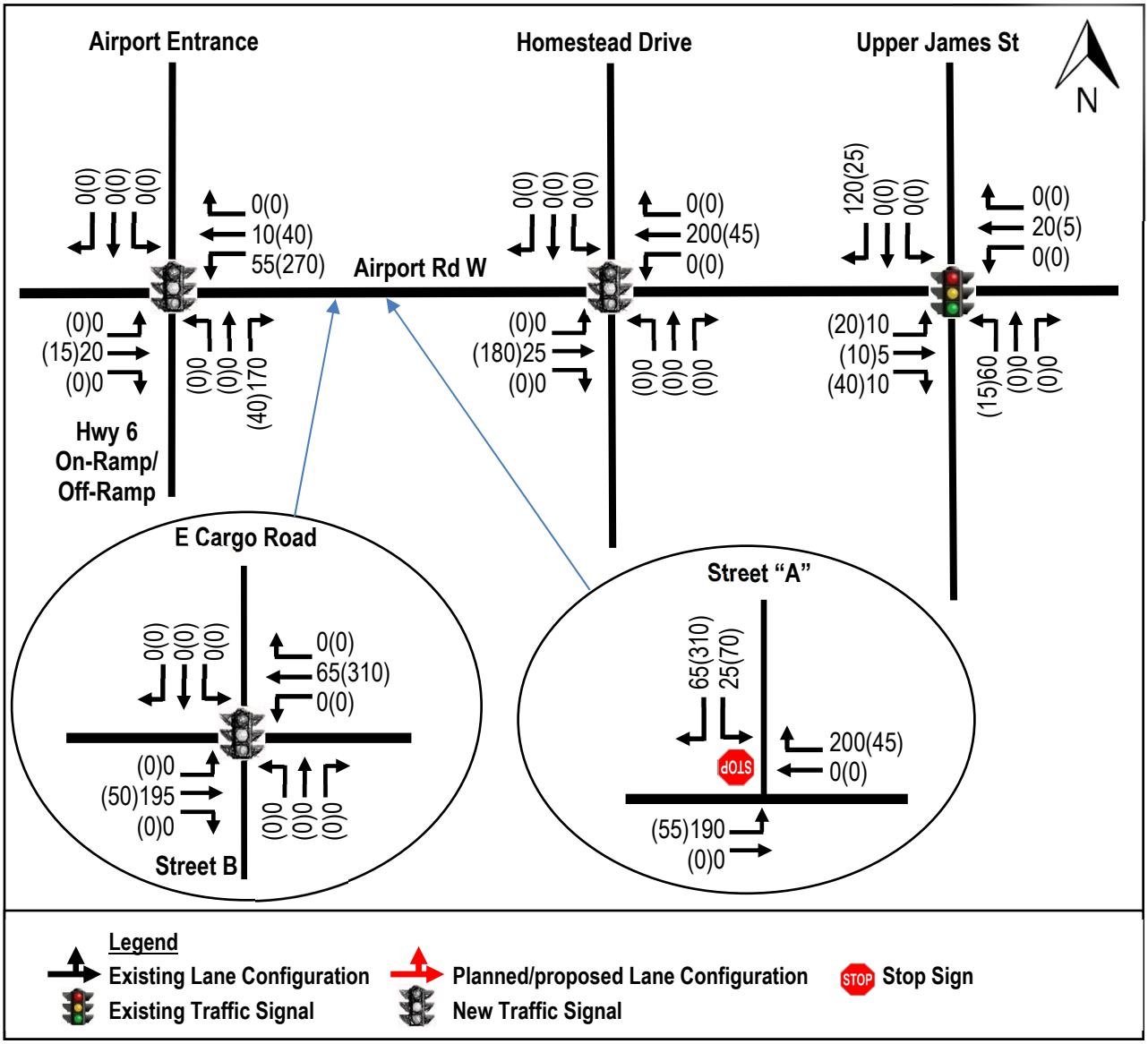
Hamilton	Toronto	Halton	Flamborough	Dundas	Ancaster	Glanbrook	Stoney Creek	Waterloo/ Brantford
50%	4%	9%	2%	3%	4%	13%	3%	11%

Table 8 – Site Trip Assignment

General Direction (To/From)	Percentage Assignment
North (Upper James Street/Hwy 6)	70%
South (Upper James Street/Homestead Drive)	15%
East (Airport Road W/White Church Road W)	5%
West (Airport Road W/Hwy 6)	10%
Total	***100%***

Figure 11 illustrates the proposed development generated traffic volumes.

Figure 11 – Site Traffic Volumes

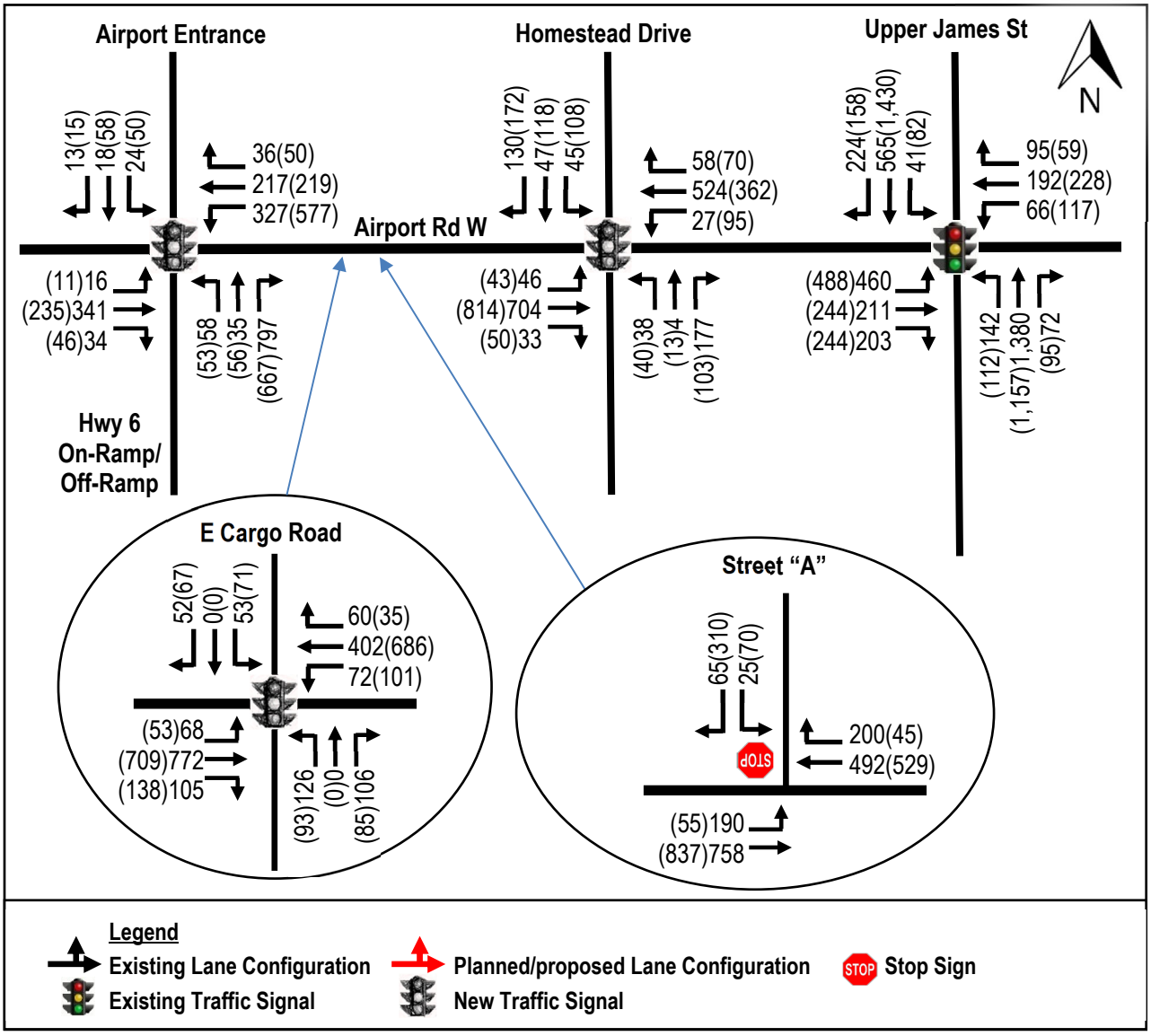


6.0 FUTURE TOTAL TRAFFIC CONDITIONS

6.1. Future Total Traffic Assessment for Auto Mode

The estimated future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 12** and were analyzed using Synchro Version 10 software. The detailed calculations are provided in **Appendix G** and summarized in **Table 9**.

Figure 12 – 2028 Future Total Traffic Volumes

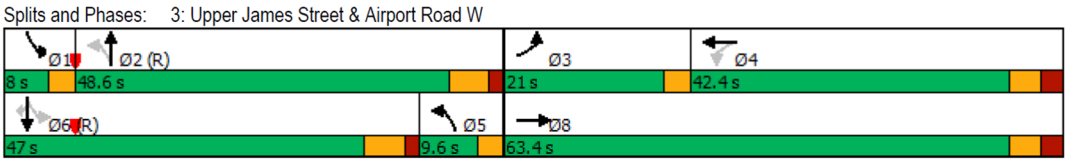


Under the 2028 future total conditions, all intersections considered in the analysis will need improvements due to the significant background developments in the area, including the developments related to the existing Hamilton International Airport, Airport Employment Growth District Secondary Plan, 9255 Airport Road and other background developments in the area. Below are the descriptions of the required improvements:

- Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
    - Westbound left turn lane and shared through/right (current pavement width is 10 m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length can be a minimum of 15 m.
    - Eastbound double left and a shared through/right lane ((current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median). The eastbound double left turn lane storage length can be approximately 60 m.

- Potential signal timing plans for this intersection:

AM Peak (120s cycle length, 4s amber and 2s all red)



PM Peak (120s cycle length, 4s amber and 2s all red)

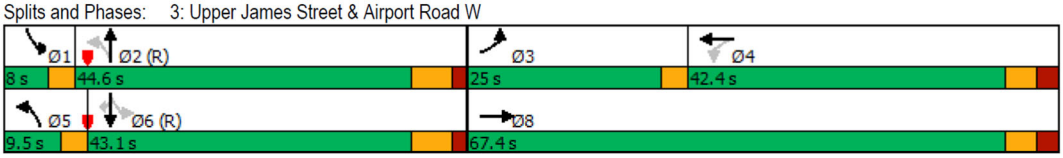
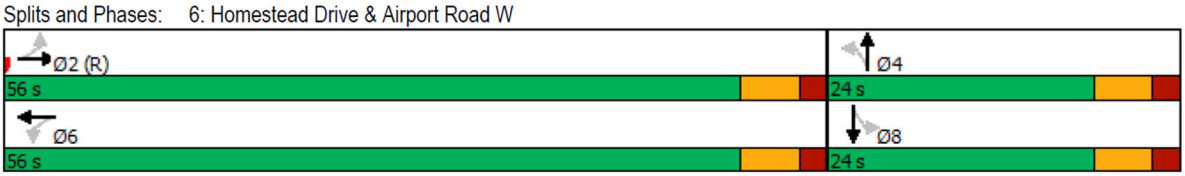


Table 9 – 2028 Future Total Levels of Service

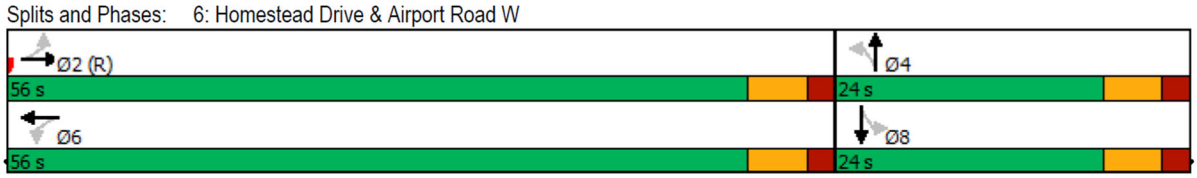
Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Airport Rd W/ Upper James St/ (Signalized)	**Overall**	**D (0.94)**	**36**		**D (0.85)**	**38**		
	EB – LL	E (0.94)	77	96	E (0.85)	62	91	120
	EB – TR	C (0.68)	31	104	C (0.69)	29	114	220
	WB – L	D (0.40)	45	28	E (0.68)	61	47	15
	WB – TR	D (0.78)	54	92	D (0.76)	54	93	200
	NB – L	C (0.37)	28	41	C (0.55)	29	35	135
	NB – TR	C (0.72)	31	153	C (0.68)	33	131	260
	SB – L	C (0.26)	24	15	C (0.41)	23	23	120
	SB – T	C (0.29)	23	50	D (0.79)	38	173	300
	SB – R	A (0.33)	4	17	A (0.26)	8	21	80
Airport Rd W/ Homestead Dr/ (Signalized)	**Overall**	**A (0.63)**	**10**		**B (0.80)**	**17**		
	EB – L	A (0.09)	5	4	A (0.08)	6	6	30
	EB – TR	A (0.63)	8	72	B (0.80)	14	121	800
	WB – L	A (0.08)	4	4	B (0.49)	18	26	30
	WB – TR	A (0.50)	6	68	A (0.41)	8	50	220
	NB – L	D (0.39)	41	15	D (0.44)	41	16	30
	NB – TR	B (0.52)	10	17	A (0.30)	9	15	260
	SB – L	D (0.49)	48	17	C (0.49)	34	32	30
	SB – TR	B (0.57)	17	25	D (0.80)	37	70	550
Airport Rd W/ Hamilton Airport Entrance/Hwy 6 (Signalized)	**Overall**	**C (0.98)**	**37**		**B (0.93)**	**20**		
	EB – L	C (0.05)	23	7	C (0.03)	24	6	30
	EB – TR	D (0.75)	38	123	C (0.54)	29	83	160
	WB – L	B (0.68)	17	54	B (0.82)	15	54	30
	WB – TR	A (0.27)	9	35	A (0.26)	4	15	320
	NB – L	C (0.17)	22	16	C (0.37)	34	19	30
	NB – TR	C (0.98)	33	131	C (0.93)	23	93	135
	SB – L	C (0.27)	29	10	D (0.59)	54	23	30
	SB – TR	B (0.07)	14	8	C (0.22)	23	20	90
Airport Rd W/ E Cargo Dr/ Provident Way (Signalized)	**Overall**	**B (0.95)**	**16**		**A (0.66)**	**10**		
	EB – L	A (0.19)	5	4	A (0.14)	4	3	15
	EB – TR	C (0.95)	21	206	A (0.66)	9	151	320
	WB – L	C (0.53)	23	30	A (0.31)	7	14	15
	WB – TR	A (0.49)	6	44	A (0.56)	7	83	840
	NB – L	D (0.58)	39	36	D (0.49)	38	28	15
	NB - TR	A (0.29)	5	9	A (0.21)	1	0	100
	SB – L	C (0.31)	31	17	C (0.37)	35	22	60
	SB – TR	A (0.13)	1	0	A (0.16)	1	0	310
Airport Rd W/ Proposed Street 'A' (Unsignalized)	EB – L	B (0.24)	11	8	A (0.06)	9	2	15
	EB – TR	B (0.48)	0	0	A (0.54)	0	0	320
	WB – TR	B (0.44)	0	0	A (0.37)	0	0	225
	SB – L	F (0.93)	340	24	F (0.96)	183	41	30
	SB – R	B (0.15)	14	4	D (0.67)	25	39	200

- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. However, the intersection pavement markings should be restriped to delineate left turn lane and shared through/right lane.

AM Peak (80s cycle length, 4s amber and 2s all red)

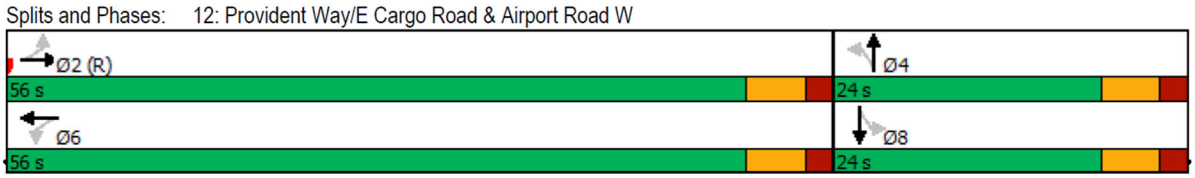


PM Peak (80s cycle length, 4s amber and 2s all red)

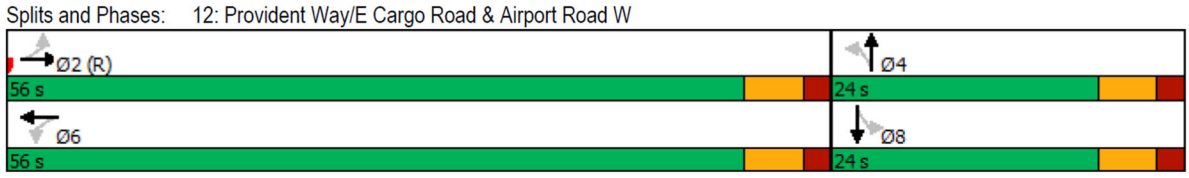


- Airport Road W at E Cargo Road/Provident Way – installation of new traffic signals and eastbound and westbound exclusive left turn lanes on Airport Road W. The exclusive eastbound and westbound lane should have at least 30 m storage length. It is Nextrans' understanding that this traffic signal has been planned and will be installed prior to this horizon year.

AM Peak (80s cycle length, 4s amber and 2s all red)

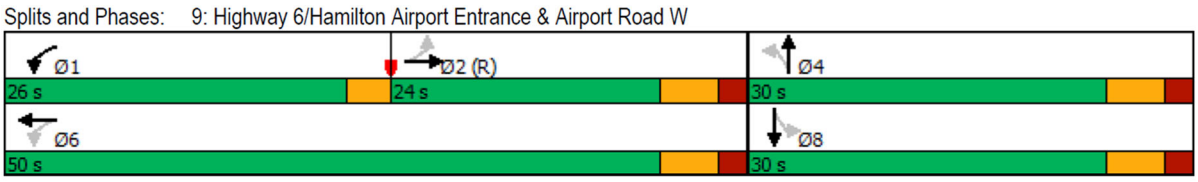


PM Peak (80s cycle length, 4s amber and 2s all red)

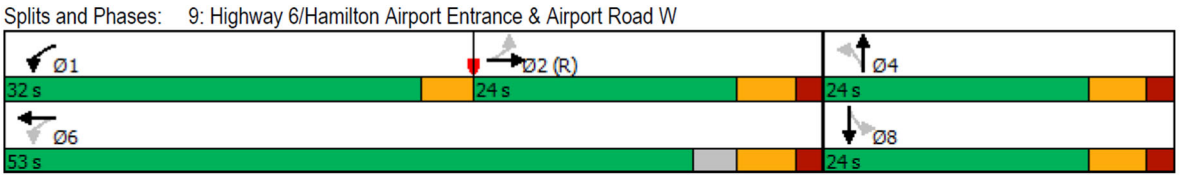


- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with existing lane configurations. However, the westbound left turn pavement marking should be restriped to provide a longer storage length of 120 m, an increase from existing 30 m storage.

AM Peak (80s cycle length, 4s amber and 2s all red)



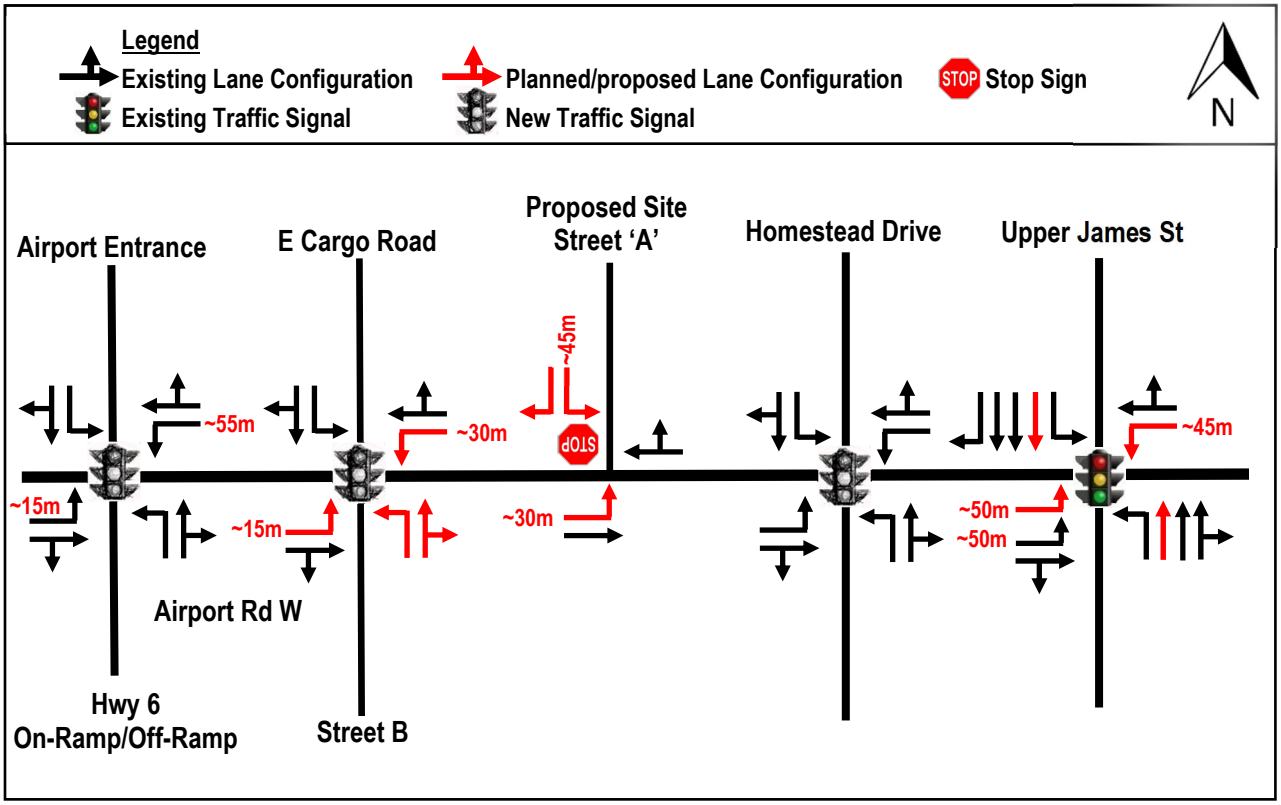
PM Peak (80s cycle length, 4s amber and 2s all red)



The analysis indicates that these improvements should be implemented prior or by 2028 horizon. Based on Nextrans' review of the Paradigm TIS dated December 2016, some of these improvements have been identified and recommended to be implemented by 2026 horizon with the proposed background development in the area, without the subject development at 3054 Homestead Drive. However, Paradigm TIS dated December 2016 did not recommend any physical improvements at the Airport Road W/Upper James Street and signalization of the Airport Road W/Hamilton International Airport access because the analysis horizon year was 2026.

Figure 13 illustrates the 2028 horizon planned and proposed intersection improvements for the area based on the findings of this Study and all background studies prepared for the area background development proposals.

Figure 13 – 2028 Horizon Planned and Recommended Intersection Improvements



Based on the analysis findings, it is Nextrans' opinion that the proposed development has negligible impacts on the road network and therefore does not trigger these improvements, except for the localized improvements at the Airport Road W/E Cargo Road intersection to service the site. The majority of the required intersection improvements, especially the double left turn at the intersection of Airport Road W and Homestead Drive, are required under the existing conditions as there already over 300 vehicles making eastbound left turn at this intersection.

In addition, the double left turn lanes are also triggered by the significant amount of background residential and commercial development applications in the area. It is Nextrans' opinion that these improvements should be implemented by the City of Hamilton, or by the proposed development that are directly fronting on Airport Road W. It should be noted that the subject development has no frontage onto this intersection, therefore it has no control over this intersection.

In addition, the subject development is in discussion with the proposed Rice Group development to the north to connect Street A from the subject development to provide an alternative access arrangement. Although this connection is not required to accommodate the proposed development, however, it will provide an alternative access option and this will significantly reduce the numbers of eastbound left turn at the Airport Road W/Upper James Street intersection.

6.2. Traffic Signal Warrant Analysis

Nextrans has conducted a traffic signal warrant analysis for the following intersections based on the 2028 future forecast volumes and Justification 7 of the Ontario Traffic Manual Book 12:

- Airport Road W/E Cargo Road/Street B – Numerically warranted by 2028 horizon
- Airport Road W/Hamilton International Airport Access/Hwy 6 – Numerically warranted by 2028 horizon
- Airport Road W/Homestead Drive – Numerically warranted by 2028 horizon
- Airport Road W/Proposed Development Access – Not numerically warranted by 2028 horizon

The traffic signal warrant analyses as outlined in **Appendix H** indicate that traffic signals are numerically warranted at these the intersections based on overall/combined warrant by 2028. The analysis indicates that the proposed Airport Road W/Proposed Development Access intersection is not numerically warranted under the 2028 horizon.

6.3. Scenario with Access Via 2876 Upper James Street

The City has indicated through their comments that an access option via 2876 Upper James Street development should be explored. It is Nextrans understanding that the subject development will protect for an interconnection to 2876 Upper James Street at the Street 'A' cul-de-sac. The proposed development will not preclude this option. However, the analysis indicates that this interconnection is not require for the subject development as the timing of the two proposed land uses may not coincide.

It is Nextrans further understanding that Paradigm has analyzed an option with the subject development traffic to be rerouted through the future 2876 Upper James Street proposed development as part of their October, 2022 TIS. The analysis indicates that the subject development traffic can be accommodated by the proposed intersection with Upper James Street sign future signalization of this intersection.

Given that the current development proposal is expected to generate significantly less traffic than the previous development proposal, which Paradigm included in the analysis, for this reason, the current development proposal traffic can be accommodated through 2876 Upper James Street development if needed.

6.4. Active Transportation Mode Assessment

Sidewalk

As indicated in Section 2 of this Study, sidewalk is currently provided on south side only on Airport Road W from Homestead Dr to Mt Hope Public School. On Homestead Drive, sidewalks are provided on the east side north of Airport Rd, and on the west side south of Airport Rd. Sidewalk are not currently provided on Upper James Street and E Cargo Road. The analysis indicates that sidewalk on the south side of Airport Road W should be extended from the existing Mt Hope Public School to E Cargo Road/Future Street "B" so that the future residents south of Airport Road W can walk to the existing school.

In addition, sidewalk should also be extended to the Hamilton Airport to support transit and employees who work for the airport authority. This provision should be included in the City's capital projects as this provision is beyond the scope of this Study. As part of the proposed development, sidewalk will be provided on one side of Street 'A' within the entire length of Street 'A' from the proposed intersection with Airport Road W to the cul-de-sac.

Figure 14 illustrates the proposed development active transportation network. It should be noted that these provisions also addressed the City's comments on the previous submission.

Bicycle

Currently, there are no dedicated bike lanes or multi-use path in the immediate area. The existing Chippawa Rail Trail is located almost 3 km to the east of the site. It is Nextrans' understanding that the City of Hamilton is planning to construct bicycle lanes along Airport Road W and multi-use trail along Upper James Street/Homestead Drive in the area in the future. The analysis indicates that these facilities are important for the community and businesses in the area. **Figure 15** illustrates the future planned cycling network.

Through the comments provided in the previous submission, the City staff asked for a multi-use path along one side of Street 'A'. Nextrans has reviewed the context of the area and the proposed development to determine the most appropriate active transportation facilities for the proposed development.

Nextrans recommends that a 3.0 m wide multi-use path (MUP) be provided on the west to north side of Street 'A' as there are less driveway interruptions, with sidewalk be provided on the east to south side of Street 'A'. As pedestrians can also walk on the MUP, there is no need to provide sidewalk on both sides of Street 'A'. The MUP will be paved with asphalt, while the sidewalk will be constructed with concrete. **Figure 14** illustrates the proposed MU P and sidewalk on Street 'A'.

Figure 14 – Proposed Sidewalk and MUP for Street 'A'

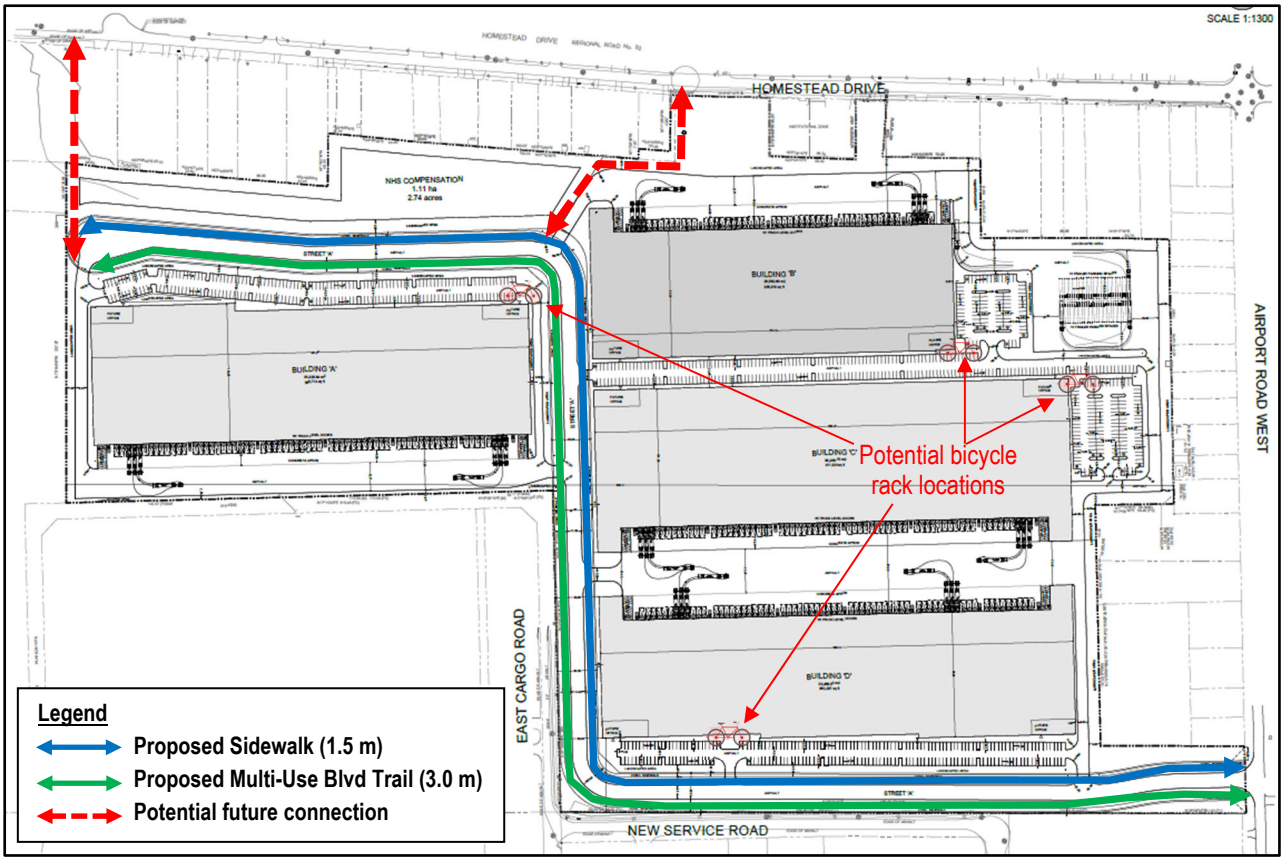
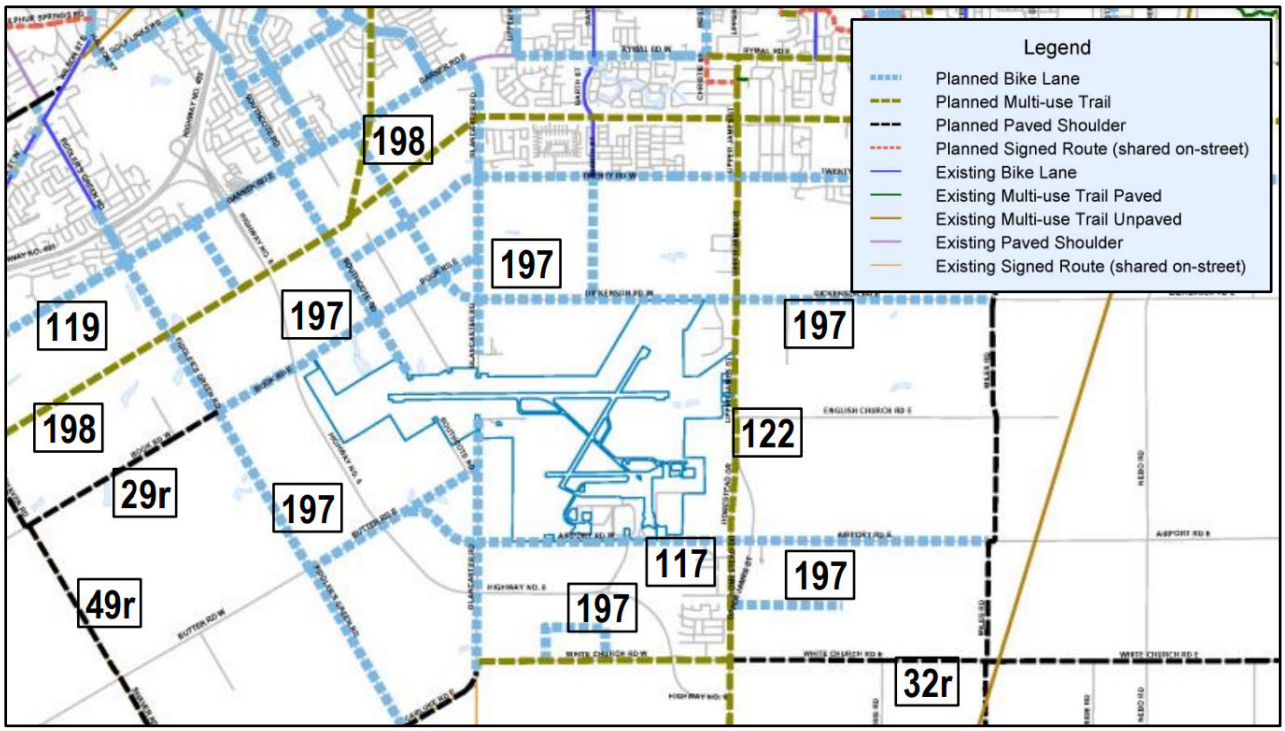


Figure 15 – Future Planned Cycling Network by the City of Hamilton



Source: City of Hamilton Transportation Master Plan Review and Update Report

6.5. Transit Mode Assessment

If a 10% modal is applied to the proposed development site generated trips, the proposed development is expected to generate 48 two-way transit trips (10 inbound and 38 outbound) and 48 two-way transit trips (39 inbound and 9 outbound) during the morning and afternoon peak hours, respectively.

As indicated in Section 2 of this Study, the closest bus stops to the proposed development are the Bus Route 20 stops located at the Airport Road W/Canadian Warplane Heritage Museum driveway, which is about 700 m (about 10-minute walk). The service frequency is about 15-25 minutes (or about 3-4 buses) during the morning and afternoon peak periods.

Given that the transit passenger demands generated by the proposed development per transit vehicle is low (at most 10 passengers per transit vehicle per hour). Therefore, the proposed development impact on transit service is negligible and no improvements are required. In reality, some passengers could be bunched together during the peak 15 minutes, instead of spreading during the entire peak hour. Even if this is the case, the estimates indicate that the demand per vehicle is low and can be accommodated without the need for additional transit vehicles or improvements during both the morning and afternoon peak periods.

7.0 SITE PLAN REVIEW

7.1. Loading Requirement

As indicated in previous sections of this report, the proposed development includes five industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2). It is Nextrans' understanding that given the industrial land use nature of the proposed development, the proposed development will provide sufficient or exceed the loading space requirements to accommodate the proposed industrial uses.

For illustration purposes, the vehicle turning templates for TAC-WB19 has been provided in **Figure 19**. More detailed vehicle track templates will be provided using AutoTURN software as part of the future site plan submission for each proposed building so that more details can be provided.

It should be noted that all access curb radii for individual building will be designed in accordance with the City standards and TAC Geometric Design Guideline for Canadian Roads and to accommodate the largest type of servicing vehicles that will be accessed the site on a daily basis.

7.2. Airport Road and Proposed Street A

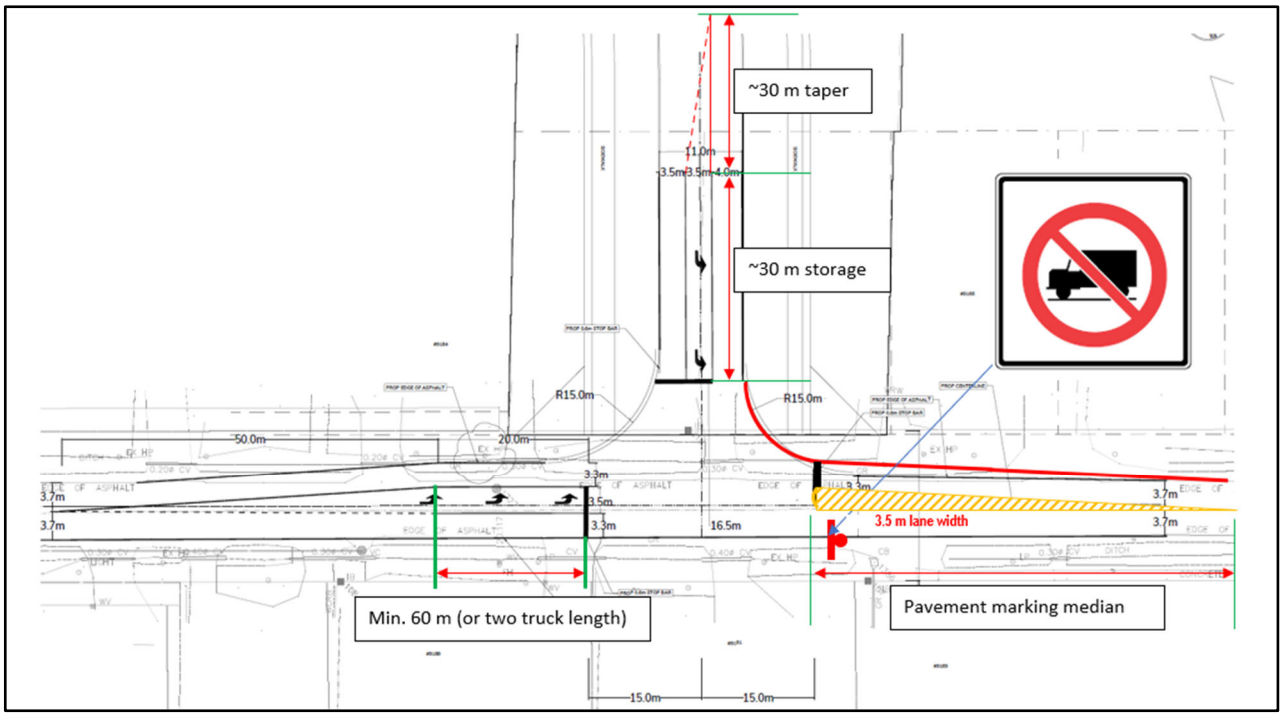
As the proposed development also includes the 9174 & 9166 Airport Road West parcels, this provides an opportunity to provide a direct access onto Airport Road W. It should be noted that under the Planning Act, municipality cannot landlock a development and must provide an access for a development.

Under the proposed draft plan of subdivision, the main development road or Street "A", will be connected directly to Airport Road to service the proposed development. Street "A" will be using the 9174 & 9166 Airport Road West parcels to connect to Airport Road W. The terminus of Street "A" (i.e. cul-de-sac) is also protected for a potential future connection with the Rice Group proposed development to the north, if desired and appropriate. However, the technical analysis indicates that this interconnection is not required for the subject site development. Given the timing of the two developments and potential reciprocal easement, it will be very difficult and time consuming to address this in a short-term. It also limits the ability for both developments to move forward when market demand for the lands.

The analysis indicates the Street "A"/Airport Road W intersection is expected to operate at acceptable levels of service with minimum delay and queue. **Figure 16** illustrates a potential conceptual intersection functional plan for illustration purposes. The detailed functional design will be provided once the City approves it in principle. The recommended lane configurations and traffic control for this intersection include:

- One eastbound exclusive left turn lane and one through lane on Airport Road W;
- One westbound shadow lane and a shared through/right lane on Airport Road W;
- One southbound exclusive left turn lane and one exclusive right turn lane on Street "A"; and
- The intersection will be stop-controlled on Street "A', with free-flow on Airport Road W

Figure 16 – Potential Conceptual Intersection Functional Design



7.3. Driveway Location and Configuration

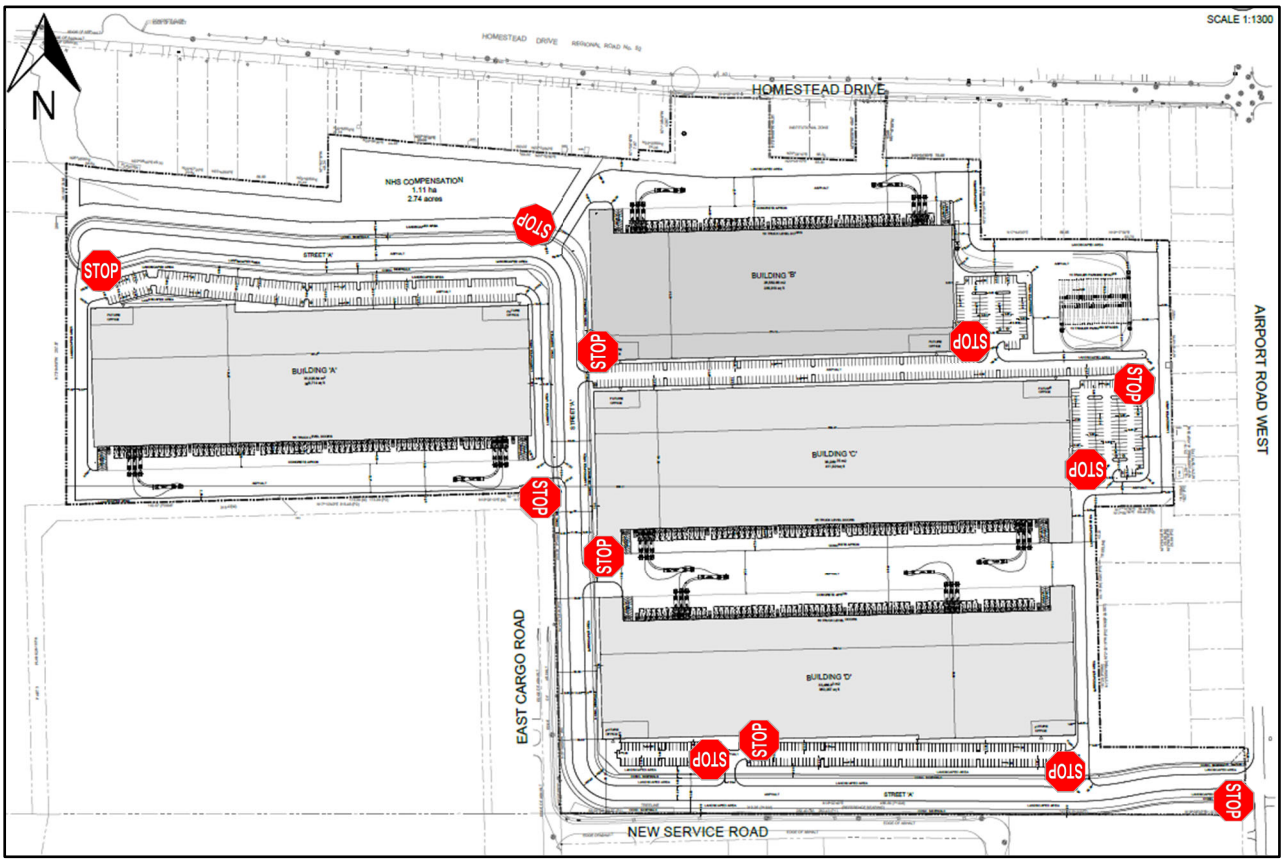
All internal accesses that will be required to service the proposed individual buildings will be provided via Street A. Based on Nextrans' technical review of the internal accesses, it is indicated that:

- The proposed access locations for Building "A" are appropriate with no potential sightline issues as Street "A" is relative flat with no horizon curves in the vicinity of the site accesses.
- The proposed access locations for Building "B" are also appropriate. The City has indicated that the access should not be located within the horizon curve. However, given that the access for Building "B" is located on the outside of the horizon curve, there are no potential sightline issues as the sightlines are not being obstructed by the curves or buildings.
- The proposed access locations for Building "C" are appropriate with no potential sightline issues as Street "A" is relative flat with no horizon curves in the vicinity of the site accesses.
- The proposed access locations for Building "D" are also appropriate. The sight distance to the horizontal curve is approximately 105m, which is much greater than the stopping sight distance of 66m for 50 km/h design speed with 3% downgrade (assumed worst-case scenario).

The detailed access configurations and locations will be reviewed in more detailed as part of the site plan stage for each building, if required. **Figure 17** illustrates the potential/general traffic control type for the proposed internal site accesses.

It should be noted that a detailed pavement markings and signage plan will be provided at appropriate time to address the City's requirements once the proposed locations of the site accesses are approved in principle. This provision is to avoid any unnecessary review times from staff and minimize revisions for the project team.

Figure 17 – Potential/General Traffic Control Type for the Internal Accesses



7.4. Traffic Calming Measures

Based on Nextrans comprehensive assessment of the area and the proposed development context, the analysis indicates that traffic calming measures are not required on Street 'A' as this road will mostly service the proposed development.

Traffic calming measures are also not required along this section of Airport Road W as it is intended to service commercial and development traffic. However, given that there is a school (Mt Hope Elementary School) located on the south side of Airport Road W, west of Marion Street, it is recommended that the City considers installing speed radar board on both sides of Airport Road in the vicinity of the school driveway (i.e. 100 m east and west of the driveway). Speed humps are not appropriate for this application as there are emergency vehicles, buses and servicing vehicles that will using Airport Road W and speed humps may cause some unnecessary delays for these essential vehicles to service the community and the airport.

8.0 PARKING ASSESSMENT

8.1. Vehicle Parking Requirement

For the purpose of this assessment, Zoning By-law No. 05-200 Section 5.6 (Consolidated as of September, 2019) has been reviewed and applied in the analysis for vehicle parking requirements. **Table 10** summarizes the vehicle parking requirement, based on the City's Zoning By-law No. 05-200, Sections 5.6.

Table 10 – Zoning By-law No. 05-200 Vehicle Parking Requirement

Description		GFA (m^2)	Parking Rates	Required	Provided (Approx.)
Building A	Industrial (95%)	31,659.36	1.0 space/200 m^2	158	***214***
	Office (5%)	1666.282	1.0 space/30m^2	56	
	Total	***33,325.64***		***214***	
Building B	Industrial (95%)	25,234.55	1.0 space/200 m^2	126	**187**
	Office (5%)	1,328.13	1.0 space/30m^2	44	
	Total	***26,562.68***		***170***	
Building C	Industrial (95%)	36,355.31	1.0 space/200 m^2	182	**262**
	Office (5%)	1,913.44	1.0 space/30m^2	64	
	Total	***38,268.75***		***246***	
Building D	Industrial (95%)	31,795.48	1.0 space/200 m^2	159	**224**
	Office (5%)	1,673.45	1.0 space/30m^2	56	
	Total	***33,468.93***		***215***	
Total Development Vehicle Parking Requirement				***845***	***887***

Based on the City's By-Law No. 05-200, a total of 845 vehicle parking spaces are required for the proposed development, which include 220 parking spaces for office component and 625 spaces for the industrial/warehouse component. The proposed development will provide approximately 887 vehicle parking spaces. Therefore, the proposed development just slightly exceeds the minimum Zoning By-law requirement. It should also be noted that the proposed development will provide 245 truck level doors and 30 trailer parking spaces. These are to accommodate the demand for the proposed anticipated industrial land uses.

8.2. Bicycle Parking Requirement

Based on the City's By-Law No. 05-200, bicycle parking spaces are not required for industrial use. However, to support active transportation and TDM, Nextrans recommends that the proposed development provide 5 short-term bicycle parking spaces (bicycle rack) near the front entrance of each proposed building. The proposed bicycle rack locations are illustrated in **Figure 14**.

9.0 TRANSPORTATION DEMAND MANAGEMENT

9.1. City of Hamilton's TDM for Development (June, 2015)

The City of Hamilton's TDM for Development Report (June, 2015) has been reviewed and consulted to prepare the TDM requirement for the proposed development. In order to address the City's requirements, the following TDM recommendations are provided to support the proposed development. Transportation Demand Management (TDM) is a coordinated series of actions aimed at maximizing the people moving capability of the transportation system. According to the City's TDM Report, the main objectives of TDM are:

- Shifting travel modes (e.g. walking, cycling, taking transit or carpooling instead of driving alone);
- Reducing the number of trips people must make (e.g. destinations and activities such as work and shopping, near each other); and,
- Travelling more efficiently (e.g. making trips outside of peak hours).

Potential TDM measures may include but not limited to: TDM supportive land use, bicycle and pedestrian programs and facilities, public transit improvements, preferential treatments for buses and high occupancy vehicles (if applicable), ridesharing, and employee incentives.

9.1.1. Proposed Development Context

As indicated in previous sections of this report, the proposed development includes five industrial buildings with a total gross floor area of 131,626.00 m^2 (or 1,416,180 ft^2). Therefore, the TDM measures and incentives are very limited for this proposed land use, given the context of the area.

9.1.2. Sidewalks and Pathways

As indicated in Section 2 of this Study, sidewalk is currently provided on south side only on Airport Road W from Homestead Dr to Mt Hope Public School. On Homestead Drive, sidewalks are provided on the east side north of Airport Rd, and on the west side south of Airport Rd. Sidewalk are not currently provided on Upper James Street and E Cargo Road.

The analysis indicates that sidewalk on the south side of Airport Road W should be extended from the existing Mt Hope Public School to E Cargo Road/Future Street "B" so that the future residents south of Airport Road W can walk to the existing school. In addition, sidewalk should also be extended to the Hamilton Airport to support transit and employees who work for the airport authority. This provision should be included in the City's capital projects as this provision is beyond the scope of this Study.

As part of the proposed development, sidewalk will be provided at least on one side of Street 'A' within the entire length of Street 'A' from the proposed intersection with Airport Road W to the cul-de-sac.

9.1.3. Bicycle Parking (Long-term and Short-term)

Based on the City's By-Law No. 05-200, bicycle parking spaces are not required for industrial use. However, to support active transportation and TDM, Nextrans recommends that the proposed development provides 5 short-term bicycle parking spaces (bicycle rack) near the front entrance of each proposed building. The potential bicycle rack locations are illustrated in **Figure 14**. Long-term bicycle parking is not appropriate for the proposed development as everyone will leave the building after the business hours.

9.1.4. Direct Connections to Transit

As indicated in Section 2 of this Study, the closest bus stops to the proposed development are the Bus Route 20 stops located at the Airport Road W/Canadian Warplane Heritage Museum driveway, which is about 700 m (about 10-minute

walk). The service frequency is about 15-25 minutes (or about 3-4 buses) during the morning and afternoon peak periods. The future employees can walk to the bus stop using the future sidewalks along Street 'A' that connects to Airport Road W.

9.2. Recommended TDM Measures and Incentives for the Proposed Development

Based on the review of the context of the proposed development in relation to the TDM requirements by the City of Hamilton, a number of TDM measures and incentives are identified for the proposed development to consider, given the limited transit service and active transportation network in the area. **Table 11** summarizes the recommended TDM measures and incentives.

Table 11 – Recommended TDM Measures for the Proposed Development

Category	TDM Initiative required by the City of Hamilton or suggested by Nextrans	Recommended Actions	Responsibility
Cycling	• Visible, well-lit, short-term bicycle parking for visitors (above minimum provisions or recommendations) • Ensure development connects to bicycle network	• Provides 5 short-term bicycle parking spaces (bicycle rack) near the front entrance of each proposed building • Provide MUP on the west side of Street 'A' • Protect for future connection to Homestead Drive, if appropriate	Applicant
Walking	• Safe, attractive and direct walkways for pedestrians linking building entrances with public sidewalks and with key destinations such as schools • Enhanced pedestrian amenities on-site (benches, landscaping, lighting)	• Provide sidewalk at least on one side of Street 'A' (i.e. east side) that connect the proposed development to Airport Road W • Protect for future connection to Homestead Drive, if appropriate	Applicant
Transit	• Enhance walking routes between main building entrance(s) and transit stops/stations	• Provide sidewalk at least on one side of Street 'A' that provides the proposed development connection to transit stop on Airport Road W	Applicant
Smart Commute	• Join Hamilton Smart Commute Program (partner level, core level or enhanced level)	• The owners/employers join Hamilton Smart Commute Program with the minimum Partner Level • Contact email to join the program: smartcommute@hamilton.ca	Applicant

10.0 CONCLUSIONS / FINDINGS

10.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

- The proposed development is expected to generate 480 total two-way auto trips (390 inbound and 90 outbound) and 480 total two-way auto trips (100 inbound and 380 outbound) during the morning and afternoon peak hours, respectively.

- In addition, the proposed development is anticipated to generate a total of 15 two-way truck trips (10 inbound and 5 outbound) and 20 two-way truck trips (5 inbound and 15 outbound) during the morning and afternoon peak hours, respectively. It should be noted that most truck trips to and from the site will avoid peak hours to save gas and travel time, therefore, the trip generation is reflective of this provision.

- Based on the intersection capacity analysis, under the existing, all intersections considered are expected to operate at acceptable levels of service.

- Under the 2028 future total conditions, all intersections considered in the analysis will need improvements due

to the significant background developments in the area, including the developments related to the existing Hamilton International Airport and subject development. Below are the descriptions of the required improvements:

- Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
  - Westbound left turn lane and shared through/right (current pavement width is 10 m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length can be a minimum of 15 m.
  - Eastbound double left and a shared through/right lane ((current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median). The eastbound double left turn lane storage length can be approximately 60 m.
- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. However, the intersection pavement markings should be restriped to delineate left turn lane and shared through/right lane.
- Airport Road W at E Cargo Road – installation of new traffic signals and eastbound and westbound exclusive left turn lanes on Airport Road W. The exclusive eastbound and westbound lane can be 70 m and 30 m storage length, respectively. It is Nextrans' understanding that this traffic signal has been planned and will be installed prior to this horizon year.
- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with existing lane configurations.

The analysis indicates that these improvements should be implemented prior or by 2028 horizon. It is Nextrans' understanding that some of these improvements have been identified in the Paradigm TIS dated December 2016 by 2026 horizon with the proposed background development in the area, without the subject development at 3054 Homestead Drive. However, Paradigm did not recommend any physical improvements at the Airport Road W/Upper James Street and signalization of the Airport Road W/Hamilton International Airport access because the analysis horizon year was 2026.

Based on the analysis findings, it is Nextrans' opinion that the proposed development has negligible impacts on the road network and therefore does not trigger these improvements, with the exception of the localized improvements at the Airport Road W/E Cargo Road intersection to service the site. The majority of the required intersection improvements, especially the double left turn at the intersection of Airport Road W and Homestead Drive, are required under the existing conditions as there already over 300 vehicles making eastbound left turn at this intersection. In addition, the double left turn lanes are also triggered by the significant amount of background residential and commercial development applications in the area. It is Nextrans' opinion that these improvements should be implemented by the City of Hamilton, or by the proposed development that are directly fronting on Airport Road W. It should be noted that the subject development has no frontage onto this intersection, therefore it has no control over this intersection.

In addition, the subject development is in discussion with the proposed Rice Group development to the north to connect Street A from the subject development to provide an alternative access arrangement. Although this connection is not required to accommodate the proposed development, however, it will provide an alternative access option and this will significantly reduce the numbers of eastbound left turn at the Airport Road W/Upper James Street intersection.

- Based on the City's By-Law No. 05-200, a total of 845 vehicle parking spaces are required for the proposed development, which include 220 parking spaces for office component and 625 spaces for the industrial/warehouse component. The proposed development will provide approximately 887 vehicle parking

spaces. Therefore, the proposed development just slightly exceeds the minimum Zoning By-law requirement. It should also be noted that the proposed development will provide 245 truck level doors and 30 trailer parking spaces. These are to accommodate the demand for the proposed anticipated industrial land uses.

- Based on the City's By-Law No. 05-200, bicycle parking spaces are not required for industrial use. However, to support active transportation and TDM, Nextrans recommends that the proposed development provide 5 short-term bicycle parking spaces (bicycle rack) near the front entrance of each proposed building.
- The analysis indicates the E Cargo Road/Airport Road W is expected to operate at acceptable levels of service with minimum delay and queue. The recommended lane configurations and traffic control for this intersection include:
    - One eastbound shared left/through/right on Airport Road W;
    - One westbound shared left/through/right on Airport Road W;
    - One southbound exclusive left turn lane and one shared through/right lane on E Cargo Road;
    - And one northbound exclusive left turn lane and one shared through/right lane on proposed Street "B" to the south; and
    - The intersection will be stop-controlled on the minor approaches, with stop signs on E Cargo Road and Street "B', with free-flow on Airport Road W

  It should be noted that the terminus of Street A (i.e. cul-de-sac) is also protected for a potential future connection with the Rice Group proposed development to the north, if desired and appropriate.

- Given the proposed land use, the proposed development will provide sufficient or exceed the loading space requirements to accommodate the proposed industrial uses. For illustration purposes, the vehicle turning templates for TAC-WB19 has been provided as part of this Study. More detailed vehicle track templates will be provided using AutoTURN software as part of the future site plan submission for each proposed building.

10.2. Study Recommendations

Based on the findings of this Study, the following recommendations are provided:

- The City of Hamilton approves the proposed development as the proposed development will create jobs and economic activities for the City and immediate area. The proposed development will accommodate opposite direction traffic flow of the proposed background residential developments in the area, therefore, the proposed development is not expected to contribute to significant directional flow of traditional residential traffic. The proposed development will also attract some of the existing and future residents to work close by and these residents can walk or cycle to work instead of driving private vehicles;
- The proposed development to construct the intersection of Airport Road W/Street 'A' with the recommended lane configurations and traffic control. The intersection will be constructed based on the City's standards and TAC Geometric Design Guide for Canadian Roads once the functional design is approved in principle;
- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- The proposed development provides the recommended active transportation facilities as provided in this Study;
- The proposed development to join Smart Commute (contact smartcommute@hamilton.ca) programs;
- The City of Hamilton monitors and considers the following improvements for the area intersection by 2028:
    - Airport Road W at Upper James Street – signal timing optimization and restriping of the intersection pavement markings to provide:
        - Westbound left turn lane and shared through/right (current pavement width is 10 m-11m, which it can be restriped to provide one eastbound 3.3 m through lane, one 3.3 m westbound

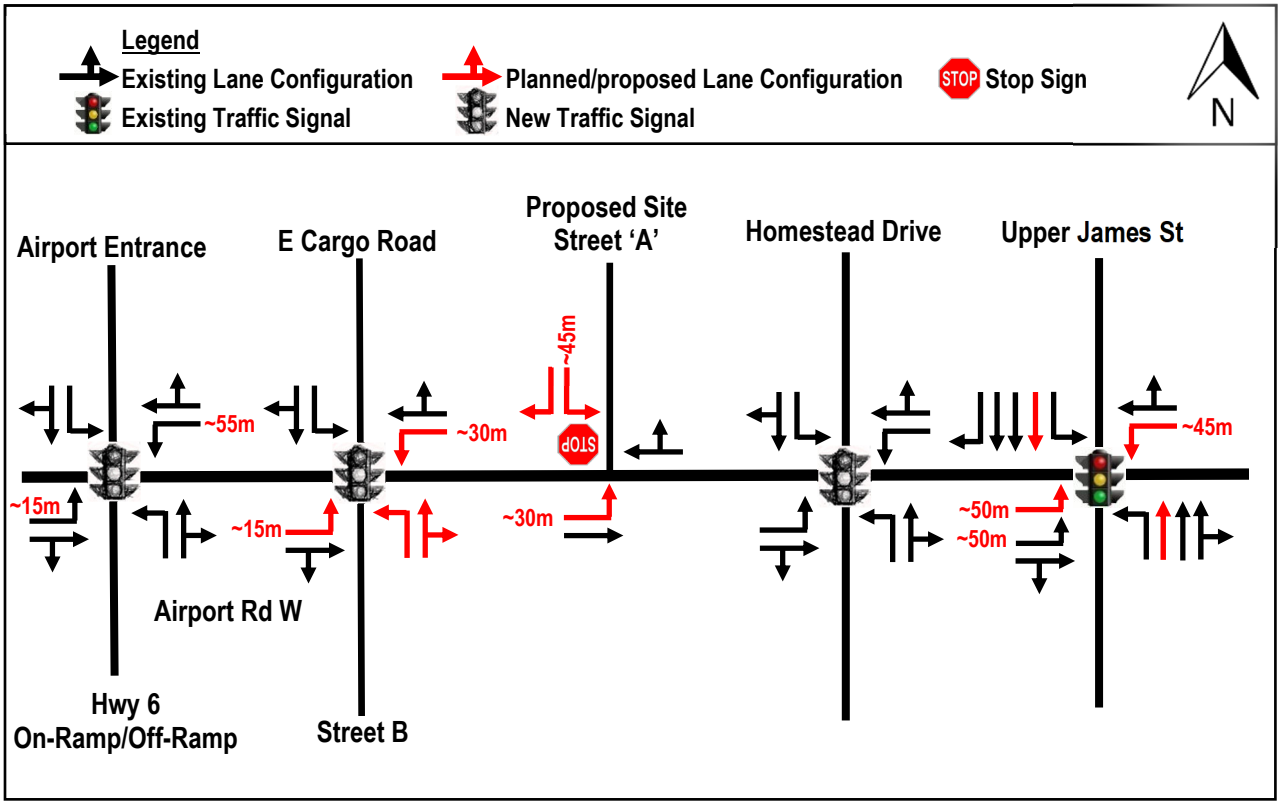
left lane and one 3.3 m westbound shared through/right lane). The westbound left turn storage length can be a minimum of 45 m.

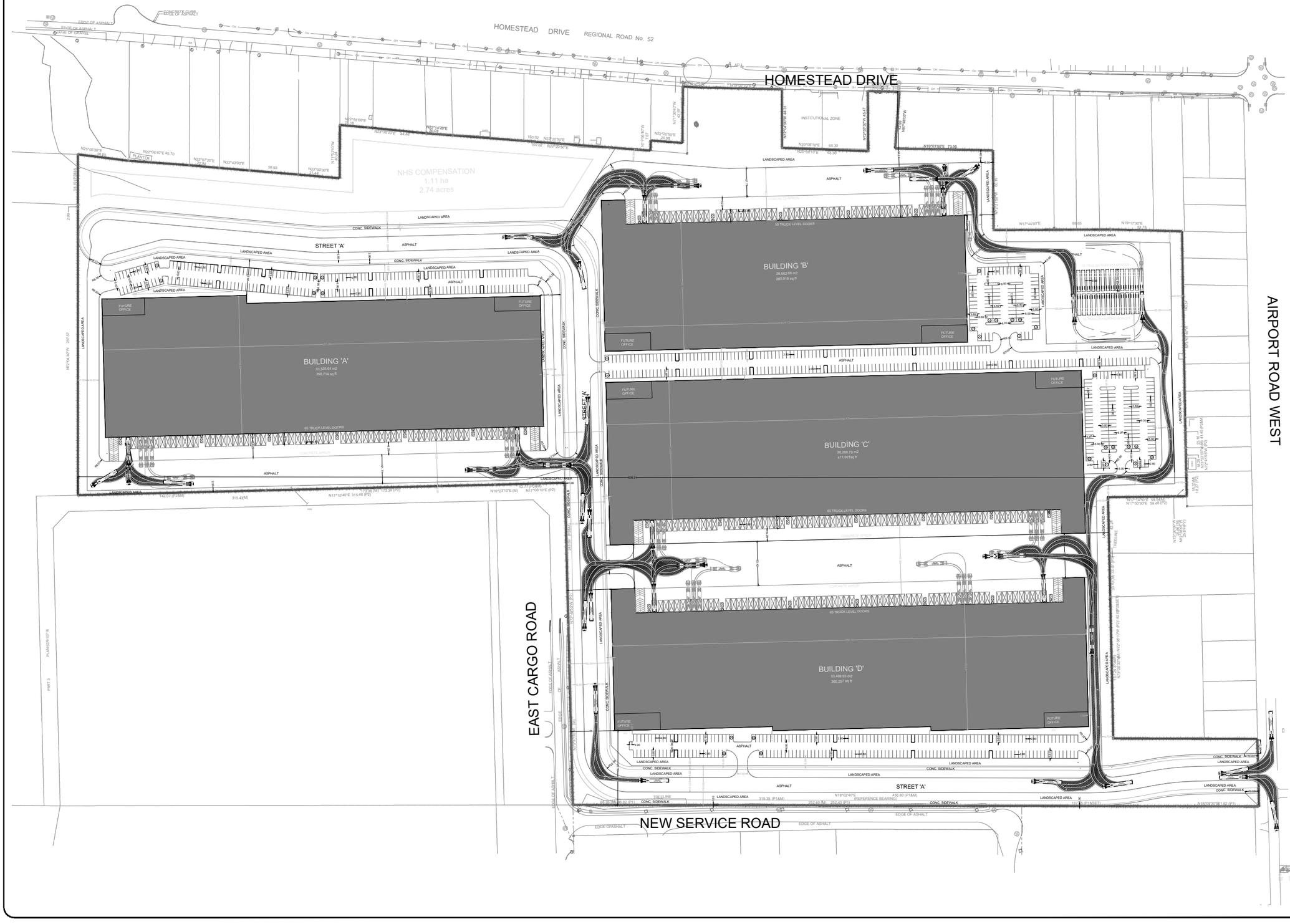
- Eastbound double left and a shared through/right lane ((current pavement width is 15 m, which it can be restriped to provide one westbound 3.5 m through lane, double eastbound left turn lane with 3.3 m each lane, and one shared eastbound through/right lane with 3.5 m width and 1.4 m concrete median). The eastbound double left turn lane storage length can be approximately 50 m.

- Airport Road W at Homestead Drive – installation of new traffic signals with existing lane configurations. The intersection pavement markings should be restriped to delineate left turn lane and shared through/right lane.
- Airport Road W at Hamilton International Airport Entrance/Hwy 6 – installation of new traffic signals with existing lane configurations.

Figure 19 illustrates the 2028 horizon proposed/recommended intersections for the study area intersections.

Figure 18 – 2028 Horizon Proposed and Recommended Intersection Improvements





KEY PLAN

BENCHMARK

REVISONS

NO	REVISION	DATE	BY

STAMP

nexTrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:

Commercial Development

3054 Homestead Drive

City of Hamilton

DRAWING TITLE:

AutoTURN Analysis
WB-20 TAC-2017

DESIGN BY: K.A.	DATE: February 23, 2023
CHECKED BY: R.P.	PROJECT NO. NT-21-087
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 19

Appendix A
Study Terms of Reference

Hamilton

Mailing Address:
71 Main Street West, 5th Floor
Hamilton, Ontario
Canada L8P 4Y5
www.hamilton.ca

Planning and Economic Development Department
Development Planning
71 Main Street West, 5th Floor, Hamilton ON L8P 4Y5
Phone: 905-546-2424 Fax: 905-546-4202

April 22, 2022

Files: UHOPA-22-008
ZAC-22-017
25T-202202

Folder: 2022 103889 00 PLAN (1098920)

UrbanSolutions Planning & Land Development Consultants Inc. c/o Matt Johnston
3 Studebaker Place, Unit 1
Hamilton ON L8L 0C8 mjohnston@urbansolutions.info

Dear Sir:

Re: Official Plan Amendment, Zoning By-law Amendment, and Draft Plan of Subdivision Applications by Fengate Homestead Holdings LP c/o Anthony Girolami for Lands Located at 3054 Homestead Drive, Glanbrook (Ward 11)

Your Official Plan Amendment, Zoning By-law Amendment, and Draft Plan of Subdivision applications have been considered by the City of Hamilton and external stakeholders.

The purpose of this proposed **Urban Hamilton Official Plan Amendment** is to:

- remove a portion of the subject lands from the District Commercial designation in the Mount Hope Secondary Plan and add the portion to the Airport Light Industrial designation in the Airport Employment Growth District Secondary Plan; and,
- redesignate the balance of the lands from the Airport Reserve designation to the Airport Light Industrial designation and Airside Industrial designation in the Airport Employment Growth District Secondary Plan.

The purpose of this proposed **Zoning By-law Amendment** is to:

- change the zoning from the Airport Reserve (M9, H37) Zone to a modified Airport Light Industrial (M10) Zone (Block 1);
- change the zoning from the District Commercial (C6, 580) Zone to a modified Airport Light Industrial (M10) Zone (Block 2); and,
- change the zoning from the Zoning from Airport Reserve (M9, H37) Zone to a modified Airside Industrial (M7) Zone (Block 3).

The proposed **Draft Plan of Subdivision** consists of six blocks, with two blocks for industrial uses (Blocks 1 and 2), a stormwater management channel (Block 3), a temporary cul-de-sac (Block 4), a 0.3 m reserve block (Block 5), a natural heritage offset compensation block (Block 6), and a portion of a future public road (Street ‘A’).

The effect of these applications is to permit the development of five industrial buildings containing a total gross floor area of 141,600 square metres of employment uses.

…/2

The City of Hamilton and external stakeholders offer the following feedback:

Comment/Concern	Required Study/Report
Development Planning **Tim Vrooman**	
• The subject lands are designated "Employment Areas" and "Neighbourhoods" on Schedule E – Urban Structure and "Airport Employment Growth District" and "District Commercial" on Schedule E-1 – Urban Land Use Designations. • The subject lands are further designated "Airport Reserve" on the Airport Employment Growth District Secondary Plan Land Use Plan, and are not shown within either Servicing Phase 1 or 2 on the Airport Employment Growth District Secondary Plan Phasing Plan; and, "District Commercial" on the Mount Hope Secondary Plan Land Use Plan.	Required documentation: • A revised Planning Justification Report and supporting documentation addressing comments below, in further consultation with the airport authority.

The following policies, amongst others, apply:

<u>Volume 1: Employment Areas, Airport Employment Growth District, and Airport Reserve</u>

C.4.8.1 It is the objective of this Plan to support John C. Munro International Airport as a 24 hour, seven day a week operation. The Airport and the adjacent Airport Business Park is one of the City's major economic nodes and a valued transportation facility which links the movement of goods and people.

C.4.8.2 The lands identified as John C. Munro International Airport on Schedule E-1 – Urban Land Use Designations are recognized as the City's major airport facility, which includes both airport uses and complementary uses supporting the primary function of the Airport. These lands are intended to have full municipal services.

C.4.8.5 The City shall minimize future conflicts between operation of the Airport and surrounding land uses to ensure:

a) there shall be no negative impact on the long-term operations of the Airport;

b) the opportunities for expansion of airport operations shall not be limited; and,

c) there are no land uses in the vicinity which may cause a potential aviation hazard.

E.1.0 The following goals shall apply to the urban systems and land use designations of this plan.

l) Protect land adjacent to John C. Munroe Airport for future expansion. (OPA 35)

E.5.5.8 All development in the Airport Employment Growth District shall be adequately separated, screened and buffered from existing residential and institutional uses in or abutting the Airport Employment Growth District.

The Official Plan contemplates the airport will require additional lands to provide for runway expansions and airfield operations during the lifetime of this Plan to ensure the long-term viability of the airport and that interim land uses are not appropriate which might create conflicts with the feasible expansion of the airport. As a result, certain lands must be reserved specifically for the airport's future needs.

E.7.1 The lands designated as Airport Reserve shall be subject to the policies of Volume 2 - Section B.8 - Airport Employment Growth District.

Volume 2: Airport Employment Growth District Secondary Plan

B.8.3.4 All development applications within the Airport Employment Growth District shall be subject to review to ensure a high quality of development in accordance with this Secondary Plan and the Airport Employment Growth District Eco-industrial Design Guidelines and Urban Design Guidelines.

B.8.3.5 All development within the Secondary Plan Area shall be planned on a comprehensive basis, avoid where possible impacts on natural features, and effectively integrate with adjacent development and future development. The implementing zoning by-law shall incorporate provisions relating to the height, density and design of development based on the provisions of this Secondary Plan and the Airport Employment Growth District Eco-industrial Design Guidelines and Urban Design Guidelines.

B.8.3.6 This Plan recognizes that there are existing residential and private recreational establishments within the plan's area, although these uses are designated for future employment and employment-related uses. This Plan recognizes the legal non-conforming and non-complying status of these uses and anticipates that these lands shall be redeveloped at an appropriate time. Until such time as these existing uses are redeveloped, this Plan shall require abutting employment and employment-related uses to assess their potential impact to these properties through special studies and mitigate the impacts to these properties based on the recommendations of the special studies.

Airport Reserve

B.8.8 The Airport Employment Growth District Secondary Plan contemplates that the airport shall require additional lands to provide for runway expansions and airfield operations during the lifetime of this plan to ensure the long-term viability of the airport and that interim land uses are not appropriate which might create conflicts with the feasible expansion of the airport. As a result, certain lands must be reserved specifically for the airport's future needs. Lands reserved exclusively for the airport's expansion are shown on Map B.8-1 – Airport Employment Growth District Land Use Plan and are subject to the following policies.

B.8.8.1 Until storm water management facilities are in place at the Hamilton John C. Munro International Airport, no airport expansion into lands designated as Airport Reserve will be permitted.

B.8.8.2 Subject to Policy B.8.8.1, the following uses shall be permitted on lands designated Airport Reserve on Map B.8-1 – Airport Employment Growth District Land Use Plan:

a. existing land uses; and,

b. airport storage, maintenance and operation facilities.

B.8.8.3 Notwithstanding Policy B.8.8.2, expansions to existing uses and lot additions or lot creation that does not serve the needs of the Airport shall not be permitted.

B.8.8.4 Subject to Policy B.8.8.1, once any portion of the Airport Reserve lands are transferred to the airport, the transferred lands may be rem oved from Airport Reserve in this Secondary Plan, and incorporated into the area identified as the John C. Munro Hamilton International Airport on the schedules of the appropriate Official Plans without an Amendment to the Parent Plan or Secondary Plan.

Airport Light Industrial

B.8.4.6 Airport Light Industrial is planned for employment uses that do not necessarily require frontage on the existing or future major roads in the Airport Employment Growth District, but will incorporate urban design treatment and are able to accommodate buffering from sensitive land uses.

B.8.4.6.1 Notwithstanding Section E.5.5 – Employment Area – Airport Employment Growth District of Volume 1, the following policies shall apply to the lands designated Airport Light Industrial on Map B.8-1 – Airport Employment Growth District Land Use Plan:

a. The Airport Light Industrial designation shall permit manufacturing, assembly, warehousing, repair service, building or contracting supply establishments, transportation terminals, research and development, office, communication establishment, private power generation, high technology industry, and post-secondary schools.

b. The Airport Light Industrial designation shall also permit uses which primarily support industry including labour association halls, trade schools, training facilities, commercial motor vehicle and equipment sales, commercial rental establishments.

c. The Airport Light Industrial designation shall further permit airport-related industrial uses including airport transportation and cargo services, airport waste processing facilities within wholly enclosed buildings, airport waste transfer facilities within wholly enclosed buildings, and utility activities benefitting from proximity to airport services.

d. The Airport Light Industrial designation shall permit outdoor storage of goods that do not cause interference with airport operations.

e. Small-scale accessory uses which primarily support employees such as cafes, fitness centres, or personal service uses which are developed integrally with the principal building on a site may be permitted.

B.8.4.6.2 Limited agricultural uses including only a cannabis growing and harvesting facility, a greenhouse and an aquaponics facility may be permitted in accordance with Policy E.5.5.10 of Volume 1.

B.8.4.6.3 Airport Light Industrial uses shall be developed in accordance with the supporting policies, principles and requirements of the Airport Employment Growth District Eco-industrial Design Guidelines and Urban Design Guidelines. Development within the Airport Light Industrial designation shall be subject to minimum standards for urban design and a high level of sustainable design. Strict standards shall be established to control outdoor storage permitted in B.8.4.6.1 d) above.

Airside Industrial

B.8.4.7 Airside Industrial is planned for employment uses that need to be adjacent to the John C. Munro Hamilton International Airport.

B.8.4.7.1 Notwithstanding Section E.5.5 – Employment Area – Airport Employment Growth District of Volume 1, the following policies shall apply to the lands designated

Airside Industrial on Map B.8-1 – Airport Employment Growth District Land Use Plan:

a. The Airside Industrial designation shall permit warehousing, transportation terminals, research and development, office, communication establishment, fuel storage, and airport catering services.

b. The Airside Industrial designation shall also permit airport-related industrial uses such as airport transportation and cargo services, airport waste processing facilities, and airport waste transfer facilities, and utility activities benefiting from proximity to airport services.

c. The Airside Industrial designation shall permit outdoor storage of goods that do not cause interference with airport operations.

d. As a condition of development approval, the City may require confirmation from the John C. Munro Hamilton International Airport operator that a proposed development in the Airside Industrial designation warrants and shall be granted direct access to the airport.

B.8.4.7.2 Airside Industrial uses shall be developed in accordance with the supporting policies, principles and requirements of the Airport Employment Growth District Eco-industrial Design Guidelines and Urban Design Guidelines.

Planning staff have reviewed the submitted materials, and have the following comments:

- The proposed public local road Street 'A' is being accessed exclusively via East Cargo Road, which is a privately owned road accessed via Airport Road West. The applicant shall demonstrate how the proposed subdivision will be accessed and serviced from the current municipal road network.

- Until such time as it has been demonstrated that the airport authority does not require the Airport Reserve lands to provide for runway expansions and airfield operations to ensure the long-term viability of the airport, the proposed Official Plan and Zoning By-law Amendments are considered premature.

- Notwithstanding the foregoing, Planning staff provide the following preliminary comments on the development proposal:

    - The proposed Official Plan mapping amendments shall also include:

        - Vol. 1, Schedule E - Urban Structure from Neighbourhoods to Employment Areas;

- Vol. 1, Schedule E-1 - Urban Land Use Designations from District Commercial to Airport Employment Growth District;
- All Vol. 2, Airport Employment Growth District Secondary Plan mapping regarding the boundary adjustment, as well as identifying the subject lands within the Servicing Phases in Map B.8-4 - Airport Employment Growth District Phasing Plan; and,
- Vol. 2, Appendix A – Secondary Plan Index Map regarding the Secondary Plan boundary adjustments.

o The proposed zoning modifications include:

- Reducing the minimum landscaped strip from 3.0 metres to 0.8 metres in width for both the M7 and M10 Zones. The Planning Justification Report identifies a pinch point to the south of proposed Building A due to the proposed bioswale. Further clarification is required with respect to the location of this pinch point and the amendment should be made more specific to this location with the remainder of the frontage remaining unchanged. Further, the draft zoning by-law amendment is proposing Building A within the proposed M7 Zone. Further clarification for why this modification is included for the M10 Zone is required; and,

- Eliminating minimum landscaped area requirements from the M7 Zone. Other than to facilitate the proposed built form, the Planning Justification Report has not provided planning rationale for the proposed modification.

o The proposed acoustic barrier and landscaping is proposed within Block 1, in line with the rear lot lines of 2982 through 3102 Homestead Drive. Given this separation of land uses, the frontage and exposure to Homestead Drive, and existing land use designations, it should be considered whether redesignating this portion of the proposed block is the most appropriate use for these lands.

- Planning staff have reviewed the Public Consultation Strategy and have no further comments at this time. Staff request additional information be provided should a Neighbourhood Information Meeting be deemed warranted in consultation with the Ward Councillor.

Natural Heritage
Melissa Kiddie

INTRODUCTION: The subject property is located within the boundaries of the Urban Hamilton Official Plan (UHOP) and has been identified within the Airport Employment Growth District (AEGD) Secondary Plan. Based on mapping within the	Required documentation: • Environmental Impact Statement: Revisions are required

UHOP (Volume 1-Schedule B Natural Heritage System and Volume 2-AEGD Secondary Plan Natural Heritage System Map B.8-2), a Core Area (watercourse) has been identified within the subject property. This watercourse is also regulated by the Niagara Peninsula Conservation Authority (NPCA). Additional Core Areas (wetlands) have been identified through inventories associated with the Environmental Impact Statement (EIS).	• Tree Protection Plan: Revisions are required

The following documents have been reviewed:

- Environmental Impact Study 3054 Homestead Drive, Hamilton Ontario prepared by GEI Consultants (Savanta Division) December 2021
- Tree Protection and Management Plan Homestead, Hamilton, Ontario prepared by GEI Consultants (Savanta Division) October 2021
- Proposed Industrial Development 3054 Homestead Drive, City of Hamilton Functional Servicing Report prepared by Odan-Detech Consulting Engineers December 8, 2021
- Concept Plan prepared by Urban Solutions Inc. October 19, 2021
- Draft Plan of Subdivision prepared by Urban Solutions Inc. December 21, 2021
- Planning Justification Report 3054 Homestead Drive prepared by Urban Solutions Inc. December 2021

RECOMMENDATIONS:

1. Environmental Impact Statement (EIS): An EIS has been prepared by GEI (Savanta Division) December 2021. Based on the information provided, there is concern that the policies of the Provincial Policy Statement (PPS) and UHOP has not been met. At this time, the EIS has not been approved.

   To address these concerns, it is advised:

   a) A revised EIS is to be submitted. Key issues and technical comments have been provided to aid in the revision. To ensure that environmental impacts are considered early in the design process, the EIS is to be approved prior to the approval of the Zoning By-law Amendment and draft Plan of Subdivision.

2. Tree Protection Plan (TPP): A TPP has been prepared by GEI (Savanta) October 2021. Based on this report, a total of 345 trees have been inventoried. Of these trees, 235 have been proposed to be removed. Trees provide a variety of functions to the overall community (i.e. canopy cover, energy conservation, mental health benefits, wildlife habitat). Integration of trees into the design has not been taken into consideration. At this time, the TPP has not been approved.

   To address these concerns, it is advised:

a) A revised TPP is to be submitted. Technical comments to aid in the revisions have been provided. To ensure that trees are considered within the design of the site, the revised TPP is to be approved prior to the approval of the Zoning By-law Amendment and draft Plan of Subdivision.

3. Zoning By-law Amendment: As per UHOP Volume 1 policy C.2.2.8, all natural features, required vegetation protection zones and enhancement and restoration areas are to be placed in appropriate zoning. As a result, these areas are to be zoned as "P5" (Conservation/Hazard Lands) within the City's 05-200 Zoning By-law.

   Since the EIS and TPP have not been approved, Natural Heritage Planning staff cannot support the Zoning By-law Amendment at this time.

4. Draft Plan of Subdivision. Since the EIS and TPP have not been approved, draft Plan conditions cannot be provided at this time.

KEY ISSUES:

1. Environmentally Significant Areas Impact Evaluation Group (ESAIEG): As per UHOP Volume 1 policy F.3.3.1.1, the EIS is to be reviewed by the City's ESAIEG. This group provides technical advice to City staff on the impacts of the proposed land use changes within and adjacent to Core Areas. Final comments on the EIS will be provided once it has been reviewed by ESAIEG. A review fee is required at the time of ESAIEG review. The 2022 review fee is $405.00.
2. Compliance with PPS/UHOP Policies:
   a) Wetland Removal/Compensation: Wetland communities (MAM2-2, MAS2-1/MAS1-12 and SWD3-2) totaling 1.11 ha, have been observed within the subject property.
      i. The focus of the EIS is to remove these communities and replace in a linear, semi-rectangular shape at the edge of the property. This approach is not supported. As per principles of the AEGD Secondary Plan (B.8.2.2 b), natural features are to be integrated into the design of the development ("design with nature").

         In addition, compensation or "off-setting" is not supported in the policies of the UHOP. Core Areas are to be preserved and enhanced (UHOP Volume 1 policy C.2.3) and vegetation removal and encroachment into Core Areas is generally not permitted (UHOP Volume 1 policy C.2.3.3).

         The mitigation hierarchy (avoid first, if avoidance cannot be achieved, mitigation is undertaken) has not been considered since removal of the wetland and "compensation" has been identified as a first step.
      ii. Details (i.e. water balance) on whether the wetland can be hydrologically supported over the long-term have not been provided. It has been

referenced that this information will be provided at detail design. This information is important to provide at this stage.

b) Headwater Drainage Feature (HDF) Removal: An HDF Assessment was undertaken. Based on the evaluation, it was originally identified that the feature within the more northerly section as evaluated as "Conservation" (maintain, relocate and/or enhance the drainage feature and its riparian zone corridor). This feature was subsequently re-evaluated to "Mitigation" (replicate or enhance functions through lot level conveyance measures such as well-vegetated swales to mimic online wetland vegetation pockets or replicated wetland features connected to downstream) due to the presence of invasive species and the determination that the ecological function can be replicated elsewhere.

   This does not meet the intent of the AEGD Secondary Plan policies (specifically B.8.9.3-stream corridors shall be protected to address flood/erosion control and fish habitat requirements). Retention of watercourses have not been considered within the design of the development.

c) Vegetation Protection Zone (VPZ): As per UHOP Volume 1 policy C.2.3.3, an appropriate VPZ is to be applied to all Core Areas. Minimum VPZs have been outlined within the UHOP (e.g. 15 metres on each side of the watercourse for warmwater/important/marginal habitat; 15 metres for unevaluated wetlands). An evaluation of VPZs is to occur within the EIS.

   A 10 metre VPZ has been proposed for the "compensated" wetland. A thorough discussion on how this width was determined (and why the minimum has not been proposed) has not been included within the EIS.

d) Tree Removal: Trees provide a variety of functions (i.e. canopy cover, energy conservation, mental health benefits and wildlife habitat) to the overall community and are integral in minimizing the impacts of air pollution, climate change and enhancing biodiversity. This is recognized within the PPS (policies 1.1.1 h, i, 1.1.3.2 c and 1.8.1 f, g) and the UHOP (Volume 1 policy C.2.11.1; Volume 2 policy 8.2.2 b). There is concern that this has not been taken into consideration.

3. Impact Assessment and Mitigation Measures: The analysis that has been provided within the EIS with regards to the impact assessment and the associated mitigation measures is limited and does not consider a variety of factors such as cumulative impacts, wildlife/human interactions (i.e. encroachment, dumping, spread of invasive species, wildlife/road conflicts), snow storage.
4. Draft Zoning By-law: The draft Zoning By-law proposes to change the zoning on the lands from Airport Reserve to Airport Light Industrial, District Commercial Zone to Airport Light Industrial and Airport Reserve to Airside Industrial. This does not address the natural features, VPZs or restoration areas. All natural areas, VPZs and restoration areas are to be zoned as "P5" (Conservation/Hazard Lands) within the City's 05-200 Zoning By-law.

TECHNICAL COMMENTS:

1. EIS:
    a) Page 8 (Section 1.3.1)
        i. There is confusion with regards to Core Areas being located on the subject property. It has been stated "*no portions of the City's Natural Heritage System (NHS) were identified within the Subject Lands, and no Core Areas or Linkages were identified*". The watercourse on the property has been identified as a Core Area (UHOP Volume 1-Schedule B, B-8 and Volume 2 AEGD Secondary Plan Natural Heritage System Map B.8-2).

            In addition, based on the field inventories completed, wetlands have been identified within the subject property (staked by NPCA August 6, 2021). Wetlands are considered Core Areas (included within the definitions of key natural heritage features, key hydrologic features and local natural areas).
        ii. Natural Heritage policies from Volume 1 of the UHOP (e.g. C.2.2.8, C.2.3, C.2.3.2, C.2.3.3, C.2.5.3, C.2.5.5, C.2.5.7, C.2.5.8, C.2.5.9, C.2.5.10, C.2.5.11, C.2.5.13) are missing from the discussion. The discussion is to be revised to include this information.
        iii. The principles/policies of the AEGD Secondary Plan (e.g. 8.2.2 b; 8.2.3 a, d, e; 8.2.4 i; 8.2.11; 8.3.5; 8.4.5.7; 8.5; 8.9.6; 8.9.12; 8.12; 8.14.25; 8.14.27; 8.14.28; 8.14.29; 8.14.30; 8.14.32; 8.14.33; 8.14.71 and 8.14.72) are missing from the discussion. The discussion is to be revised to include this information.
    b) Pages 10-11 (Section 1.3.3): The focus of the PPS review is on features/functions outlined within Section 2.1. Policies have also been included within the PPS that relate to climate change, biodiversity and water resources. This is missing from the discussion. In addition, policies 2.1.1 (protection of features for long-term), 2.1.2 (maintenance, restoration and enhancement of diversity and connectivity of features/functions) and 2.1.3 (Natural Heritage Systems are to be identified) have not been included. The discussion is to be revised to include this information.
    c) Page 12 (Section 1.3.6): To comply with the Migratory Birds Convention Act, it has been identified that best management practices are to be implemented. These practices have not been identified/described. The discussion is to be revised.
    d) Page 13 (Section 2.1): It has been identified that "*no Core Areas or Linkages were identified within or adjacent to the Subject Lands*". There is concern with this statement. Based on the UHOP, Core Areas (watercourses) have been identified within the adjacent property. In addition, preliminary information provided for 2876 Upper James Street (FC-22-070) indicated the presence of wetlands.
    e) Page 18 (Section 2.2.2): It has been identified that 2 woodlands are located within the subject property. There is concern that these features have not been

previously discussed. These areas may be considered as part of the Natural Heritage System as Linkages. Further discussion is required.

f) Pages 27-31 (Section 3.4.1): H1S1 and H2S1 have been classified with the same attributes (Valued Hydrology, Important Riparian Habitat, Contributing Fish Habitat and Valued Terrestrial Habitat), however H1S1 has been evaluated as "Mitigation" and H2S1 has been evaluated as "Conservation". Further clarification is required.

g) Pages 33-40 (Section 4.0): There is concern that the focus is on features/functions outlined within the PPS and City requirements are not considered.
   i. The wetlands observed within the property are considered Core Areas (key natural heritage features, key hydrologic features, local natural areas). This has not been taken into consideration in the discussion.
   ii. Treed areas representative of woodlands have been identified within the subject property. It has been identified that these features are not "significant", however, it is unclear if these areas should be considered as Linkages. Further clarification is required.
   iii. Barn Swallow, a "threatened" species, has been identified foraging within and adjacent to the subject property. It has been identified that there is abundant foraging habitat available. It is unclear how this has been determined since industrial development has been proposed within the surrounding area. Further clarification is required.

h) Page 42 (Section 5.1): It has been identified that low impact development (LID) strategies will be considered at the detailed design stage. There is concern with this approach. It is important to understand how this will influence the design of the development. This information is to be discussed at this stage.

i) Page 43 (Section 6.0):
   i. The impact assessment is to include a discussion on direct, indirect and cumulative impacts. There is concern that cumulative impacts have not been discussed.
   ii. Wildlife/Human Interactions: There may be impacts related to encroachment, dumping and spread of invasive species. In addition, it has been identified that habitat enhancements (i.e. brush piles) will be provided within the compensation wetland. Wildlife/human interactions have not been adequately discussed.
   iii. Snow Storage: There will be an increase in impervious surface as a result of the proposed development. It has been identified that alternatives to salt will be considered where feasible. It is unclear what these alternatives are. In addition, it is unclear where snow will be stored. Further clarification is required

j) Page 47 (Section 6.2): Reference has been made to Credit Valley Conservation (CVC) and Toronto Region Conservation Authority (TRCA) in terms of appropriate vegetation protection zones (VPZ). There is concern with this approach. Minimum

VPZs have been outlined within the UHOP and the EIS is to include an evaluation. This has not been taken into consideration.

k) Figures: The wetlands on the property were staked in consultation with NPCA August 6, 2021. This boundary and the date of the staking is to be provided on all figures.

2. TPP:

a) A TPP review fee is to be submitted to the City. At this time, it is unclear if this fee has been provided. Further clarification is required. The 2022 review fee is $635.00.

b) A total of 345 trees have been inventoried. Of these, it has been proposed that 235 trees will be removed (110 trees retained). Trees provide a variety of functions to the overall community and are integral in minimizing the impacts of air pollution and climate change. Principles within the AEGD Secondary Plan (UHOP Volume 2 policy B.8.2.2 b) support a design with nature approach (mature trees are to be integrated into the development).

There is concern that this has not been taken into consideration since most of the trees within the subject property are proposed to be removed. Removal of trees will result in canopy loss. Preserving existing mature trees is essential to maintaining the urban forest canopy. Opportunities to retain more trees on site are to be explored.

c) Tree Inventory Table:

i. Some trees (i.e. 368, 369) within the tree inventory table have been identified to be retained, however, they are in poor health. It is unclear why these trees are proposed to be retained. Further clarification is required.

ii. Within the table, trees have been identified to be removed or preserved. Specific rationale (i.e. grading within the root zone) has not been provided. The table is to be revised to include this information.

iii. A column has been provided for “boundary trees”. This column is to be revised to “ownership” and is to include trees on site, boundary trees, neighbouring trees and municipal trees (if appropriate).

d) Tree Protection Measures: Based on the City’s Council adopted Tree Protection Guidelines (revised October 2010), tree protection fencing is to be located at a minimum of 1 metre from the dripline of the tree. There is concern that this has not been taken into consideration. Further clarification is required.

In addition, it has been identified that a modified tree protection zone will occur prior to construction. It is unclear what this means. Further clarification is required. Construction is not to occur within 1 metre of the dripline of the tree (area that is proposed to be protected with fencing).

e) It has been identified that a Post-Grading tree management report will be provided. It is unclear how this will be implemented. Further clarification is required.

f) Compensation: To ensure that existing tree cover is maintained, the City requires 1 for 1 compensation for the removal of any tree (10 cm DBH or greater) on private property. There is concern that the number of trees proposed to be removed is different than reported within the EIS. Further clarification is required. If trees cannot be accommodated on site (i.e. no space), cash-in-lieu is required

g) Figures:

i. Since there are several trees within the subject property, individual tree inventory charts are to be provided on the figures.

ii. The following notations are to be provided on the drawings:

- "The Owner is to be aware of the Migratory Birds Convention Act, 1994 that protects birds and their nests. The Migratory Birds Convention Act is implemented by Environment Canada. It is advised that the owner make every effort to avoid removal of vegetation from the period of March 31st to August 31st".
- *"Where possible, the cutting of surface roots of existing trees is to be avoided. However, if these cuts are required, the cuts should be completed under the supervision of a tree management professional (i.e. certified arborist) so that cuts are made appropriately*".
- "*An Arborist is to be on site during all site alteration activities*."
- "*A Verification of Tree Protection Letter is to be prepared by a recognized tree management professional (i.e. certified arborist, registered professional forester or landscape architect) to ensure that all tree protection measures have been implemented. This correspondence is to be provided to the Director of Planning prior to the start of any on-site works*".
- "Permission is required from both landowners prior to the removal of tree that has been identified on the property boundary".

iii. A tree protection fencing detail is to be provided on the drawings. An appropriate detail can be found within Appendix 8 of the City's Site Plan Guidelines.

Cultural Heritage
Stacey Kursikowski

<u>Archaeology:</u> The subject property meets five of the ten criteria used by the City of Hamilton and Ministry of Heritage, Sport, Tourism and Culture Industries for determining archaeological potential: 1) Within 250 metres of known archaeological sites;	<u>Archaeology:</u> Stage 3 Archaeological Assessment in accordance with the recommendations of the Stage 1 & 2 Archaeological Assessment (P017-0886-2020)

2) Within 300 metres of a primary watercourse or permanent waterbody, 200 metres of a secondary watercourse or seasonal waterbody, or 300 metres of a prehistoric watercourse or permanent waterbody; 3) In the vicinity of distinctive or unusual landforms; 4) In areas of pioneer EuroCanadian settlement; and 5) Along historic transportation routes. These criteria define the property as having archaeological potential. Accordingly, Section 2 (d) of the *Planning Act* and Section 2.6.2 of the *Provincial Policy Statement* apply to the subject application. A Stage 1 & 2 Archaeological Assessment (P017-0886-2020) for the subject property has been submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries and the City of Hamilton. The report recommends that further archaeological work be conducted to address the archaeological potential of the subject property. Heritage Staff concur with the recommendations and **require that the applicant conduct a Stage 3 archaeological assessment (and potentially a subsequent Stage 4 Mitigation of Development Impacts, if required) and that this report be submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries and the City of Hamilton prior to any further approvals.** <u>Built Heritage:</u> No comments.	Subsequent Stage 4 Mitigation of Development Impacts may be required depending on outcome of Stage 3
Urban Design **Edward Winter**	
Urban Design Staff have reviewed the documents submitted with the Urban Solutions cover letter dated December 24, 2021 and have the following comments regarding the applications for Zoning By-law Amendment & Draft Plan of Subdivision at 3254 Homestead Drive: **Site Plan**	**Staff request revisions or clarification regarding details of the documents noted below:**

• Confirmation of alignment of new Street A & E. Cargo Road. • The 26m road section presented in the urban design brief is noted to support both pedestrian and cycling movements, as well as the inclusion of bioswales on both sides of the roadway. • Provide private sidewalks to the primary entrance(s) in locations giving priority for pedestrian circulation. Provisions for bike parking located on the exterior or interior. • Addition of upgraded pedestrian markings in parking lots breaking up large parking areas. • Is there any planned development for the two small frontages on Homestead Drive? Will these be naturalized or planted with trees?	**Site Plan** • **Confirmation of road alignment** *The following comment is suitable for resolution at Site Plan stage.* • Addition of parking boulevards with trees and pedestrian markings to break-up large parking areas.
Elevations Concept • Upgraded cladding materials on street facings elevations and primary entrances are noted in the Urban design brief.	**Elevations Concept** No Comments – *Submit final elevations at Site Plan Stage*
Landscape Plans • Landscape buffer at property lines to include provisions for large canopy trees and plantings where appropriate to buffer vehicle noise and light. (noted as described in urban design brief) • Addition of treed boulevards in vehicle parking lots. • Confirm details of the Natural Heritage Offsetting Compensation area (presented in Urban Design Brief without details).	**Landscape Concept** • **Natural Heritage Offsetting Compensation area. Confirm intent & details if available.** *The following comments are suitable to be resolved at site plan stage:* • Landscape buffer details (inclusion and spacing of trees / plantings) • Treed boulevards in parking lots
Sustainable Technology & Design • Low-impact design of grading and drainage across site is noted in Urban Design brief. • Consider collection of Grey water and re-use on-site	**Sustainable Technology & Design** No Comments – *Suitable for inclusion at Site Plan Stage.*
Refer to Figures 1-4 below.	

Figure 1 – Concept Plan Notes – Parking Areas

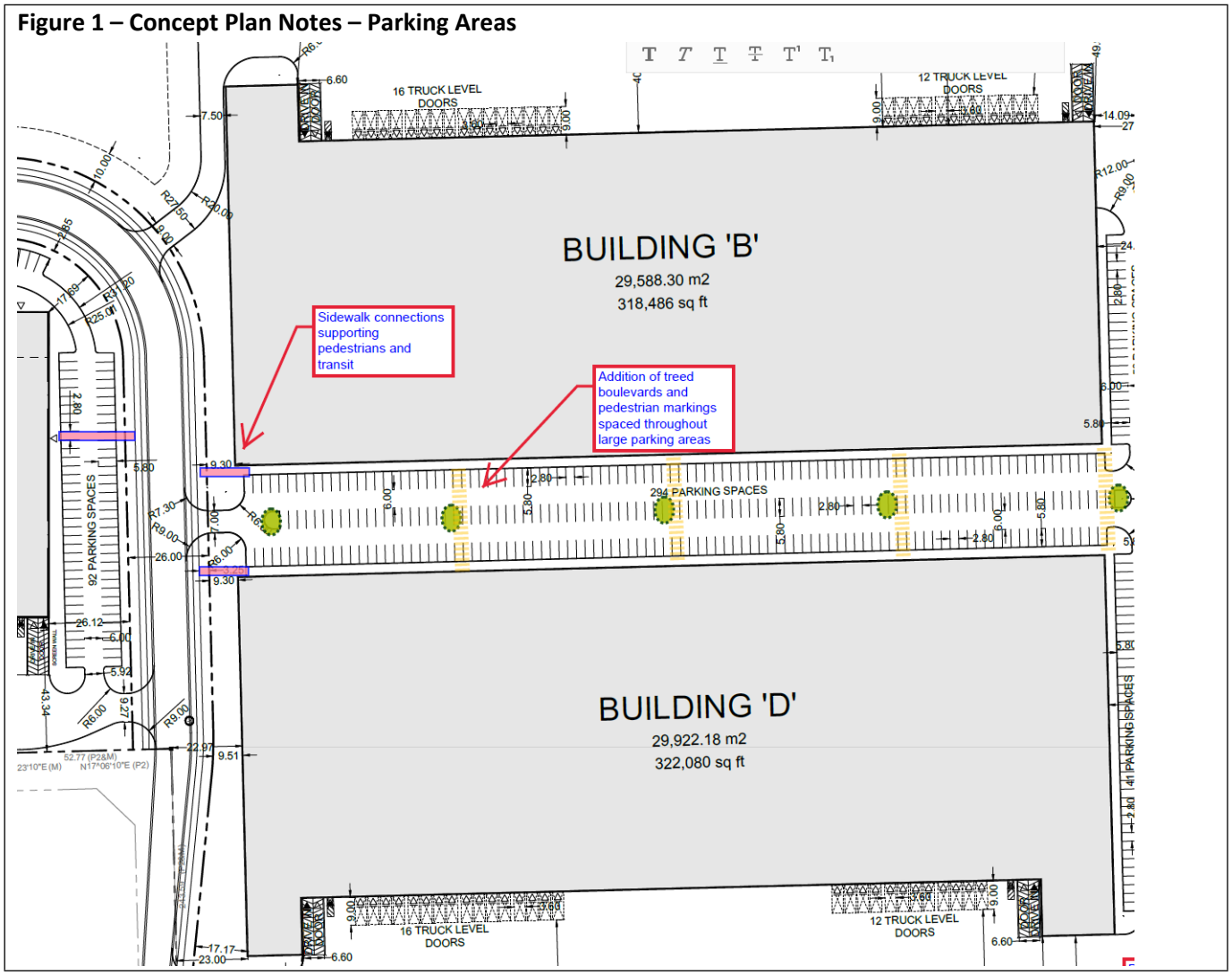


Figure 2 – Concept Plan Notes – Landscape Buffer Areas

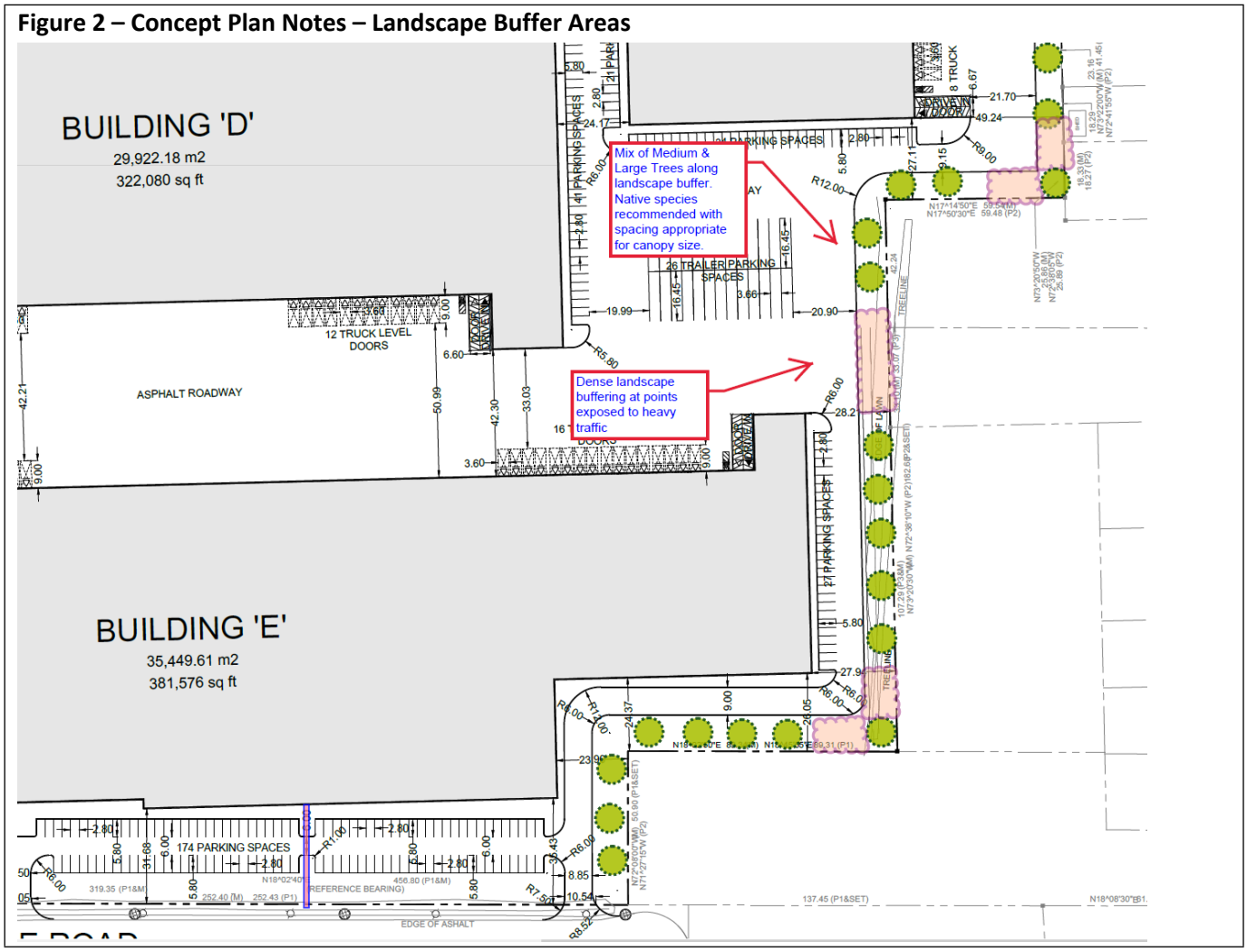


Figure 3 – Concept Plan Notes – Homestead Connection

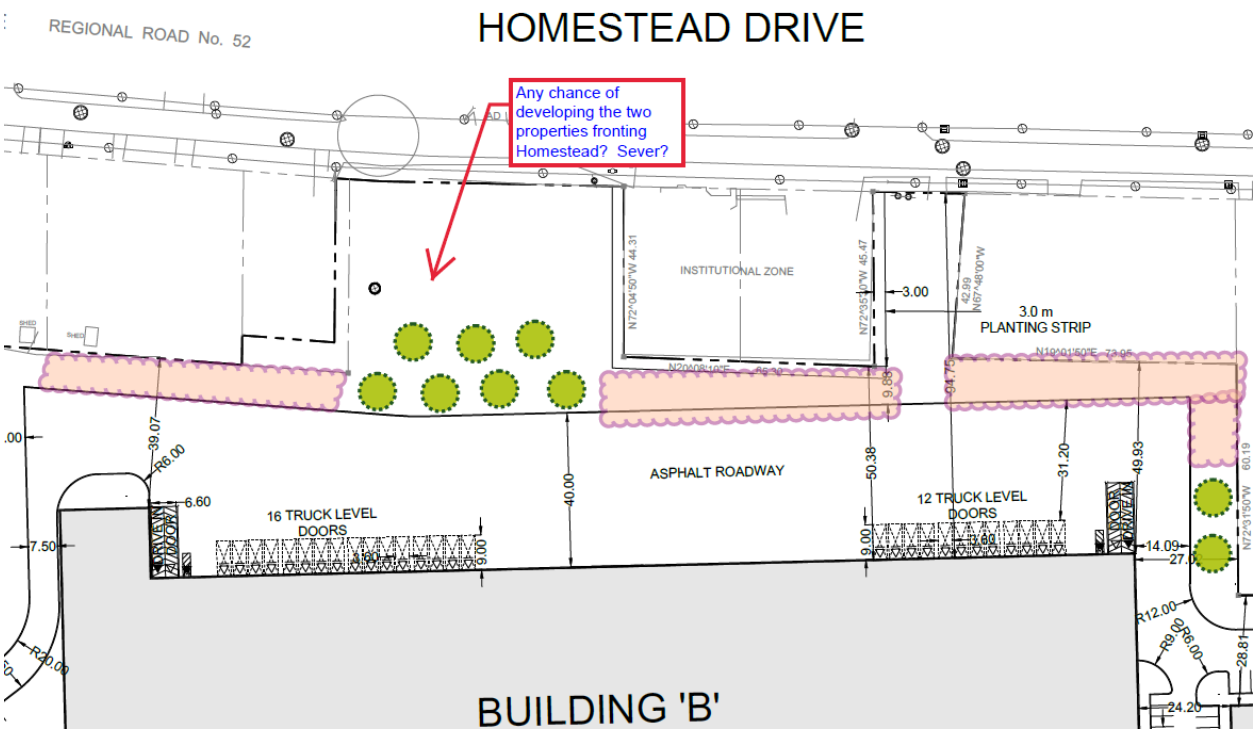
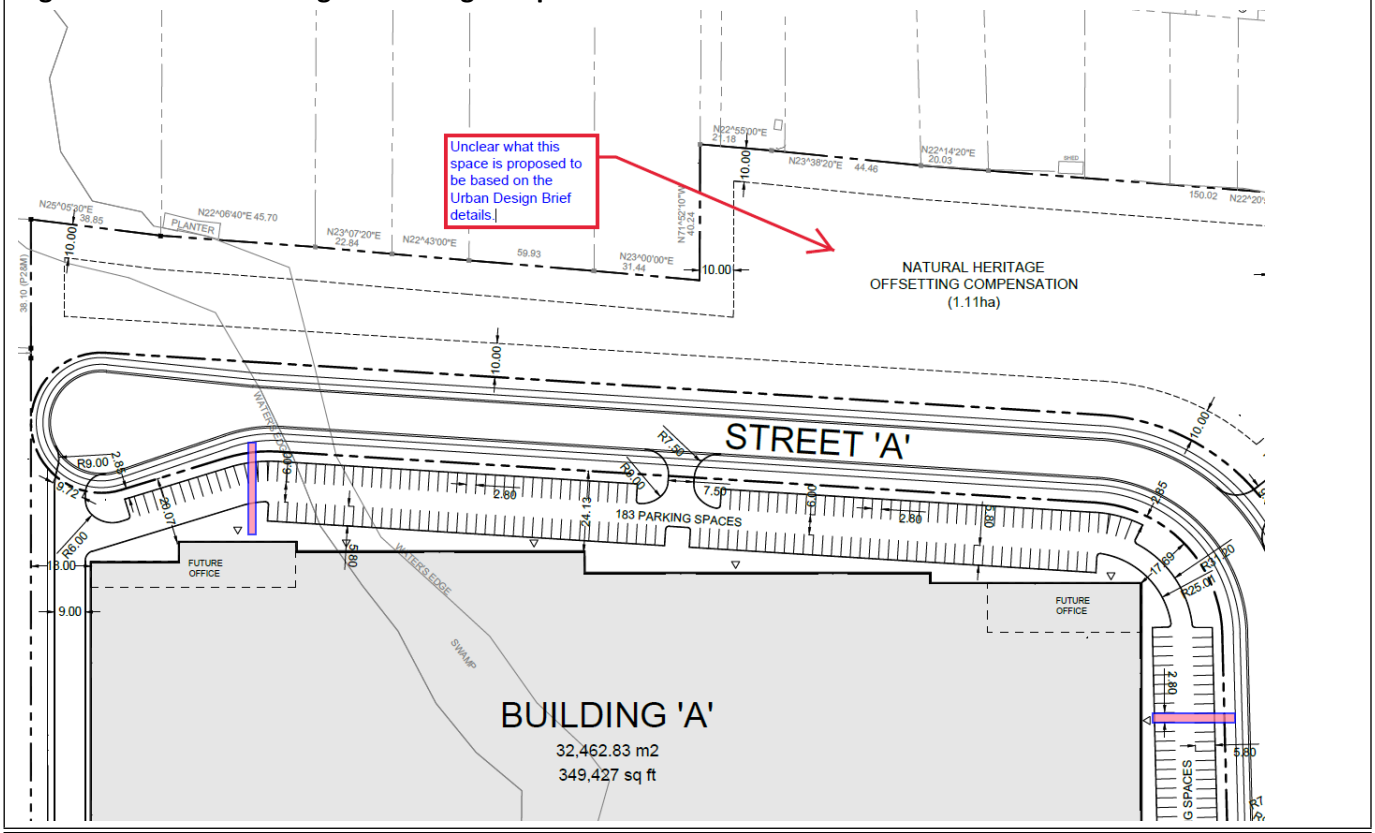


Figure 4 – Natural Heritage Offsetting Compensation area



Noise Study Review
Johanna Black

I have reviewed the Noise Impact Study by dBA Consultant dates December 2021 as it relates to the above mentioned development applications and require the following revisions / clarifications.

- **Page 3**. There are no methods to ensure trucks with air conditioning units will be restricted to the site. The Noise study must reflect worst case scenario. Please review and revise
- **Page 5.** The site plan in the appendix does not show the truck route as suggested in the study. Please include this in the resubmission
- **Page 5, Section 4.3.** Please summarize, in tabular form, the predicted sound levels and the mitigated sound levels at each receptor. The mapping in the appendix is not sufficient and is not clear. Please also include the sound levels for properties that were evaluated but did not exceed the exclusion limit values.
- **Page 5 Section 4.4**. I’m not clear on the recommendation for an acoustical barrier to mitigate the noise to 45 dBa Is the 2.6m and 3.6m height in addition to the recommended 5m and 6m heights? Please clarify. What additional plot is being referred to in Appendix A?

- **Page 6, Section 5.** Proposed HVAC units must be evaluated. The recommendation in the report is not sufficient as details on the choice of HVAC system has not been provided. If truck noise is in fact louder, this must be verified in the report through a proper review.

Building Engineering and Zoning

- *{Comments forthcoming}*

Commercial Districts and Small Business Section
Phil Caldwell

ase find comments below on behalf of CDSB for UHOPA-22-008 / ZAC-22-017 / 25T-202202 (3054 Homestead Drive):

- A portion of the subject site fronting on Homestead Drive is located within the Mount Hope /Airport Gateway Community Improvement Project Area (CIPA) and as such:
    - CDSB staff note that the purpose of the existing Mount Hope/Airport Gateway CIPA area is to support the transition of the existing residential uses to commercial uses which are more compatible with the area's proximity to the airport and in doing so, to support the creation of a new, cohesive commercial district. In this respect, staff note that this application includes the redesignation and rezoning of the portion of the property fronting on Homestead Drive from commercial to light industrial. CDSB staff would strongly encourage that if such redesignation/rezoning were to be approved, that the portion of the property fronting on Homestead Drive be required to be designed in such away to respect and compliment the intended scale and commercial function of Homestead Drive going forward and ensure that in no way would adjacent properties fronting on Homestead Drive be impeded from transitioning over time to a commercial function in keeping with that envisioned through the Mount Hope Secondary Plan and applicable commercial zoning.
    - CDSB staff note that industrial uses are not eligible under financial incentive programs available within the Mount Hope/Airport Gateway CIPA.

Development Engineering Approvals
Zivko Panovski

We have received the following applications attached to your memo dated March 3, 2022 and offer the following comments based on the review of the below noted documents:

- Survey Plan c/w Topo prepared by Nanfara & Ng Surveyors Inc., dated February 5, 2021
- Concept Plan prepared by Urban Solutions;
- Draft Plan of Subdivision, prepared by Urban Solutions, dated September 20, 2021; and

- Functional Servicing Report, prepared by Odan/Detech Group Inc., dated December 8, 2021;

Urban Hamilton Official Plan Amendment (File No. UHOPA-22-008)

The purpose of this application is to:

- remove a portion of the subject lands from the District Commercial designation in the Mount Hope Secondary Plan and add the portion to the Airport Light Industrial designation in the Airport Employment Growth District Secondary Plan; and,

- re-designate the balance of the lands from the Airport Reserve designation to the Airport Light Industrial designation and Airside Industrial designation in the Airport Employment Growth District Secondary Plan.

Our office has no issues with the proposed UHOPA if the proponents obtains and submits to the City written confirmation by the Federal Authorities that the lands identified as an airport reserve in the AEGD land use schedules may be developed at this time.

Zoning By-law Amendment (File No. ZAC-22-017)

The purpose of this application is to:

- change the zoning from the Airport Reserve (M9, H37) Zone to a modified Airport Light Industrial (M10) Zone (Block 1);

- change the zoning from the District Commercial (C6, 580) Zone to a modified Airport Light Industrial (M10) Zone (Block 2); and,

- change the zoning from the Zoning from Airport Reserve (M9, H37) Zone to a modified Airside Industrial (M7) Zone (Block 3).

Draft Plan of Subdivision (File No. 25T-202202)

The proposed Draft Plan of Subdivision consists of six blocks, with two blocks for industrial uses (Blocks 1 and 2), a stormwater management channel (Block 3), a temporary cul-de-sac (Block 4), a 0.3 m reserve block (Block 5), a natural heritage offset compensation block (Block 6), and a portion of a future public road (Street 'A').

Information:

1. Homestead Drive is subject to a road widening as described below:

   Existing Right-of-Way Width

- Homestead Drive –Collector Road –20.4 metres (approx.)

Future Right-of-Way Width (Urban Official Plan Schedule C-2)

- Homestead Drive – Collector Road –26.213 metres (approx.)

The applicant will be required to dedicate sufficient lands to the City for road widening purposes as a condition of draft plan of subdivision approval. The proposed draft plan of subdivision shall be amended to include separate Blocks adjacent to the Homestead Drive that should be dedicated to the City of Hamilton for road widening purposes by the Owner's certificate on the final plan.

Currently, Homestead Drive has rural cross section adjacent to the subject lands. Therefore, the owner will be required to provide a cash payment to the City for the future urbanization of the street as a condition of approval of the proposed development.

2. Currently, the following municipal servicing infrastructure exists in the vicinity of the site:
    - 400 mm dia. watermain
    - 675 mm dia. sanitary sewer
    - 300 mm dia. storm sewer

3. East Cargo Road is a private roadway in the Federal jurisdiction. Connection of the future municipal right of way (Street A) to a private right of way is not in accordance with City's Development criteria. If a connection is proposed from Street A to East Cargo, Street A may not be a municipal roadway. A permanent turning circle would be required at the west end of Street A at East Cargo Road in case Street A is extended easterly to connect to Upper James Street.

4. Street A is shown as a 26.0m wide local road that tapers down to 0.0 from the southwest corner of Block 2 as noted on the draft plan. This proposal is not acceptable to the City. The proposed 26.0m wide right-of-way may not be sufficient to provide for installation of a local industrial road and to achieve the objectives of the eco-industrial design criteria for the AEGD Secondary Plan.

5. The site access on to this subdivision is unclear and dependent on the Future ROW within the lands to the north to provide for a municipal street connection to Upper James Street. The subject lands have frontage on Homestead Drive. However, an upgrades are required at the intersection of Airport Road West and Homestead Drive as indicated in the executive summary of Transportation Impact Study, dated November 2021, by Nextrans Consulting Engineers submitted in support of the proposed development. Furthermore, we would like to advise that the existing pavement structure on Homestead Drive may not be adequate to support heave industrial truck traffic, if a temporary road connection is considered at this time.

6. We offer the following comments on the Functional Servicing Report (FSR) and the preliminary grading and servicing plans by Odan/Detech Group submitted in support of the Draft Plan of Subdivision:

   Section 2 Sanitary Servicing

   - Two sanitary outlets are discussed in this Section, the existing 675 mm municipal sanitary sewer on Homestead Drive and the existing 300mm dia. sewer on East Cargo Road. The existing sanitary sewer on East Cargo Road is in private ownership and will require a Joint Use Agreement to be registered on the title of the lands to address the future maintenance of the sewer. Furthermore, the preliminary servicing plan shows that the sanitary alignment bisects the lands at 9266 Airport Road which is in different ownership and may impact the development potential of the property. Therefore, the existing sanitary sewer on East Cargo Road intended to service Building 'E' may not be feasible. In addition, there are no sanitary design calculation included in the FSR to demonstrate that adequate capacity exist in the existing sewer on East Cargo Road .
   - The existing 675mm dia sanitary sewer on Homestead Drive discharges to the Twenty Road sanitary pumping station under the current servicing scenario. The sanitary flows from this area are intended to be diverted to the future trunk sanitary sewer on Dickenson Road East in accordance with the Master Servicing Strategy for the AEGD lands. In order to ensure that adequate capacity in the system exist to support the developments that relay on the Twenty Road SPS, and before trunk sanitary sewer on Dickenson Road East is completed, the City has adopted a Wastewater Allocation Policy. Therefore, the proponent will be required to apply for and obtain a written permission from the Director of Growth Management Division for allocated sanitary capacity as a condition of development of the subject lands.
     - The preliminary sanitary flows from the proposed development has been calculated based on 30ppha and infiltration allowance of 0.4l/s/ha for the proposed development. We note that although the population density reflects the AEGD Master Servicing recommendations it is below the current City development standard for an industrial development. Furthermore, the wastewater calculation included in Appendix 'B' of the FSR, based on the OBC for approximately 5,000sqm of office space for total building area of more than 18.0ha, does not justify that the assumed employment density is adequate. Therefore, the proponent will be required to establish and implement a monitoring plan to ensure that the sanitary flows does not exceed the allocated capacity as a condition of approval of the proposed development.
     - It appears that the proposed development may really on a private sanitary system that could direct the flows to the existing municipal sewer on Homestead Drive. However, if a municipal sewer is proposed within Street 'A' as shown on the preliminary servicing plan prepared by Odan/Detech Group an adequate easement in the City favour will be required.

Section 3 Water Supply and Distribution

- We note that the existing 250mm dia. watermain on East Cargo Road is in private ownership and will require a Joint Use Agreement to be registered on the title of the lands to address the future maintenance.
- A municipal watermain will be required within Street 'A' to provide the required domestic and fire flows to support the proposed development. A watermain hydraulic analysis for PD6 shall be completed and submitted to the City to demonstrate that proposed municipal main could provide the required fire flows for the proposed development in support of the proposed draft plan of subdivision. The preliminary servicing plan shows a connection to the existing municipal main on Homestead Drive. An adequate easement in the City favour will be required as a condition of draft plan approval. Also, the proponent will be required to address the water quality issues and provide for watermain flushing at the detailed design stage.

Section 4 Stormwater Management

- It appears that the drainage divide shown on Figure 3 in Appendix C of the FSR is in conflict with the existing topo shown on the survey plan prepared by Nanfara & Ng Surveyors Inc. The excerpt from the SWM Master Servicing Study, exhibit 1, provided in Section 4.2 of the document is not appropriate to justify the drainage divide and provide adequate info to establish appropriate conditions driven by the proposed development. Drainage area A should be further subdivided to establish the flows at control nodes at the south property line, adjacent to the rear of the existing properties fronting Airport Road West, under the pre-development conditions. The consultant shall update the info provided on Figure 3 and in Table 5, Section 4.2 of the report accordingly.
- The post-development flows from the south portion the subject lands, within the Welland River sub watershed catchment, are intended to drain to the existing centralized SWM facility constructed under the Lancaster residential subdivision. It appears that the existing storm sewer on Airport Road West, to the east of Provident Way, may need to be extended to provide adequate outlet for the proposed development in case of the minor storm event. We note that there is no provision in design of the existing private storm sewer on East Cargo Road to service the subject lands to our understanding. The Consultant shall provide additional clarification on this issue. The future storm sewer on Airport Road West is intended to be extended to the intersection with Marion Street in accordance with the approved servicing concept under the previous developments within the area. The Consultant shall provide preliminary plan and profile of the future storm sewer on Airport Road West to clarify the extend of the required works to service the proposed development. The Consultant should provide additional info for Airport Road West to demonstrate feasibility of the major storm overland flow from the proposed development to the existing SWM facility.
- The post-development flows from the norther portion of the subject lands, within the Twenty Mile Creek sub watershed catchment, are intended to drain

to the future centralized SWM facility within the adjacent lands to the north in accordance with the AEGD Master SWM strategy to our understanding. In absence of development proposal for the adjacent lands to the north, the portion of proposed development that is within the Twenty Mile Creek sub watershed, may be considered as pre-mature at this time.

Please refer to the more detailed comments provided by the Infrastructure Planning staff, dated April 1, 2022, on the preliminary SWM servicing concept submitted by the proponent in support of the proposed development.

The Hamilton Water staff offers the following additional comments related to servicing of the proposed development from water and wastewater point of view:

Sanitary Servicing

The Applicant has proposed two sanitary connections, one to Homestead Drive and one to East Cargo Road. To the best of our knowledge, East Cargo Road and the sewers within that roadway are private. Prior to approval, the Applicant is required to confirm ownership of the roadway and sewers as being public, or revise the proposed servicing strategy to direct all wastewater to the municipal sanitary sewer on Homestead Drive.

In addition, please remove commentary related to the potential requirement for a municipal easement (e.g., Section 2.2) and reserve for the Site Plan application. HW is not in a position to accept/reject this as part of the above noted applications.

Minor Storm Servicing

Similar to the above, the Applicant is proposing to direct stormwater runoff to East Cargo Road. The Applicant is required to confirm ownership of the roadway and sewers as being municipally owned, or revise the proposed servicing strategy to direct all stormwater to the municipal ROWs.

In addition, HW will not accept any increases in peak flow rates. Please revise.

From the water servicing perspective, we have the following comments:

1. Water Demands:
   - The maximum day domestic water demand for the development, based on a population-based approach, has been provisionally calculated as 9.5 L/s. This calculation is acceptable at this time.

2. Required Fire Flow:
   - The maximum required fire flow (RFF) has assumed to be 250 L/s, which is the City's target available fire flow for industrial land uses.

3. Watermain Hydraulic Analysis:
   - A Watermain Hydraulic Analysis (WHA) shall be completed to confirm that the required domestic and fire flows are available within the appropriate pressure ranges, and to confirm that the impact of this development on the surrounding areas (PD6) is not adverse.
   - If new municipal watermain is required to service the proposed development, the watermain hydraulic analysis will support the Form 1 process. Please clearly delineate the municipal and private water servicing (both existing and proposed) in the WHA and on the Servicing Plan.
   - To determine the approximate static pressure of existing municipal watermain, and collect calibration data for hydraulic modelling, two-hydrant flow tests should be conducted at the closest municipal hydrants by the proponent through a licensed private contractor.
   - To assist with the completion of the WHA, please contact Winston Wang (winston.wang@hamilton.ca) for access to the City's current water model. Please contact Udo Ehrenberg (udo.ehrenberg@hamilton.ca), with carbon copy (cc) to the planner/development coordinator, to confirm the required boundary conditions prior to commencing the hydraulic analysis.

To support the draft plan approval/zoning bylaw amendment/official plan amendment applications, please provide a watermain hydraulic analysis per the above comments.

Forestry & Horticulture
Sam Brush

PREAMBLE

In response to your Memorandum of March 3, 2022, regarding the subject area under discussion, the Forestry & Horticulture Section has reviewed the Application for this site and provides the following opinion:

SCOPE

The tree management plan, completed by GEI Consultants, dated October 2021 is not approved as tree ownership has not been provided. Please refer to tree management plan requirements noted below.

An assessment of the information provided shows that there are potential conflicts with publicly owned trees. Where existing municipal trees are impacted by development work, are within proximity of the development work or access/egress to the development work, a Tree Management Plan must be submitted to the Forestry and Horticulture Section c/o the Urban Forestry Health Technician.

Where ownership of trees in proximity to the boundary between public and private land is uncertain, the subject trees must be surveyed by the applicant to confirm ownership. Ownership is as per By-law 15-125. Ownership must be clearly identified on the Tree Management Plan as either municipal or private.

A **Permit** to injure or remove municipal trees is a requirement of this application. Therefore, a **Tree Management Plan** must be submitted to the Forestry and Horticulture Section c/o the Urban Forestry Health Technician, to address potential conflicts with publicly owned trees.

Conditions of the Forestry and Horticulture Section will be cleared only after receipt of all applicable fees and payments.

TREE MANAGEMENT

Tree Protection is a measure of efforts to preserve existing trees during the Planning of New Developments, Infrastructure Enhancements, Utility Upgrades & Residential Improvements.

The Forestry & Horticulture Section requires that a Tree Management Plan be prepared by a MTCU Qualified Arborist, or ISA Certified Arborist, or a Registered Landscape Architect. All trees within this proposed development area must be surveyed, identified and accurately plotted on the plan to determine ownership, including intensions regarding retention or removal.

It is compulsory that all proposed surface treatment changes within individual tree driplines as well as property lines, building footprints, driveways, utility construction corridors and temporary access roads be accurately depicted on the submission.

The Tree Inventory Analysis Table on the Tree Management Plan shall not be considered complete without the following data and recommended action for each tree.

- Species by Botanical and common name
- Diameter at breast height in centimeters or millimeters
- Ownership {> 50% @ ground level = ownership}
- Biological health
- Structural condition
- Proposed grade changes within individual driplines {compulsory}
- Proposed utility construction within individual driplines {compulsory}
- Proposed removals or relocations
- Proposed trees to be protected

If it is determined and verified that existing trees can remain, a Tree Protection Zone Detail with notes showing Tree Preservation Techniques shall be included on the submission as per the **Public Tree Preservation and Sustainability Policy.**

The determination of ownership of all trees is the responsibility of the applicant and any civil issues which may exist or arise between property owners with respect to trees, must be resolved by the applicant. The ownership of each individual tree inventoried must be clearly stated as municipal or private.

All Healthy trees on municipal property which are found to be in conflict with this proposed development and do not meet our criteria for removal are subject to a replacement fee as outlined in the **Public Tree Preservation and Sustainability Policy** in conjunction with **By-Law 15-125**.

A $284.38 plus HST permit fee, payable to the City of Hamilton is required prior to the permit issuance.

A permit will be issued upon approval of the Tree Management Plan and applicable fees.

SUBDIVISION AGREEMENT

In accordance with the New Developments Tree Planting Policy, the city of Hamilton collects cash in lieu of Trees for residential subdivisions; the Forestry & Horticulture Section will provide clearance of a Street Tree Planting condition upon receipt of a plan depicting new trees and a cash payment as shown in item 2.8 of the completed Subdivision Agreement. The remittance is to be made payable directly to the Forestry & Horticulture Section.

The City of Hamilton's Public Tree Preservation and Sustainability Policy in conjunction with the Tree By-Law 15-125 requires new developments to provide payment of $670.96 plus HST per tree for road allowance street trees. All street tree plantings shall be planted by the City of Hamilton. All trees shown on municipal road allowance shall be identified as 'Trees to be planted by City of Hamilton Forestry Section.

Street tree requirements for all future site plan blocks identified within the subdivision will be addressed at site plan stage.

Street trees are required within the right of way along all parks, open spaces and swm ponds at 10m spacing. A site plan showing these blocks and the linear frontage are required to be shown to identify cash in lieu for street trees.

Forestry's mission to increase urban canopy through new development encourages any opportunity for planting locations.

SUMMARY

- The Tree Management Plan is not approved.

- **A permit will be issued upon approval of the Tree Management Plan and applicable fees.**

- In accordance with the New Developments Tree Planting Policy, the city of Hamilton collects cash in lieu of Trees for residential subdivisions; the Forestry & Horticulture Section will provide clearance of a Street Tree Planting condition upon receipt of a plan depicting new trees and a cash payment as shown in item 2.8 of the completed Subdivision Agreement. The remittance is to be made payable directly to the Forestry & Horticulture Section.

- The City of Hamilton's Public Tree Preservation and Sustainability Policy in conjunction with the Tree By-Law 15-125 requires new developments to provide payment of $670.96 plus HST per tree for road allowance street trees. All street tree plantings shall be planted by the City of Hamilton, as approved through the review of a proposed street tree planting scheme. All trees shown on municipal road allowance shall be identified as 'Trees to be planted by City of Hamilton Forestry Section.

We encourage you to forward a complete copy of our comments to the applicant and should you or the Applicant require clarification or technical assistance, please do not hesitate to contact me at (905) 546-2424 Ext. 7375.

Growth Management (Industrial and Airport)
Danielle Fama

The following comments are provided by the Legislative Approvals / Staging of Development Section in reply to your memorandum, dated March 3, 2022.

The following is required to be corrected prior to the Staff Report being finalized:

1. As required by Section 51(17)(a) of the Planning Act, the plan must be certified by an Ontario Land Surveyor;

2. As required by Section 51(17)(b) of the Planning Act, the location, width and name of proposed and existing highways must be shown;

3. As required by Section 51(17)(e) of the Planning Act, the existing uses of all adjoining lands must be shown;

4. As required by Section 51(17)(g) of the Planning Act, natural and artificial features within or adjacent to the proposed subdivision must be shown;

5. As required by Section 51(17)(i) of the Planning Act, the nature and porosity of the soil should be spelled out;

6. As required by Section 51(17)(k) of the Planning Act, the specific services should be listed;

7. A title should be added to the Draft Plan of Subdivision. Staff defer to Development Planning for further comment;

8. The subject lands on the plan need to be oriented in the same direction as the subject lands in the key map; and,

9. The plan needs to be panned out, so the adjacent lands are visible.

General Comments:

1. A large portion of the subject lands are identified as "Employment Areas" per Schedule E – Urban Structure, designated "Airport Employment Growth District" on Schedule E-1 – Urban Land Use Designations of Volume 1 of the Urban Hamilton Official Plan and designated "Airport Reserve" on Map B.8-1, Land Use Plan within the Airport Employment Growth District Secondary Plan of Volume 2 of the Urban Hamilton Official Plan ("UHOP"). Therefore, the subject lands should be re-designated accordingly. Staff defer to Development Planning for further comment;

2. It should be determined if the subject proposal conforms with and implements the requirements of the Airport Employment Growth District Master Plans. Staff defer to Development Engineering Approvals for further comment;

3. The use of East Cargo Road and the ultimate impact to the airport and operations should be determined. It is noted that East Cargo Road is a private road and thus, could be altered at any time, so an alternative access to a public road should be included as part of the subject proposal. Appropriate agreements will be required to facilitate the use of East Cargo Road which may require legal services input. Staff defer to Development Planning and the Airport Authority for further comment;

4. It should be determined if proposed Street 'A' should be a cul-de-sac at the north end until the future road connection is made. It should also be determined if Street 'A' will align with the future development to the north. Staff defer to Development Planning for further comment;

5. The subject lands are within a defined area of cost recoveries. Staff defer to Development Planning and / or Development Engineering Approvals for further comment;

6. It should be determined if the future Draft Plan of Subdivision will be phased. Please note a PIN Abstract would be required with the submission of a Draft Plan of Subdivision application. In addition, per subsection 51(17) of the Planning Act, the prescribed information should be shown and provided on the Draft Plan of Subdivision. Staff defer to Development Planning for further comment;

7. It should be confirmed if tenure for the subject proposal will be a Condominium. Please note a PIN Abstract would be required with the submission of any future Draft Plan of Condominium application. Staff defer to Development Planning for further comment;

8. The subject lands are subject to height restrictions amongst other matters per the airport zoning regulations. Staff defer to Development Planning for further comment; and,

9. The Owner and Agent should be made aware that municipal addresses for the individual blocks as well as street naming will be determined after Draft Approval is granted.

That the following be added as a Condition to the Draft Approval:

1. **That prior to registration**, the owner and agent work with Legislative Approvals / Staging of Development Staff to finalize street naming and municipal addressing for the individual Blocks, to the satisfaction of the Director of Growth Management.

That the following be added as a Note to the Draft Approval Conditions:

NOTES: Pursuant to Section 51(32) of the Planning Act, draft approval shall lapse if the plan is not given final approval within 3 years. However, extensions will be considered if a written request is received two months before the draft approval lapses.

df:GZ

Infrastructure Planning
Monir Moniruzzaman / Suman Saha

Infrastructure Planning staffs have reviewed the Functional Servicing Report (prepared by Odan-Detech; Dated: December 08, 2021) submitted for the subject development proposal and would like to provide following comments from stormwater management perspective:

FSR and SWM Report (Odan-Detech; dated: December 08, 2021)

1. General:
   a) Stormwater quantity control storage for the proposed development at the subject site has been provided in the combination of roof top storage, underground storage chamber and surface ponding; however, as per MECP SWM 2003 and City guideline, development areas for more than 5 ha should consider SWM pond to accommodate the development. However, still if the proponent continues to consider current proposal for stormwater management for the subject site, we recommend the applicant provides an appropriate overland flow route/emergency spillway to municipal road (Airport Road) per existing grading conditions. In addition, site plan agreement should include all the liability in City's

indemnifications to handle if on-site SWM system fails or cannot handle beyond design storm event.
Current deign did not demonstrate a legal emergency spillway to Airport Road storm outlet.
As built information including plan and profile of existing East Cargo Road should be provided to demonstrate if an emergency spillway on East Cargo Road is feasible. In addition, the owner must provide a legal authorization from Airport Authority for O&M for the sewers proposed on East cargo Road.

b) An ESC pond and an ultimate SWM facility are generally being implemented to control storm runoff from pre-grading, servicing and road & building construction works so that the predevelopment condition at each storm outlet can be maintained during all phases of the constructions. In the current design for the subject site, SWM control are proposed through rooftop, underground storage chamber, surface parking etc. Please explain and demonstrate how SWM control will be implemented and secured prior to any work in the development. In addition, there is no assurance from the City for the implementation of all building shown on the concept plan. All development within the blocks will be developed through a site plan control application. Please explain and demonstrate how SWM control target will be achieved if all buildings cannot be built at the same time.

2. Table 6: In relations to Figure 3B (approved drainage area plan for SWM Pond for Lancaster Heights subdivision), the allowable flows from EX1 and EX2 at MH1 (on Airport Road) should be consistent with approved storm sewer design for future urbanization of Airport Road submitted with Lancaster Heights subdivision which shows total combined 100 year flows from areas EX 1 and EX2 including drainages from Airport Road at MH1 is 897 l/s whereas Table 6 in the current report shows 100 year flows form EX1 and EX2 (without considering ROW drainage from Airport Rd) 1093 l/s. Please review.

3. Page 9, paragraph 4 and Figure 5 (Appendix D): It is mentioned that 18.77 ha airport lands from west as shown on Figure 5 drains through the subject site. Please provide a copy of the report that outlines 18.77 ha drainage area.

4. Page 15, Paragraph 2: Please provide stage-storage-discharge table for each underground storage (Cultec) and parking lot storage. Please show stage in terms of elevations. Appendix C (digital page 48) shows stage-storage-discharge table for roof storage where stages can also be shown in elevations.

5. Figure 3 (predevelopment tributary plan in Appendix C): Figure 3 shows a drainage break at the subject site which is not consistent with approved drainage area plan for SWM Pond for Lancaster Heights subdivision (Figure 3B) which included the subject site.
Please confirm the drainage break based on actual ground elevation contour analysis. Pleas show elevation contours on Figure 3.

6. As per Figure 4, drainages from part of the subject site belonging to Twenty Mile Creek watershed is proposed to be diverted to Welland River Watershed and vice versa. However, approved report for Lancaster Heights subdivision SWM pond (Figure 3B) which included majority of the subject site (subcatchment EX 1, EX2) shows EX1, EX2 areas draining to the Lancaster Heights subdivision SWM pond belonging to Welland River Watershed. Therefore, the consultant should justify their position regarding the drainage diversion from the subject site between the two watersheds in connection with drainage area plan for Lancaster Heights SWM pond.

7. Please overlay subcatchment EX1 (10.22 ha) and EX2 (6.83 ha; as shown on Figure 3B - Lancaster Heights SWM pond drainage area plan) on Figure 4 to confirm how much of the previously approved drainage areas towards Airport Road storm outlet/Lancaster Heights SWM pond/Welland River Watershed is considered in the current design.

8. Page 16, Exhibit 2, paragraph 1/ Page 19 (paragraph 2), Exhibit 3, Table 14: It is mentioned that 250 mm orifice proposed at MH2 in XPSWMM model, however, please refer to the servicing plan where this MH2 is located. As servicing plan (drawing no.: 1) did not show any manhole numbers. Please use the same naming convention in the XPSWMM model for the hydraulic and hydrologic nodes as per the servicing Plan (Drawing No.1) and drainage area (Figure 4). Plans. For example, Node1 shown in model schematic (Exhibit 2) should be named in reference to the storage (i.e. Cultec etc.) name/ subcatchment name (area A2) shown on the servicing plan/drainage area plan.

9. Please show a table indicating which are controlled and uncontrolled subcatchments (in relation to Figure 4) for each storm outlet (i.e. east Cargo Road/Airport Road to the south; Homestead Drive/Upper James Culvert to the north).

10. On Table 13 Please show controlled and uncontrolled flows from the subject site towards Airport Road storm outlet. Please note that total controlled and uncontrolled flows towards Airport Road storm outlet should not exceed previously approved allowable flows from the subject lands as per Lancaster Heights design (897 l/s for 100 year storm)

11. Model schematic shown on Exhibit 3 should be consistent with servicing plan, drainage area plan/Table 14. There are two Cultec chambers shown on the south and east of Building A, please clarify which model storage nodes on Exhibit 3 represents each of these Cultec chambers. Please also see comment no. 44. XXI.

12. Please note that roof storage and underground storage should have independent or separate flow control. In other words, controlled flows from building roof should bypass the underground storage/proposed Cultec chambers. Please review and confirm. Please also see comment no. 44. XX.

13. XPSWMM model schematics (Exhibit 2 and 3) shows roof ponding provided at each building roof. In this connection, please confirm with supporting information the maximum detention time and what is the impact of the regional storm.

14. Please note that roof top storage should be registered on title for future maintenance.

15. Please provide a table showing peak flows for 2 to 100 year storm events for all hydrology nodes.

16.

a) Please verify and confirm the downstream impact on Twenty Mile Creek due to flow diversion from Welland River watershed and vice versa. In addition, City requires in writing from NPCA confirming the acceptance of this proposed flow diversion between the two watersheds.

b) Please confirm if 10 mm infiltration adequate for erosion control in the downstream in both watershed (Twenty Mile Creek and Welland River watershed).

c) As per AEGD study recommendations, 250m of stream assessment and restoration works will be required downstream of proposed storm outlet to the north towards Twenty Mile Creek.

a) The Owner shall demonstrate that the subject development has riparian rights to drain onto private lands. The Owner shall notify the downstream land owner(s) (whose properties are traversed by the watercourse/ proposed storm outlet from the proposed culvert on Street A to the existing culvert on Upper James Street) of a proposed SWM outfall and impending development construction.

b) The Owner will be responsible to monitor drainages across the existing lands from the proposed north storm outlet to the existing culvert at Upper James Street to ensure that the above mentioned existing lands are not negatively impacted by the subject development. The monitoring plan shall occur throughout the construction of the subdivision and for a period of not less than 2 years after all lot/blocks within the approved draft plan are fully developed. In the event that a problem arises, the Owner further agrees to take the necessary remedial action as per the monitoring report at their cost.

17. Please provide tables showing all hydraulic nodes and links. The table should show water level, required volume and release rates for 2 to 100 year storm events for all hydraulic storage nodes (roof storage, Cultec Chamber etc.) and peak flow for 2 to 100 year storm events in all conveyances/ hydraulic links including all onsite and offsite outfall/storm outlets.

18. Table 15 shows 2-year post development flows to the north outlet exceeds predevelopment target flow. Please provide downstream erosion assessment/ erosion

threshold analysis for the post development discharge to the north outlet to the Twenty Mile Creek.

19. Table 12/Table 16: Page 20 paragraph 1 mentions that storage will be provided in the combination of underground and surface storage. Based on this, please confirm if the storage nodes mentioned on Table 16 and Table 12 are only underground storages? If yes, then please clarify which nodes on the XPSWMM model schematic (Exhibit 2 and 3) represents surface storage/ponding. Please also see comment no. 44.V, VI, XVIII.

20. Page 20, paragraph 1, last line: It is mentioned that storage in the road allowance will be achieved by ditch and pipe storage. However, please note that as per AEGD SWM Master Plan, ROW cross section on AEGD lands should include minimum 3 m wide swale on both side of the road to provide both stormwater quality, and conveyance function form ROW lands only, super pipe within ROW is not acceptable. Please note that actual width of the road side ditches will be determined based on the side slopes and bottom width considering proposed grades. Please conform width of roadside ditches by providing supporting design information.

21. Section 4.6, Page 20:

a) A channel is proposed west and north of 'Building A' to reroute the existing watercourse running through the north portion the subject site towards storm outlet towards Homestead Drive (Twenty Miles Creek watershed) conveying discharge from upstream dry pond from Airport lands. The above channel should be designed to safely convey greater of uncontrolled 100 year post development flow and Regional Storm flows from upstream airport lands (Figure 5). Please review and confirm with supporting information.

b) The design should demonstrate with supporting information that existing conditions available storage volume in the watercourses/ditches are replicated in the above mentioned proposed channel.

b) Section 4.6, page 20: It is mentioned that 10 m set back provided above 100 year water level in the above channel. Please provide supporting HEC-RAS model files to demonstrate 100 year level in the channel.

c) An appropriate easement will be required over the above-mentioned channel block and a minimum 4 m wide maintenance access will be required.

22. Page 22, last 2 lines: It is mentioned that a 56 m 825 mm concrete culvert is proposed to convey flows from proposed channel to the north through 'Street A' cul-de-sac. The culvert design should consider the following:

    a) The above culvert should be designed to safely convey greater of uncontrolled 100 year post development flow and Regional Storm flows from upstream airport lands (18.77 ha as per Figure 5)

b) The culvert east end should end at the ROW limit and transition should be provided to the natural heritage compensation areas.

c) The culvert design should consider appropriate end treatment (Wing wall, etc.).

23. Section 4.7:
The design did not demonstrate how 'Level 1' stormwater quality control will be provided by treatment train design principle. As per the servicing plan, stormwater quality control relies on OGS. Please note that stormwater quality control design should consider LID source control by implementing filter media-based LID measures on the parking lots.

Proposed OGS units should be designed based on the following:

Proposed OGS unit should be designed to capture and treat at least 90% of the runoff volume that occurs for a site on a long-term average basis using ETV Canada particle size distribution. ETV test performance data posted on the ETV Canada website/verification statement should be used for the sizing of the hydrodynamic separator/OGS unit for the target TSS removal. However, please note that as per City and MECP's standards, only 50% credit will be given for TSS removal efficiency for any proposed standalone non-filtration based OGS unit (should be ETV verified technology only); therefore, design should demonstrate other LID techniques to achieve the overall required TSS removal efficiency (Leve1). The OGS sizing calculations should show percentage TSS removal, percentage annual runoff treated, treatment flow rate and particle size distribution. Maintenance requirements of the proposed unit should also be outlined. OGS sizing calculations should be signed, dated and stamped by a Professional Engineer retained for this site and should be accompanied by ETV verification statement.

24. Table 21: Please confirm if any of the infiltration galleries receives flows from asphalt /parking areas in addition to the roof. For runoff from parking areas, filter media in the infiltration gallery for pre-treatment should be considered for stormwater quality treatment perspective.

25. Appendix C, Infiltration gallery sizing calculations:

i. Please provide supporting in-situ geotechnical investigation report to confirm infiltration rate (current calculations considered 18 mm/hr) used in the infiltration gallery sizing calculations.
ii. Based on the infiltration rate as per above please confirm the draw down time (current calculations considered 48 hour). 24 hours drawdown time preferred.

<u>Storm sewer design calculations</u>

26. Current report did not provide storm sewer design calculations as per the servicing plan. Please provide storm sewer design calculations with supporting storm sewer catchment drainage area plan.

HGL Calculations

27. Please provide 5 year and 100 year HGL calculations considering downstream boundary conditions (at the Lancaster Heights SWM pond to the south for the outlet to Airport Road and at the ditch to the north for the outlet to Homestead Drive.
Storm sewers should be designed under free flow conditions.

Drawings

Servicing Plan

28. Servicing Plan shows proposed storm outlet to provident way/Airport Road through extension of East Cargo Road which is a private Road.
Please confirm with supporting documentation if Airport Authority agrees to this proposal. Also please confirm if this storm outlet will work by providing as built drawings of existing East Cargo Road.

29. For each underground storage proposed, please mention the location and size of the areas for chambers following in addition to the information on the drawing: top and bottom elevation including length, width and number of chamber units proposed. Please mention if proposed underground chamber will have impermeable liner at the bottom; please mention 100 year water level in the underground storage chamber, and volume provided.

    Please note that underground storage should have sperate flow control independent of roof top control. Please see also comment 44. XX.

30. For each proposed roof storage, please mention the following information on the drawing: type, sizes, no of flow control and location of the control; corresponding discharge (i.e. l/s/unit head), 100 year operating head and corresponding 100 year volume provided.

31. Servicing plan shows the underground storage (Cultec chamber) and Infiltration gallery at the same locations. Please clarify how the proposed arrangement will work by showing a longitudinal section/ profile to confirm that there is no spatial conflict between the underground storage and infiltration gallery.

32. Servicing plan shows a 600 mm flow control orifice east side of control manhole on Street A. Please note that we do not support a super pipe and a flow control structure within ROW. Please review.

Conceptual Grading Plan (Drawing No.: 3)

33. Instead of saw-toothed grading, a continues 0.75% slopped grading for the 'Street A' should be considered to provide a continuous overland flow route to the emergency spillway to the north end of 'Street A'.

34. The grading plan is not consistent with the drainage area plan (Figure 4). As per Figure 4, subcatchment A2 (4.07) entirely drains to the proposed storm outlet towards East Caro Road; however, as per the grading plan, significant portion of subcatchment A2 dos not drain to the East Cargo Road storm outlet (drains to the east). Pleas review.

35. As per the current grading plan, two spilling point provided east of building C (spill elevation 233.00 m) and east of building B (spill elevation 233.06 m). Please review and confirm how overland flows spilled at these locations will be conveyed to the Airport Road without impacting/spilling to the adjacent private properties to the east.

    In general, the design should consider adequate top and bottom of curb elevation along parking lot perimeter to demonstrate a continuous overland flow route to the emergency spillway at each proposed storm outlet (to the north to Homestead Drive and to the South towards Airport Road).

36. Please confirm if the remaining lands on Block 1 east of Building B will remain vacant in the future conditions. Design should confirm storm outlet for any potential future development on these portions of lands in Block 1.

37. Grading plan should show more point elevation in sub-catchment EXT-1 (Figure 4) and also along Airport Road to demonstrate overland flow route.

38. From existing grades, it appears that rear of properties (to the east of the subject site) along Homestead Drive are lower than the front (fronting Homestead Drive) and may drain through the subject site under existing conditions. Please review and confirm.

    Proposed SWM design for the subject site should ensure appropriate major and minor system storm outlets for drainages from rear of these properties.

39. Current design proposed emergency overland flow route (for the proposed development) towards Airport Road through the proposed extension of East Cargo Road which is a private road. A legal emergency overland flow route should be provided for the proposed development.

40. We do not support the retaining wall proposed on the both sides of the proposed channel (proposed to the west/north side of Building A). The channel should be designed without a retaining wall.

    End treatment (wing wall, etc.) should be considered for the proposed culvert at end of the channel outleting to the east of 'Street A'.

Conceptual section Plan (Drawing: 4)

41. Report mentions that road side ditches provided beside Street A and proposed extension of East Cargo Road; however, sections shown on the drawing did not show roadside ditches.

42. Section A-A, B-B should be extended to the Airport Road to the south; and section D-D should be extended to the Homestead Drive to the east.

43. Section C-C: Please show side slopes for natural heritage areas.

44. Comments on XPSWMM Model output:

I. Only 2 year model output provided. Please also provide 100 year model output.

II. Model output suggests Infiltration galleries have not been included in the model. Please justify how 10 mm infiltration has been accounted in the model.

XPSWMM Model output : Welland River Watershed

III. Please justify the impervious cover 78% for Node7 (subcatchment A2 – 4.07 ha on Figure 4).

IV. The node name used in the model output is not consistent with the model schematic (Exhibit 2). Exhibit shows Node 1 but model output shows Node 7. Also, Roof D/E on schematic are shown as Roof E/F in the model output. Please ensure consistent name between model schematic, servicing plan, drainage area plan and model output.

V. Model output suggests that required on-site storage shown on Table 12 in the report is underground/Cultec &/or parking lot storage only which does not include the provided roof top storage in Building D and E. Please also show roof top storage on Table 12.

VI. It is not clarified from the model output if the provided storage 11095 m^3 at Node 7 (digital page 64) are provided entirely in the underground storage or in the combination of underground and parking lot surface storage. Please note that underground storage and surface parking should be modelled as separate node not as lumped storage node. Please clarify and update the model and Table 12 accordingly.

VII. The proposed storage volume requirement (excluding roof storage) shown in the model output (and also on Table 12) are based on 250 mm orifice at MH2 and target flows as per Table 6 exceeds the original target release from the subject site considered in the Lancaster Heights Subdivision. Servicing plan shows 100 mm orifice towards East Cargo Road outlet not a 250 mm orifice. Please revise model with correct orifice size to meet the original target release (as per Lancaster Heights design) as per above.

VIII. Model output shows above mentioned 250 mm orifice pipe has been modelled equivalent of as 300 m long pipe (digital page 64 of 97 of the FSR). Please note that our preference is orifice tube (not exceeding 3 m). Please update the servicing plan accordingly.

IX. Provided roof storage for D and E inputted in the model (4488 m^3 and 5318 m^3 as per digital page 64 of 97 of the FSR) are not consistent with stage storage discharge table (2242 m^3 and 2655 m^3 as per digital page 48 of 97 of FSR).

X. Currently submitted model is not the detailed representation of the drainage area and servicing plans. For example: 7.20 ha External area (EXT-1 on Figure 4) shown on drainage area plan is proposed to directly drain to Airport Road, however, current model shows the area drain through East Cargo Road storm outlet. Please update the model to replicate the design proposed in the servicing, grading and drainage area plans.

<u>XPSWMM Model output : Twenty Mile Creek Watershed</u>

XI. Please justify 45% impervious cover (digital page 76 of 97 of FSR) considered for Node 4 (1.89 ha; subcatchment B7 on Figure 4).

XII. Please Justify 3.89 ha pervious areas (digital page 76 of 97 of FSR) considered for this storm outlet by providing a Figure showing all pervious areas.

XIII. Volume for roof C, B, A inputted in the model (2130 m^3, 4440 m^3, 4875 m^3 as shown on digital page 79 of FSR) are not consistent stage-storage-discharge tables (1065 m^3, 2220 m^3, 2437.5 m^3) shown on digital page 48 of the FSR.

XIV. Node 5 shown in Model schematic (Exhibit 3) is not consistent with Model output as per which it appears it should be Node 24. Please clarify this storage node (Node 24) corresponds to which storage element on the servicing plan.

XV. Please clarify the storage provided for ROW lands Node 4 in the model (1.89 ha) in the storm sewers only?

XVI. R.O.W. Orifice size 200 mm shown in the model is not consistent with servicing plan which shows 600 mm. as per comment no.32 please relocate the R.O.W. orifice/ flow control structure as we do not support a super pipe and a flow control structure within ROW.

In addition, please clarify if the function of this orifice is to control flows from Node 4 (1.87 ha ROW lands) only? If yes, then the location of this orifice should be north side of the control manhole instead of east side (currently shown)?

As per the current design, this orifice provides flow control for Node 4 (ROW lands) in addition to flow control for upstream areas (building A, B, C and associated parking areas) although upstream areas are already controlled through individual orifices (at MH2, MH3, MH4). Please clarify why required flow control for upstream areas are not provided standalone in upstream control structures (at MH2, MH3, MH4) without relying on R.O.W orifice.

XVII. MH2, MH3, MH4 names are not shown in the servicing plan. Please ensure consistent name between model schematic, servicing plan, drainage area plan and model output.

XVIII. Model output suggests that required storage mentioned on Table 16 did not include roof top storage. Please include. In addition, it is not clarified in the model whether, the storage provided in the parking lot areas are entirely within underground/ Cultec or in the combination of underground and surface ponding. Please note that underground storage and surface ponding (if provided) should be represented with separate nodes in the model. Please show break down of all underground storage, surface ponding storage and roof storage on Table 16 and Table 12.

XIX. As per model schematic (Exhibit 3), there are individual flow control orifices for flow control from each roof; however, as per the orifice data (digital page 79 of the report) only 4 orifices are used in the model which are connected to the roof. Please clarify how the roof flows are controlled in the model (for both north/Twenty Mile Creek and south/Airport Road/Welland River storm outlet).

XX. In addition, please note that there should be separate flow control for each roof and parking lot storage. However, model schematic (Exhibit 3 and Exhibit 2) suggests that parking lot storages are not separately controlled (in addition to control from roof, a centralized orifice control at MH2, MH3, MH4 provides further control to roof flows in addition to flow from underground storages). Please update the model accordingly to provide separate control for each underground storages and roof storages; please update the servicing plan accordingly.

XXI. There are two sperate underground storage/ cultec chamber shown east and south sides of Building A; however, model did not consider individual storage nodes for

these underground storages. All underground and parking lot storages should be individually represented in the model.

Landscape Architectural Services
Cynthia Graham

- LAS requests to review the grading plan when it is submitted.
- Please note that as per the Recreational Trails Master Plan, an on-road bike route and multi-use trail is proposed along Homestead Drive.
- Cash-in-lieu of parkland dedication is requested, as required.

Source Water Protection, Hamilton Water
Mike Christie

Our original comments from the Formal Consultation still apply:

1. Given that the property is on the edge of the urban boundary and a small number of nearby properties rely on private water servicing, if dewatering is anticipated for construction activities, we would require a door-to-door water well survey to be conducted for the development, to the satisfaction of Director, Hamilton Water, given that dewatering has the potential to impact nearby private well owners.

This survey should examine wells within the expected radius of influence or within 500 m of the property (whichever is greater). It should include but is not limited to the well location, construction details, and copies of the well records. If active wells are found in this survey, a letter should be circulated to all affected residents and monitoring of these wells before, during, and after dewatering activities will be required. The proponent should also demonstrate how any dewatering discharge will not impact local water resources, and provide monitoring and mitigation strategies in case impacts arise which will help protect both the proponent and local well owners.

2. The proponent is also reminded that if dewatering is required to support construction activities, dewatering discharge must comply with City of Hamilton Sewer Use Bylaw standards. It is recommended to consult with the Superintendent of Environmental Monitoring and Enforcement Group within Hamilton Water as early as possible in the approval process, given that additional review may be required by Hamilton Water to verify the wastewater system could accept the quantity and/or quality of the discharge. Email sewerusebylaw@hamilton.ca to better understand water discharges to City infrastructure. If dewatering is expected to exceed 50,000 L/day, registration with the Environmental Activity Sector Registry or a Permit to Take Water from the Ministry of Environment, Conservation, and Parks may be required.

3. Regardless of dewatering needs, to the satisfaction of Director, Hamilton Water, the applicant shall provide a technical memorandum from a qualified professional (P.Eng, P.Geo) which provides justification as to why dewatering is not required, and in the event that dewatering is in fact required due to unforeseen circumstances, the applicant should provide a written record of their proposed Monitoring and Contingency plan that outlines their protocol for action. This contingency plan would include identification and monitoring of potential impacts, triggers, timelines for investigation, City notification protocol, and mitigation plans in case impacts arise.

Spatial Solutions and Data Services
Mark Mitchell

For this 25T-202202 plan, please include the following comments on behalf of Spatial Solutions and Data Services, Information Technology:

- It should be determined if the plan includes the proper private road name that is being used on adjacent lands, and if updating New Service Road with East Cargo Road is required?
- It should be determined if the road labelled as 'Street A' on the plan will be a City owned or privately owned road. If City owned, how will it connect to the current City street network?
- It should be determined if any of the existing surrounding buildings fronting onto East Cargo Road, or any of the proposed buildings will have their own address(es) and if they will be addressed from private roads or City streets?
- It should be determined if any other roads will be named on the plan, noting there are two occurrences of the text "asphalt roadway" on the current plan?

Transit Planning and Infrastructure
Andy McLaughlin

Consideration should be given to the inclusion of facilities to improve pedestrian access to the site, especially for those choosing to use transit. Pedestrian access could be provided via a 2m sidewalk or 3m multi-use path, to be situated immediately south of 3044 Homestead Drive, running westerly to connect with Street 'A'. Pedestrian scale lighting should be provided along the sidewalk/path.

Addition of the above infrastructure would provide future Building 'A' & 'B' employees with a 500m (6 minute) walk to/from the existing Route 20 A Line bus stops located on Airport Road @ Homestead Drive. There are no plans to modify the routings used by transit in and around the YHM lands. However, Route 20 service levels (both frequency and span) are planned to increase with continued implementation of the Ten Year Local Transit Strategy.

The cul-du-sac bulb at the northern end of Street 'A' should be constructed with a 15m radius.

Transit-supportive development that facilitates attractive pedestrian movement can help to attract and retain a workforce that meets evolving employer needs.

Transportation Planning
Transportation.Planning@hamilton.ca
Gregory Borys

- Official Plan Amendment – **SUPPORT**
- Zoning By-law Amendment – **DO NOT SUPPORT**
- Draft Plan of Subdivision – **CONDITIONS**
- Transportation Impact Study – **REVISIONS REQUIRED**
- Transportation Demand Management & Transit Oriented Design – **MEASURES REQUIRED**
- Infrastructure Improvements – **REQUIRED**
- Right-of-Way Dedications – **REQUIRED**
- Daylighting Triangle Dedications – **NOT REQUIRED**
- Site Plan – **FUTURE REQUIREMENTS**

Synopsis of Transportation Planning Comments for Planning Report

Transportation Planning do not support the proposed development. In order to protect the existing and future pedestrian realm, cycling infrastructure and road network, Transportation Planning shall require the following:

- Updated Transportation Impact Study to the satisfaction and approval of the Manager, Transportation Planning, the Ontario Ministry of Transportation (MTO) and the Hamilton Airport Authority.
- A 26.213 metre right-of-way dedication on the proposed 'Street A'.
- Urbanization of the existing East Cargo Road to match the design of 'Street A' which shall include sidewalks on either side of the road.
- Appropriate easement documentation for the for the shared use of East Cargo Road which is under the jurisdiction of the Hamilton Airport Authority.
- The Applicant to provide a pavement marking and signage plan for the overall subdivision to be completed to the satisfaction and approval of the Manager, Transportation Planning and the Manager, Transportation Operations & Maintenance.

Documents Reviewed

- Transportation Impact Study – NexTrans Consulting Engineers – November 30, 2021
- Concept Plan – *3054 HOMESTEAD DRIVE CONCEPT PLAN* – Revision Unknown – October 19, 2021

Official Plan Amendment – Support

1. Transportation Planning supports the Official Plan Amendment (UHOPA-22-008), however, it should be noted that future traffic conditions will be operating at or near capacity with or without this development within the surrounding road network.

Zoning By-law Amendment – Do Not Support

2. Transportation Planning does not support the proposed Zoning By-Law Amendment (ZAC-22-017) as the proposed subdivision development does not have access to municipal right of way and will create a new landlocked road (Street A) that is dependent on private lands for access to public roadways.

Draft Plan of Subdivision – Conditions

3. As a condition of approval, prior to grading, a Transportation Impact Study shall be submitted to the satisfaction and approval of the Manager, Transportation Planning.

4. As a condition of approval, prior to servicing, the Owner shall include in the engineering design and cost estimate schedule provision for the installation of 1.5 metre sidewalks along both sides of 'Street A' and East Cargo Road, at the Owners expense, to the satisfaction and approval of the Manager, Transportation Planning.

5. As a condition of approval, prior to servicing, the Owner shall provide a pavement marking and signage plan for the overall subdivision to be completed to the satisfaction and approval of the Manager, Transportation Planning and the Manager, Transportation Operations & Maintenance.

6. As a conditional of approval, prior to servicing, the Owner shall provide the appropriate easement documentation for the for the shared use of East Cargo Road which is on the Hamilton Airport Authority land.

Transportation Impact Study – Revisions Required

Transportation Planning reviewed the submitted Transportation Impact Study document which requires revisions.

The Transportation Consultant is to complete the following revisions to the Transportation Impact Study:

7. Figure 6 – Existing Traffic Volumes[1], the provided existing traffic volumes are dated from 2019, a 2% growth rate should be applied to bring the volumes up to the excepted 2022 volumes.

[1] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 17

8. 2.4 Existing Traffic Volumes[2], traffic volumes collected for the intersection of Airport Road at East Cargo Road are out of date, there has been significant development on the airport lands that has increased traffic volumes. New counts are required to be collected and TIS revised accordingly to the new volumes.

9. 5.3 Site Trip Distribution[3], further clarification is required for the proposed site trip distribution for trucks generated by the proposed development. The trip distribution has utilized TTS 2016 data; however, it appears only 10% of the trips have been assigned to Highway 6. It is Transportation Planning's opinion that majority of heavy vehicle trips should be assigned to Highway 6 as it is the most logical route.

10. 6.1 Future Total Traffic Assessment[4], based on Figure 15 it appears the traffic volumes have not been balanced between intersections. The TIS is required to be updated accordingly to balance traffic volumes through the network model to ensure accuracy in the results and recommendations.

11. Synchro Analysis[5], the intersection of East Cargo Road at Airport Road is currently under design review with the City of Hamilton for the implementation of traffic signals. The proposed design is to have eastbound, westbound, and northbound left-turn lane storage measurements of 15 metres, 50 metres and 45 metres respectively as outlined in the terms of reference. The geometric conditions used within the Synchro Analysis for the left-turn lanes differ then the City of Hamilton. The Applicant is to prepare a scenario with the City of Hamilton lane storage outlined above to determine the impacts between the proposed configuration within the TIS. Additional storage length requirements and recommendations at the intersection shall also be commented on within the revised TIS.

12. Synchro Analysis[6], based on the City of Hamilton TIS Guidelines "*Peak hour factor (PHF) is to be 0.92 unless a calculation based on actual traffic counts demonstrates another value is more appropriate."* The TIS is to be updated to provide justification for the PHF used within the synchro analysis.

Additional Information:

13. The Applicant will require approval from the Ministry of Transportation of Ontario as it's within their corridor permit control area and proximity of their interchange at Airport Road & Highway 6. The Applicant is advised to circulate the Transportation Impact Study to the Ministry of Transportation of Ontario for review and approval.

[2] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 16
[3] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 28
[4] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 32
[5] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 85
[6] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 85

14. Based on the City of Hamilton TIS Guidelines the most recent version of the ITE Trip Generation Manual (11th Edition) it to be used. Without setting a precedent, Transportation Planning will accept the use of the 10th Edition.

15. 8.0 Parking Assessment[7], the Applicant is to note that Transportation Planning does not review or comment on justification for parking reduction. Further comments may be forthcoming regarding the parking assessment.

16. It is recommended the Applicant circulate the Transportation Impact Study to the Hamilton Airport Authority as the proposed development will require all generated traffic to circulate through East Cargo Road which is a private road owned and maintained by the HAA.

Transportation Demand Management & Transit Oriented Design – Measures Required

17. The Applicant shall provide cycling facilities along Street 'A' in the form of a multi-use trail or cycle track along one side of the roadway. Cycling facilities are required to connect to future facilities along Dickenson Road West following completion of the environmental assessment for Dickenson Road West. The facilities shall be indicated, illustrated and dimensioned on all subsequent plans.

18. The Applicant shall explore the option of a pedestrian connection through a dedicated trail to homestead drive to improve pedestrian connectivity throughout the proposed development.

Additional Information:

19. Transportation Planning recommends that the future Owner for individual blocks within the proposed subdivision register for Hamilton SMART commute program in order to promote sustainable modes of transportation for employees. Additional information can be found at https://www.smartcommute.ca.

Infrastructure Improvements – Required

20. Any design, road work and modifications to the related municipal infrastructure will be fully at the expense of the Applicant. The Applicant is advised that should any modifications be required to the traffic signals and/or pavement markings and/or signage because of this development, they must be completed by a qualified traffic signal/pavement markings design consultant and fully at the expense of the Applicant. The City will review and approve the engineering design and provide the final design detail requirements. It is the Applicant's responsibility to contact trafficops@hamilton.ca for information regarding the City's design standards and drawing format. The email

[7] Transportation Impact Study, NexTrans Consulting Engineers, pdf page 38

subject line is to be 3054 Homestead Drive (Ward 11) Traffic Signal/Pavement Markings.

21. The northern limits of Street 'A' indicated in the Draft Plan submitted shall terminate in a temporary cul-de-sac with a collector road requirement of 20.75 metre radius and 15.0 metre pavement radius to be contained completely within the subject property limits, until time in which a connection to the north will be established through the development, the road connection will ultimately lead to Upper James Street.

22. Transportation Planning require the Applicant to urbanize East Cargo Road and provide sidewalk connection to Street A due to the proximity to the bus stop along Airport Road and the required pedestrian connection to the proposed development.

Additional Information:

23. The Applicant shall note that the proposed connection of Street 'A' to the lands to the north is subject to the build-out and development of those lands which are unknown at this time. The Applicant/Owner of the subject lands should coordinate with the Applicant/Owner of the lands to the north to potentially determine future timelines for any possible connections/extensions. Due to the size of the proposed development and the volumes generated, an additional access through the north connecting to Upper James will be required once the lands to the north redevelop.

Right-of-Way Dedications – Required

24. Approximately 26.213 metres are to be dedicated to the right-of-way on proposed 'Street A', as per the Council Approved Urban Official Plan: Chapter C - City Wide Systems and Designations, 4.5 Road Network Functional Classification, 4.5.2. Local Roads (proposed Street A) are to be 26.213 metres in designated Employment Areas.

A survey conducted by an Ontario Land Surveyor and at the Applicant's expense will determine the ultimate dimensions for the right-of-way widening(s).

Daylighting Triangle Dedications – Not Required

25. Based on the proposed application, the Applicant does not require to provide lands for the creation of a daylighting triangle as 'Street A' does not intersect with another municipal road.

Site Plan – Future Requirements

Driveway Location

26. Driveways accesses are not permitted within sharp curves, 90-degree bends or intersections. Proposed driveway access into Building B is currently proposed within a

curve, for motorist safety the location of the driveway is required to be relocated outside of the road curve.

27. Proposed access to Building A is currently located within a cul-de-sac for proposed Street A. The Applicant is to note that the terminus of Street A is a temporary condition and will be extended in the future, the proposed access may be impacted through future development of Street A.

Driveway Design

28. For two-way operation onto municipal road, the driveway access width(s) must be minimum 9.0 metres at the ultimate property line and curve radii minimum 9.0 metres for heavy vehicles. For two-way operation onto municipal road, the driveway access width(s) must be 7.5 metres at the ultimate property line and curve radii minimum 7.0 metres for passenger vehicles. All shall be identified and dimensioned on the future site plan applications.

29. 5.0 metres x 5.0 metres visibility triangles must be provided for each driveway access. They must be illustrated, dimensioned and identified on the site plan. Visibility triangles are between the driveway limits and the ultimate property line (right-of-way limit) and no object or mature vegetation can exceed a height of 0.6 metres above the corresponding perpendicular centreline elevation of the adjacent street.

30. Reversing of vehicles onto the right-of-way is not permitted, and a turning plan will be required to be provided for future site plan applications in order to demonstrate a vehicle can enter the site in a forward manner, turn around on private property, and exit in a forward manner.

Transportation Demand Management

Additional Information:

31. Transportation Planning notes that all Transportation Demand Management features will be reviewed at the site plan stage and shall generally be consistent with what is provided within the Transportation Impact Study.

Municipal Sidewalks

32. The municipal sidewalk must be continuous through the driveway approach and any driveway curbing must end behind the municipal sidewalk.

Should you have any questions, please email tplanning@hamilton.ca, referencing:
3054 Homestead Drive – 25T-202202, UHOPA-22-008 & ZAC-22-017 (Ward 11)
Transportation Planning Response

cc: Development Engineering Approvals

Waste Management
Diane Butterworth

This development application has been reviewed for municipal waste collection service.

This development is an industrial property which is ineligible for municipal waste collection as outlined in the City of Hamilton's Solid Waste Management By-law 20-221.

A private waste hauler must be arranged for the removal of all waste materials.

Additional Information

Information concerning the City's requirements for waste management services for new developments is available in the "City of Hamilton Waste Requirements for Design of New Developments and Collection". This document is available as Appendix 20 at the following link:
https://www.hamilton.ca/develop-property/policies-guidelines/site-plan-guidelines

Please contact the undersigned if further information regarding City waste management service is required.

Canada Post Corporation
David E. Kyle

This Draft Plan of Subdivision Application will receive mail service to centralized mail facilities provided through our Community Mailbox program.

I will specify the conditions which I request to be added for Canada Post Corporation's purposes.

The owner shall complete to the satisfaction of the Director of Engineering of the City of Hamilton and Canada Post:

a) include on all offers of purchase and sale, a statement that advises the prospective purchaser:

   i) that the home/**business** mail delivery will be from a designated Centralized Mail Box.

   ii) that the developers/owners be responsible for officially notifying the purchasers of the exact Centralized Mail Box locations prior to the closing of any home sales.

b) the owner further agrees to:

i) work with Canada Post to determine and provide temporary suitable Centralized Mail Box locations which may be utilized by Canada Post until the curbs, boulevards and sidewalks are in place in the remainder of the subdivision.

ii) install a concrete pad in accordance with the requirements of and in locations to be approved by Canada Post to facilitate the placement of Community Mail Boxes

iii) identify the pads above on the engineering servicing drawings. Said pads are to be poured at the time of the sidewalk and/or curb installation within each phase of the plan of subdivision.

iv) determine the location of all centralized mail receiving facilities in co-operation with Canada Post and to indicate the location of the centralized mail facilities on appropriate maps, information boards and plans.

v) Maps are also to be prominently displayed in the sales office(s) showing specific Centralized Mail Facility locations.

c) Canada Post's multi-unit policy, which requires that the owner/developer provide the centralized mail facility (Lock Box Assembly) at their own expense (less than 100 units will require a front loading Lock Box Assembly & more than 100 units will require a rear loading Lock Box Assembly which will require a mail room) will be in affect for buildings and complexes with a common lobby, common indoor or sheltered space.

Should the description of the project change, I would appreciate an update in order to assess the impact of the change on mail service.

If you have any questions or concerns regarding these conditions, I can be reached at 519-520-0795, fax at 519-457-5412 or the above noted address.

Hamilton International Airport

- *Refer to letter attached.*

Hydro One Networks Inc.
Kitty Luk

We are in receipt of your Plan of Subdivision Application, 2022 103889 000 00 PLAN dated March 3, 2022. We have reviewed the documents concerning the noted Plan and have no

comments or concerns at this time. Our preliminary review considers issues affecting Hydro One's 'High Voltage Facilities and Corridor Lands' only.

For proposals affecting 'Low Voltage Distribution Facilities' please consult your local area Distribution Supplier.

To confirm if Hydro One is your local distributor please follow the following link: http://www.hydroone.com/StormCenter3/. Please select "Search" and locate address in question by entering the address or by zooming in and out of the map.

If Hydro One is your local area Distribution Supplier, please contact Customer Service at 1-888-664-9376 or e-mail CustomerCommunications@HydroOne.com to be connected to your Local Operations Centre.

Niagara Peninsula Conservation Authority (NPCA)
Nikolas Wensing

NPCA staff have reviewed the provided Environmental Impact Study (EIS), *Environmental Impact Study 3054 Homestead Drive, Hamilton, Ontario* dated December 2021 and prepared by GEI Consultants Savanta Division. Generally, NPCA staff are in support of the proposed EIS submission, but provide the following comments for consideration and review:

NPCA Ecology Comments

1. NPCA staff may consider the proposed wetland compensation, pending hydrological assessment/modelling to demonstrate the feasibility of how wetland conditions will be maintained.
2. NPCA staff note that the applicant has identified that 1.11 hectares of Wetlands are present on site. The provided EIS states on page 48 that *Direct removal of all 1.11 ha of wetland is proposed to accommodate site alteration and development*. The NPCA will request further justification as to why all 1.11 hectares of wetlands must be removed for the proposed compensation. The provided Site Plan, *Concept Plan* dated October 19, 2021 and prepared Urban Solutions Planning & Land Development identifies a proposed block of the subject lands as *Natural Heritage Offsetting Compensation*. It is the NPCA's understanding that wetlands are already present with the proposed *Natural Heritage Offsetting Compensation* block. While the NPCA recognizes that some wetlands on the subject lands may need to be removed (pending further justification as identified in comment #1 above) to facilitate the proposed development, the NPCA will request that the existing wetlands located within the proposed *Natural Heritage Offsetting Compensation* block be enhanced rather than removed.
3. NPCA staff are supportive of the proposed monitoring program, however, NPCA staff will require that monitoring extend for a 10-year period to ensure successful establishment of the relocated wetland.

   a. The EIS states that *An increase in salt contributions from road salt applications during the winter months are expected* and that salt management opportunities will be considered during the detailed design process. NPCA staff are in support of opportunities to mitigate salt contributions during winter and request that during the detailed design process, a Salt Management Plan be submitted to NPCA staff for review and approval as part of the revised monitoring program submission to ensure that the proposed *Wetland Created Area* will not be negatively impacted by increased salt contributions during winter.

4. The EIS states on page 45 that *all in-water work must occur outside the warmwater fisheries window (May 15 to July 15) to avoid the potential for negative impacts on downstream fish communities during important reproductive periods.* Later, on page 47, the EIS states, *Since HDF H1S1 and HDF H2S1 are also identified as providing indirect fish habitat that supports downstream fisheries, removal of these features should be completed outside of the spring fisheries window (March 15 to July 15) to avoid adverse effects to downstream habitats.* MNRF has identified a restricted fisheries timing window of March 15 to July 15 for tributaries of 20 Mile Creek (or the Welland River) above the escarpment. Please confirm the appropriate timing window with DFO and/or MNRF.

NPCA Stormwater Management Comments

NPCA staff have reviewed the *Functional Servicing Report – Proposed Industrial Development, 3054 Homestead Drive, Hamilton,* dated December 8, 2021 and prepared by The Odan/Detech Group. Based on our review, the NPCA offers the following comments with respect to stormwater management (SWM):

5. The NPCA will require that all post development peak stormwater flows be attenuated to pre-development levels for up to and including the 100 year design storm event for stormwater discharging into the Welland River and 20 Mile Creek watersheds.
   a. The NPCA has no objection to the utilization of rooftop, parking lot, and underground storage to achieve this criterion.
   b. The NPCA will require that the finalized SWM report and detailed design drawings confirm that this criterion has been addressed.
   c. The NPCA will require that the location of all major overland flow routes be identified.
6. The NPCA will require that all stormwater runoff be captured and treated to an Enhanced standard prior to discharge from the site.
   a. The NPCA will require that the finalized SWM report and detailed design drawings confirm that this criterion has been addressed.
7. The NPCA will require that all stormwater runoff from the 25mm design storm event is captured and released over a period of 24 hours in order to mitigate the impacts of erosion on the receiving watercourse.
   a. The NPCA will require that the finalized SWM report and detailed design drawings confirm that this criterion has been addressed.

8. The NPCA has no objection to the provision to infiltrate 10mm of rainfall across the site in order to better replicate the existing hydrologic condition and to reduce the volume of runoff leaving the site.
    a. The NPCA will require that the finalized SWM report and detailed design drawings confirm that this criterion has been addressed.
9. The NPCA understands that a tributary of 20 Mile Creek is proposed to be realigned. The NPCA has no objection in principle but will require that the watercourse be realigned utilizing the principles of Natural Channel Design.
10. Prior to construction, detailed grading, storm servicing, stormwater management, and construction sediment control drawings shall be circulated to this office for review and approval.

WSP (obo Bell Canada)

We have reviewed the circulation regarding the above noted application and have no objections to the application as this time. However, we hereby advise the Owner to contact Bell Canada at planninganddevelopment@bell.ca during detailed design to confirm the provisioning of communication/telecommunication infrastructure needed to service the development. We would also ask that the following paragraph be included as a condition of approval:

“The Owner agrees that should any conflict arise with existing Bell Canada facilities where a current and valid easement exists within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost.”

It shall also be noted that it is the responsibility of the Owner to provide entrance/service duct(s) from Bell Canada’s existing network infrastructure to service this development. In the event that no such network infrastructure exists, in accordance with the Bell Canada Act, the Owner may be required to pay for the extension of such network infrastructure.

If the Owner elects not to pay for the above noted connection, Bell Canada may decide not to provide service to this development.

To ensure that we are able to continue to actively participate in the planning process and provide detailed provisioning comments, we note that we would be pleased to receive circulations on all applications received by the Municipality and/or recirculations.

Please note that WSP operates Bell’s development tracking system, which includes the intake of municipal circulations. WSP is mandated to notify Bell when a municipal request for comments or for information, such as a request for clearance, has been received. All responses to these municipal circulations are generated by Bell, but submitted by WSP on Bell’s behalf. WSP is not responsible for Bell’s responses and for any of the content herein.

If you believe that these comments have been sent to you in error or have questions regarding Bell's protocols for responding to municipal circulations and enquiries, please contact planninganddevelopment@bell.ca.

Should you have any questions, please contact the undersigned.

Please refer to attached comments from:

- Hamilton International Airport.

If you have any questions or concerns with the comments outlined in this letter, please contact Tim Vrooman at 905.546.2424 ext. 5277 or by email at Tim.Vrooman@Hamilton.ca.

OI:tv

From: Borys, Gregory <Gregory.Borys@hamilton.ca>
Sent: Monday, June 28, 2021 1:58 PM
To: Sam Nguyen <sam@nextrans.ca>
Cc: Radaelli, Matthew <Matthew.Radaelli@hamilton.ca>
Subject: RE: 3054 Homestead Proposed Scope of Work

Good afternoon Sam,

Thank you for providing the scope of work for the TIS located at 3054 Homestead Drive, Transportation Planning have reviewed the proposed scope of work and made additional comments below in green. Please feel free to contact me if you have any further questions or concerns.

Regards,

Gregory Borys, C.E.T.
Transportation Planning Technologist, Transportation Planning Development Approvals
Transportation Planning
Planning and Economic Development Department
City of Hamilton
Hamilton
On Behalf of Transportation Planning
COVID-19 UPDATE: Flexibility and patience is asked of ourselves, clients, contractors and customers working with the City of Hamilton. Most staff are working remotely with limited access to voicemail, so please send emails. All in-person meetings that are required will be become conference calls or another form of virtual meetings. The City is making adjustments to ensure staff are connected to office tools and project files while we protect ourselves and our communities during this time. Please note that while we are trying to maintain time frames for comments on applications and dealing with responding information, we may not always achieve these goals.

From: Sam Nguyen <sam@nextrans.ca>
Sent: Monday, June 21, 2021 11:14 AM
To: Transportation Planning <Transportation.Planning@hamilton.ca>
Subject: 3054 Homestead Proposed Scope of Work

Good Morning,

We have been retained to undertake a TIS to support the proposed development located at 3054 Homestead, in the City of Hamilton. We have received the pre-consultation consolidated comment report from the City dated June 9, 2021. The following is a proposed scope of the TIS that takes into consideration of your comments, the City Traffic

Impact Study Guidelines and MTO TIS Guidelines. If possible, please provide us with your comments by end of this week so that we can start the study.

1. Study Area intersection: [Approved, MTO to provide comments regarding their on/off ramp]
    a. East Cargo Road and Airport Road West (unsignalized); [Intersection of East Cargo Road and Airport Road West is to be signalized in the near future, please see Additional Information below for intersection configuration]
    b. Airport Road West and Highway 6 (signalized);
    c. Airport Road and Homestead Drive (signalized); [This intersection is currently not signalized]
    d. Airport Road and Upper James Street (signalized);
    e. Proposed development accesses
2. Horizon Year
    a. Project completion by 2023
    b. Analysis horizon year 2028 and 2033 (5 and 10 year horizon as per MTO requirements) [City of Hamilton will not review 10 year horizon as this is an MTO requirement]
3. Background Developments and Growth Rate
    a. Background corridor through traffic growth – 2% as per City typical requirements [Approved]
    b. Please let us know if any proposed background developments in the area [Applicant advised to review https://www.hamilton.ca/develop-property/planning-applications/development-applications-mapping and include any applicable background developments, TIS to include 9255 Airport Rd W, 8521-8527 AIRPORT RD prepared by Paradigm]
    c. Please send us any available TIS for the background developments in the area [Transportation Planning notes that, as we are not the owner/author of these report Transportation Planning will direct you to contact the authors in order to get their and their client's approval and to obtain a copy of the report. Please note that the reports are solely for the use of background traffic information. Additionally, this does not indicate Transportation Planning's endorsement of the report and its findings. Any assumptions made by this report should be verified the City of Hamilton.]
4. Trip Generation
    a. ITE Trip Generation Manual 10th Edition or proxy site, where appropriate.
    b. Multimodal trip generation using 2016 TTS modal split data. [For the purposes of this TIS a modal split reduction shall not be applied. It is assumed that the ITE Vehicular trip generation rates inherently account for modal split reductions].
5. Trip Distribution
    a. Extract 2016 TTS data based on the surrounding traffic zones where appropriate
    b. Transportation Planning requires all vehicular traffic will be directed to the intersection of East Cargo Road & Airport Road West. No connection to the lands to the north will be assumed for the purposes of this report as has been discussed previously with the Applicant.
6. Future Total Assessment
    a. The following tasks will be conducted for the future total conditions:
        - Future Total Traffic Assessment for Auto Mode (using existing signal timing and optimize as necessary) [For information on existing traffic signal timings at City of Hamilton traffic signals contact trafficops@hamilton.ca, and for MTO Traffic Signals contact mtoinfo@ontario.ca with a cc to tplanning@hamilton.ca, with a subject line of ADDRESS-FILE NUMBER (Ward #) traffic signal timings.]
        - Future non-auto mode assessment [Please note Transportation Planning will not accept modal split reductions applied to ITE vehicular trip generation rates].
        - Proposed development access assessment
        - Vehicular and Bicycle Parking Assessment
        - Internal Site Circulation and loading assessment (if necessary)
7. Transit, Active Transportation and TDM

a. Conduct a review of the existing and proposed future transit network in the area. Based on these findings, appropriate recommendations will be provided to ensure adequate walking distances to/from the proposed development to transit stations/stops.
b. Review the existing and proposed future active transportation network in the area. Based on these findings, Nextrans will identify missing gaps and additional interconnections and connections from the proposed development to adjacent land uses, the City facilities, as well as to transition stations/stops.
c. A Transportation Demand Management (TDM) assessment will be undertaken to identify specific measures and programs to reduce single-occupant-vehicle trips to/from the proposed development. These TDM measures and programs may include but not limited to, Carpooling, Auto Share, Bike racks, Parking management strategies, etc. The TDM report will be completed and included as part of this Study for submission purposes submitted in accordance with the City requirements. [Transportation Planning notes that TDM measures recommended within the TIS shall be indicated and included on the future site plan accordingly.]

Parking Justification Study if necessary

Additional Information:

- Proposed Scope of Work required to be approved by the MTO, additional comments may be provided by the MTO
- Please note that Transportation Planning is currently Updating the AEGD TMP road network and many of the classifications and alignments of roadways may be modified from the previous AEGD TMP (2016) Implementation update.

East Cargo Road at Airport Road signal configuration:

- Eastbound, westbound and northbound left-turn lane storage measurements (15 metres, 50 metres, and 45 metres, respectively)

Sam (Trang) Nguyen
Transportation Analyst

o: 905-503-2563 ext. 207
e: sam@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8
COVID UPDATE: Please be advised that we continue to service our clients to the fullest extent possible, albeit in a modified office environment, as such a reply may be slightly delayed.
Thank you and keep well!

From: Lagakos, Ted (MTO) <Ted.Lagakos@ontario.ca>
Sent: Monday, September 20, 2021 1:16 PM
To: Sam Nguyen <sam@nextrans.ca>
Cc: Nunes, Paul (MTO) <Paul.Nunes@ontario.ca>
Subject: RE: 3054 Homestead Term of Reference

Sam,

As it stands now, the site appears to be located outside our permit control limit; hence, we don't have any comments on the TIS. Note that official MTO comments will be provided once the municipality circulates us for a formal response.

Ted Lagakos
Senior Project Manager (Niagara/Hamilton)
Highway Corridor Management Section - Central Operations

Ministry of Transportation
159 Sir William Hearst Avenue, 7th Floor
Toronto, ON M3M 0B7

Phone: 416-268-3932
E-Mail: ted.lagakos@ontario.ca
Web: www.mto.gov.on.ca/english/engineering/management/corridor

Highway Corridor Management

From: Sam Nguyen <sam@nextrans.ca>
Sent: September 20, 2021 12:48 PM
To: Lagakos, Ted (MTO) <Ted.Lagakos@ontario.ca>
Cc: Nunes, Paul (MTO) <Paul.Nunes@ontario.ca>
Subject: RE: 3054 Homestead Term of Reference

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Ted,

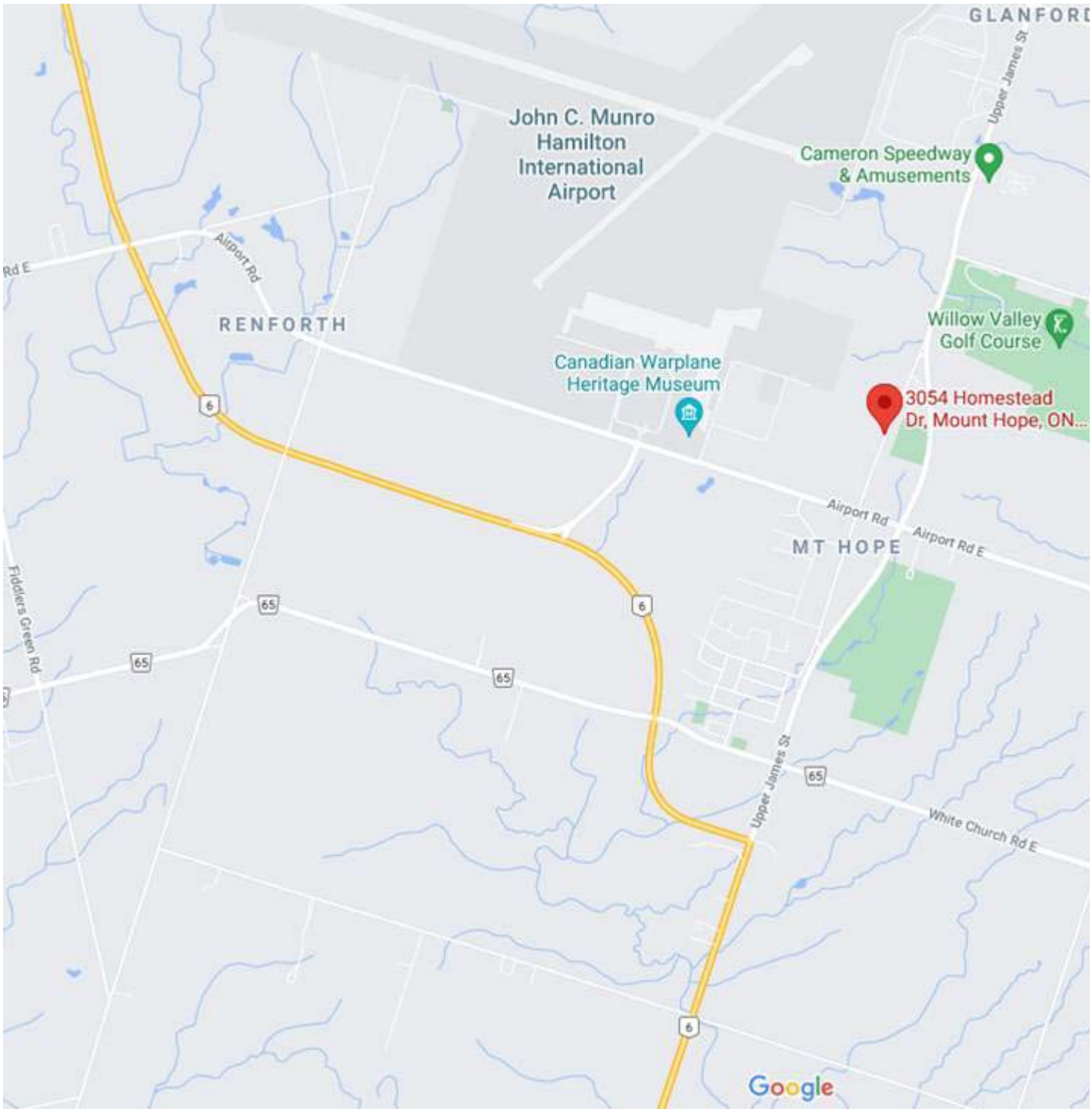
Thanks so much for getting back to us. Please find the attached limit of the site area and the general map location. It will be a draft plan of subdivision and future site plan application. The proposed development is similar to the existing uses in the area (distribution centres and warehouses).

It should be noted that all proposed development accesses are provided via existing approved access, no new access will be introduced onto Airport Road, Upper James or Homestead Road.

It is our opinion that it will not impact MTO Hwy 6, however, the City staff are asking us to reach out to you just in case.

Thank you

Sam



Sam (Trang) Nguyen
Transportation Analyst

o: 905-503-2563 ext. 207
e: sam@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

From: Lagakos, Ted (MTO) <Ted.Lagakos@ontario.ca>
Sent: Monday, September 20, 2021 9:43 AM
To: Sam Nguyen <sam@nextrans.ca>
Cc: Nunes, Paul (MTO) <Paul.Nunes@ontario.ca>
Subject: RE: 3054 Homestead Term of Reference

Morning Sam,

This request was directed to my attention for response.

Can you please send me a plan showing me the limits of this application so I can confirm if the site is located within our permit control limit. Can you also confirm if this will eventually be a site plan of subdivision application.

Ted Lagakos
Senior Project Manager (Niagara/Hamilton)
Highway Corridor Management Section - Central Operations

Ministry of Transportation
159 Sir William Hearst Avenue, 7th Floor
Toronto, ON M3M 0B7

Phone: 416-268-3932
E-Mail: ted.lagakos@ontario.ca
Web: www.mto.gov.on.ca/english/engineering/management/corridor

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From: Sam Nguyen <sam@nextrans.ca>
Sent: September 14, 2021 10:50 AM
To: Mikolajczak, Margaret (MTO) <Margaret.Mikolajczak@ontario.ca>; Francolini, William (MTO) <William.Francolini@ontario.ca>
Cc: Richard Pernicky <richard@nextrans.ca>
Subject: 3054 Homestead Term of Reference

Good Morning,

We have been retained to undertake a TIS to support the proposed development located at 3054 Homestead, in the City of Hamilton. The following is a proposed scope of the TIS that takes into consideration of MTO TIS Guidelines. If possible, please provide us with your comments by end of this week so that we can start the study.

1. Study Area intersection:
    a. East Cargo Road and Airport Road West (unsignalized);

   b. Airport Road West and Highway 6 (signalized);
   c. Airport Road and Homestead Drive (signalized);
   d. Airport Road and upper James Street (signalized);
   e. Proposed development accesses
2. Horizon Year
   a. Project completion by 2023
   b. Analysis horizon year 2028 and 2033 (5 and 10 year horizon as per MTO's TIS Guidelines)
3. Background Developments and Growth Rate
   a. Background corridor through traffic growth – 2% as per City typical requirements
   b. Please let us know if any proposed background developments in the area
   c. Please send us any available TIS for the background developments in the area
4. Trip Generation
   a. ITE Trip Generation Manual 10th Edition
   b. Multimodal trip generation using 2016 TTS modal split data
5. Trip Distribution
   a. Extract 2016 TTS data based on the surrounding traffic zones where appropriate
6. Future Total Assessment
   a. The following tasks will be conducted for the future total conditions:
      - Future Total Traffic Assessment for Auto Mode (using existing signal timing and optimize as necessary)
      - Future non-auto mode assessment
      - Proposed development access assessment
      - Vehicular and Bicycle Parking Assessment
      - Internal Site Circulation and loading assessment (if necessary)
7. Transit, Active Transportation and TDM
   a. Conduct a review of the existing and proposed future transit network in the area. Based on these findings, appropriate recommendations will be provided to ensure adequate walking distances to/from the proposed development to transit stations/stops.
   b. Review the existing and proposed future active transportation network in the area. Based on these findings, Nextrans will identify missing gaps and additional interconnections and connections from the proposed development to adjacent land uses, the City facilities, as well as to transition stations/stops.
   c. A Transportation Demand Management (TDM) assessment will be undertaken to identify specific measures and programs to reduce single-occupant-vehicle trips to/from the proposed development. These TDM measures and programs may include but not limited to, Carpooling, Auto Share, Bike racks, Parking management strategies, etc. The TDM report will be completed and included as part of this Study for submission purposes submitted in accordance with the City requirements.
8. Parking Justification Study if necessary

Sam (Trang) Nguyen
Transportation Analyst

o: 905-503-2563 ext. 207
e: sam@nextrans.ca
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Appendix B
Existing Traffic Data

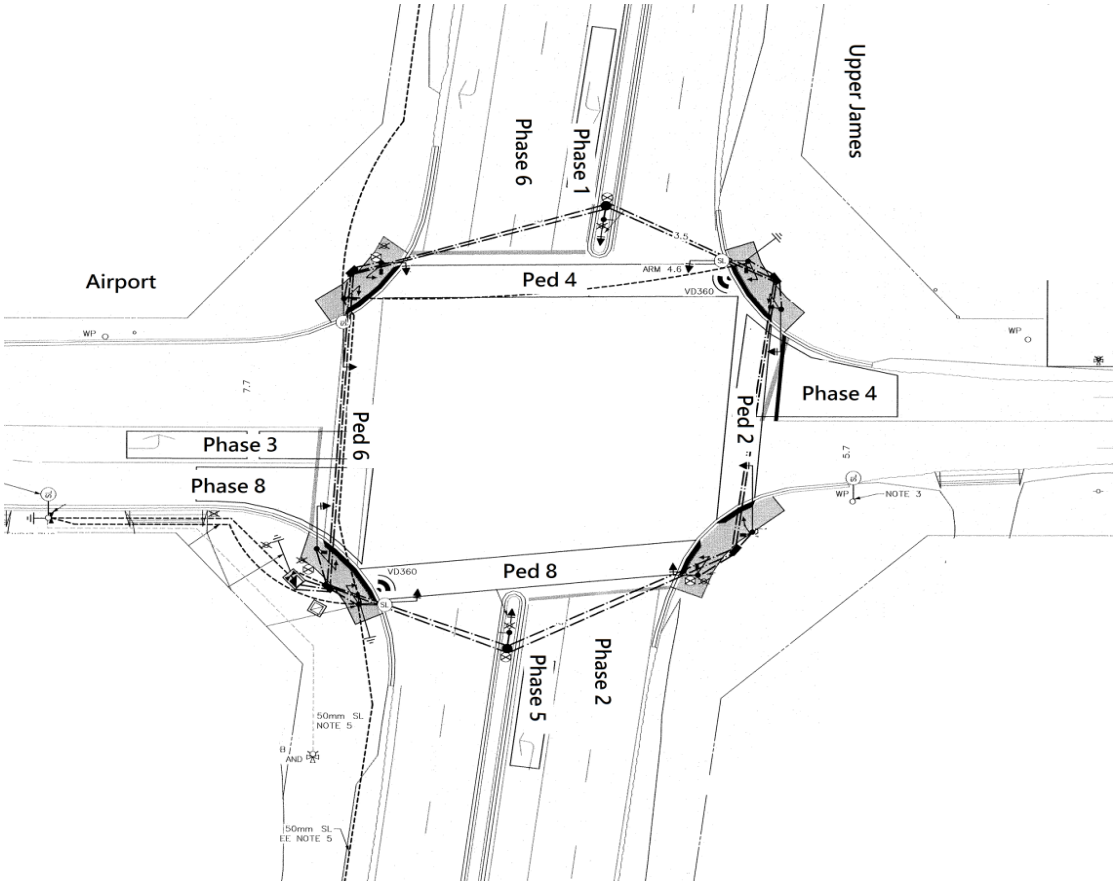
City of Hamilton - Traffic
Traffic Signal Controller Timing Data

Intersection: **Upper James St @ Airport Rd**

Controller Type: **3000E** Page **1** of

Programmed By: **MF** Installed By:

Date: Date:



ϕ1: Upper Jame - SBLT
ϕ2: Upper James - NB, East Xwalk
ϕ3: Airport - EBLT
ϕ4: Airport - WB, North Xwalk
ϕ5: Upper James - NBLT
ϕ6: Upper James - SB, West Xwalk
ϕ7:
ϕ8: Airport - EB, South Xwalk

Flash Operation: **Red: Upper James**
Red: Airport

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases				X				X								
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	5.0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1	X	X	X	X												
	Ring 2					X	X		X								
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1	X	X			X	X										
	CO PH 2			X	X				X								
	CO PH 3																
	CO PH 4																

CONTROLLER DATA

PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.) USE 1 TO ALL 4 TIMING PLANS

TP1 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X		X	X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP2 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X		X	X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

TP3 PHASE RECALLS

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL		X				X										
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK	X		X	X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2) ONLY 1 PLAN PER UNIT

(X = ENABLE)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1																
	CNA 2																
	CNA 3																
	CNA 4																
	WRM																
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

Upper James St @ Airport Rd

PHASE TIMES (MM-3-1-3-PGDN, etc.)

CONTROLLER DATA
USE 1 TO ALL 4 TIMING PLANS

3/23/2020

TP1

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	30	5	10	5	30		10								
	Passage	1.0	5.9	1.0	3.0	1.0	5.9		3.0								
	Yellow	3.0	4.6	3.0	3.7	3.0	4.6		3.7								
	Red		1.7		2.6		1.7		2.6								
	Walk		10		7		10		7								
	Ped Clr		17		24		17		24								
	Max 1	10	35	10	20	10	35		20								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

TP2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	35	5	10	5	35		10								
	Passage	1.0	5.9	1.0	3.0	1.0	5.9		3.0								
	Yellow	3.0	4.6	3.0	3.7	3.0	4.6		3.7								
	Red		1.7		2.6		1.7		2.6								
	Walk		12		12		12		12								
	Ped Clr		17		24		17		24								
	Max 1	10	50	10	20	10	50		20								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP3															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial	5	35	5	10	5	35		10								
	Passage	1.0	5.9	1.0	3.0	1.0	5.9		3.0								
	Yellow	3.0	4.6	3.0	3.7	3.0	4.6		3.7								
	Red		1.7		2.6		1.7		2.6								
	Walk		12		12		12		12								
	Ped Clr		17		24		17		24								
	Max 1	10	50	10	20	10	50		20								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

VEHICLE DETECTOR ASSIGNMENTS (MM-3-1-4-1, PGDN etc.)

(X = ASSIGN VEH DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET ASSIGN-MENTS	1	X															
	2		X														
	3			X													
	4				X												
	5					X											
	6						X										
	7																
	8								X								

PED DETECTOR ASSIGNMENTS (MM-3-1-4-2)

(X = ASSIGN PED DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED	1																
DET	2																
ASSIGN-	3																
MENTS	4				X												
	5																
	6																
	7																
	8								X								

DUAL ENTRY (MM-3-1-6)

DUAL ENTRY ENABLE:	**Y**	Y/N: Y=Enable Dual Entry. Note this is only one setting even though it appears on each controller screen.

PG1	PH/CALLS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DUAL	1						X										
ENTRY	2						X										
ASSIGN-	3								X								
MENTS	4								X								
	5		X														
	6		X														
	7				X												
	8				X												

ENHANCED OPTIONS

DYNAMIC OMITS (MM-3-1-9-1-1)

DYNAM OMITS GP1 ENABLE:	**Y**	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	OMIT PHS	**X**															
OMITS	IF PH ON		**X**				**X**										
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

Select phases to be dynamically omitted from OMIT PHS row. Select the PH-ONs and/or O/L GRNs that will cause those omits. Phases are omitted when controller state matches IF PH ON row or O/L GRN row.

Note that there are 2 groups of dynamic omits, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	OMIT PHS					**X**											
OMITS	IF PH ON		**X**				**X**										
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	OMIT PHS			**X**													
OMITS	IF PH ON				**X**				**X**								
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

DYNAMIC RECALLS (MM-3-1-9-1-2)

DYN. RECALL GP1 ENABLE:	**Y**	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input rquired for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS		**X**				**X**										
RECALLS	IF PH ON	**X**															
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

Select phases to be dynamically recalled from RCL PHS row. Select the PH-ONs and/or O/L GRNs that will cause those recalls. Phases are recalled when controller state matches PH ON row or O/L GRN row.

Note that there are 2 groups of dynamic recalls, each with 8 patterns. Group 1 is the default group and group 2 can be selected by input or TOD ckt 96. When a group is active, any one or all of the pattterns within that group may be true depending on the controller state.

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS		**X**				**X**										
RECALLS	IF PH ON					**X**											
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

GRP1-3	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	RCL PHS				**X**				**X**								
RECALLS	IF PH ON			**X**													
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

DETECTOR SWITCH AND COPY (MM-3-1-4-6-PGDN, etc.)

Detector Switching Enable	**Y**	Y/N; Y= Enable, detector switching per plans 1-16 is enabled
Detector Copy Group 1 Enable	**N**	Y/N; Y = Enable, detector copy per plans 1-16 is enabled
Detector Copy Group 2 Input Eneble	**N**	Y/N; Y = Enable, the goupr 2 input is enabled. GP2 will then become selected copy group if input is active

Detector switching disconnects calls from the "From" phase and transfers them to the "To" phase when "To" phase is green.
Detector copy simply copies calls from the "From" phase to the "To" phase, still retaining calls on "From" phase

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET	Ph Grns																
SWITCH	Switch (TS1)																
& COPY	G1 Copy																
1 of 16	G2 Copy																

	Swtch	G1C	G2C
From Ph:	**1**		
To Ph:	**6**		

Notes: 1. Phase greens on "Switch" row apply to TS1 only, do not use for TS2
TS2 Det Switching requires "From" and "To" phases only -->
2. Det switch and copy operates at phase level and applies all calls from all detectors assigned to "From" phase

From/To phases = Specify the phases from which and to which calls get switched or copied for Switch, Group 1, and Group 2 copy.

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET	Ph Grns																
SWITCH	Switch (TS1)																
& COPY	G1 Copy																
5 of 16	G2 Copy																

	Swtch	G1C	G2C
From Ph:	**5**		
To Ph:	**2**		

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DET	Ph Grns																
SWITCH	Switch (TS1)																
& COPY	G1 Copy																
3 of 16	G2 Copy																

	Swtch	G1C	G2C
From Ph:	**3**		
To Ph:	**8**		

DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	ON
2	00	00					11(FRE)	ON
	06	30					14(TP2)	ON
	10	00					14(TP2)	OFF
	14	30					15(TP3)	ON
	18	00					15(TP3)	OFF

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

CIRCUIT OVERRIDES (MM-3-3-6)

For each ciruit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER-RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	73	74	75	76	77	78	79	80
	Function	CN1	CN2	CN3	CN4	WRM	MIN	DIM	CVS
	State								
CIRCUIT OVER-RIDES	Circuit	81	82	83	84	85	86	87	88
	Function							PR1	PR2
	State							**ON**	**ON**
	Circuit	121	122	123	124	**125**	**126**	127	128
	Function	PH2	DP2	DP3	3CD	**EVL**	**EML**	ASC	DCP
	State					**ON**	**ON**		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	**2**	**11**	**1**

Enter Month and Week of Month for Spring Forward and Fall Back days (typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified. Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	**0**	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	**00**	**00**	TOD clock reset to by TBC input
Interrupter:		**N**	Y/N; Y = Interrupter pulses provided
Pulses:		**0**	0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES		HH	MM		HH	MM		HH	MM
	CYC 1:	**00**	**00**	CYC 2:	**00**	**00**	CYC 3:	**00**	**00**
	CYC 4:	**00**	**00**	CYC 5:	**00**	**00**	CYC 6:	**00**	**00**

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.
When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

CLOSED LOOP ID (MM-3-5-1)

CLOSED LOOP ID	Master Type:		0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID		0-255
	Master Identification		0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		0 = None, 1 = Odd, 2=Even
	Data bits		0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:		1200, 2400, 4800, 9600, 14400, 19200
	Parity		0 = None, 1 = Odd, 2=Even
	Data bits		0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM-BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

LOG DATA (MM-3-5-5)

PG1 SAMPLE	Volume Log Sample period:	**60**	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 125 (EVL)
	MOE Log Sample period:	**60**	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 126 (EML)

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (1 . AIRPORT RD & HIA MAIN ENTRANCE)

Start Time	N Approach HIA MAIN ENTRANCE						E Approach AIRPORT ROAD						S Approach RAMP 6 TO AIRPORT						W Approach AIRPORT ROAD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	0	0	5	0	0	5	7	21	9	0	0	37	38	7	10	0	0	55	5	27	0	0	0	32	129	
07:15:00	2	1	7	0	0	10	7	23	9	0	0	39	20	7	4	0	0	31	9	29	0	0	0	38	118	
07:30:00	2	4	9	0	0	15	9	35	16	0	0	60	33	7	14	0	0	54	5	35	3	0	0	43	172	
07:45:00	2	1	4	0	0	7	9	45	14	0	0	68	30	11	12	0	0	53	4	25	0	0	0	29	157	576
08:00:00	2	7	1	0	0	10	8	20	34	0	0	62	33	9	7	0	0	49	5	21	3	0	0	29	150	597
08:15:00	1	1	5	0	0	7	6	27	19	0	0	52	39	5	6	0	0	50	15	19	4	0	0	38	147	626
08:30:00	1	1	3	0	0	5	8	11	21	0	0	40	19	5	7	0	0	31	33	16	2	0	0	51	127	581
08:45:00	2	5	6	0	0	13	5	20	15	0	0	40	31	5	8	0	0	44	4	24	0	0	0	28	125	549
09:00:00	1	0	2	0	0	3	3	14	22	0	0	39	25	2	5	0	0	32	5	8	3	0	0	16	90	489
09:15:00	0	1	4	0	0	5	7	15	18	0	0	40	18	5	5	0	0	28	4	15	2	0	0	21	94	436
09:30:00	0	2	1	0	0	3	8	27	37	0	0	72	23	4	6	1	0	34	0	19	1	0	0	20	129	438
09:45:00	1	4	3	0	0	8	6	18	15	0	0	39	18	4	5	1	0	28	4	17	2	0	0	23	98	411
BREAK																										
16:00:00	6	8	13	0	0	27	11	14	22	0	0	47	18	13	7	0	0	38	16	43	3	0	0	62	174	
16:15:00	1	7	9	0	0	17	6	13	28	0	0	47	35	16	8	0	0	59	9	33	2	0	0	44	167	
16:30:00	3	6	10	0	0	19	14	21	31	0	0	66	24	9	8	0	0	41	6	38	1	0	0	45	171	
16:45:00	0	8	9	0	0	17	14	14	32	0	0	60	29	11	9	0	0	49	8	23	0	0	0	31	157	669
17:00:00	4	27	11	0	0	42	5	24	22	0	0	51	27	11	1	0	0	39	13	30	1	0	0	44	176	671
17:15:00	2	11	3	0	0	16	4	22	16	0	0	42	20	8	3	0	0	31	12	22	0	0	0	34	123	627
17:30:00	2	5	5	0	0	12	2	16	24	0	0	42	28	5	0	0	0	33	34	73	0	0	0	107	194	650
17:45:00	1	6	12	0	0	19	4	17	19	0	0	40	26	0	4	0	0	30	5	17	0	0	0	22	111	604
18:00:00	2	13	11	0	0	26	6	12	10	0	0	28	17	4	2	0	0	23	8	33	0	0	0	41	118	546
18:15:00	3	3	4	0	0	10	3	12	24	0	0	39	12	3	3	0	0	18	9	18	1	0	0	28	95	518
18:30:00	1	4	1	0	0	6	3	13	17	0	0	33	15	0	2	0	0	17	7	18	1	0	0	26	82	406
18:45:00	1	0	5	0	0	6	3	12	18	0	0	33	10	1	3	0	0	14	1	20	1	0	0	22	75	370
Grand Total	40	125	143	0	0	308	158	466	492	0	0	1116	588	152	139	2	0	881	221	623	30	0	0	874	**3179**	-
Approach%	13%	40.6%	46.4%	0%		-	14.2%	41.8%	44.1%	0%		-	66.7%	17.3%	15.8%	0.2%		-	25.3%	71.3%	3.4%	0%		-	-	-
Totals %	1.3%	3.9%	4.5%	0%		9.7%	5%	14.7%	15.5%	0%		35.1%	18.5%	4.8%	4.4%	0.1%		27.7%	7%	19.6%	0.9%	0%		27.5%	-	-
Heavy	17	1	2	0		-	27	30	61	0		-	54	12	44	1		-	79	57	1	0		-	-	-
Heavy %	42.5%	0.8%	1.4%	0%		-	17.1%	6.4%	12.4%	0%		-	9.2%	7.9%	31.7%	50%		-	35.7%	9.1%	3.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:30 AM - 08:30 AM **Weather: Clear Sky (17.39 °C)**

Start Time	N Approach HIA MAIN ENTRANCE						E Approach AIRPORT ROAD						S Approach RAMP 6 TO AIRPORT						W Approach AIRPORT ROAD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:30:00	2	4	9	0	0	15	9	35	16	0	0	60	33	7	14	0	0	54	5	35	3	0	0	43	172
07:45:00	2	1	4	0	0	7	9	45	14	0	0	68	30	11	12	0	0	53	4	25	0	0	0	29	157
08:00:00	2	7	1	0	0	10	8	20	34	0	0	62	33	9	7	0	0	49	5	21	3	0	0	29	150
08:15:00	1	1	5	0	0	7	6	27	19	0	0	52	39	5	6	0	0	50	15	19	4	0	0	38	147
Grand Total	7	13	19	0	0	39	32	127	83	0	0	242	135	32	39	0	0	206	29	100	10	0	0	139	**626**
Approach%	17.9%	33.3%	48.7%	0%		-	13.2%	52.5%	34.3%	0%		-	65.5%	15.5%	18.9%	0%		-	20.9%	71.9%	7.2%	0%		-	**-**
Totals %	1.1%	2.1%	3%	0%		6.2%	5.1%	20.3%	13.3%	0%		38.7%	21.6%	5.1%	6.2%	0%		32.9%	4.6%	16%	1.6%	0%		22.2%	**-**
PHF	0.88	0.46	0.53	0		0.65	0.89	0.71	0.61	0		0.89	0.87	0.73	0.7	0		0.95	0.48	0.71	0.63	0		0.81	**-**
Heavy	1	0	0	0		1	5	7	19	0		31	19	1	5	0		25	17	12	0	0		29	**-**
Heavy %	14.3%	0%	0%	0%		2.6%	15.6%	5.5%	22.9%	0%		12.8%	14.1%	3.1%	12.8%	0%		12.1%	58.6%	12%	0%	0%		20.9%	**-**
Lights	6	13	19	0		38	27	119	64	0		210	116	31	34	0		181	12	88	10	0		110	**-**
Lights %	85.7%	100%	100%	0%		97.4%	84.4%	93.7%	77.1%	0%		86.8%	85.9%	96.9%	87.2%	0%		87.9%	41.4%	88%	100%	0%		79.1%	**-**
Single-Unit Trucks	0	0	0	0		0	0	5	16	0		21	11	1	1	0		13	13	5	0	0		18	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	3.9%	19.3%	0%		8.7%	8.1%	3.1%	2.6%	0%		6.3%	44.8%	5%	0%	0%		12.9%	**-**
Buses	0	0	0	0		0	5	2	1	0		8	1	0	0	0		1	0	7	0	0		7	**-**
Buses %	0%	0%	0%	0%		0%	15.6%	1.6%	1.2%	0%		3.3%	0.7%	0%	0%	0%		0.5%	0%	7%	0%	0%		5%	**-**
Articulated Trucks	1	0	0	0		1	0	0	2	0		2	7	0	4	0		11	4	0	0	0		4	**-**
Articulated Trucks %	14.3%	0%	0%	0%		2.6%	0%	0%	2.4%	0%		0.8%	5.2%	0%	10.3%	0%		5.3%	13.8%	0%	0%	0%		2.9%	**-**
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**

Spectrum

Turning Movement Count
Location Name: AIRPORT RD & HIA MAIN ENTRANCE
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (26.6 °C)

Start Time	N Approach HIA MAIN ENTRANCE						E Approach AIRPORT ROAD						S Approach RAMP 6 TO AIRPORT						W Approach AIRPORT ROAD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	1	7	9	0	0	17	6	13	28	0	0	47	35	16	8	0	0	59	9	33	2	0	0	44	167
16:30:00	3	6	10	0	0	19	14	21	31	0	0	66	24	9	8	0	0	41	6	38	1	0	0	45	171
16:45:00	0	8	9	0	0	17	14	14	32	0	0	60	29	11	9	0	0	49	8	23	0	0	0	31	157
17:00:00	4	27	11	0	0	42	5	24	22	0	0	51	27	11	1	0	0	39	13	30	1	0	0	44	176
Grand Total	8	48	39	0	0	95	39	72	113	0	0	224	115	47	26	0	0	188	36	124	4	0	0	164	**671**
Approach%	8.4%	50.5%	41.1%	0%		-	17.4%	32.1%	50.4%	0%		-	61.2%	25%	13.8%	0%		-	22%	75.6%	2.4%	0%		-	**-**
Totals %	1.2%	7.2%	5.8%	0%		14.2%	5.8%	10.7%	16.8%	0%		33.4%	17.1%	7%	3.9%	0%		28%	5.4%	18.5%	0.6%	0%		24.4%	**-**
PHF	0.5	0.44	0.89	0		0.57	0.7	0.75	0.88	0		0.85	0.82	0.73	0.72	0		0.8	0.69	0.82	0.5	0		0.91	**-**
Heavy	2	0	0	0		2	4	5	10	0		19	10	2	19	0		31	8	8	0	0		16	**-**
Heavy %	25%	0%	0%	0%		2.1%	10.3%	6.9%	8.8%	0%		8.5%	8.7%	4.3%	73.1%	0%		16.5%	22.2%	6.5%	0%	0%		9.8%	**-**
Lights	6	48	39	0		93	35	67	103	0		205	105	45	7	0		157	28	116	4	0		148	**-**
Lights %	75%	100%	100%	0%		97.9%	89.7%	93.1%	91.2%	0%		91.5%	91.3%	95.7%	26.9%	0%		83.5%	77.8%	93.5%	100%	0%		90.2%	**-**
Single-Unit Trucks	0	0	0	0		0	0	4	7	0		11	7	1	17	0		25	3	3	0	0		6	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	5.6%	6.2%	0%		4.9%	6.1%	2.1%	65.4%	0%		13.3%	8.3%	2.4%	0%	0%		3.7%	**-**
Buses	0	0	0	0		0	4	1	3	0		8	1	0	0	0		1	0	5	0	0		5	**-**
Buses %	0%	0%	0%	0%		0%	10.3%	1.4%	2.7%	0%		3.6%	0.9%	0%	0%	0%		0.5%	0%	4%	0%	0%		3%	**-**
Articulated Trucks	2	0	0	0		2	0	0	0	0		0	2	1	2	0		5	5	0	0	0		5	**-**
Articulated Trucks %	25%	0%	0%	0%		2.1%	0%	0%	0%	0%		0%	1.7%	2.1%	7.7%	0%		2.7%	13.9%	0%	0%	0%		3%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (17.39 °C)

Peak Hour: 04:15 PM - 05:15 PM **Weather: Overcast Clouds (26.6 °C)**

Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & E CARGO RD
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (2 . AIRPORT RD W & E CARGO RD)

Start Time	N Approach EAST CARGO RD						E Approach AIRPORT RD						S Approach EAST CARGO RD						W Approach AIRPORT RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	4	0	2	0	0	6	15	31	4	0	0	50	0	0	4	0	0	4	13	42	11	0	0	66	126	
07:15:00	2	0	3	0	0	5	7	37	4	0	0	48	0	0	1	0	0	1	6	43	8	0	0	57	111	
07:30:00	7	0	2	0	0	9	10	51	4	0	0	65	4	0	4	0	0	8	10	56	11	0	0	77	159	
07:45:00	5	0	8	0	0	13	19	64	7	0	0	90	4	0	1	0	0	5	4	45	14	0	0	63	171	567
08:00:00	24	0	25	0	0	49	16	39	5	1	0	61	1	0	5	0	0	6	6	26	17	0	0	49	165	606
08:15:00	7	0	13	0	0	20	9	43	5	0	0	57	3	0	3	0	0	6	2	38	12	0	0	52	135	630
08:30:00	7	0	10	0	1	17	10	41	2	0	0	53	4	0	2	1	0	7	1	25	14	0	0	40	117	588
08:45:00	2	0	9	0	0	11	14	40	6	0	0	60	6	0	1	0	0	7	5	38	14	0	0	57	135	552
09:00:00	11	1	11	0	0	23	12	29	3	0	0	44	7	0	0	0	0	7	2	18	11	0	0	31	105	492
09:15:00	6	0	8	0	0	14	7	33	5	0	0	45	5	0	1	0	1	6	5	26	4	0	2	35	100	457
09:30:00	28	0	29	0	0	57	8	40	7	0	0	55	6	0	6	0	0	12	3	22	14	0	0	39	163	503
09:45:00	13	0	18	0	1	31	11	28	3	0	1	42	5	0	2	0	0	7	6	18	12	0	1	36	116	484
BREAK																										
16:00:00	7	0	16	0	0	23	2	51	3	0	1	56	4	0	3	0	0	7	2	57	6	0	0	65	151	
16:15:00	11	0	11	0	0	22	6	54	3	0	0	63	4	0	5	0	0	9	2	52	9	0	0	63	157	
16:30:00	13	0	19	0	0	32	2	64	2	0	0	68	6	0	9	0	0	15	2	61	5	0	0	68	183	
16:45:00	9	0	8	0	0	17	9	50	4	0	0	63	4	0	7	0	0	11	4	53	7	0	1	64	155	646
17:00:00	7	0	6	0	0	13	5	41	2	0	0	48	4	0	6	0	0	10	3	60	8	0	0	71	142	637
17:15:00	5	0	4	0	0	9	8	30	2	0	0	40	3	0	7	0	0	10	2	44	3	0	0	49	108	588
17:30:00	10	0	13	0	0	23	3	31	0	0	0	34	9	0	1	0	0	10	5	99	5	0	0	109	176	581
17:45:00	4	0	8	0	0	12	10	31	2	0	0	43	6	0	4	0	0	10	3	49	5	0	0	57	122	548
18:00:00	2	0	5	0	0	7	6	22	3	0	0	31	5	0	2	0	0	7	2	55	6	0	0	63	108	514
18:15:00	4	0	5	0	0	9	4	33	2	0	0	39	3	0	3	0	0	6	3	27	7	0	0	37	91	497
18:30:00	10	0	5	0	0	15	4	15	2	0	0	21	1	0	2	0	0	3	1	49	6	1	0	57	96	417
18:45:00	5	0	4	0	0	9	7	20	2	0	0	29	5	0	3	0	0	8	4	48	4	0	1	56	102	397
Grand Total	203	1	242	0	2	446	204	918	82	1	2	1205	99	0	82	1	1	182	96	1051	213	1	5	1361	**3194**	-
Approach%	45.5%	0.2%	54.3%	0%		-	16.9%	76.2%	6.8%	0.1%		-	54.4%	0%	45.1%	0.5%		-	7.1%	77.2%	15.7%	0.1%		-	-	-
Totals %	6.4%	0%	7.6%	0%		14%	6.4%	28.7%	2.6%	0%		37.7%	3.1%	0%	2.6%	0%		5.7%	3%	32.9%	6.7%	0%		42.6%	-	-
Heavy	35	0	3	0		-	2	71	4	1		-	3	0	10	1		-	11	81	21	0		-	-	-
Heavy %	17.2%	0%	1.2%	0%		-	1%	7.7%	4.9%	100%		-	3%	0%	12.2%	100%		-	11.5%	7.7%	9.9%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:30 AM - 08:30 AM **Weather: Clear Sky (17.39 °C)**

Start Time	N Approach EAST CARGO RD						E Approach AIRPORT RD						S Approach EAST CARGO RD						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:30:00	7	0	2	0	0	9	10	51	4	0	0	65	4	0	4	0	0	8	10	56	11	0	0	77	159
07:45:00	5	0	8	0	0	13	19	64	7	0	0	90	4	0	1	0	0	5	4	45	14	0	0	63	171
08:00:00	24	0	25	0	0	49	16	39	5	1	0	61	1	0	5	0	0	6	6	26	17	0	0	49	165
08:15:00	7	0	13	0	0	20	9	43	5	0	0	57	3	0	3	0	0	6	2	38	12	0	0	52	135
Grand Total	43	0	48	0	0	91	54	197	21	1	0	273	12	0	13	0	0	25	22	165	54	0	0	241	**630**
Approach%	47.3%	0%	52.7%	0%		-	19.8%	72.2%	7.7%	0.4%		-	48%	0%	52%	0%		-	9.1%	68.5%	22.4%	0%		-	**-**
Totals %	6.8%	0%	7.6%	0%		14.4%	8.6%	31.3%	3.3%	0.2%		43.3%	1.9%	0%	2.1%	0%		4%	3.5%	26.2%	8.6%	0%		38.3%	**-**
PHF	0.45	0	0.48	0		0.46	0.71	0.77	0.75	0.25		0.76	0.75	0	0.65	0		0.78	0.55	0.74	0.79	0		0.78	**-**
Heavy	15	0	1	0		16	0	13	2	1		16	0	0	3	0		3	3	22	5	0		30	**-**
Heavy %	34.9%	0%	2.1%	0%		17.6%	0%	6.6%	9.5%	100%		5.9%	0%	0%	23.1%	0%		12%	13.6%	13.3%	9.3%	0%		12.4%	**-**
Lights	28	0	47	0		75	54	184	19	0		257	12	0	10	0		22	19	143	49	0		211	**-**
Lights %	65.1%	0%	97.9%	0%		82.4%	100%	93.4%	90.5%	0%		94.1%	100%	0%	76.9%	0%		88%	86.4%	86.7%	90.7%	0%		87.6%	**-**
Single-Unit Trucks	13	0	1	0		14	0	5	2	1		8	0	0	3	0		3	2	11	2	0		15	**-**
Single-Unit Trucks %	30.2%	0%	2.1%	0%		15.4%	0%	2.5%	9.5%	100%		2.9%	0%	0%	23.1%	0%		12%	9.1%	6.7%	3.7%	0%		6.2%	**-**
Buses	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	0	8	1	0		9	**-**
Buses %	0%	0%	0%	0%		0%	0%	4.1%	0%	0%		2.9%	0%	0%	0%	0%		0%	0%	4.8%	1.9%	0%		3.7%	**-**
Articulated Trucks	2	0	0	0		2	0	0	0	0		0	0	0	0	0		0	1	3	2	0		6	**-**
Articulated Trucks %	4.7%	0%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	4.5%	1.8%	3.7%	0%		2.5%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & E CARGO RD
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

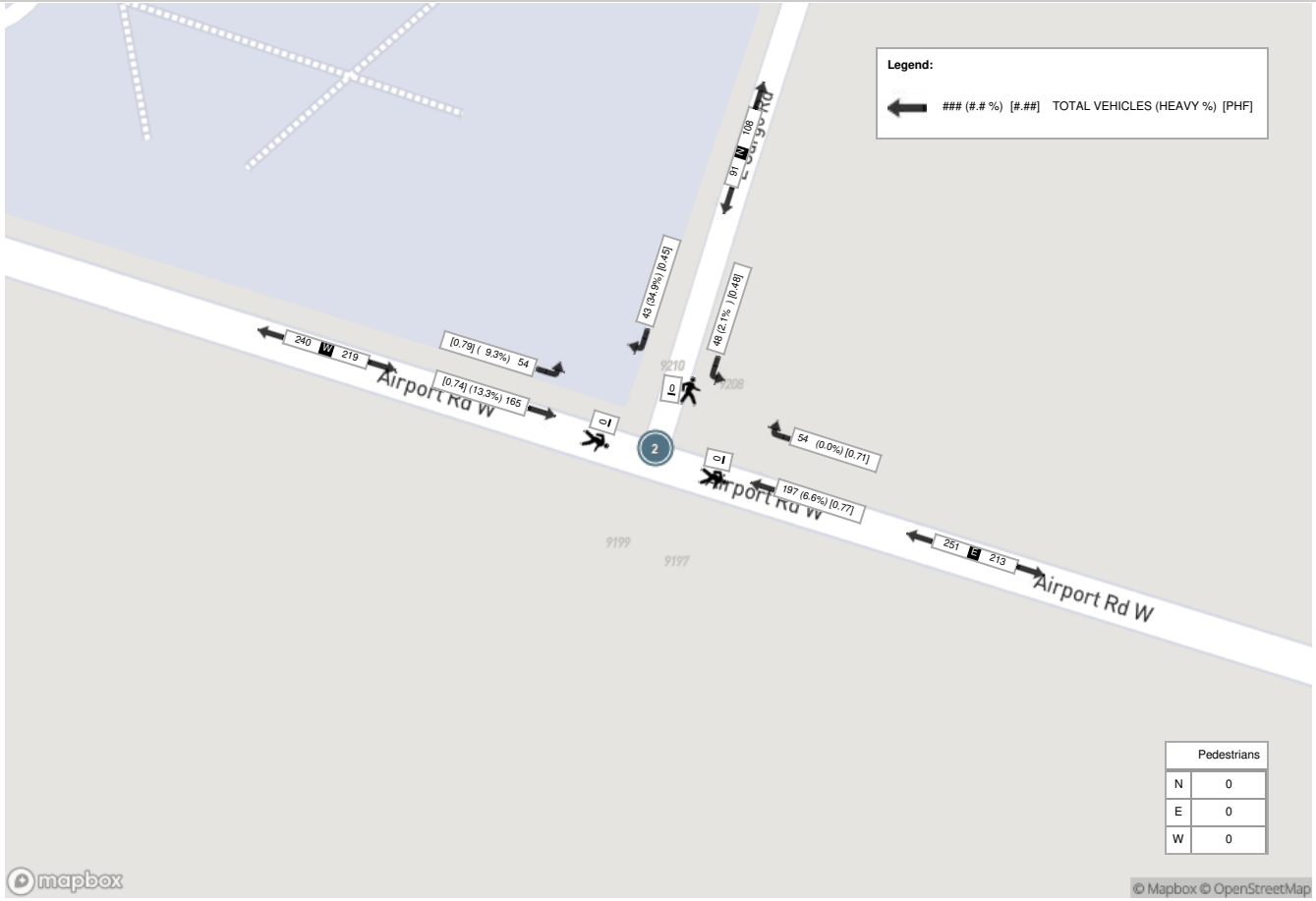
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (26.6 °C)

Start Time	N Approach EAST CARGO RD						E Approach AIRPORT RD						S Approach EAST CARGO RD						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:00:00	7	0	16	0	0	23	2	51	3	0	1	56	4	0	3	0	0	7	2	57	6	0	0	65	151
16:15:00	11	0	11	0	0	22	6	54	3	0	0	63	4	0	5	0	0	9	2	52	9	0	0	63	157
16:30:00	13	0	19	0	0	32	2	64	2	0	0	68	6	0	9	0	0	15	2	61	5	0	0	68	183
16:45:00	9	0	8	0	0	17	9	50	4	0	0	63	4	0	7	0	0	11	4	53	7	0	1	64	155
Grand Total	40	0	54	0	0	94	19	219	12	0	1	250	18	0	24	0	0	42	10	223	27	0	1	260	**646**
Approach%	42.6%	0%	57.4%	0%		-	7.6%	87.6%	4.8%	0%		-	42.9%	0%	57.1%	0%		-	3.8%	85.8%	10.4%	0%		-	**-**
Totals %	6.2%	0%	8.4%	0%		14.6%	2.9%	33.9%	1.9%	0%		38.7%	2.8%	0%	3.7%	0%		6.5%	1.5%	34.5%	4.2%	0%		40.2%	**-**
PHF	0.77	0	0.71	0		0.73	0.53	0.86	0.75	0		0.92	0.75	0	0.67	0		0.7	0.63	0.91	0.75	0		0.96	**-**
Heavy	1	0	0	0		1	0	16	1	0		17	0	0	3	0		3	1	11	4	0		16	**-**
Heavy %	2.5%	0%	0%	0%		1.1%	0%	7.3%	8.3%	0%		6.8%	0%	0%	12.5%	0%		7.1%	10%	4.9%	14.8%	0%		6.2%	**-**
Lights	39	0	54	0		93	19	203	11	0		233	18	0	21	0		39	9	212	23	0		244	**-**
Lights %	97.5%	0%	100%	0%		98.9%	100%	92.7%	91.7%	0%		93.2%	100%	0%	87.5%	0%		92.9%	90%	95.1%	85.2%	0%		93.8%	**-**
Single-Unit Trucks	1	0	0	0		1	0	7	1	0		8	0	0	3	0		3	0	3	3	0		6	**-**
Single-Unit Trucks %	2.5%	0%	0%	0%		1.1%	0%	3.2%	8.3%	0%		3.2%	0%	0%	12.5%	0%		7.1%	0%	1.3%	11.1%	0%		2.3%	**-**
Buses	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	0	7	0	0		7	**-**
Buses %	0%	0%	0%	0%		0%	0%	3.7%	0%	0%		3.2%	0%	0%	0%	0%		0%	0%	3.1%	0%	0%		2.7%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	1	1	1	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	10%	0.4%	3.7%	0%		1.2%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	50%		-	-	-	-	0%		-	-	-	-	50%		**-**

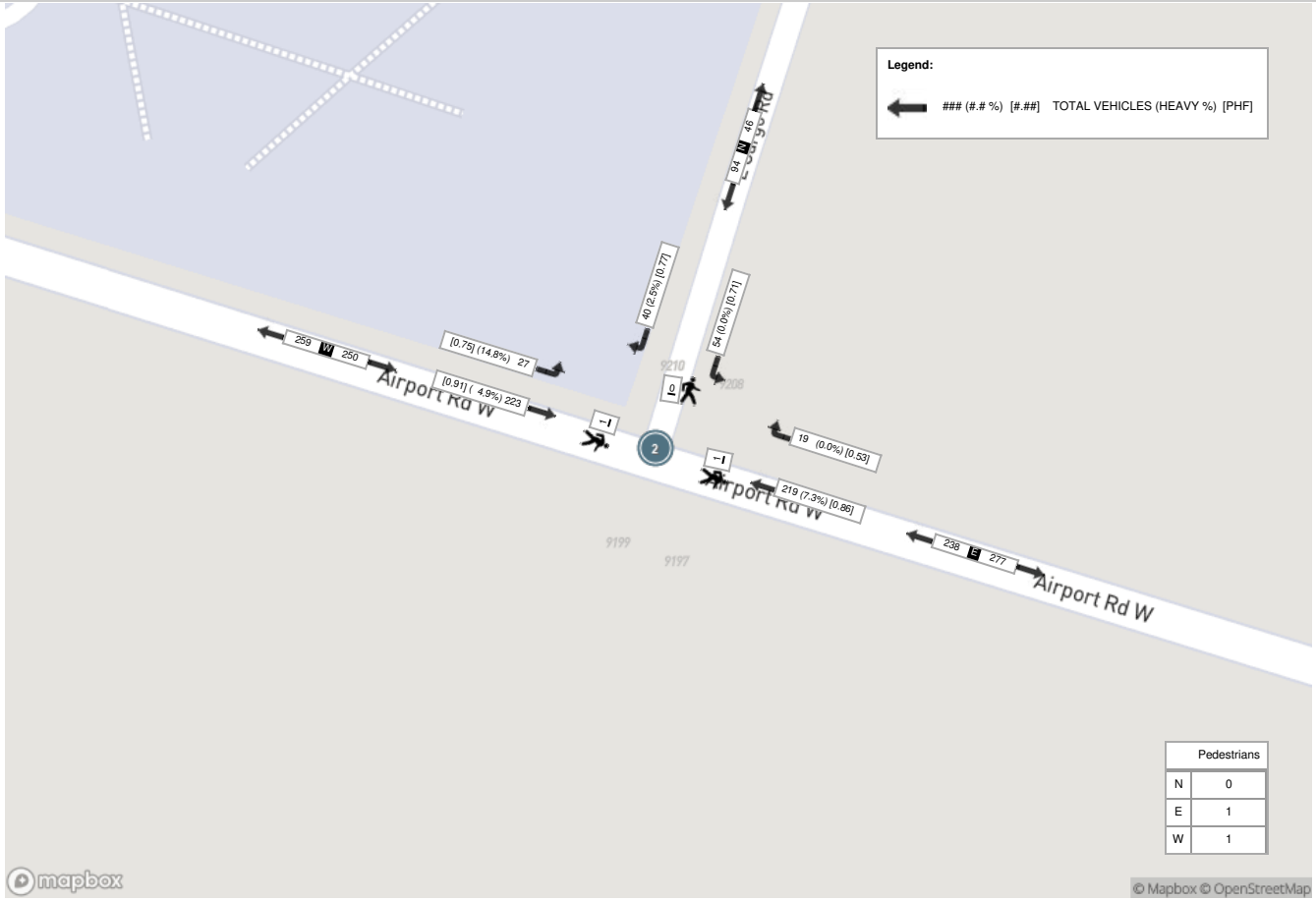
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 07:30 AM - 08:30 AM **Weather: Clear Sky (17.39 °C)**



NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (26.6 °C)**



Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & HOMESTEAD DR
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (3 . AIRPORT RD W & HOMESTEAD DR)

Start Time	N Approach HOMESTEAD DR						E Approach AIRPORT RD						S Approach HOMESTEAD DR						W Approach AIRPORT RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	16	14	6	0	3	36	1	38	6	0	0	45	22	0	3	0	1	25	5	40	1	0	3	46	152	
07:15:00	12	8	3	0	0	23	2	39	5	0	0	46	38	2	8	0	1	48	0	43	1	0	0	44	161	
07:30:00	24	8	6	0	0	38	1	25	3	0	0	29	45	1	14	0	0	60	5	56	3	0	0	64	191	
07:45:00	28	11	2	0	0	41	4	54	4	0	0	62	41	0	7	0	0	48	11	53	2	0	0	66	217	721
08:00:00	16	11	4	0	0	31	7	35	5	0	0	47	48	2	9	0	0	59	7	43	1	0	0	51	188	757
08:15:00	17	15	9	0	0	41	5	38	10	0	0	53	37	1	8	0	0	46	10	45	2	0	0	57	197	793
08:30:00	15	14	15	0	0	44	5	27	5	0	0	37	36	2	5	0	0	43	1	44	0	0	1	45	169	771
08:45:00	26	10	9	0	1	45	5	44	7	0	0	56	50	1	8	0	0	59	3	39	3	0	9	45	205	759
09:00:00	17	16	14	0	1	47	4	32	16	0	0	52	41	2	14	0	1	57	9	45	2	0	2	56	212	783
09:15:00	16	21	9	0	0	46	0	19	10	0	2	29	18	0	9	0	0	27	15	35	5	0	0	55	157	743
09:30:00	16	5	7	0	0	28	3	33	9	0	0	45	19	0	4	0	1	23	6	53	5	0	0	64	160	734
09:45:00	20	5	9	0	0	34	1	20	9	0	0	30	22	2	6	0	0	30	0	46	3	0	1	49	143	672
BREAK																										
16:00:00	21	27	10	0	8	58	6	27	18	0	0	51	14	1	7	0	4	22	10	78	5	0	8	93	224	
16:15:00	28	25	10	0	0	63	10	39	16	0	0	65	27	4	4	0	3	35	7	61	3	0	0	71	234	
16:30:00	28	33	10	0	1	71	6	40	11	0	0	57	34	4	12	0	3	50	11	80	4	0	1	95	273	
16:45:00	20	26	20	0	0	66	3	28	26	0	0	57	24	4	8	0	0	36	11	56	3	0	1	70	229	960
17:00:00	20	21	11	0	2	52	2	25	11	0	0	38	26	1	6	0	0	33	8	64	0	0	2	72	195	931
17:15:00	17	25	10	0	2	52	2	26	16	0	0	44	27	4	5	0	0	36	15	36	3	0	3	54	186	883
17:30:00	16	28	11	0	1	55	8	19	16	0	0	43	28	1	1	0	0	30	14	95	8	0	6	117	245	855
17:45:00	18	22	10	0	0	50	4	20	12	0	1	36	38	4	5	0	3	47	7	52	4	0	3	63	196	822
18:00:00	12	34	11	0	3	57	5	23	21	0	0	49	30	4	4	0	0	38	12	54	1	0	4	67	211	838
18:15:00	14	20	11	0	2	45	2	20	10	0	0	32	31	5	5	0	0	41	6	31	2	0	5	39	157	809
18:30:00	8	21	16	0	4	45	3	12	13	0	2	28	24	5	1	0	0	30	2	49	4	0	5	55	158	722
18:45:00	10	24	6	0	4	40	4	20	12	0	0	36	19	3	1	0	0	23	3	55	1	0	1	59	158	684
Grand Total	435	444	229	0	32	1108	93	703	271	0	5	1067	739	53	154	0	17	946	178	1253	66	0	55	1497	**4618**	-
Approach%	39.3%	40.1%	20.7%	0%		-	8.7%	65.9%	25.4%	0%		-	78.1%	5.6%	16.3%	0%		-	11.9%	83.7%	4.4%	0%		-	**-**	-
Totals %	9.4%	9.6%	5%	0%		24%	2%	15.2%	5.9%	0%		23.1%	16%	1.1%	3.3%	0%		20.5%	3.9%	27.1%	1.4%	0%		32.4%	**-**	-
Heavy	11	18	16	0		-	4	61	14	0		-	11	3	8	0		-	9	74	4	0		-	**-**	-
Heavy %	2.5%	4.1%	7%	0%		-	4.3%	8.7%	5.2%	0%		-	1.5%	5.7%	5.2%	0%		-	5.1%	5.9%	6.1%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & HOMESTEAD DR
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (17.39 °C)

Start Time	N Approach HOMESTEAD DR						E Approach AIRPORT RD						S Approach HOMESTEAD DR						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:30:00	24	8	6	0	0	38	1	25	3	0	0	29	45	1	14	0	0	60	5	56	3	0	0	64	191
07:45:00	28	11	2	0	0	41	4	54	4	0	0	62	41	0	7	0	0	48	11	53	2	0	0	66	217
08:00:00	16	11	4	0	0	31	7	35	5	0	0	47	48	2	9	0	0	59	7	43	1	0	0	51	188
08:15:00	17	15	9	0	0	41	5	38	10	0	0	53	37	1	8	0	0	46	10	45	2	0	0	57	197
Grand Total	85	45	21	0	0	151	17	152	22	0	0	191	171	4	38	0	0	213	33	197	8	0	0	238	**793**
Approach%	56.3%	29.8%	13.9%	0%		-	8.9%	79.6%	11.5%	0%		-	80.3%	1.9%	17.8%	0%		-	13.9%	82.8%	3.4%	0%		-	**-**
Totals %	10.7%	5.7%	2.6%	0%		19%	2.1%	19.2%	2.8%	0%		24.1%	21.6%	0.5%	4.8%	0%		26.9%	4.2%	24.8%	1%	0%		30%	**-**
PHF	0.76	0.75	0.58	0		0.92	0.61	0.7	0.55	0		0.77	0.89	0.5	0.68	0		0.89	0.75	0.88	0.67	0		0.9	**-**
Heavy	2	4	1	0		7	3	13	3	0		19	0	0	1	0		1	6	15	0	0		21	**-**
Heavy %	2.4%	8.9%	4.8%	0%		4.6%	17.6%	8.6%	13.6%	0%		9.9%	0%	0%	2.6%	0%		0.5%	18.2%	7.6%	0%	0%		8.8%	**-**
Lights	83	41	20	0		144	14	139	19	0		172	171	4	37	0		212	27	182	8	0		217	**-**
Lights %	97.6%	91.1%	95.2%	0%		95.4%	82.4%	91.4%	86.4%	0%		90.1%	100%	100%	97.4%	0%		99.5%	81.8%	92.4%	100%	0%		91.2%	**-**
Single-Unit Trucks	1	2	0	0		3	2	7	2	0		11	0	0	1	0		1	3	7	0	0		10	**-**
Single-Unit Trucks %	1.2%	4.4%	0%	0%		2%	11.8%	4.6%	9.1%	0%		5.8%	0%	0%	2.6%	0%		0.5%	9.1%	3.6%	0%	0%		4.2%	**-**
Buses	1	2	1	0		4	1	6	1	0		8	0	0	0	0		0	2	6	0	0		8	**-**
Buses %	1.2%	4.4%	4.8%	0%		2.6%	5.9%	3.9%	4.5%	0%		4.2%	0%	0%	0%	0%		0%	6.1%	3%	0%	0%		3.4%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	1	2	0	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	3%	1%	0%	0%		1.3%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & HOMESTEAD DR
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

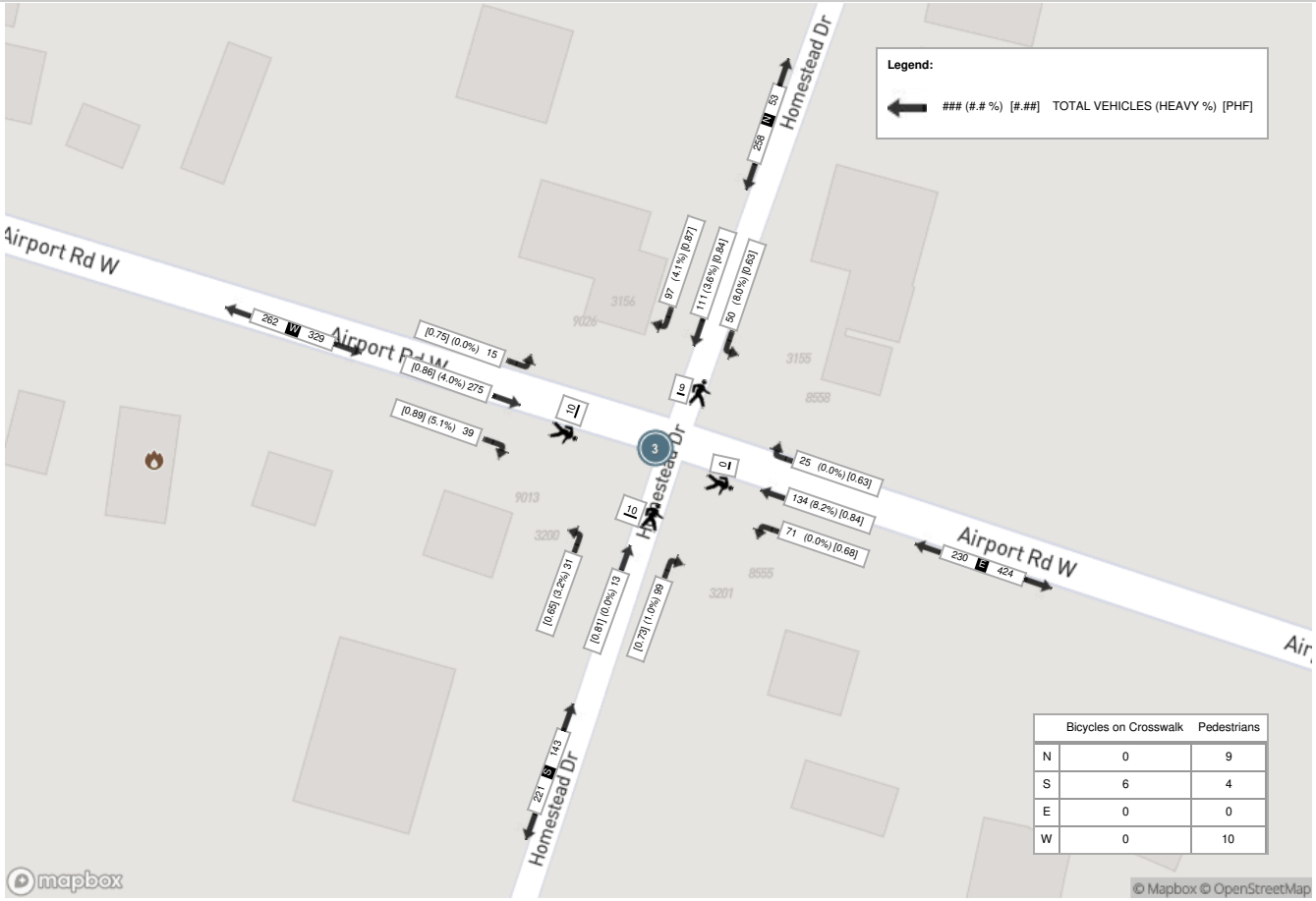
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (26.6 °C)

Start Time	N Approach HOMESTEAD DR						E Approach AIRPORT RD						S Approach HOMESTEAD DR						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:00:00	21	27	10	0	8	58	6	27	18	0	0	51	14	1	7	0	4	22	10	78	5	0	8	93	224
16:15:00	28	25	10	0	0	63	10	39	16	0	0	65	27	4	4	0	3	35	7	61	3	0	0	71	234
16:30:00	28	33	10	0	1	71	6	40	11	0	0	57	34	4	12	0	3	50	11	80	4	0	1	95	273
16:45:00	20	26	20	0	0	66	3	28	26	0	0	57	24	4	8	0	0	36	11	56	3	0	1	70	229
Grand Total	97	111	50	0	9	258	25	134	71	0	0	230	99	13	31	0	10	143	39	275	15	0	10	329	**960**
Approach%	37.6%	43%	19.4%	0%		-	10.9%	58.3%	30.9%	0%		-	69.2%	9.1%	21.7%	0%		-	11.9%	83.6%	4.6%	0%		-	**-**
Totals %	10.1%	11.6%	5.2%	0%		26.9%	2.6%	14%	7.4%	0%		24%	10.3%	1.4%	3.2%	0%		14.9%	4.1%	28.6%	1.6%	0%		34.3%	**-**
PHF	0.87	0.84	0.63	0		0.91	0.63	0.84	0.68	0		0.88	0.73	0.81	0.65	0		0.72	0.89	0.86	0.75	0		0.87	**-**
Heavy	4	4	4	0		12	0	11	0	0		11	1	0	1	0		2	2	11	0	0		13	**-**
Heavy %	4.1%	3.6%	8%	0%		4.7%	0%	8.2%	0%	0%		4.8%	1%	0%	3.2%	0%		1.4%	5.1%	4%	0%	0%		4%	**-**
Lights	93	107	46	0		246	25	123	71	0		219	97	13	30	0		140	37	264	15	0		316	**-**
Lights %	95.9%	96.4%	92%	0%		95.3%	100%	91.8%	100%	0%		95.2%	98%	100%	96.8%	0%		97.9%	94.9%	96%	100%	0%		96%	**-**
Single-Unit Trucks	2	0	0	0		2	0	5	0	0		5	0	0	0	0		0	0	5	0	0		5	**-**
Single-Unit Trucks %	2.1%	0%	0%	0%		0.8%	0%	3.7%	0%	0%		2.2%	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1.5%	**-**
Buses	1	4	4	0		9	0	6	0	0		6	0	0	1	0		1	2	6	0	0		8	**-**
Buses %	1%	3.6%	8%	0%		3.5%	0%	4.5%	0%	0%		2.6%	0%	0%	3.2%	0%		0.7%	5.1%	2.2%	0%	0%		2.4%	**-**
Articulated Trucks	1	0	0	0		1	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	**-**
Articulated Trucks %	1%	0%	0%	0%		0.4%	0%	0%	0%	0%		0%	1%	0%	0%	0%		0.7%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	1%	0%	0%	0%		0.7%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	9	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	10	-	**-**
Pedestrians%	-	-	-	-	31%		-	-	-	-	0%		-	-	-	-	13.8%		-	-	-	-	34.5%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	20.7%		-	-	-	-	0%		**-**

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (17.39 °C)

Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (26.6 °C)**



Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & UPPER JAMES ST
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (4 . AIRPORT RD W & UPPER JAMES ST)

Start Time	N Approach UPPER JAMES ST						E Approach AIRPORT RD						S Approach UPPER JAMES ST						W Approach AIRPORT RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	22	79	7	0	0	108	14	15	10	0	0	39	13	176	9	0	0	198	3	14	46	0	0	63	408	
07:15:00	12	87	9	0	0	108	25	25	9	0	0	59	10	212	12	0	0	234	5	31	51	0	0	87	488	
07:30:00	10	93	9	0	0	112	22	20	11	0	0	53	23	226	6	0	0	255	2	38	63	0	0	103	523	
07:45:00	19	95	10	0	0	124	20	38	7	0	0	65	23	228	14	0	0	265	2	22	65	0	0	89	543	1962
08:00:00	13	88	8	0	0	109	28	25	11	0	0	64	16	184	13	0	0	213	2	25	62	0	0	89	475	2029
08:15:00	16	95	11	0	0	122	18	31	13	0	0	62	8	191	11	0	0	210	2	18	65	0	0	85	479	2020
08:30:00	11	88	11	0	0	110	22	16	17	0	0	55	13	191	13	0	0	217	13	35	48	0	0	96	478	1975
08:45:00	20	63	11	0	0	94	15	25	12	0	0	52	21	162	11	0	0	194	3	20	58	0	0	81	421	1853
09:00:00	12	91	10	0	0	113	15	25	9	0	0	49	5	114	11	0	1	130	8	23	76	0	0	107	399	1777
09:15:00	15	98	9	0	0	122	10	14	2	0	0	26	13	113	3	0	0	129	4	11	44	0	0	59	336	1634
09:30:00	19	89	12	0	0	120	9	12	8	0	0	29	13	133	15	0	0	161	1	17	51	1	1	70	380	1536
09:45:00	15	105	3	0	0	123	13	11	10	0	0	34	5	138	12	0	0	155	4	24	51	0	0	79	391	1506
BREAK																										
16:00:00	14	169	12	0	0	195	7	29	23	0	0	59	17	159	13	0	0	189	10	40	53	0	0	103	546	
16:15:00	27	195	19	0	0	241	15	37	18	0	0	70	10	161	3	0	0	174	12	38	49	0	0	99	584	
16:30:00	18	161	26	0	0	205	11	36	20	0	0	67	18	159	11	0	0	188	4	47	63	0	0	114	574	
16:45:00	12	231	24	0	0	267	12	32	27	0	0	71	24	162	6	0	0	192	3	42	53	0	0	98	628	2332
17:00:00	13	180	21	0	0	214	11	25	18	0	0	54	25	195	5	0	0	225	2	47	56	0	0	105	598	2384
17:15:00	15	184	6	0	0	205	21	30	21	0	0	72	21	195	9	0	0	225	6	18	47	0	0	71	573	2373
17:30:00	13	181	19	0	0	213	19	28	17	0	0	64	14	169	12	0	0	195	5	51	78	0	0	134	606	2405
17:45:00	10	148	18	0	0	176	14	21	13	0	0	48	21	174	11	0	0	206	6	32	62	0	0	100	530	2307
18:00:00	17	155	24	0	0	196	15	31	18	0	0	64	17	175	11	0	0	203	8	30	55	0	0	93	556	2265
18:15:00	11	143	9	0	0	163	13	16	7	0	0	36	8	154	9	0	1	171	7	20	54	0	0	81	451	2143
18:30:00	8	96	13	0	0	117	10	10	7	0	0	27	9	115	8	0	0	132	4	26	47	0	0	77	353	1890
18:45:00	11	116	16	0	0	143	9	16	11	0	0	36	15	92	9	0	0	116	2	27	49	0	0	78	373	1733
Grand Total	353	3030	317	0	0	3700	368	568	319	0	0	1255	362	3978	237	0	2	4577	118	696	1346	1	1	2161	**11693**	-
Approach%	9.5%	81.9%	8.6%	0%		-	29.3%	45.3%	25.4%	0%		-	7.9%	86.9%	5.2%	0%		-	5.5%	32.2%	62.3%	0%		-	**-**	-
Totals %	3%	25.9%	2.7%	0%		31.6%	3.1%	4.9%	2.7%	0%		10.7%	3.1%	34%	2%	0%		39.1%	1%	6%	11.5%	0%		18.5%	**-**	-
Heavy	53	192	11	0		-	12	12	19	0		-	12	233	15	0		-	9	19	77	0		-	**-**	-
Heavy %	15%	6.3%	3.5%	0%		-	3.3%	2.1%	6%	0%		-	3.3%	5.9%	6.3%	0%		-	7.6%	2.7%	5.7%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: AIRPORT RD W & UPPER JAMES ST
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Clear Sky (17.39 °C)

Start Time	N Approach UPPER JAMES ST						E Approach AIRPORT RD						S Approach UPPER JAMES ST						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:15:00	12	87	9	0	0	108	25	25	9	0	0	59	10	212	12	0	0	234	5	31	51	0	0	87	488
07:30:00	10	93	9	0	0	112	22	20	11	0	0	53	23	226	6	0	0	255	2	38	63	0	0	103	523
07:45:00	19	95	10	0	0	124	20	38	7	0	0	65	23	228	14	0	0	265	2	22	65	0	0	89	543
08:00:00	13	88	8	0	0	109	28	25	11	0	0	64	16	184	13	0	0	213	2	25	62	0	0	89	475
Grand Total	54	363	36	0	0	453	95	108	38	0	0	241	72	850	45	0	0	967	11	116	241	0	0	368	**2029**
Approach%	11.9%	80.1%	7.9%	0%		-	39.4%	44.8%	15.8%	0%		-	7.4%	87.9%	4.7%	0%		-	3%	31.5%	65.5%	0%		-	**-**
Totals %	2.7%	17.9%	1.8%	0%		22.3%	4.7%	5.3%	1.9%	0%		11.9%	3.5%	41.9%	2.2%	0%		47.7%	0.5%	5.7%	11.9%	0%		18.1%	**-**
PHF	0.71	0.96	0.9	0		0.91	0.85	0.71	0.86	0		0.93	0.78	0.93	0.8	0		0.91	0.55	0.76	0.93	0		0.89	**-**
Heavy	9	29	3	0		41	3	3	7	0		13	4	45	2	0		51	2	6	10	0		18	**-**
Heavy %	16.7%	8%	8.3%	0%		9.1%	3.2%	2.8%	18.4%	0%		5.4%	5.6%	5.3%	4.4%	0%		5.3%	18.2%	5.2%	4.1%	0%		4.9%	**-**
Lights	45	334	33	0		412	92	104	31	0		227	68	805	43	0		916	9	110	231	0		350	**-**
Lights %	83.3%	92%	91.7%	0%		90.9%	96.8%	96.3%	81.6%	0%		94.2%	94.4%	94.7%	95.6%	0%		94.7%	81.8%	94.8%	95.9%	0%		95.1%	**-**
Single-Unit Trucks	5	18	3	0		26	3	0	7	0		10	2	20	1	0		23	2	5	3	0		10	**-**
Single-Unit Trucks %	9.3%	5%	8.3%	0%		5.7%	3.2%	0%	18.4%	0%		4.1%	2.8%	2.4%	2.2%	0%		2.4%	18.2%	4.3%	1.2%	0%		2.7%	**-**
Buses	3	1	0	0		4	0	1	0	0		1	2	4	1	0		7	0	1	6	0		7	**-**
Buses %	5.6%	0.3%	0%	0%		0.9%	0%	0.9%	0%	0%		0.4%	2.8%	0.5%	2.2%	0%		0.7%	0%	0.9%	2.5%	0%		1.9%	**-**
Articulated Trucks	1	10	0	0		11	0	2	0	0		2	0	21	0	0		21	0	0	1	0		1	**-**
Articulated Trucks %	1.9%	2.8%	0%	0%		2.4%	0%	1.9%	0%	0%		0.8%	0%	2.5%	0%	0%		2.2%	0%	0%	0.4%	0%		0.3%	**-**
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

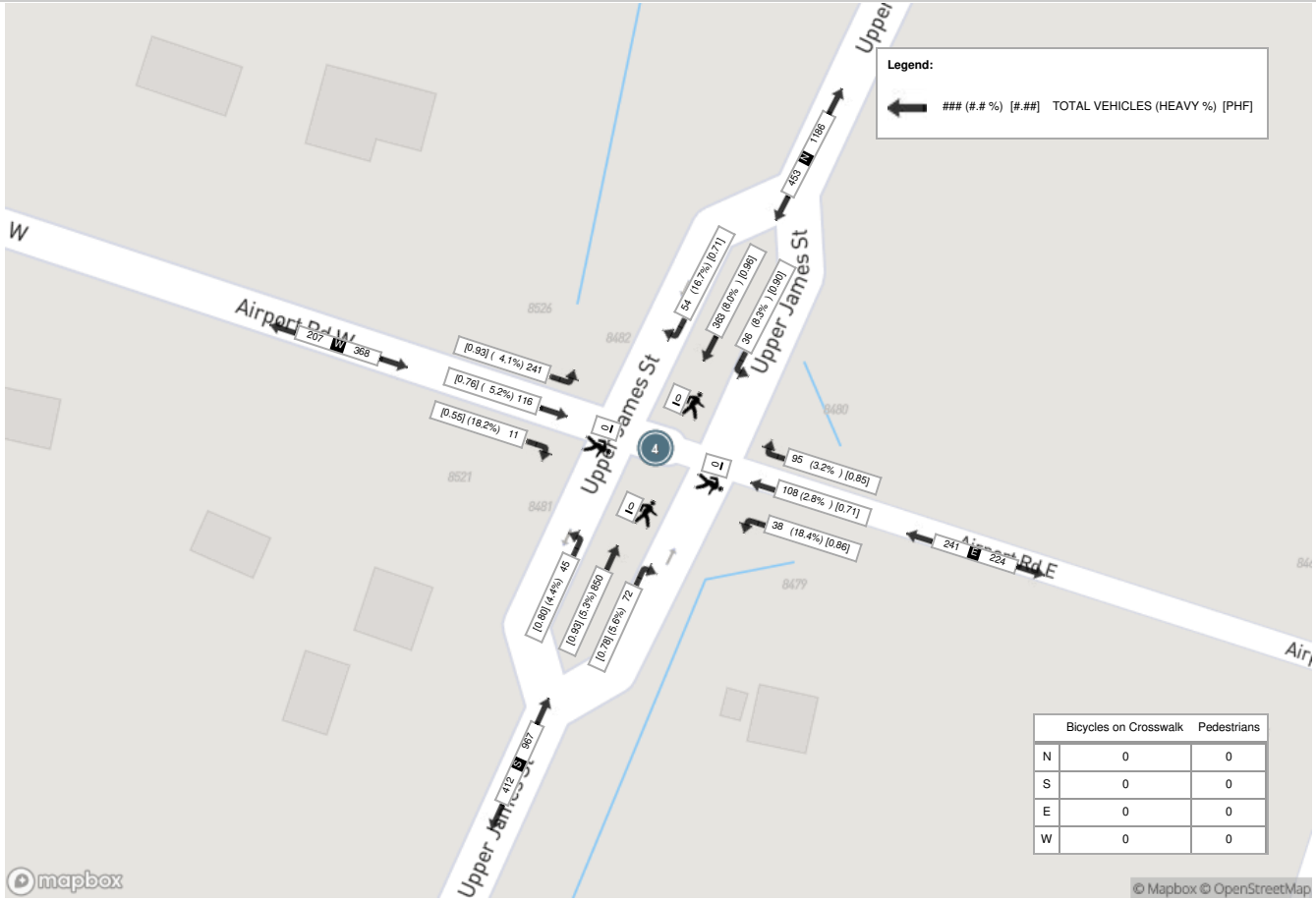
Turning Movement Count
Location Name: AIRPORT RD W & UPPER JAMES ST
Date: Wed, Jun 15, 2022 Deployment Lead: Tasos Issaaakidis

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (26.6 °C)

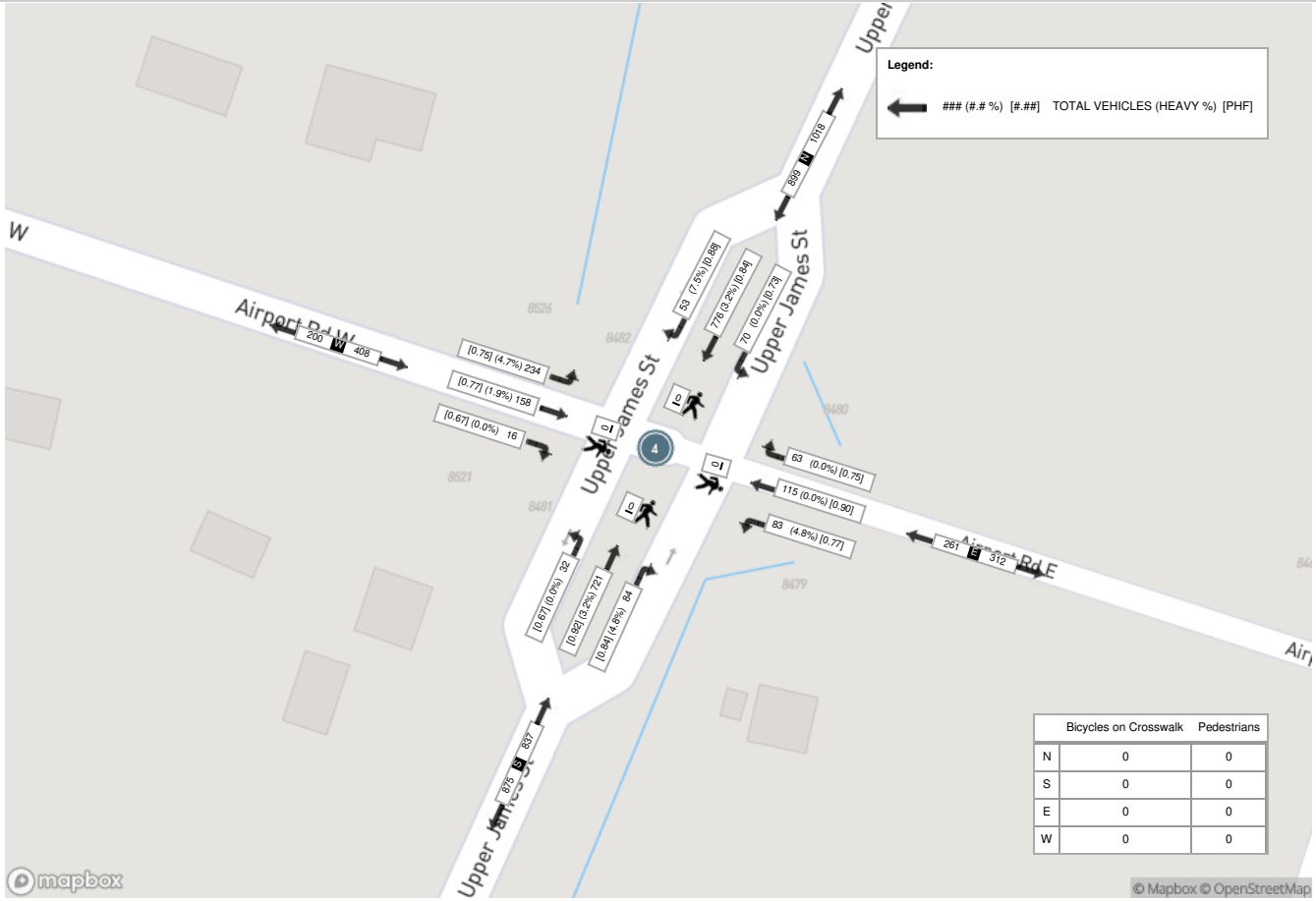
Start Time	N Approach UPPER JAMES ST						E Approach AIRPORT RD						S Approach UPPER JAMES ST						W Approach AIRPORT RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	12	231	24	0	0	267	12	32	27	0	0	71	24	162	6	0	0	192	3	42	53	0	0	98	628
17:00:00	13	180	21	0	0	214	11	25	18	0	0	54	25	195	5	0	0	225	2	47	56	0	0	105	598
17:15:00	15	184	6	0	0	205	21	30	21	0	0	72	21	195	9	0	0	225	6	18	47	0	0	71	573
17:30:00	13	181	19	0	0	213	19	28	17	0	0	64	14	169	12	0	0	195	5	51	78	0	0	134	606
Grand Total	53	776	70	0	0	899	63	115	83	0	0	261	84	721	32	0	0	837	16	158	234	0	0	408	**2405**
Approach%	5.9%	86.3%	7.8%	0%		-	24.1%	44.1%	31.8%	0%		-	10%	86.1%	3.8%	0%		-	3.9%	38.7%	57.4%	0%		-	**-**
Totals %	2.2%	32.3%	2.9%	0%		37.4%	2.6%	4.8%	3.5%	0%		10.9%	3.5%	30%	1.3%	0%		34.8%	0.7%	6.6%	9.7%	0%		17%	**-**
PHF	0.88	0.84	0.73	0		0.84	0.75	0.9	0.77	0		0.91	0.84	0.92	0.67	0		0.93	0.67	0.77	0.75	0		0.76	**-**
Heavy	4	25	0	0		29	0	0	4	0		4	4	23	0	0		27	0	3	11	0		14	**-**
Heavy %	7.5%	3.2%	0%	0%		3.2%	0%	0%	4.8%	0%		1.5%	4.8%	3.2%	0%	0%		3.2%	0%	1.9%	4.7%	0%		3.4%	**-**
Lights	49	751	70	0		870	63	115	79	0		257	80	698	32	0		810	16	155	223	0		394	**-**
Lights %	92.5%	96.8%	100%	0%		96.8%	100%	100%	95.2%	0%		98.5%	95.2%	96.8%	100%	0%		96.8%	100%	98.1%	95.3%	0%		96.6%	**-**
Single-Unit Trucks	1	13	0	0		14	0	0	4	0		4	4	9	0	0		13	0	1	2	0		3	**-**
Single-Unit Trucks %	1.9%	1.7%	0%	0%		1.6%	0%	0%	4.8%	0%		1.5%	4.8%	1.2%	0%	0%		1.6%	0%	0.6%	0.9%	0%		0.7%	**-**
Buses	3	1	0	0		4	0	0	0	0		0	0	2	0	0		2	0	1	7	0		8	**-**
Buses %	5.7%	0.1%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0.6%	3%	0%		2%	**-**
Articulated Trucks	0	11	0	0		11	0	0	0	0		0	0	12	0	0		12	0	1	2	0		3	**-**
Articulated Trucks %	0%	1.4%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	1.7%	0%	0%		1.4%	0%	0.6%	0.9%	0%		0.7%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 07:15 AM - 08:15 AM **Weather: Clear Sky (17.39 °C)**

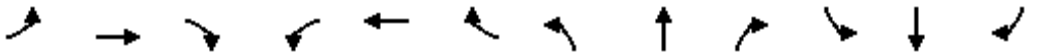


	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	0
W	0	0

Peak Hour: 04:45 PM - 05:45 PM **Weather: Overcast Clouds (26.6 °C)**



Appendix C
Existing Traffic Level of Service Calculations



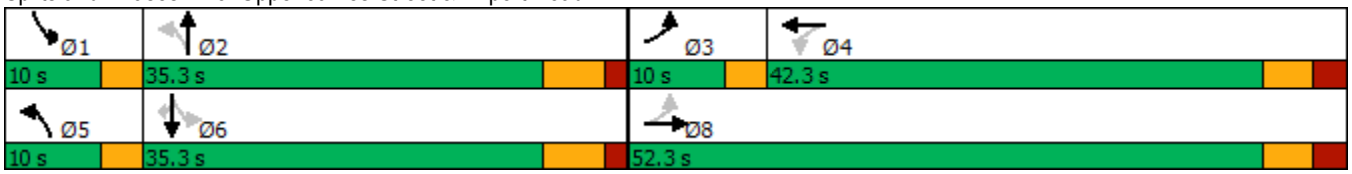
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	116	11	38	108	95	45	850	72	36	363	54
Future Volume (vph)	241	116	11	38	108	95	45	850	72	36	363	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	0.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1716	1747	0	0	1675	0	1716	3357	0	1653	3305	1365
Flt Permitted	0.418				0.924		0.513			0.170		
Satd. Flow (perm)	755	1747	0	0	1560	0	927	3357	0	296	3305	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			39			9				104
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	18%	18%	3%	3%	4%	5%	6%	8%	8%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	137	0	0	259	0	48	991	0	39	390	58
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8			4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	10.0	52.3		42.3	42.3		10.0	35.3		10.0	35.3	35.3
Total Split (%)	10.2%	53.6%		43.3%	43.3%		10.2%	36.2%		10.2%	36.2%	36.2%
Maximum Green (s)	7.0	46.0		36.0	36.0		7.0	29.0		7.0	29.0	29.0
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3			5.3		2.0	5.3		2.0	5.3	5.3

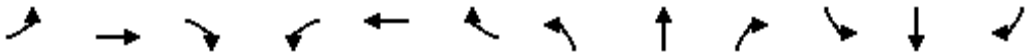
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	30.2	26.9			16.7		38.3	30.6		38.1	30.6	30.6
Actuated g/C Ratio	0.41	0.37			0.23		0.52	0.42		0.52	0.42	0.42
v/c Ratio	0.62	0.21			0.68		0.09	0.71		0.14	0.28	0.09
Control Delay	23.4	16.7			31.7		9.9	23.3		10.6	17.0	1.4
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	23.4	16.7			31.7		9.9	23.3		10.6	17.0	1.4
LOS	C	B			C		A	C		B	B	A
Approach Delay		21.1			31.7			22.7			14.6	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	27.7	13.8			31.1		3.1	66.7		2.5	21.3	0.0
Queue Length 95th (m)	46.1	26.2			55.7		9.5	#108.4		8.1	37.4	2.4
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0						135.0			120.0		80.0
Base Capacity (vph)	416	1139			818		570	1402		304	1372	627
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.62	0.12			0.32		0.08	0.71		0.13	0.28	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 97.6			
Actuated Cycle Length: 73.6			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Upper James Street & Airport Road W

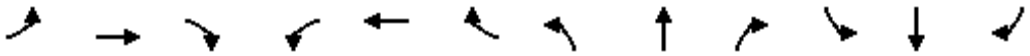




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	8	197	33	22	168	17	38	4	171	21	45	85
Future Volume (vph)	8	197	33	22	168	17	38	4	171	21	45	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	214	36	24	183	18	41	4	186	23	49	92

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	9	250	24	201	41	190	23	141
Volume Left (vph)	9	0	24	0	41	0	23	0
Volume Right (vph)	0	36	0	18	0	186	0	92
Hadj (s)	0.50	0.06	0.74	0.10	0.55	-0.69	0.58	-0.38
Departure Headway (s)	6.4	5.9	6.7	6.0	6.6	5.4	6.8	5.8
Degree Utilization, x	0.02	0.41	0.04	0.34	0.08	0.29	0.04	0.23
Capacity (veh/h)	531	579	510	567	507	620	493	575
Control Delay (s)	8.3	11.8	8.8	10.8	9.0	9.4	8.9	9.3
Approach Delay (s)	11.7		10.6		9.3		9.2	
Approach LOS	B		B		A		A	

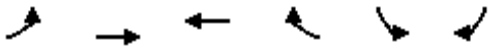
Intersection Summary				
Delay	10.3			
Level of Service	B			
Intersection Capacity Utilization	42.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	100	29	83	165	32	39	32	135	19	13	7
Future Volume (vph)	10	100	29	83	165	32	39	32	135	19	13	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	105	31	87	174	34	41	34	142	20	14	7

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	11	136	87	208	41	176	20	21
Volume Left (vph)	11	0	87	0	41	0	20	0
Volume Right (vph)	0	31	0	34	0	142	0	7
Hadj (s)	0.50	0.23	0.89	0.02	0.72	-0.36	0.50	-0.15
Departure Headway (s)	6.0	5.8	6.3	5.4	6.4	5.3	6.4	5.8
Degree Utilization, x	0.02	0.22	0.15	0.31	0.07	0.26	0.04	0.03
Capacity (veh/h)	562	597	551	644	531	637	519	575
Control Delay (s)	7.9	9.1	9.2	9.6	8.7	9.0	8.5	7.8
Approach Delay (s)	9.1		9.5		9.0		8.1	
Approach LOS	A		A		A		A	

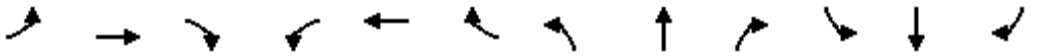
Intersection Summary				
Delay	9.1			
Level of Service	A			
Intersection Capacity Utilization	39.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	200	237	54	48	43
Future Volume (Veh/h)	54	200	237	54	48	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	69	256	304	69	62	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	373				732	338
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	373				732	338
tC, single (s)	4.2				6.4	6.5
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.6
p0 queue free %	94				83	91
cM capacity (veh/h)	1148				365	636

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	325	373	117
Volume Left	69	0	62
Volume Right	0	69	55
cSH	1148	1700	688
Volume to Capacity	0.06	0.22	0.17
Queue Length 95th (m)	1.5	0.0	4.9
Control Delay (s)	2.2	0.0	14.2
Lane LOS	A		B
Approach Delay (s)	2.2	0.0	14.2
Approach LOS			B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

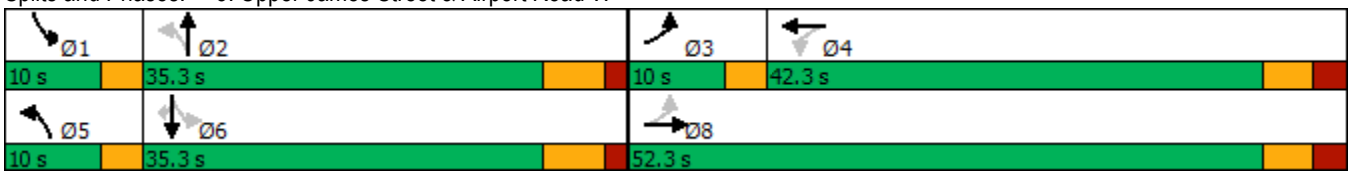


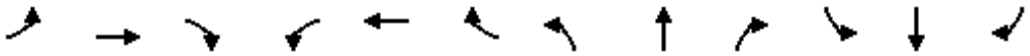
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	158	16	83	145	63	32	721	84	70	776	53
Future Volume (vph)	234	158	16	83	145	63	32	721	84	70	776	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	0.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1700	1820	0	0	1774	0	1785	3404	0	1785	3466	1479
Flt Permitted	0.441				0.840		0.239			0.193		
Satd. Flow (perm)	789	1820	0	0	1511	0	449	3404	0	363	3466	1479
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			16			13				104
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%	0%	3%	5%	0%	3%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	187	0	0	313	0	34	865	0	75	834	57
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8			4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	10.0	52.3		42.3	42.3		10.0	35.3		10.0	35.3	35.3
Total Split (%)	10.2%	53.6%		43.3%	43.3%		10.2%	36.2%		10.2%	36.2%	36.2%
Maximum Green (s)	7.0	46.0		36.0	36.0		7.0	29.0		7.0	29.0	29.0
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3			5.3		2.0	5.3		2.0	5.3	5.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	35.4	32.0			21.9		39.5	30.5		40.4	32.6	32.6
Actuated g/C Ratio	0.44	0.40			0.27		0.49	0.38		0.50	0.40	0.40
v/c Ratio	0.58	0.26			0.75		0.10	0.67		0.24	0.60	0.09
Control Delay	21.3	16.8			37.2		12.5	25.7		13.7	23.4	1.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.3	16.8			37.2		12.5	25.7		13.7	23.4	1.2
LOS	C	B			D		B	C		B	C	A
Approach Delay		19.4			37.2			25.2			21.4	
Approach LOS		B			D			C			C	
Queue Length 50th (m)	27.2	19.8			45.2		2.6	62.2		5.8	58.9	0.0
Queue Length 95th (m)	44.0	33.8			73.4		8.6	99.5		15.6	95.7	2.2
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0						135.0			120.0		80.0
Base Capacity (vph)	436	1079			711		356	1293		324	1399	659
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.58	0.17			0.44		0.10	0.67		0.23	0.60	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 97.6			
Actuated Cycle Length: 80.8			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 24.3		Intersection LOS: C	
Intersection Capacity Utilization 72.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Upper James Street & Airport Road W

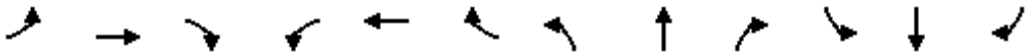




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	275	39	71	134	25	31	13	99	50	111	97
Future Volume (vph)	15	275	39	71	134	25	31	13	99	50	111	97
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	16	302	43	78	147	27	34	14	109	55	122	107

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	16	345	78	174	34	123	55	229
Volume Left (vph)	16	0	78	0	34	0	55	0
Volume Right (vph)	0	43	0	27	0	109	0	107
Hadj (s)	0.50	-0.02	0.50	0.01	0.55	-0.61	0.64	-0.26
Departure Headway (s)	6.7	6.2	6.8	6.3	7.3	6.1	7.1	6.2
Degree Utilization, x	0.03	0.59	0.15	0.31	0.07	0.21	0.11	0.40
Capacity (veh/h)	511	555	496	537	457	539	472	544
Control Delay (s)	8.7	16.4	9.8	10.9	9.6	9.5	9.8	12.1
Approach Delay (s)	16.1		10.6		9.5		11.6	
Approach LOS	C		B		A		B	

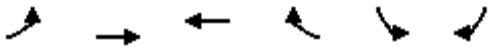
Intersection Summary				
Delay	12.6			
Level of Service	B			
Intersection Capacity Utilization	50.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	4	124	36	113	131	39	26	47	115	39	48	8
Future Volume (vph)	4	124	36	113	131	39	26	47	115	39	48	8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	4	136	40	124	144	43	29	52	126	43	53	9

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	4	176	124	187	29	178	43	62
Volume Left (vph)	4	0	124	0	29	0	43	0
Volume Right (vph)	0	40	0	43	0	126	0	9
Hadj (s)	0.50	0.02	0.65	-0.03	1.74	-0.37	0.50	-0.04
Departure Headway (s)	6.3	5.8	6.3	5.6	7.7	5.6	6.6	6.1
Degree Utilization, x	0.01	0.28	0.22	0.29	0.06	0.28	0.08	0.10
Capacity (veh/h)	539	592	550	618	445	607	508	552
Control Delay (s)	8.1	9.9	9.8	9.6	10.0	9.5	9.0	8.6
Approach Delay (s)	9.8		9.7		9.6		8.7	
Approach LOS	A		A		A		A	

Intersection Summary				
Delay	9.6			
Level of Service	A			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			

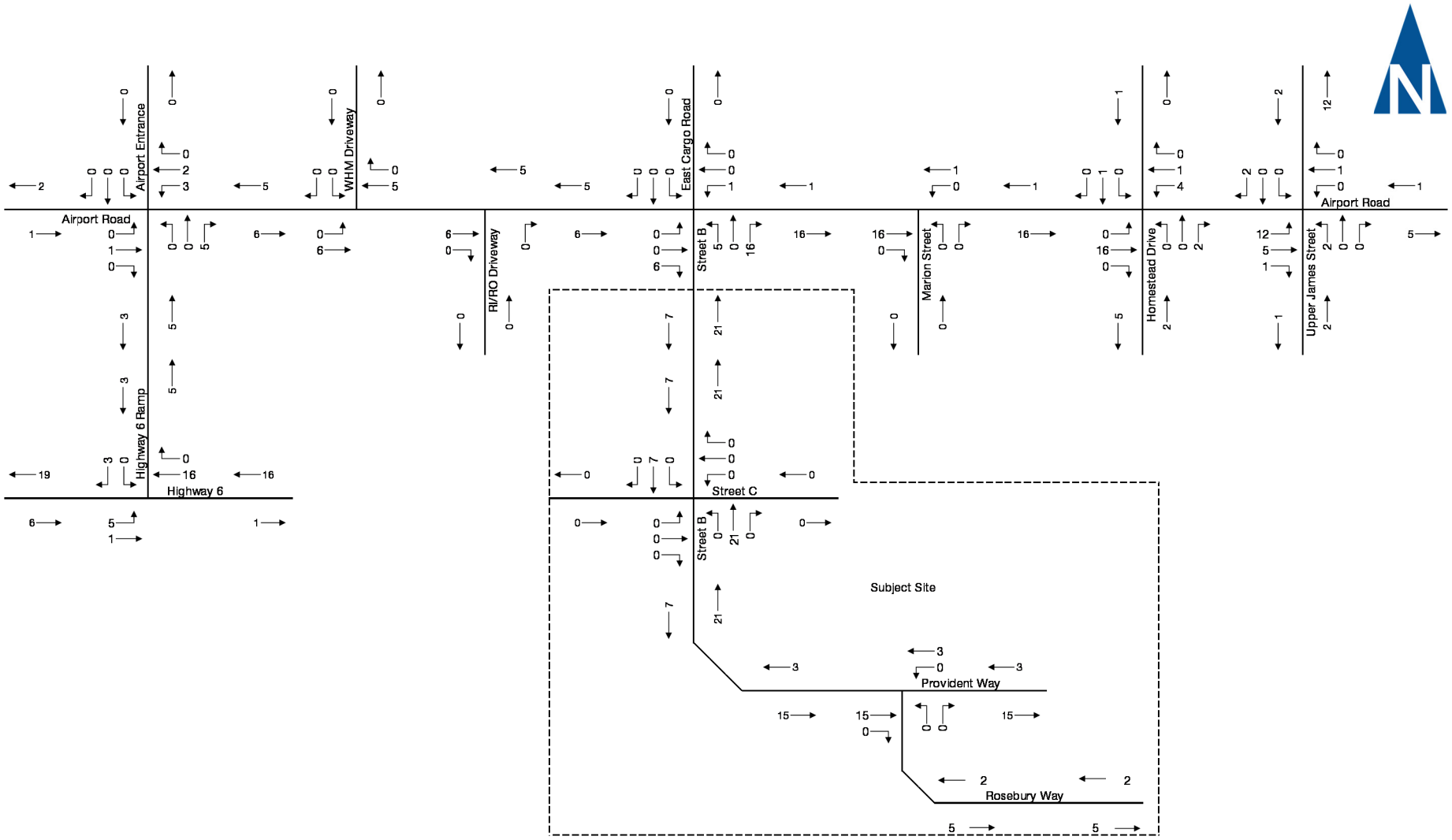


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	251	237	54	54	40
Future Volume (Veh/h)	27	251	237	54	54	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	28	261	247	56	56	42
Pedestrians		1	1			
Lane Width (m)		3.5	3.5			
Walking Speed (m/s)		1.2	1.2			
Percent Blockage		0	0			
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	303				593	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	303				593	276
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	98				88	94
cM capacity (veh/h)	1188				460	760

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	289	303	98
Volume Left	28	0	56
Volume Right	0	56	42
cSH	1188	1700	805
Volume to Capacity	0.02	0.18	0.12
Queue Length 95th (m)	0.6	0.0	3.3
Control Delay (s)	1.0	0.0	12.2
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	12.2
Approach LOS			B

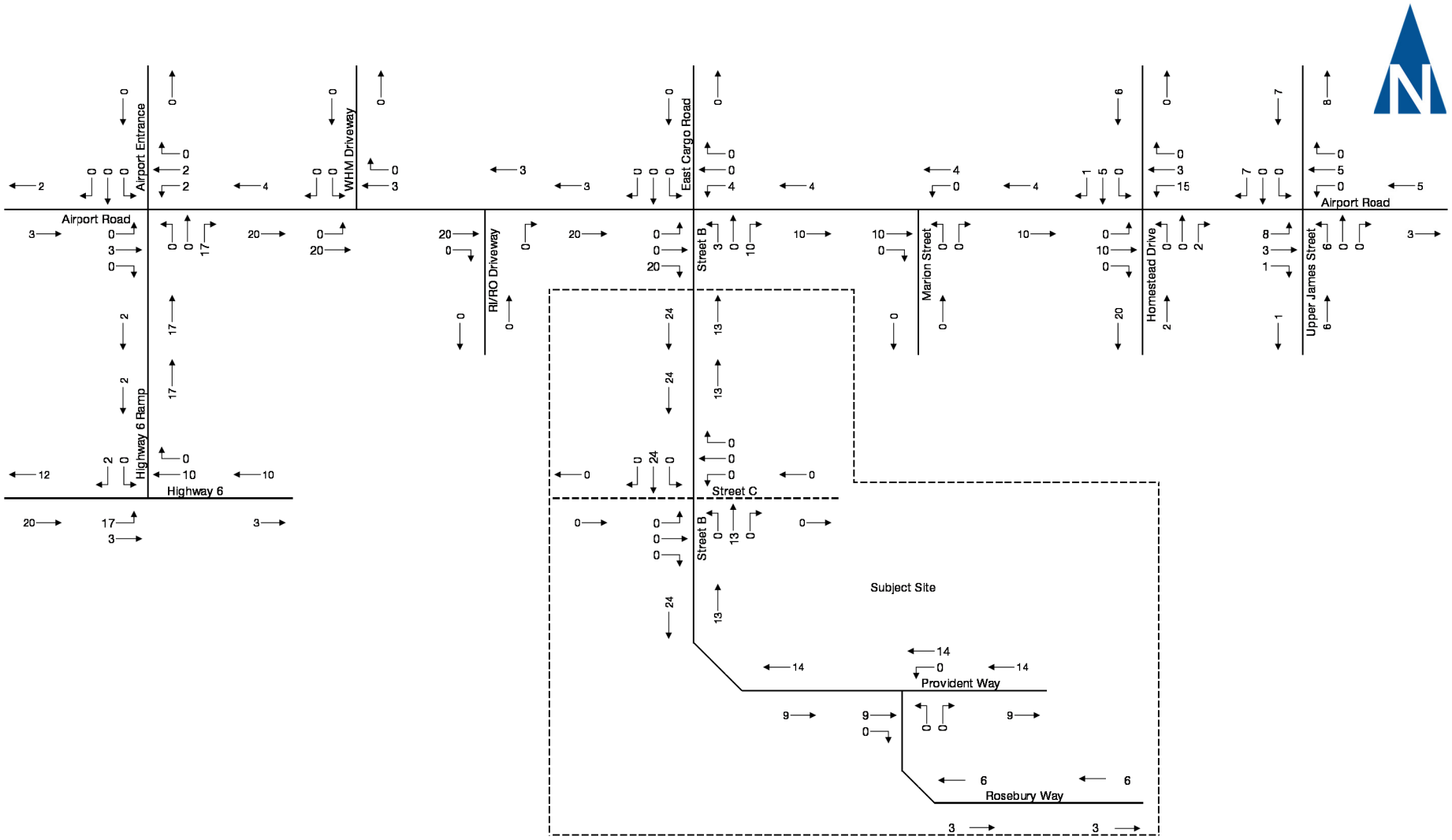
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D
Background Development Information

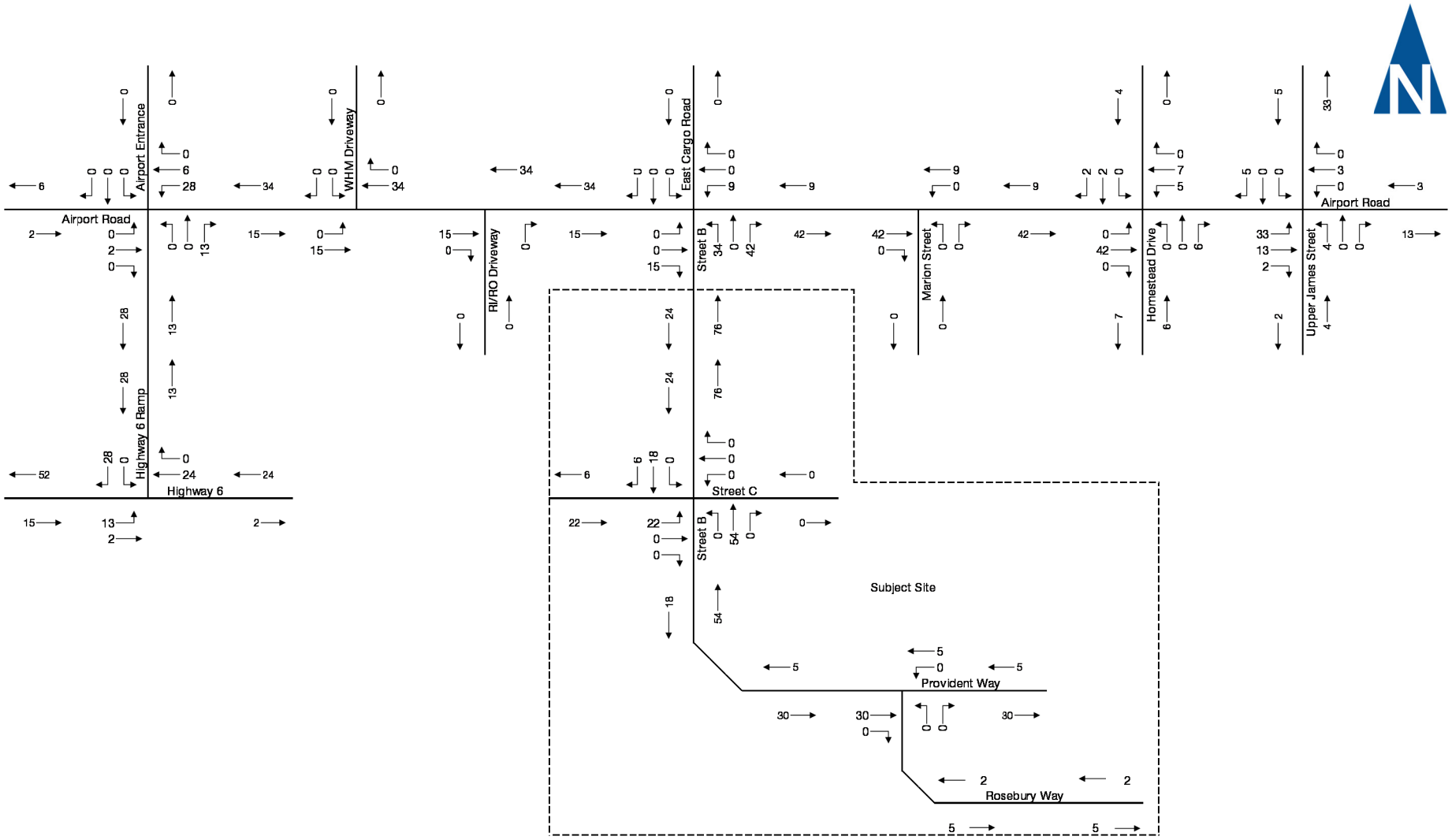


2017 Site Generated AM Peak Hour Traffic Volumes

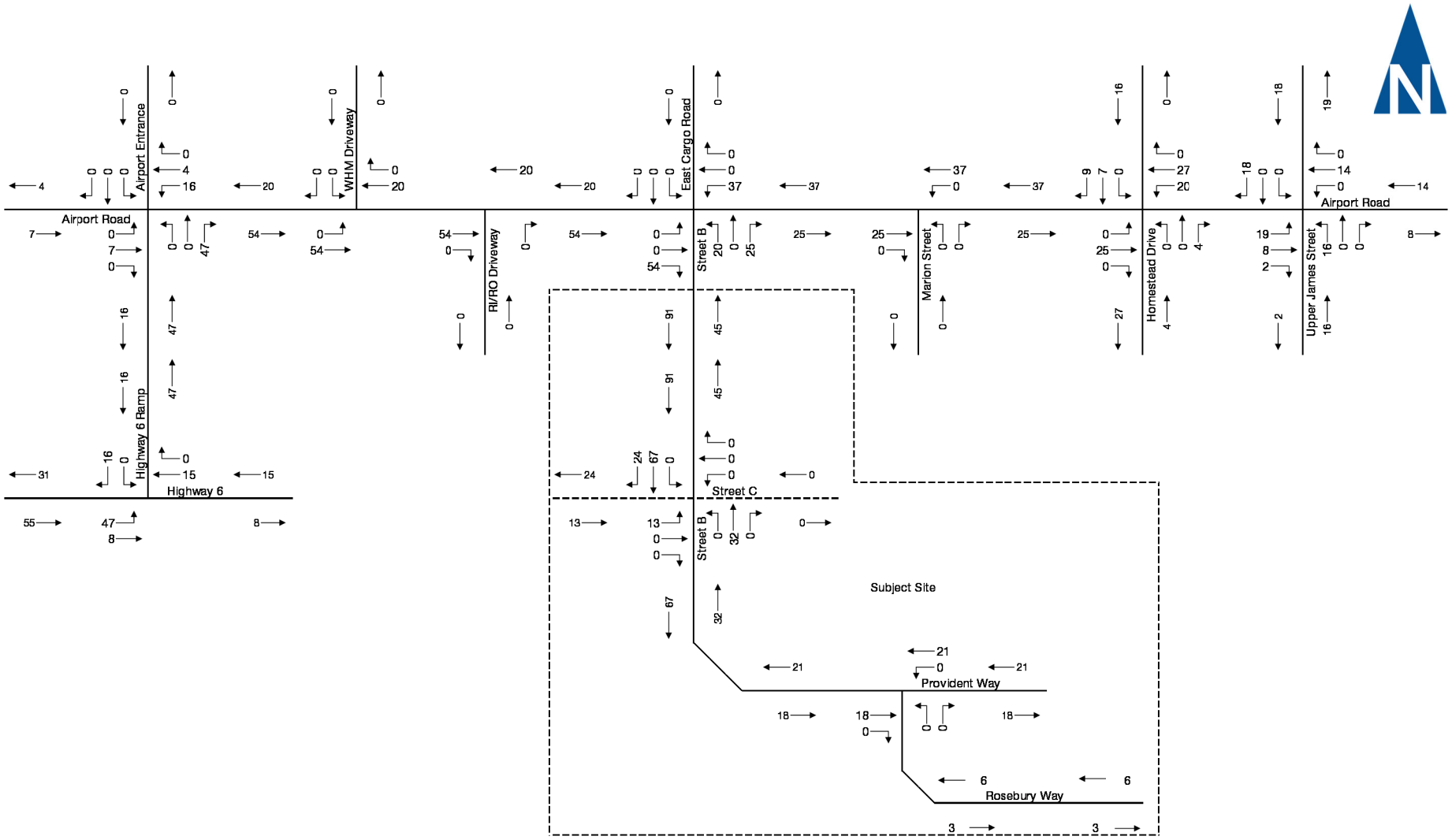
Figure 3.2A



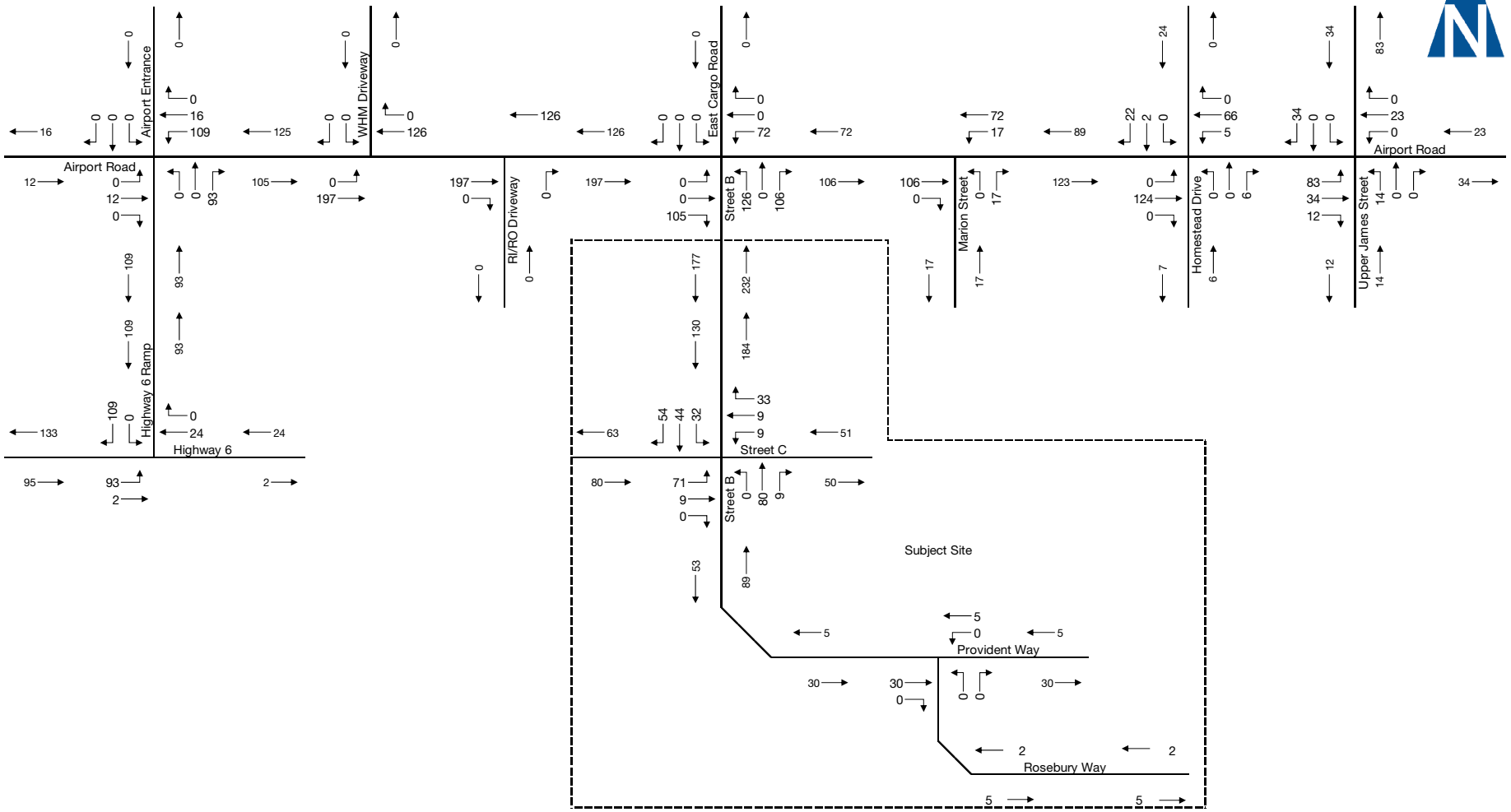
2017 Site Generated PM Peak Hour Traffic Volumes



2019 Site Generated AM Peak Hour Traffic Volumes

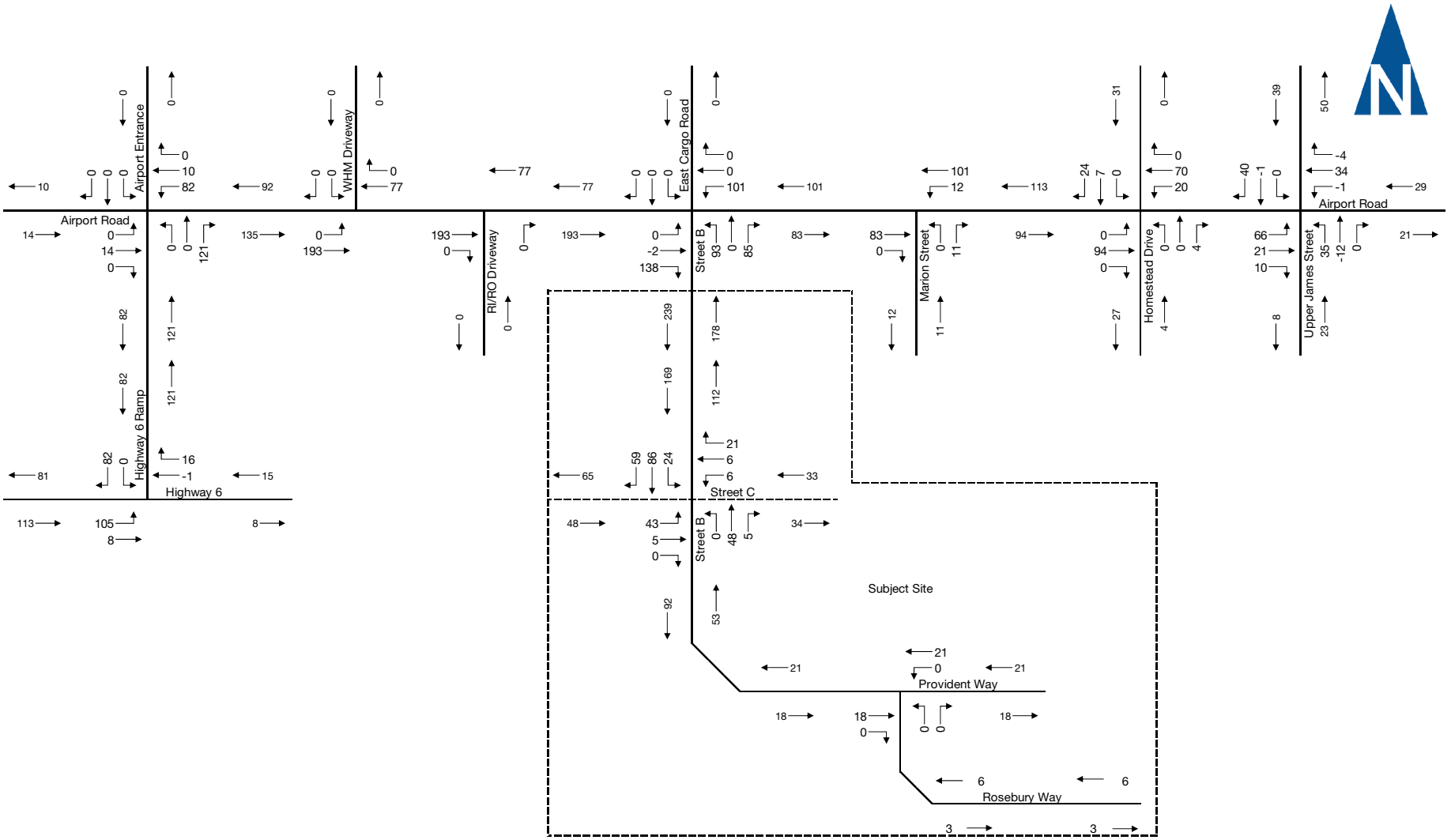


2019 Site Generated PM Peak Hour Traffic Volumes



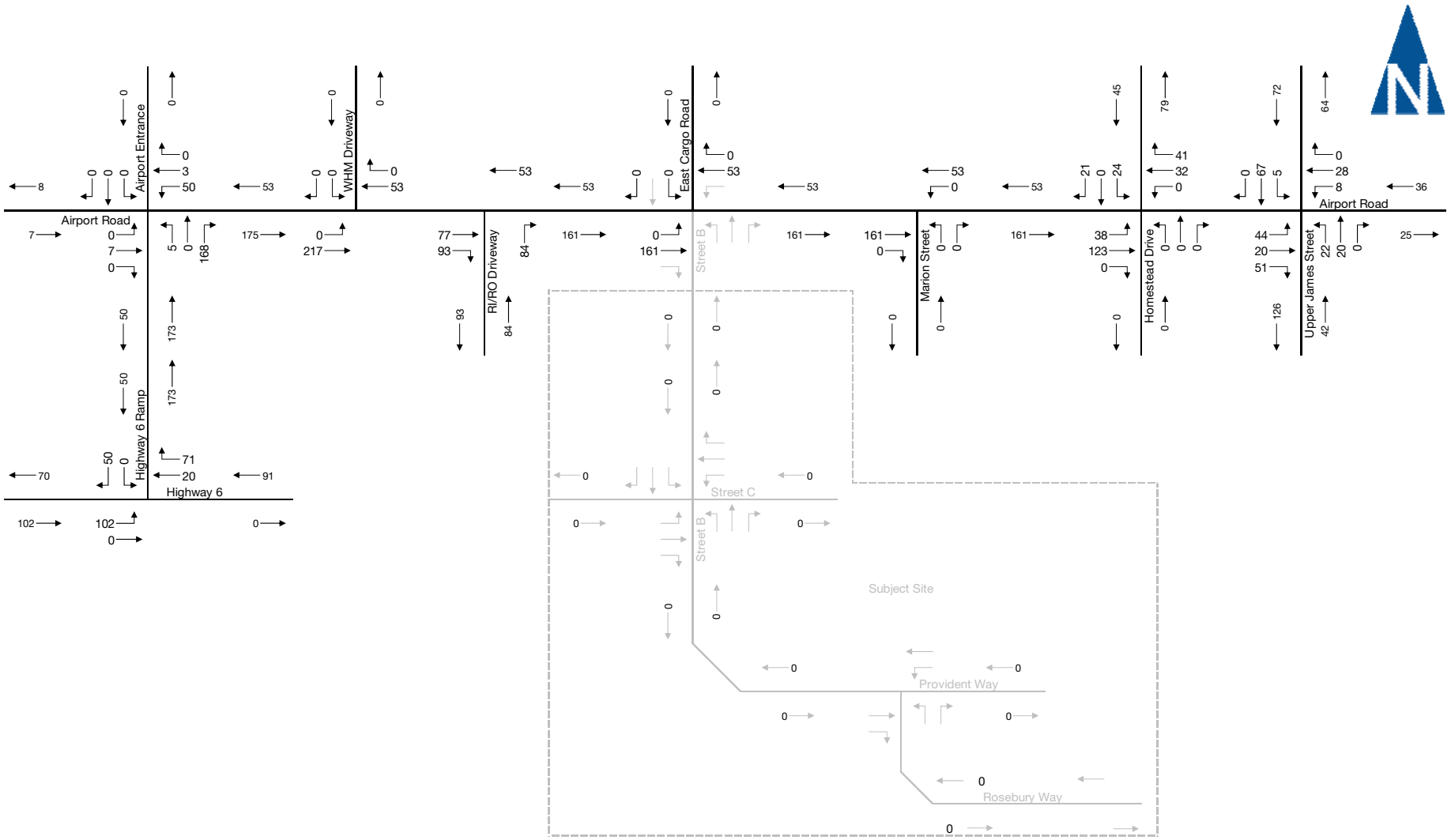
2021 Site Generated AM Peak Hour Traffic Volumes

Figure 3.4A



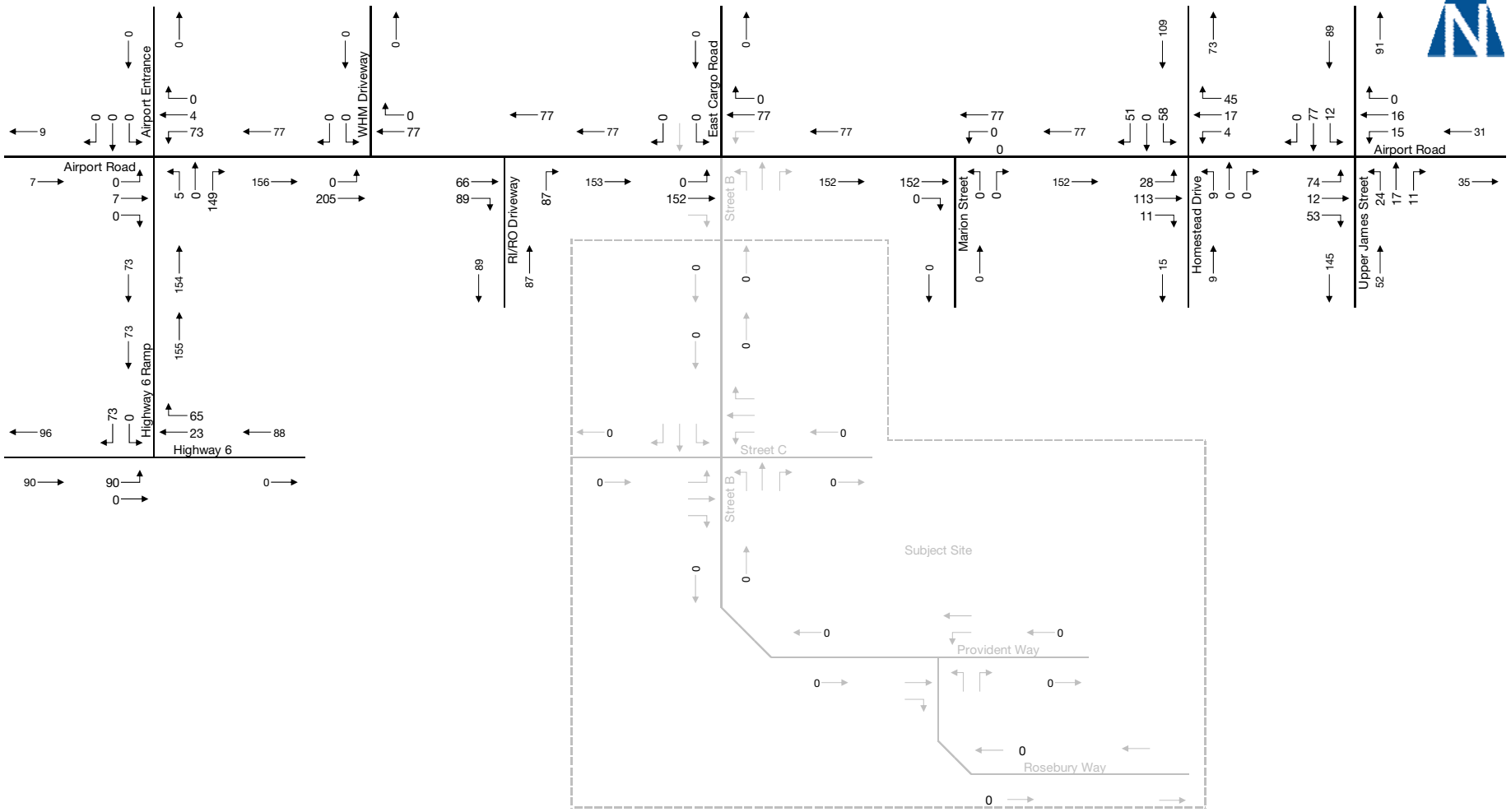
2021 Site Generated PM Peak Hour Traffic Volumes

Figure 3.4B



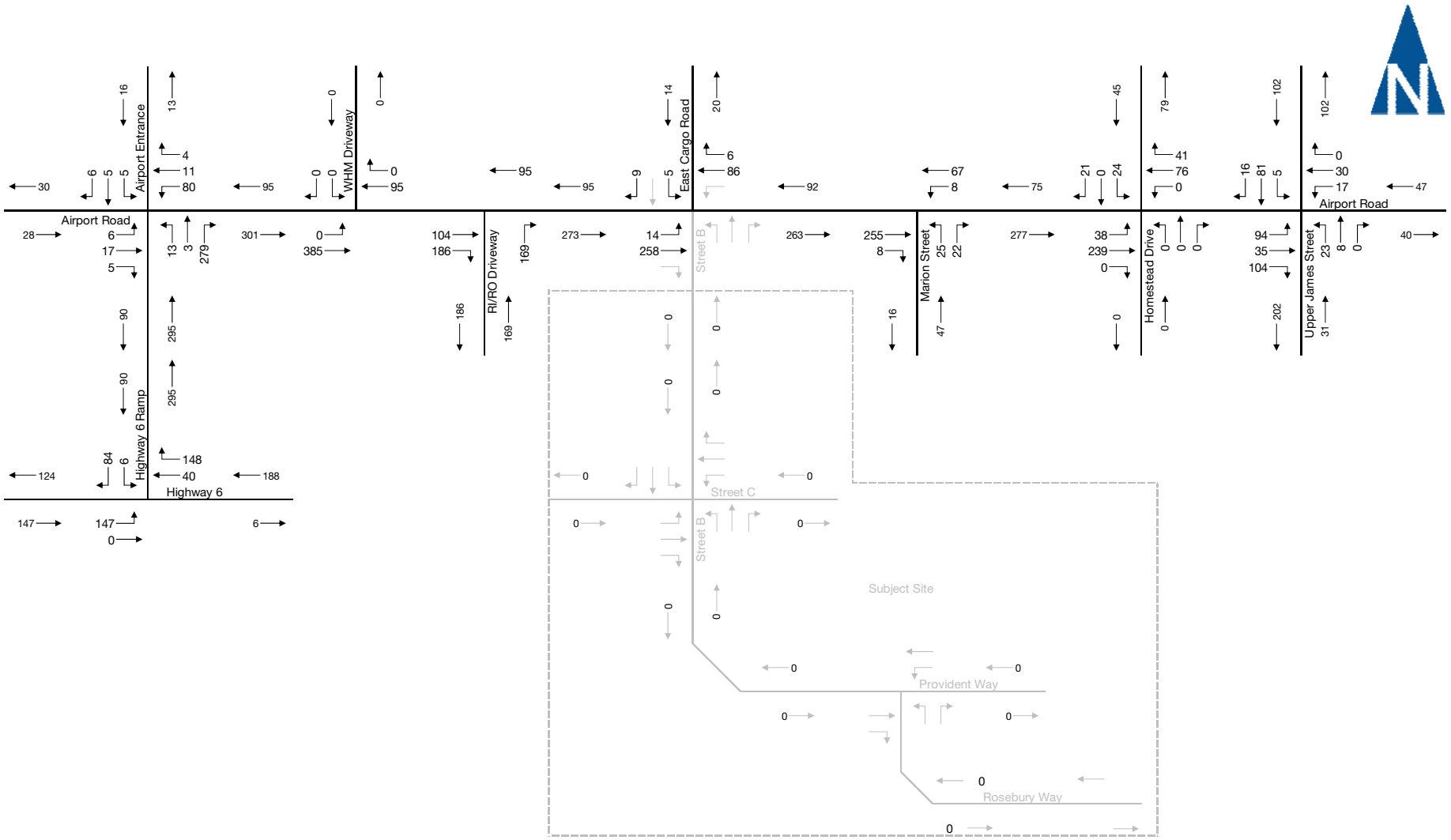
2019 Other Area Development Site Traffic

A.M. Peak Hour



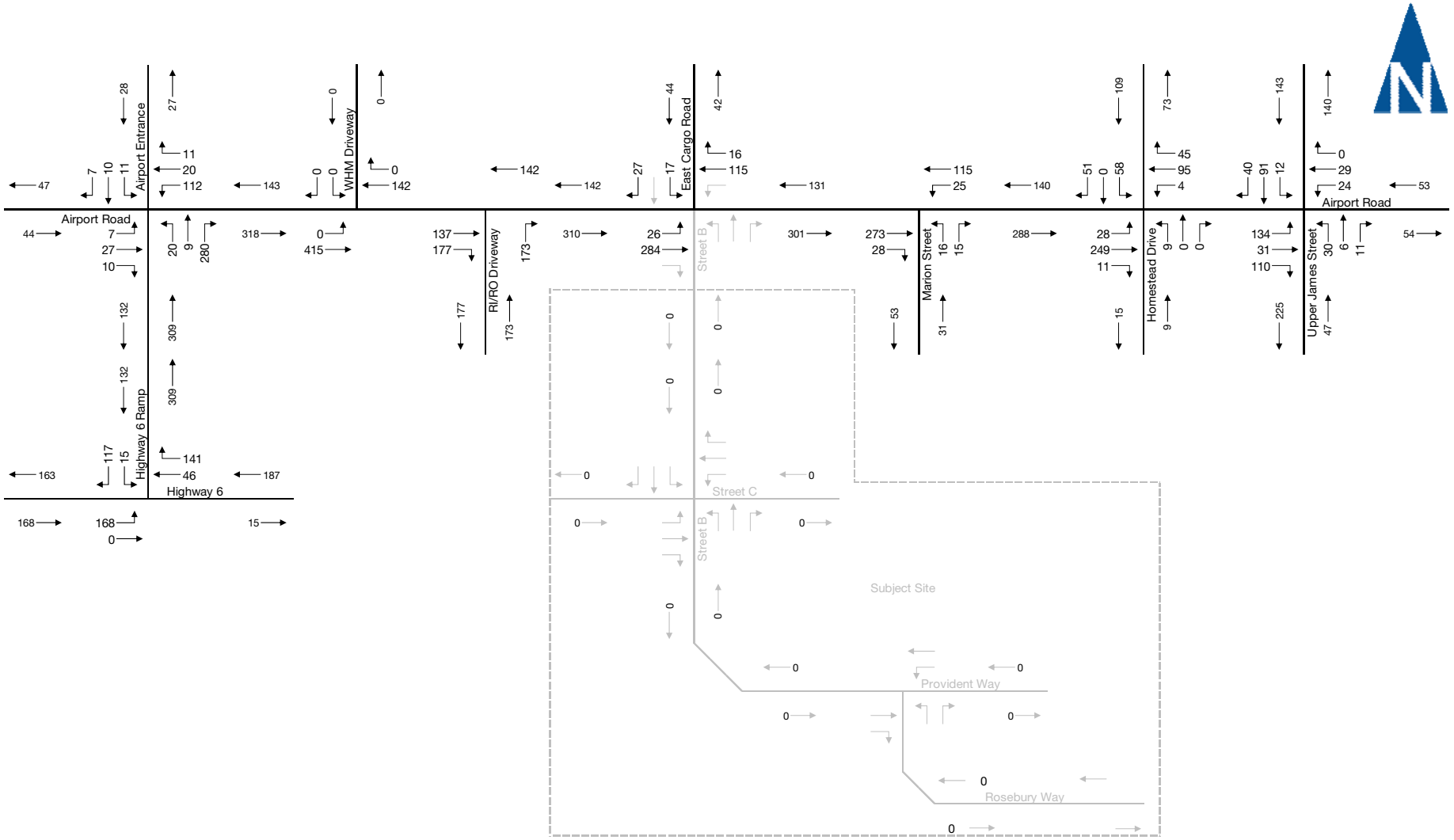
2019 Other Area Development Site Traffic

P.M. Peak Hour



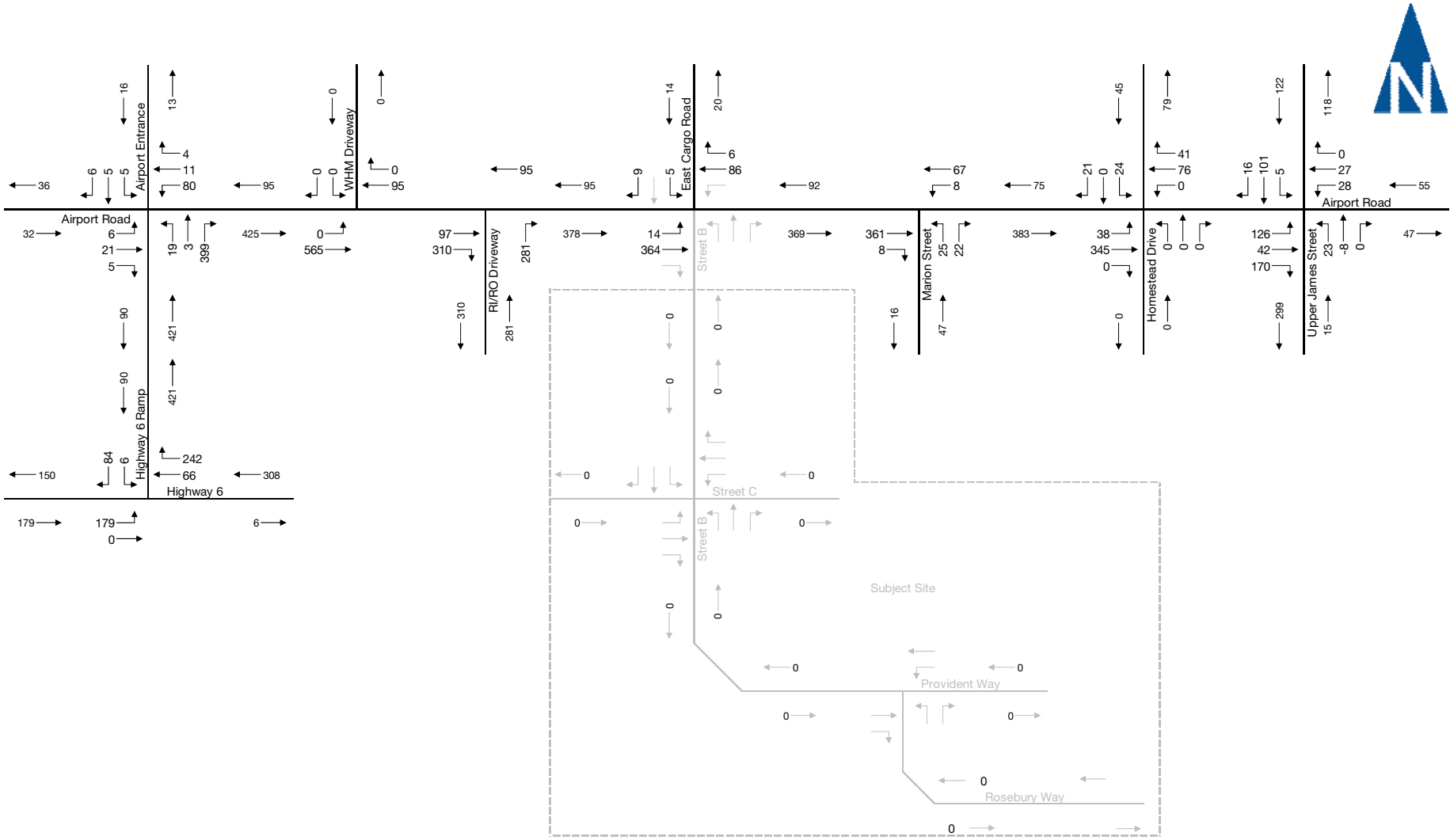
2021 Other Area Development Site Traffic

A.M. Peak Hour



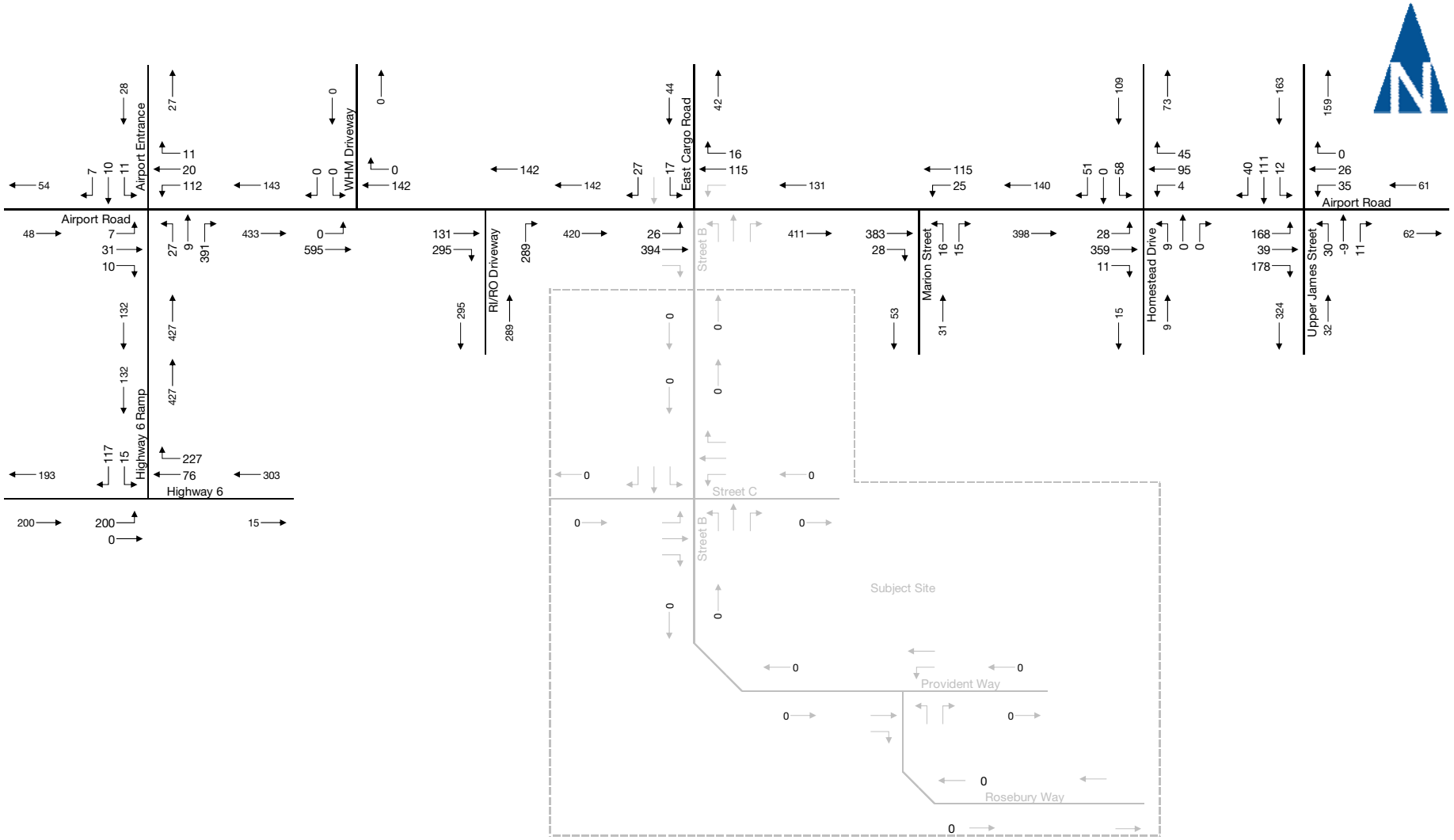
2021 Other Area Development Site Traffic

P.M. Peak Hour



2026 Other Area Development Site Traffic

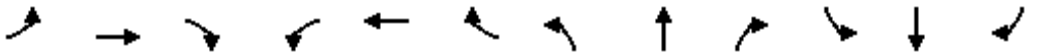
A.M. Peak Hour



2026 Other Area Development Site Traffic

P.M. Peak Hour

Appendix E
Future Background Level of Service Calculations



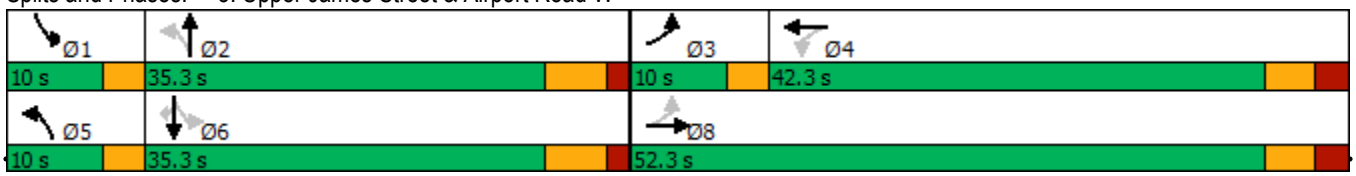
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	206	193	66	172	95	82	1380	72	41	565	104
Future Volume (vph)	450	206	193	66	172	95	82	1380	72	41	565	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	0.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1716	1565	0	0	1689	0	1716	3375	0	1653	3305	1365
Flt Permitted	0.397				0.831		0.318			0.128		
Satd. Flow (perm)	717	1565	0	0	1417	0	575	3375	0	223	3305	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			24			6				112
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	18%	18%	3%	3%	4%	5%	6%	8%	8%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	484	430	0	0	358	0	88	1561	0	44	608	112
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8			4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	10.0	52.3		42.3	42.3		10.0	35.3		10.0	35.3	35.3
Total Split (%)	10.2%	53.6%		43.3%	43.3%		10.2%	36.2%		10.2%	36.2%	36.2%
Maximum Green (s)	7.0	46.0		36.0	36.0		7.0	29.0		7.0	29.0	29.0
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3			5.3		2.0	5.3		2.0	5.3	5.3

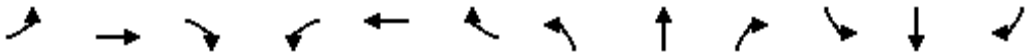
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	39.3	35.9			25.8		40.5	32.7		39.7	30.6	30.6
Actuated g/C Ratio	0.46	0.42			0.30		0.48	0.39		0.47	0.36	0.36
v/c Ratio	1.13	0.61			0.80		0.23	1.20		0.19	0.51	0.20
Control Delay	107.5	20.1			39.7		15.4	124.2		15.6	25.4	6.0
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	107.5	20.1			39.7		15.4	124.2		15.6	25.4	6.0
LOS	F	C			D		B	F		B	C	A
Approach Delay		66.4			39.7			118.3			22.0	
Approach LOS		E			D			F			C	
Queue Length 50th (m)	~77.2	48.4			53.9		7.8	~189.6		3.8	44.4	0.0
Queue Length 95th (m)	#147.3	77.9			86.5		19.5	#274.3		11.3	72.2	12.3
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0						135.0			120.0		80.0
Base Capacity (vph)	428	912			642		383	1303		242	1189	563
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	1.13	0.47			0.56		0.23	1.20		0.18	0.51	0.20

Intersection Summary

Area Type: Other
Cycle Length: 97.6
Actuated Cycle Length: 84.9
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 77.8 Intersection LOS: E
Intersection Capacity Utilization 104.6% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Upper James Street & Airport Road W

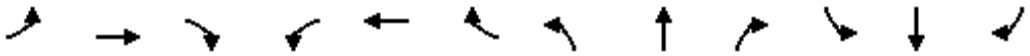




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	46	679	33	27	324	58	38	4	177	45	47	130
Future Volume (vph)	46	679	33	27	324	58	38	4	177	45	47	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	738	36	29	352	63	41	4	192	49	51	141

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	50	774	29	415	41	196	49	192
Volume Left (vph)	50	0	29	0	41	0	49	0
Volume Right (vph)	0	36	0	63	0	192	0	141
Hadj (s)	0.50	0.11	0.74	0.07	0.55	-0.69	0.58	-0.45
Departure Headway (s)	7.5	7.1	7.9	7.2	8.6	7.4	8.6	7.6
Degree Utilization, x	0.10	1.53	0.06	0.83	0.10	0.40	0.12	0.40
Capacity (veh/h)	464	510	444	488	402	468	401	456
Control Delay (s)	10.2	265.1	10.2	35.9	11.3	14.0	11.5	14.4
Approach Delay (s)	249.6		34.2		13.5		13.8	
Approach LOS	F		D		B		B	

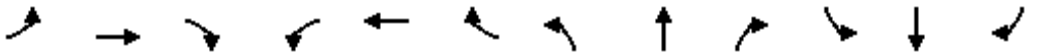
Intersection Summary				
Delay	130.2			
Level of Service	F			
Intersection Capacity Utilization	62.7%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	16	146	34	272	207	36	58	35	627	24	18	13
Future Volume (vph)	16	146	34	272	207	36	58	35	627	24	18	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	154	36	286	218	38	61	37	660	25	19	14

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	17	190	286	256	61	697	25	33
Volume Left (vph)	17	0	286	0	61	0	25	0
Volume Right (vph)	0	36	0	38	0	660	0	14
Hadj (s)	0.50	0.22	0.89	0.02	0.72	-0.43	0.50	-0.20
Departure Headway (s)	8.0	7.8	7.9	7.1	7.6	6.4	8.4	7.7
Degree Utilization, x	0.04	0.41	0.63	0.50	0.13	1.24	0.06	0.07
Capacity (veh/h)	434	455	450	504	463	567	409	444
Control Delay (s)	10.1	14.8	22.1	15.7	10.5	144.1	10.7	10.1
Approach Delay (s)	14.4		19.1		133.4		10.4	
Approach LOS	B		C		F		B	

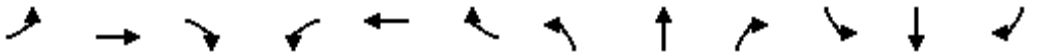
Intersection Summary				
Delay	73.5			
Level of Service	F			
Intersection Capacity Utilization	75.4%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	577	105	72	337	60	126	0	106	53	0	52
Future Volume (Veh/h)	68	577	105	72	337	60	126	0	106	53	0	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.92	0.92	0.78	0.78	0.92	0.92	0.92	0.78	0.92	0.78
Hourly flow rate (vph)	87	740	114	78	432	77	137	0	115	68	0	67
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	509			854			1664	1636	797	1712	1654	470
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	509			854			1664	1636	797	1712	1654	470
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	91			90			0	100	70	0	100	87
cM capacity (veh/h)	1021			794			59	84	390	43	82	533

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	941	587	137	115	68	67
Volume Left	87	78	137	0	68	0
Volume Right	114	77	0	115	0	67
cSH	1021	794	59	390	43	533
Volume to Capacity	0.09	0.10	2.32	0.30	1.56	0.13
Queue Length 95th (m)	2.2	2.6	108.4	9.7	54.5	3.4
Control Delay (s)	2.2	2.6	754.8	18.1	487.4	12.7
Lane LOS	A	A	F	C	F	B
Approach Delay (s)	2.2	2.6	418.6		251.8	
Approach LOS			F		F	

Intersection Summary				
Average Delay	74.7			
Intersection Capacity Utilization	68.2%	ICU Level of Service	C	
Analysis Period (min)	15			



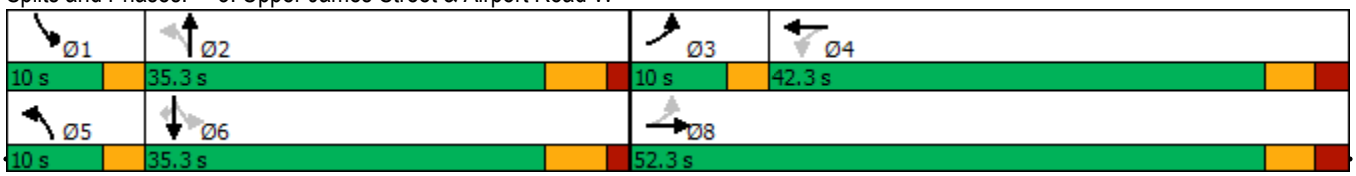
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	234	204	117	223	59	97	1157	95	82	1430	133
Future Volume (vph)	468	234	204	117	223	59	97	1157	95	82	1430	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	0.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	1		0	0		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1700	1729	0	0	1789	0	1785	3423	0	1785	3466	1479
Flt Permitted	0.426				0.694		0.132			0.132		
Satd. Flow (perm)	762	1729	0	0	1259	0	248	3423	0	248	3466	1479
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			10			9				104
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%	0%	3%	5%	0%	3%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	503	471	0	0	429	0	104	1346	0	88	1538	143
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8			4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	10.0	52.3		42.3	42.3		10.0	35.3		10.0	35.3	35.3
Total Split (%)	10.2%	53.6%		43.3%	43.3%		10.2%	36.2%		10.2%	36.2%	36.2%
Maximum Green (s)	7.0	46.0		36.0	36.0		7.0	29.0		7.0	29.0	29.0
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3			5.3		2.0	5.3		2.0	5.3	5.3

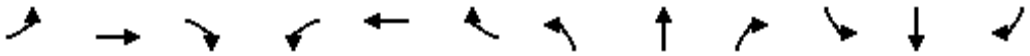
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	47.7	44.4			34.3		39.8	30.3		39.8	30.3	30.3
Actuated g/C Ratio	0.51	0.48			0.37		0.43	0.33		0.43	0.33	0.33
v/c Ratio	1.07	0.55			0.91		0.44	1.20		0.38	1.36	0.26
Control Delay	83.0	17.9			53.9		22.2	129.9		20.7	197.7	10.1
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	83.0	17.9			53.9		22.2	129.9		20.7	197.7	10.1
LOS	F	B			D		C	F		C	F	B
Approach Delay		51.5			53.9			122.2			173.7	
Approach LOS		D			D			F			F	
Queue Length 50th (m)	~74.6	54.6			76.9		11.8	~179.5		10.0	~220.2	5.5
Queue Length 95th (m)	#154.4	84.7			#136.9		22.1	#223.3		19.4	#263.8	19.9
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0						135.0			120.0		80.0
Base Capacity (vph)	472	912			511		239	1121		239	1129	551
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	1.07	0.52			0.84		0.44	1.20		0.37	1.36	0.26

Intersection Summary

Area Type: Other
Cycle Length: 97.6
Actuated Cycle Length: 93.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 120.7 Intersection LOS: F
Intersection Capacity Utilization 109.2% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Upper James Street & Airport Road W

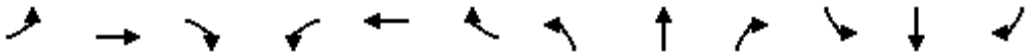




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	43	744	50	95	317	70	40	13	103	108	118	172
Future Volume (vph)	43	744	50	95	317	70	40	13	103	108	118	172
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	47	818	55	104	348	77	44	14	113	119	130	189

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	47	873	104	425	44	127	119	319
Volume Left (vph)	47	0	104	0	44	0	119	0
Volume Right (vph)	0	55	0	77	0	113	0	189
Hadj (s)	0.50	0.02	0.50	-0.02	0.55	-0.61	0.64	-0.35
Departure Headway (s)	8.1	7.7	8.1	7.6	9.2	8.1	8.6	7.7
Degree Utilization, x	0.11	1.86	0.24	0.90	0.11	0.29	0.28	0.68
Capacity (veh/h)	429	476	434	457	370	419	407	456
Control Delay (s)	10.9	411.1	12.4	47.3	12.1	13.1	13.8	24.2
Approach Delay (s)	390.7		40.5		12.8		21.4	
Approach LOS	F		E		B		C	

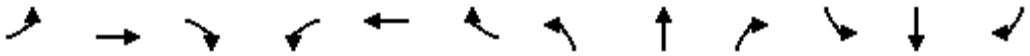
Intersection Summary				
Delay	190.7			
Level of Service	F			
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	185	46	307	179	50	53	56	627	50	58	15
Future Volume (vph)	11	185	46	307	179	50	53	56	627	50	58	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	203	51	337	197	55	58	62	689	55	64	16

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	12	254	337	252	58	751	55	80
Volume Left (vph)	12	0	337	0	58	0	55	0
Volume Right (vph)	0	51	0	55	0	689	0	16
Hadj (s)	0.50	0.03	0.65	-0.02	1.74	-0.50	0.50	-0.05
Departure Headway (s)	8.4	7.9	8.1	7.4	9.1	6.9	8.8	8.2
Degree Utilization, x	0.03	0.56	0.75	0.52	0.15	1.43	0.13	0.18
Capacity (veh/h)	416	438	434	480	386	536	393	418
Control Delay (s)	10.4	19.3	30.7	16.9	12.5	224.1	11.9	11.9
Approach Delay (s)	18.9		24.8		208.9		11.9	
Approach LOS	C		C		F		B	

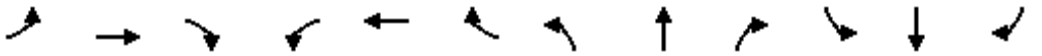
Intersection Summary				
Delay	105.8			
Level of Service	F			
Intersection Capacity Utilization	81.2%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	53	659	138	101	376	35	93	0	85	71	0	67
Future Volume (vph)	53	659	138	101	376	35	93	0	85	71	0	67
Peak Hour Factor	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Hourly flow rate (vph)	55	686	150	110	392	36	101	0	92	74	0	70

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	891	538	101	92	74	70
Volume Left (vph)	55	110	101	0	74	0
Volume Right (vph)	150	36	0	92	0	70
Hadj (s)	-0.01	0.09	0.50	-0.70	0.50	-0.65
Departure Headway (s)	6.2	6.3	8.6	7.4	8.7	7.6
Degree Utilization, x	1.54	0.94	0.24	0.19	0.18	0.15
Capacity (veh/h)	572	556	406	470	395	454
Control Delay (s)	268.4	50.2	13.1	10.9	12.4	10.7
Approach Delay (s)	268.4	50.2	12.0		11.6	
Approach LOS	F	F	B		B	

Intersection Summary				
Delay	153.0			
Level of Service	F			
Intersection Capacity Utilization	74.8%	ICU Level of Service	D	
Analysis Period (min)	15			



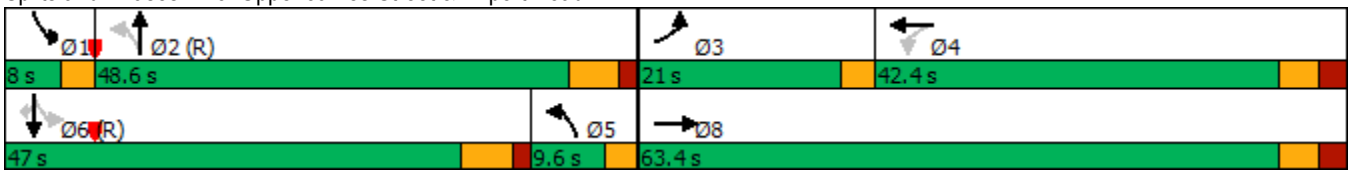
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	450	206	193	66	172	95	82	1380	72	41	565	104
Future Volume (vph)	450	206	193	66	172	95	82	1380	72	41	565	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	15.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	3330	1565	0	1513	1727	0	1716	4849	0	1653	4749	1365
Flt Permitted	0.950			0.512			0.411			0.087		
Satd. Flow (perm)	3330	1565	0	815	1727	0	743	4849	0	151	4749	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			24			7				115
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	18%	18%	3%	3%	4%	5%	6%	8%	8%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	484	430	0	71	287	0	88	1561	0	44	608	112
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases				4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	21.0	63.4		42.4	42.4		9.6	48.6		8.0	47.0	47.0
Total Split (%)	17.5%	52.8%		35.3%	35.3%		8.0%	40.5%		6.7%	39.2%	39.2%
Maximum Green (s)	18.0	57.1		36.1	36.1		6.6	42.3		5.0	40.7	40.7
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3		5.3	5.3		2.0	5.3		2.0	5.3	5.3

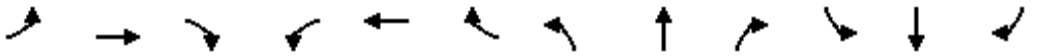
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	19.0	45.9		24.9	24.9		58.3	55.0		57.2	53.9	53.9
Actuated g/C Ratio	0.16	0.38		0.21	0.21		0.49	0.46		0.48	0.45	0.45
v/c Ratio	0.92	0.68		0.42	0.76		0.21	0.70		0.25	0.29	0.17
Control Delay	73.5	32.0		47.3	53.6		23.4	29.8		22.9	22.3	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.5	32.0		47.3	53.6		23.4	29.8		22.9	22.3	4.6
LOS	E	C		D	D		C	C		C	C	A
Approach Delay		54.0			52.3			29.5			19.7	
Approach LOS		D			D			C			B	
Queue Length 50th (m)	61.6	77.5		15.4	62.0		11.9	113.4		5.7	34.1	0.0
Queue Length 95th (m)	#93.1	102.2		28.3	86.3		25.7	153.4		14.4	49.3	11.4
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0			15.0			135.0			120.0		80.0
Base Capacity (vph)	527	785		251	550		422	2224		174	2133	676
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.92	0.55		0.28	0.52		0.21	0.70		0.25	0.29	0.17

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 35.8 Intersection LOS: D
Intersection Capacity Utilization 75.8% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Upper James Street & Airport Road W





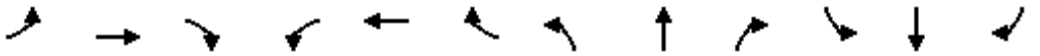
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	679	33	27	324	58	38	4	177	45	47	130
Future Volume (vph)	46	679	33	27	324	58	38	4	177	45	47	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	30.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1720	0	1566	1663	0	1733	1603	0	1700	1610	0
Flt Permitted	0.509			0.306			0.439			0.426		
Satd. Flow (perm)	956	1720	0	504	1663	0	801	1603	0	762	1610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			22			192			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		837.2			218.0			261.5			546.2	
Travel Time (s)		60.3			15.7			18.8			39.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	8%	18%	14%	9%	18%	3%	0%	0%	5%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	774	0	29	415	0	41	196	0	49	192	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	59.4	59.4		59.4	59.4		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.13	0.13		0.13	0.13	
v/c Ratio	0.07	0.61		0.08	0.33		0.39	0.52		0.49	0.57	
Control Delay	3.2	10.2		4.2	4.6		41.2	10.4		47.5	17.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.2	10.2		4.2	4.6		41.2	10.4		47.5	17.2	
LOS	A	B		A	A		D	B		D	B	
Approach Delay		9.8			4.6			15.7			23.3	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	2.0	87.6		1.0	16.4		6.1	0.6		7.4	7.5	
Queue Length 95th (m)	m3.0	150.2		4.1	36.2		15.1	17.3		17.3	25.1	
Internal Link Dist (m)		813.2			194.0			237.5			522.2	
Turn Bay Length (m)	30.0			30.0			30.0			30.0		
Base Capacity (vph)	710	1279		374	1241		190	527		180	489	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.61		0.08	0.33		0.22	0.37		0.27	0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Homestead Drive & Airport Road W

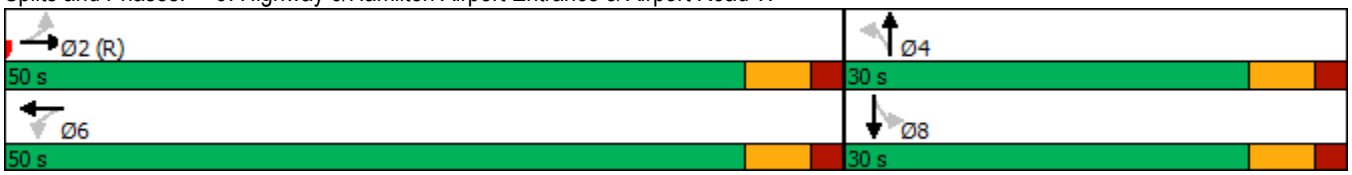


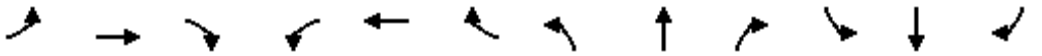
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	146	34	272	207	36	58	35	627	24	18	13
Future Volume (vph)	16	146	34	272	207	36	58	35	627	24	18	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	70.0		0.0	80.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1511	0	1451	1710	0	1580	1421	0	1785	1660	0
Flt Permitted	0.601			0.638			0.736			0.267		
Satd. Flow (perm)	1129	1511	0	975	1710	0	1224	1421	0	502	1660	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			18			660			14	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		158.4			319.2			136.8			89.0	
Travel Time (s)		11.4			23.0			6.2			6.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	12%	59%	23%	6%	16%	13%	3%	14%	0%	0%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	190	0	286	256	0	61	697	0	25	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	55.0	55.0		55.0	55.0		15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.19	0.19		0.19	0.19	
v/c Ratio	0.02	0.18		0.43	0.22		0.27	0.87		0.27	0.10	
Control Delay	6.6	5.9		7.1	4.2		27.4	16.0		31.2	15.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	5.9		7.1	4.2		27.4	16.0		31.2	15.8	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		5.9			5.7			16.9			22.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.7	7.0		11.1	8.5		8.7	5.2		3.6	2.6	
Queue Length 95th (m)	3.8	22.6		36.8	18.2		16.1	43.3		9.2	8.2	
Internal Link Dist (m)		134.4			295.2			112.8			65.0	
Turn Bay Length (m)	70.0			70.0			80.0			65.0		
Base Capacity (vph)	776	1047		670	1182		382	897		156	528	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.18		0.43	0.22		0.16	0.78		0.16	0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Highway 6/Hamilton Airport Entrance & Airport Road W





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	577	105	72	337	60	126	0	106	53	0	52
Future Volume (vph)	68	577	105	72	337	60	126	0	106	53	0	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1638	1655	0	1785	1733	0	1785	1597	0	1750	1192	0
Flt Permitted	0.438			0.242			0.713			0.683		
Satd. Flow (perm)	755	1655	0	455	1733	0	1340	1597	0	1258	1192	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			22			240			456	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		319.2			837.2			174.8			311.2	
Travel Time (s)		23.0			60.3			15.7			28.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.78	0.78	0.92	0.92	0.78	0.78	0.92	0.92	0.92	0.78	0.92	0.78
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	13%	0%	0%	7%	0%	0%	0%	0%	2%	0%	34%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	854	0	78	509	0	137	115	0	68	67	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

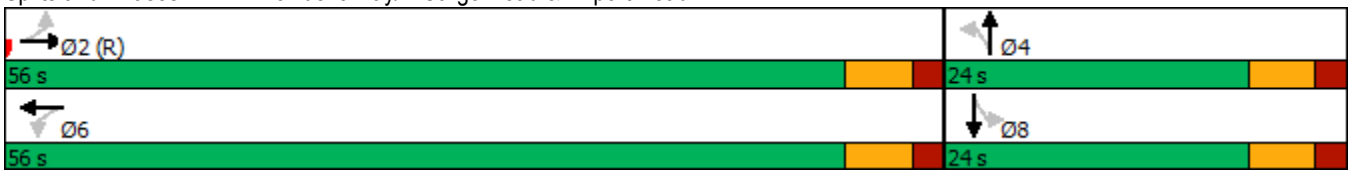
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	55.9	55.9		55.9	55.9		14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.18	0.18		0.18	0.18	
v/c Ratio	0.17	0.74		0.25	0.42		0.58	0.24		0.31	0.11	
Control Delay	5.3	12.8		10.1	9.0		39.4	1.2		30.8	0.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.3	12.8		10.1	9.0		39.4	1.2		30.8	0.4	
LOS	A	B		B	A		D	A		C	A	
Approach Delay		12.1			9.1			21.9			15.7	
Approach LOS		B			A			C			B	
Queue Length 50th (m)	3.6	70.0		5.5	39.6		20.2	0.0		9.5	0.0	
Queue Length 95th (m)	m6.4	106.0		14.5	51.8		35.6	0.0		16.8	0.0	
Internal Link Dist (m)		295.2			813.2			150.8			287.2	
Turn Bay Length (m)	15.0			15.0			15.0			60.0		
Base Capacity (vph)	527	1161		317	1217		318	562		298	630	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.74		0.25	0.42		0.43	0.20		0.23	0.11	

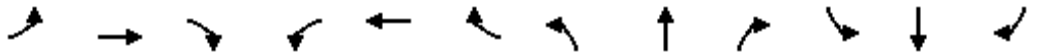
Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 12.8 Intersection LOS: B
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15

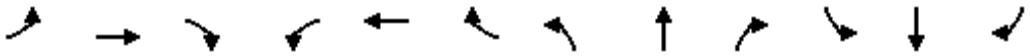
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Provident Way/E Cargo Road & Airport Road W





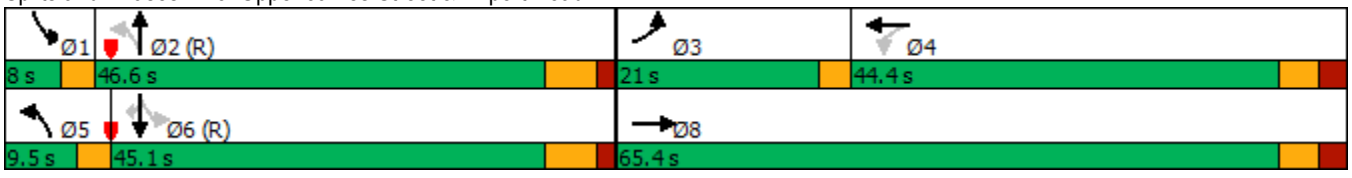
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	234	204	117	223	59	97	1157	95	82	1430	133
Future Volume (vph)	468	234	204	117	223	59	97	1157	95	82	1430	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	15.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	3298	1729	0	1700	1821	0	1785	4918	0	1785	4980	1479
Flt Permitted	0.950			0.493			0.078			0.116		
Satd. Flow (perm)	3298	1729	0	882	1821	0	147	4918	0	218	4980	1479
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			12			12				125
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%	0%	3%	5%	0%	3%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	503	471	0	126	303	0	104	1346	0	88	1538	143
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases				4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	21.0	65.4		44.4	44.4		9.5	46.6		8.0	45.1	45.1
Total Split (%)	17.5%	54.5%		37.0%	37.0%		7.9%	38.8%		6.7%	37.6%	37.6%
Maximum Green (s)	18.0	59.1		38.1	38.1		6.5	40.3		5.0	38.8	38.8
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3		5.3	5.3		2.0	5.3		2.0	5.3	5.3

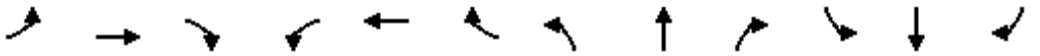


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	19.0	46.8		25.8	25.8		64.6	51.4		63.2	50.7	50.7
Actuated g/C Ratio	0.16	0.39		0.22	0.22		0.54	0.43		0.53	0.42	0.42
v/c Ratio	0.96	0.67		0.67	0.76		0.49	0.64		0.38	0.73	0.21
Control Delay	81.8	30.9		59.2	53.9		24.5	29.7		19.3	32.9	7.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	81.8	30.9		59.2	53.9		24.5	29.7		19.3	32.9	7.0
LOS	F	C		E	D		C	C		B	C	A
Approach Delay		57.2			55.5			29.3			30.1	
Approach LOS		E			E			C			C	
Queue Length 50th (m)	64.5	85.1		28.8	68.2		11.8	93.7		9.9	114.6	2.6
Queue Length 95th (m)	#99.4	108.7		47.1	92.1		27.9	127.7		21.4	#165.5	17.9
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0			15.0			135.0			120.0		80.0
Base Capacity (vph)	522	891		287	601		214	2113		234	2104	697
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.96	0.53		0.44	0.50		0.49	0.64		0.38	0.73	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9.5 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 37.9		Intersection LOS: D	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Upper James Street & Airport Road W





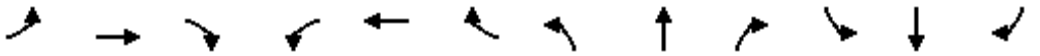
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	744	50	95	317	70	40	13	103	108	118	172
Future Volume (vph)	43	744	50	95	317	70	40	13	103	108	118	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	30.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1785	0	1785	1703	0	1733	1615	0	1653	1605	0
Flt Permitted	0.483			0.210			0.276			0.676		
Satd. Flow (perm)	899	1785	0	395	1703	0	498	1615	0	1176	1605	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			27			113			87	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		837.2			218.0			261.5			546.2	
Travel Time (s)		60.3			15.7			18.8			39.3	
Confl. Peds. (#/hr)	9		10	10		9	10					10
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	5%	0%	8%	0%	3%	0%	1%	8%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	873	0	104	425	0	44	127	0	119	319	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Total Split (%)	68.8%	68.8%		68.8%	68.8%		31.3%	31.3%		31.3%	31.3%	
Maximum Green (s)	49.0	49.0		49.0	49.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	53.2	53.2		53.2	53.2		16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.21	0.21		0.21	0.21	
v/c Ratio	0.08	0.73		0.40	0.37		0.42	0.30		0.48	0.79	
Control Delay	6.6	18.0		12.9	7.3		39.1	8.5		33.7	35.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	18.0		12.9	7.3		39.1	8.5		33.7	35.5	
LOS	A	B		B	A		D	A		C	D	
Approach Delay		17.4			8.4			16.4			35.0	
Approach LOS		B			A			B			D	
Queue Length 50th (m)	3.7	121.8		7.1	25.9		6.0	1.7		16.4	34.4	
Queue Length 95th (m)	m5.1	173.9		20.6	45.1		16.0	14.6		31.6	62.1	
Internal Link Dist (m)		813.2			194.0			237.5			522.2	
Turn Bay Length (m)	30.0			30.0			30.0			30.0		
Base Capacity (vph)	597	1189		262	1141		124	488		294	466	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.73		0.40	0.37		0.35	0.26		0.40	0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 85.7%		ICU Level of Service E	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Homestead Drive & Airport Road W



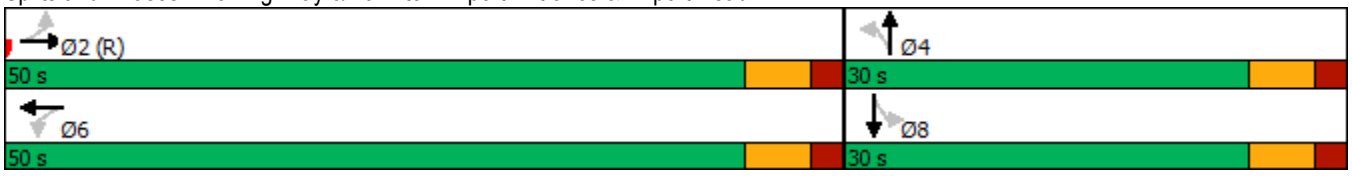
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	185	46	307	179	50	53	56	627	50	58	15
Future Volume (vph)	11	185	46	307	179	50	53	56	627	50	58	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	70.0		0.0	80.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1657	0	1638	1688	0	1032	1492	0	1785	1736	0
Flt Permitted	0.603			0.602			0.705			0.208		
Satd. Flow (perm)	1133	1657	0	1038	1688	0	766	1492	0	391	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			29			688			16	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		158.4			319.2			136.8			89.0	
Travel Time (s)		11.4			23.0			6.2			6.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	7%	22%	9%	7%	10%	73%	4%	9%	0%	0%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	254	0	337	252	0	58	751	0	55	80	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

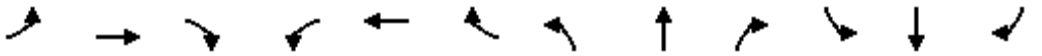
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	50.8	50.8		50.8	50.8		19.2	19.2		19.2	19.2	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.24		0.51	0.23		0.32	0.85		0.59	0.19	
Control Delay	7.7	7.6		10.6	5.6		27.1	14.2		50.1	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.7	7.6		10.6	5.6		27.1	14.2		50.1	18.6	
LOS	A	A		B	A		C	B		D	B	
Approach Delay		7.6			8.5			15.2			31.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.7	15.5		30.7	13.0		7.2	7.6		7.4	7.7	
Queue Length 95th (m)	3.0	29.9		44.3	20.0		16.8	#57.0		#19.7	17.2	
Internal Link Dist (m)		134.4			295.2			112.8			65.0	
Turn Bay Length (m)	70.0			70.0			80.0			65.0		
Base Capacity (vph)	719	1061		658	1082		239	939		122	553	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.24		0.51	0.23		0.24	0.80		0.45	0.14	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 83.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Highway 6/Hamilton Airport Entrance & Airport Road W





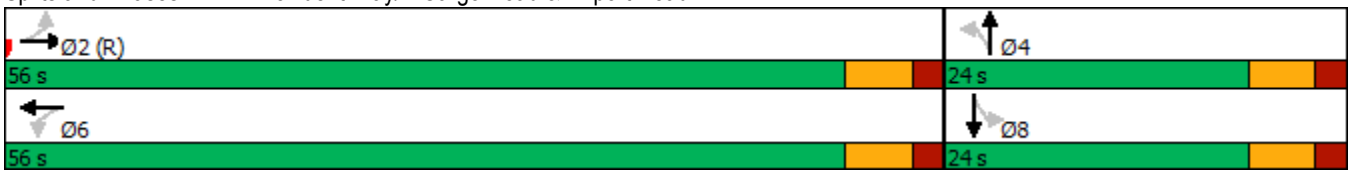
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	659	138	101	376	35	93	0	85	71	0	67
Future Volume (vph)	53	659	138	101	376	35	93	0	85	71	0	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1552	1756	0	1785	1743	0	1785	1597	0	1785	1516	0
Flt Permitted	0.500			0.273			0.711			0.697		
Satd. Flow (perm)	817	1756	0	513	1743	0	1336	1597	0	1307	1516	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			11			269			495	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		319.2			837.2			175.1			311.2	
Travel Time (s)		23.0			60.3			15.8			28.0	
Confl. Peds. (#/hr)										1		1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	15%	5%	0%	0%	7%	0%	0%	0%	0%	0%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	836	0	110	428	0	101	92	0	74	70	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	61.2	61.2		61.2	61.2		12.3	12.3		12.1	12.1	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.15	0.15		0.15	0.15	
v/c Ratio	0.09	0.62		0.28	0.32		0.49	0.19		0.37	0.11	
Control Delay	3.7	7.8		7.9	5.9		38.3	0.9		34.5	0.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.7	7.8		7.9	5.9		38.3	0.9		34.5	0.3	
LOS	A	A		A	A		D	A		C	A	
Approach Delay		7.6			6.3			20.5			17.9	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	1.9	60.6		6.8	26.5		15.0	0.0		10.8	0.0	
Queue Length 95th (m)	m3.1	118.5		m17.0	51.1		28.1	0.0		21.7	0.0	
Internal Link Dist (m)		295.2			813.2			151.1			287.2	
Turn Bay Length (m)	15.0			15.0			15.0			60.0		
Base Capacity (vph)	624	1348		392	1335		317	584		310	737	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.62		0.28	0.32		0.32	0.16		0.24	0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 73.0%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Provident Way/E Cargo Road & Airport Road W



Appendix F
2016 Transportation Tomorrow Survey (TTS)
Data Analysis

Auto Distribution - External

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Planning district of origin - pd_orig

Filters:
2006 GTA zone of destination - gta06_dest In 5008 5016 5020 5038
and
Primary travel mode of trip - mode_prime In D M P T U
and
Start time of trip - start_time In 600-900
and
Trip purpose of destination - purp_dest In r w

Trip 2016
Table:

	PD 14 of Toronto	Milton	Oakville	Burlington	Flamborough	Dundas	Ancaster	Glanbrook	Stoney Creek	Hamilton	Pelham	Kitchener	Brant	Brantford	
5016	0	0	0	0	0	0	0	0	0	53	0	0	0	0	
5020	44	47	15	44	0	32	0	154	26	433	17	29	15	51	
5038	0	0	0	0	26	0	51	0	15	110	0	0	0	21	
	44	47	15	44	26	32	51	154	41	596	17	29	15	72	1183
	4%	4%	1%	4%	2%	3%	4%	13%	3%	50%	1%	2%	1%	6%	100%

Hamilton	50%
Toronto	4%
Halton	9%
Flamborough	2%
Dundas	3%
Ancaster	4%
Glanbrook	13%
Stoney Creek	3%
Waterloo/Brantford	11%
	100%

Auto Distribution - Internal

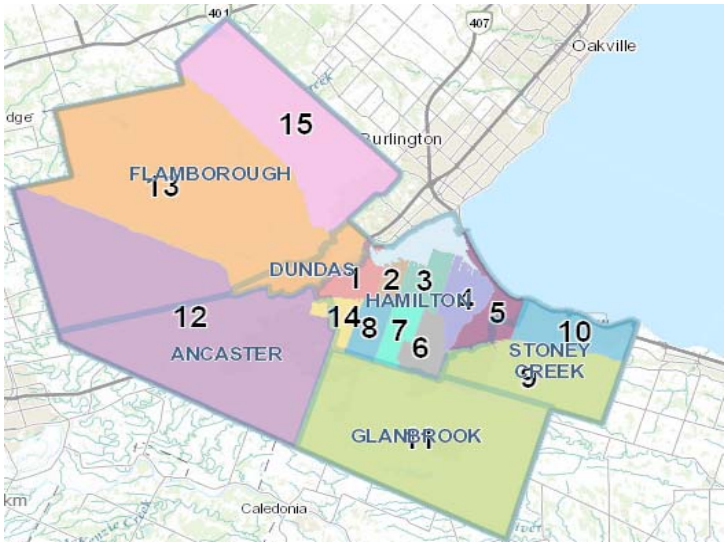
Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Ward number of origin - ward_orig

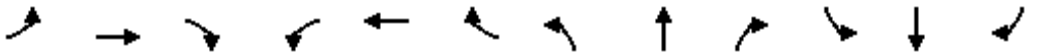
Filters:
2006 GTA zone of destination - gta06_dest In 5008 5016 5020 5038
and
Primary travel mode of trip - mode_prime In D M P T U
and
Start time of trip - start_time In 600-900
and
Trip purpose of destination - purp_dest In r w
and
Ward number of origin - ward_orig In 171-185

Trip 2016
Table:

Hamilton Wards	2	4	7	8	9	11	12	13	14	
2006 TTS Wards	172	174	177	178	179	181	182	183	184	
5016	0	0	28	25	0	0	0	0	0	
5020	0	97	124	211	26	154	0	32	0	
5038	58	0	0	53	15	0	51	0	26	
	58	97	152	289	41	154	51	32	26	900
	6%	11%	17%	32%	5%	17%	6%	4%	3%	100%



Appendix G
Future Total Level of Service Calculations



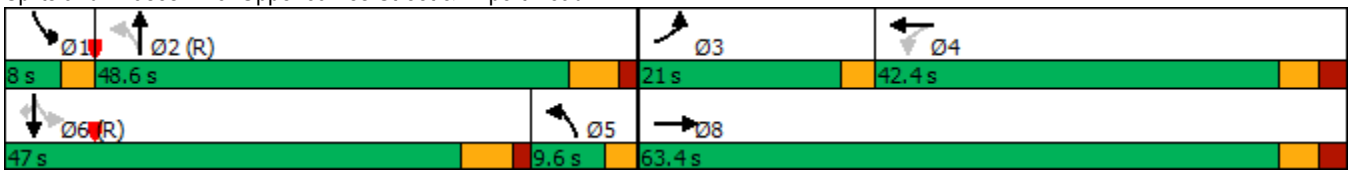
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	460	211	203	66	192	95	142	1380	72	41	565	224
Future Volume (vph)	460	211	203	66	192	95	142	1380	72	41	565	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	15.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	3330	1564	0	1513	1733	0	1716	4849	0	1653	4749	1365
Flt Permitted	0.950			0.505			0.411			0.089		
Satd. Flow (perm)	3330	1564	0	804	1733	0	743	4849	0	155	4749	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			22			7				241
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	18%	18%	3%	3%	4%	5%	6%	8%	8%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	495	445	0	71	308	0	153	1561	0	44	608	241
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases				4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	21.0	63.4		42.4	42.4		9.6	48.6		8.0	47.0	47.0
Total Split (%)	17.5%	52.8%		35.3%	35.3%		8.0%	40.5%		6.7%	39.2%	39.2%
Maximum Green (s)	18.0	57.1		36.1	36.1		6.6	42.3		5.0	40.7	40.7
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3		5.3	5.3		2.0	5.3		2.0	5.3	5.3

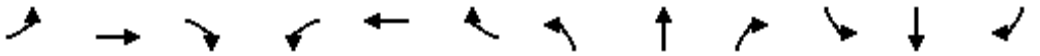
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	19.0	47.4		26.4	26.4		57.1	53.8		55.7	52.4	52.4
Actuated g/C Ratio	0.16	0.40		0.22	0.22		0.48	0.45		0.46	0.44	0.44
v/c Ratio	0.94	0.68		0.40	0.78		0.37	0.72		0.26	0.29	0.33
Control Delay	76.9	31.2		45.2	53.7		27.6	30.9		24.0	23.3	4.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	76.9	31.2		45.2	53.7		27.6	30.9		24.0	23.3	4.4
LOS	E	C		D	D		C	C		C	C	A
Approach Delay		55.3			52.1			30.6			18.2	
Approach LOS		E			D			C			B	
Queue Length 50th (m)	63.2	79.3		15.1	67.3		22.0	116.1		5.9	35.0	0.0
Queue Length 95th (m)	#96.3	104.3		27.8	91.9		41.4	153.4		14.8	50.4	17.1
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0			15.0			135.0			120.0		80.0
Base Capacity (vph)	527	786		248	550		415	2177		171	2074	732
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.94	0.57		0.29	0.56		0.37	0.72		0.26	0.29	0.33

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 35.8 Intersection LOS: D
Intersection Capacity Utilization 76.9% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Upper James Street & Airport Road W





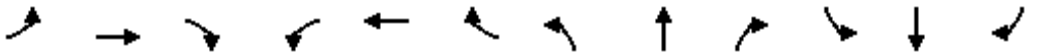
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	704	33	27	524	58	38	4	177	45	47	130
Future Volume (vph)	46	704	33	27	524	58	38	4	177	45	47	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	30.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1720	0	1566	1684	0	1733	1603	0	1700	1610	0
Flt Permitted	0.380			0.293			0.439			0.426		
Satd. Flow (perm)	714	1720	0	483	1684	0	801	1603	0	762	1610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			14			192			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		531.2			218.0			261.5			546.2	
Travel Time (s)		38.2			15.7			18.8			39.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	8%	18%	14%	9%	18%	3%	0%	0%	5%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	801	0	29	633	0	41	196	0	49	192	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	59.4	59.4		59.4	59.4		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.13	0.13		0.13	0.13	
v/c Ratio	0.09	0.63		0.08	0.50		0.39	0.52		0.49	0.57	
Control Delay	5.2	7.6		4.3	6.4		41.2	10.4		47.5	17.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.2	7.6		4.3	6.4		41.2	10.4		47.5	17.2	
LOS	A	A		A	A		D	B		D	B	
Approach Delay		7.4			6.3			15.7			23.3	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	2.2	48.0		1.0	31.2		6.1	0.6		7.4	7.5	
Queue Length 95th (m)	m4.2	m71.9		4.1	67.5		15.1	17.3		17.3	25.1	
Internal Link Dist (m)		507.2			194.0			237.5			522.2	
Turn Bay Length (m)	30.0			30.0			30.0			30.0		
Base Capacity (vph)	530	1279		358	1254		190	527		180	489	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.63		0.08	0.50		0.22	0.37		0.27	0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.0		Intersection LOS: A	
Intersection Capacity Utilization 66.9%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Homestead Drive & Airport Road W



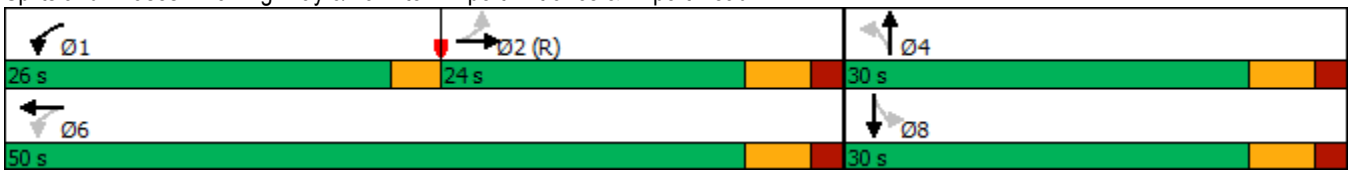
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	341	34	327	217	36	58	35	797	24	18	13
Future Volume (vph)	16	341	34	327	217	36	58	35	797	24	18	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	70.0		0.0	80.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1593	0	1451	1712	0	1580	1417	0	1785	1660	0
Flt Permitted	0.595			0.303			0.736			0.167		
Satd. Flow (perm)	1118	1593	0	463	1712	0	1224	1417	0	314	1660	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			17			677			14	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		158.4			319.2			136.8			89.0	
Travel Time (s)		11.4			23.0			6.2			6.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	12%	59%	23%	6%	16%	13%	3%	14%	0%	0%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	395	0	344	266	0	61	876	0	25	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		9.5	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		26.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	30.0%	30.0%		32.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	18.0	18.0		23.0	44.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		2.0	5.0		5.0	5.0		5.0	5.0	

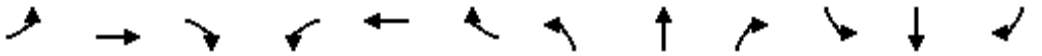
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		None	Max		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	26.3	26.3		49.1	46.1		23.9	23.9		23.9	23.9	
Actuated g/C Ratio	0.33	0.33		0.61	0.58		0.30	0.30		0.30	0.30	
v/c Ratio	0.05	0.75		0.68	0.27		0.17	0.98		0.27	0.07	
Control Delay	23.1	38.1		17.3	8.9		21.5	33.2		29.4	13.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.1	38.1		17.3	8.9		21.5	33.2		29.4	13.8	
LOS	C	D		B	A		C	C		C	B	
Approach Delay		37.5			13.6			32.4			20.5	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	1.9	56.3		33.1	21.6		7.0	33.4		3.0	2.1	
Queue Length 95th (m)	7.2	#122.9		54.2	35.4		16.1	#131.4		10.2	8.2	
Internal Link Dist (m)		134.4			295.2			112.8			65.0	
Turn Bay Length (m)	70.0			70.0			80.0			65.0		
Base Capacity (vph)	367	527		580	992		382	908		98	528	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.75		0.59	0.27		0.16	0.96		0.26	0.06	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 30 (38%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 27.4 Intersection LOS: C
Intersection Capacity Utilization 100.9% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Highway 6/Hamilton Airport Entrance & Airport Road W





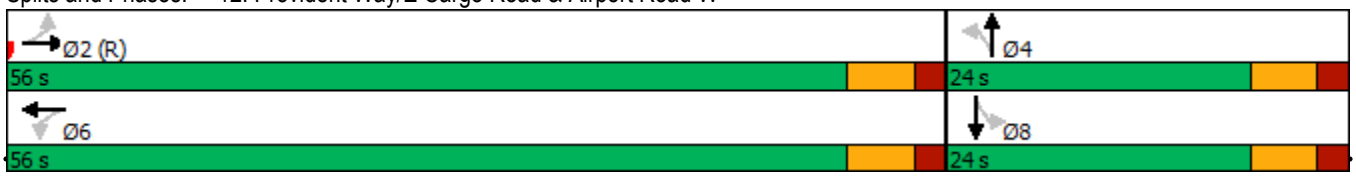
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	772	105	72	402	60	126	0	106	53	0	52
Future Volume (vph)	68	772	105	72	402	60	126	0	106	53	0	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1638	1657	0	1785	1736	0	1785	1597	0	1750	1192	0
Flt Permitted	0.387			0.111			0.713			0.683		
Satd. Flow (perm)	667	1657	0	209	1736	0	1340	1597	0	1258	1192	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			19			141			384	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		319.2			306.1			174.8			311.2	
Travel Time (s)		23.0			22.0			15.7			28.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.78	0.78	0.92	0.92	0.78	0.78	0.92	0.92	0.92	0.78	0.92	0.78
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	13%	0%	0%	7%	0%	0%	0%	0%	2%	0%	34%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1104	0	78	592	0	137	115	0	68	67	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

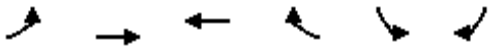
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	55.9	55.9		55.9	55.9		14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.18	0.18		0.18	0.18	
v/c Ratio	0.19	0.95		0.53	0.49		0.58	0.29		0.31	0.13	
Control Delay	4.6	20.6		23.1	6.3		39.4	5.2		30.8	0.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.6	20.6		23.1	6.3		39.4	5.2		30.8	0.5	
LOS	A	C		C	A		D	A		C	A	
Approach Delay		19.5			8.3			23.8			15.8	
Approach LOS		B			A			C			B	
Queue Length 50th (m)	2.9	134.1		4.7	31.8		20.2	0.0		9.5	0.0	
Queue Length 95th (m)	m4.2	m#206.1		m#29.5	44.1		35.6	8.8		16.8	0.0	
Internal Link Dist (m)		295.2			282.1			150.8			287.2	
Turn Bay Length (m)	15.0			15.0			15.0			60.0		
Base Capacity (vph)	465	1161		146	1218		318	486		298	575	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.95		0.53	0.49		0.43	0.24		0.23	0.12	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 41 (51%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 77.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Provident Way/E Cargo Road & Airport Road W

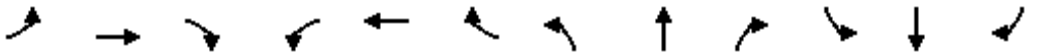




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	190	758	492	200	25	65
Future Volume (Veh/h)	190	758	492	200	25	65
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	207	824	535	217	27	71
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		306				
pX, platoon unblocked					0.66	
vC, conflicting volume	752				1882	644
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	752				2082	644
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	76				7	85
cM capacity (veh/h)	858				29	473

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	207	824	752	27	71
Volume Left	207	0	0	27	0
Volume Right	0	0	217	0	71
cSH	858	1700	1700	29	473
Volume to Capacity	0.24	0.48	0.44	0.93	0.15
Queue Length 95th (m)	7.5	0.0	0.0	24.4	4.2
Control Delay (s)	10.5	0.0	0.0	340.3	13.9
Lane LOS	B			F	B
Approach Delay (s)	2.1		0.0	103.9	
Approach LOS				F	

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

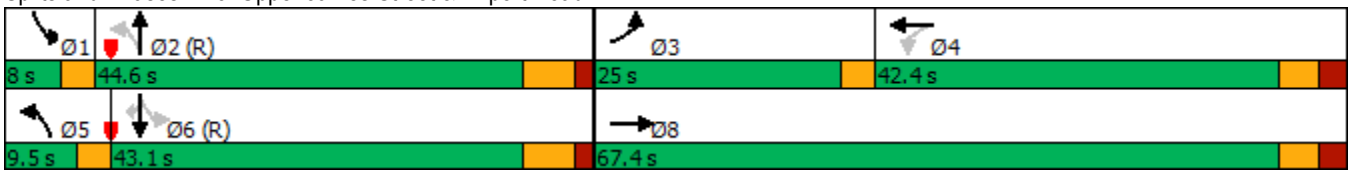


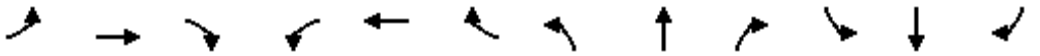
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	488	244	244	117	228	59	112	1157	95	82	1430	158
Future Volume (vph)	488	244	244	117	228	59	112	1157	95	82	1430	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	15.0		0.0	135.0		0.0	120.0		80.0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	3298	1721	0	1700	1821	0	1785	4918	0	1785	4980	1479
Flt Permitted	0.950			0.470			0.083			0.107		
Satd. Flow (perm)	3298	1721	0	841	1821	0	156	4918	0	201	4980	1479
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			11			12				145
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		218.0			195.5			259.1			310.3	
Travel Time (s)		15.7			14.1			11.7			14.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%	0%	3%	5%	0%	3%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	525	524	0	126	308	0	120	1346	0	88	1538	170
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases				4			2			6		6
Detector Phase	3	8		4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	8.0	42.3		42.3	42.3		9.5	35.3		8.0	35.3	35.3
Total Split (s)	25.0	67.4		42.4	42.4		9.5	44.6		8.0	43.1	43.1
Total Split (%)	20.8%	56.2%		35.3%	35.3%		7.9%	37.2%		6.7%	35.9%	35.9%
Maximum Green (s)	22.0	61.1		36.1	36.1		6.5	38.3		5.0	36.8	36.8
Yellow Time (s)	3.0	3.7		3.7	3.7		3.0	4.6		3.0	4.6	4.6
All-Red Time (s)	0.0	2.6		2.6	2.6		0.0	1.7		0.0	1.7	1.7
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	2.0	5.3		5.3	5.3		2.0	5.3		2.0	5.3	5.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		12.0		12.0	12.0			12.0			12.0	12.0
Flash Dont Walk (s)		24.0		24.0	24.0			17.0			17.0	17.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	22.4	50.7		26.3	26.3		61.4	48.0		58.6	46.6	46.6
Actuated g/C Ratio	0.19	0.42		0.22	0.22		0.51	0.40		0.49	0.39	0.39
v/c Ratio	0.85	0.69		0.68	0.76		0.55	0.68		0.41	0.79	0.26
Control Delay	61.5	28.9		61.0	53.8		29.4	32.9		23.0	37.6	7.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	61.5	28.9		61.0	53.8		29.4	32.9		23.0	37.6	7.9
LOS	E	C		E	D		C	C		C	D	A
Approach Delay		45.2			55.9			32.6			34.1	
Approach LOS		D			E			C			C	
Queue Length 50th (m)	65.1	91.6		29.0	69.7		15.0	100.4		10.8	124.5	3.9
Queue Length 95th (m)	#90.9	113.8		47.2	92.6		#35.4	131.3		23.4	#173.3	20.9
Internal Link Dist (m)		194.0			171.5			235.1			286.3	
Turn Bay Length (m)	30.0			15.0			135.0			120.0		80.0
Base Capacity (vph)	632	920		260	570		217	1976		213	1935	663
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.83	0.57		0.48	0.54		0.55	0.68		0.41	0.79	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9.5 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 38.1		Intersection LOS: D	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Upper James Street & Airport Road W





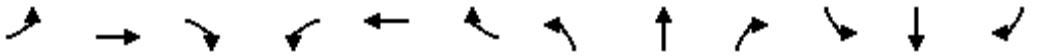
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	814	50	95	362	70	40	13	103	108	118	172
Future Volume (vph)	43	814	50	95	362	70	40	13	103	108	118	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	30.0		0.0	30.0		0.0	30.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1785	0	1785	1708	0	1733	1615	0	1653	1605	0
Flt Permitted	0.450			0.170			0.271			0.676		
Satd. Flow (perm)	838	1785	0	319	1708	0	489	1615	0	1176	1605	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			24			113			86	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		529.2			218.0			261.5			546.2	
Travel Time (s)		38.1			15.7			18.8			39.3	
Confl. Peds. (#/hr)	9		10	10		9	10					10
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	5%	0%	8%	0%	3%	0%	1%	8%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	950	0	104	475	0	44	127	0	119	319	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	53.4	53.4		53.4	53.4		16.6	16.6		16.6	16.6	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.21	0.21		0.21	0.21	
v/c Ratio	0.08	0.80		0.49	0.41		0.44	0.30		0.49	0.80	
Control Delay	6.3	13.8		17.5	7.6		40.9	8.8		34.4	37.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.3	13.8		17.5	7.6		40.9	8.8		34.4	37.1	
LOS	A	B		B	A		D	A		C	D	
Approach Delay		13.5			9.4			17.0			36.4	
Approach LOS		B			A			B			D	
Queue Length 50th (m)	1.7	53.3		7.8	31.0		6.0	1.7		16.3	34.4	
Queue Length 95th (m)	m6.0	#121.2		25.7	50.3		16.4	14.9		32.2	#69.8	
Internal Link Dist (m)		505.2			194.0			237.5			522.2	
Turn Bay Length (m)	30.0			30.0			30.0			30.0		
Base Capacity (vph)	559	1194		213	1148		116	469		279	446	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.80		0.49	0.41		0.38	0.27		0.43	0.72	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 35 (44%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 89.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Homestead Drive & Airport Road W

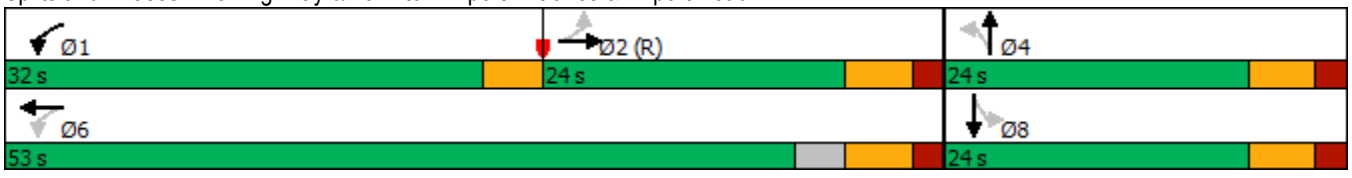


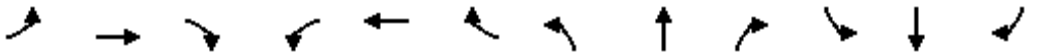
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	235	46	577	219	50	53	56	667	50	58	15
Future Volume (vph)	11	235	46	577	219	50	53	56	667	50	58	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	70.0		0.0	70.0		0.0	80.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1785	1673	0	1638	1698	0	1032	1491	0	1785	1736	0
Flt Permitted	0.579			0.408			0.705			0.245		
Satd. Flow (perm)	1088	1673	0	703	1698	0	766	1491	0	460	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			28			698			15	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		158.4			319.2			136.8			89.0	
Travel Time (s)		11.4			23.0			6.2			6.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	7%	22%	9%	7%	10%	73%	4%	9%	0%	0%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	309	0	634	296	0	58	795	0	55	80	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		9.5	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	24.0	24.0		32.0	53.0		24.0	24.0		24.0	24.0	
Total Split (%)	30.0%	30.0%		40.0%	66.3%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	18.0	18.0		28.5	47.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		2.5	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		None	Max		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	27.0	27.0		56.2	53.7		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.34	0.34		0.70	0.67		0.20	0.20		0.20	0.20	
v/c Ratio	0.03	0.54		0.82	0.26		0.37	0.93		0.59	0.22	
Control Delay	23.9	28.8		14.8	3.6		33.6	23.1		54.4	22.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.9	28.8		14.8	3.6		33.6	23.1		54.4	22.6	
LOS	C	C		B	A		C	C		D	C	
Approach Delay		28.6			11.2			23.8			35.5	
Approach LOS		C			B			C			D	
Queue Length 50th (m)	1.5	43.3		21.9	9.5		7.7	12.7		7.6	8.3	
Queue Length 95th (m)	5.7	#83.2		#54.3	14.5		18.8	#92.9		#23.1	19.5	
Internal Link Dist (m)		134.4			295.2			112.8			65.0	
Turn Bay Length (m)	70.0			70.0			80.0			65.0		
Base Capacity (vph)	367	573		838	1149		181	886		109	423	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.54		0.76	0.26		0.32	0.90		0.50	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 47 (59%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 20.0		Intersection LOS: B	
Intersection Capacity Utilization 103.0%		ICU Level of Service G	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Highway 6/Hamilton Airport Entrance & Airport Road W





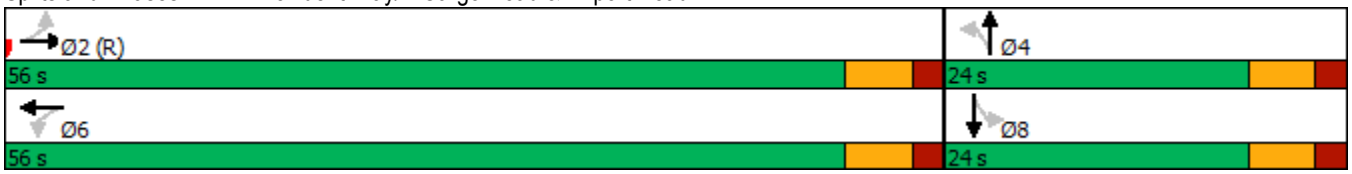
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	709	138	101	686	35	93	0	85	71	0	67
Future Volume (vph)	53	709	138	101	686	35	93	0	85	71	0	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	15.0		0.0	15.0		0.0	15.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1552	1759	0	1785	1749	0	1785	1597	0	1785	1516	0
Flt Permitted	0.316			0.247			0.711			0.697		
Satd. Flow (perm)	516	1759	0	464	1749	0	1336	1597	0	1307	1516	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			6			240			253	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		319.2			308.0			175.1			311.2	
Travel Time (s)		23.0			22.2			15.8			28.0	
Confl. Peds. (#/hr)										1		1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	15%	5%	0%	0%	7%	0%	0%	0%	0%	0%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	889	0	110	751	0	101	92	0	74	70	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

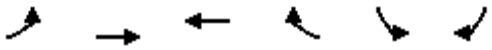
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	61.2	61.2		61.2	61.2		12.3	12.3		12.1	12.1	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.15	0.15		0.15	0.15	
v/c Ratio	0.14	0.66		0.31	0.56		0.49	0.21		0.37	0.16	
Control Delay	4.0	9.3		6.7	6.9		38.3	1.0		34.5	0.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.0	9.3		6.7	6.9		38.3	1.0		34.5	0.8	
LOS	A	A		A	A		D	A		C	A	
Approach Delay		8.9			6.9			20.5			18.1	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	1.4	82.2		3.5	48.9		15.0	0.0		10.8	0.0	
Queue Length 95th (m)	m3.1	m151.4		m14.3	82.6		28.1	0.0		21.7	0.0	
Internal Link Dist (m)		295.2			284.0			151.1			287.2	
Turn Bay Length (m)	15.0			15.0			15.0			60.0		
Base Capacity (vph)	394	1350		354	1338		317	562		310	552	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.66		0.31	0.56		0.32	0.16		0.24	0.13	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 9.8 Intersection LOS: A
Intersection Capacity Utilization 75.6% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Provident Way/E Cargo Road & Airport Road W





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	837	529	45	70	310
Future Volume (Veh/h)	55	837	529	45	70	310
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	910	575	49	76	337
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		308				
pX, platoon unblocked					0.78	
vC, conflicting volume	624				1630	600
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	624				1665	600
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				4	33
cM capacity (veh/h)	967				79	505

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	60	910	624	76	337
Volume Left	60	0	0	76	0
Volume Right	0	0	49	0	337
cSH	967	1700	1700	79	505
Volume to Capacity	0.06	0.54	0.37	0.96	0.67
Queue Length 95th (m)	1.6	0.0	0.0	41.2	39.1
Control Delay (s)	9.0	0.0	0.0	182.7	25.3
Lane LOS	A			F	D
Approach Delay (s)	0.6		0.0	54.2	
Approach LOS				F	

Intersection Summary			
Average Delay	11.4		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix H
Signal Warrant Analysis

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Airport Road W

Minor Street: Street A

Comment Future Total (2028) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [X] No [ ]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,730	1,846	n/a	895
1B - Minor	90	380	25%	118
2A - Major	1,640	1,466	25%	777
2B - Crossi	120	98	25%	55

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [ ]	No [X]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	895
	% FULFILLED				124%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	180	255	180	255	118
	% FULFILLED				46%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	777
	% FULFILLED				108%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	55
	% FULFILLED				73%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Airport Road W

Minor Street: E Cargo Road/Provident Way

Comment Future Total (2028) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [ ] No [X]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,888	2,038	n/a	982
1B - Minor	416	316	25%	183
2A - Major	1,472	1,722	25%	799
2B - Crossi	294	215	25%	127

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [X]	No [ ]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	982
	% FULFILLED				136%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	120	170	120	170	183
	% FULFILLED				108%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [X]	No [ ]
80% Satisfied:	Yes [X]	No [ ]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	799
	% FULFILLED				111%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	127
	% FULFILLED				169%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [X]	No [ ]
80% Satisfied:	Yes [X]	No [ ]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Airport Road W

Minor Street: Hamilton International Airport Entrance/Hwy 6

Comment Future Total (2028) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [ ] No [X]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,916	2,037	n/a	988
1B - Minor	945	899	25%	461
2A - Major	971	1,138	25%	527
2B - Crossi	281	450	25%	183

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [X]	No [ ]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	988
	% FULFILLED				137%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	120	170	120	170	461
	% FULFILLED				271%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [X]	No [ ]
100% Satisfied:	Yes [X]	No [ ]
80% Satisfied:	Yes [X]	No [ ]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	527
	% FULFILLED				73%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	183
	% FULFILLED				244%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Airport Road W

Minor Street: Homestead Drive

Comment Future Total (2028) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [ ] No [X]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,833	1,992	n/a	956
1B - Minor	441	583	25%	256
2A - Major	1,392	1,409	25%	700
2B - Crossi	153	340	25%	123

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [X]	No [ ]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [X]	No [ ]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	956
	% FULFILLED				133%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	120	170	120	170	256
	% FULFILLED				151%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [X]	No [ ]
100% Satisfied:	Yes [X]	No [ ]
80% Satisfied:	Yes [X]	No [ ]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	700
	% FULFILLED				97%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	123
	% FULFILLED				164%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [X]	No [ ]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.