MARCH 29, 2022

**REFER TO FILE: 1346-4573** 

**SENT BY EMAIL:** 

MNIEVAS@WESTONCONSULTING.COM

City of Mississauga Transportation & Works Department 201 City Centre Drive, Suite 800 Mississauga, ON, L5B 2T4

Attention: Ryan Au, P.Eng.

Bo Yang Yu, C.Tech City of Mississauga

RE: ADDENDUM TRAFFIC OPINION LETTER

FILE. NO: OZ/OPA 18 13 & 21T-M 18 3

7170 GOREWAY DRIVE RESIDENTIAL DEVELOPMENT

**CITY OF MISSISSAUGA** 

Dear Ryan and Bo,

Pursuant to Rup Group's (proponent) request, this letter was prepared to address the City of Mississauga Traffic Review comments (dated September 2021) pertaining the Second submission Traffic Opinion Letter (dated July 2021) previously submitted for the proposed residential development at 7170 Goreway Drive in the City of Mississauga.

Correspondence between Crozier and the City of Mississauga staff dated June 16, 2017 confirmed the scope of work used for the original Traffic Opinion Letter (TOL) Submitted in 2017; while the TOL (dated July 2021) addressed the first submission comments. This Addendum TOL incorporates the current site plan and addresses the City's second submission comments. The historical correspondence with City staff and a comments response matrix highlighting how the comments were addressed are included in **Attachments A**.

Following the original scope, the TOL reviews the development plan from a transportation engineering perspective based on the main elements listed below.

- Assess existing traffic operations at the study intersection of Etude Drive at Goreway Drive during the weekday a.m. and p.m. peak hours.
- Forecasts site trip generation and distribution for the proposed development.
- Assess the 2017 total traffic operations at the intersections of Etude Drive at Goreway Drive and the proposed full moves site access during the weekday a.m. and p.m. peak hours.
- Proposed Site Access Safety Review including: Vehicle Maneuverability, Sight Distance Assessment, Access Spacing, Corner Clearance and Site Access Geometrics.



#### 1.0 SUBJECT LANDS AND DEVELOPMENT PROPOSAL

The subject land (7170 Goreway Drive) is located on the southwest quadrant of the Goreway Drive at Etude Drive intersection. The site is zoned Residential "R3-69" by the City of Mississauga Zoning By-Law 0225-2007. Relevant zoning excerpts are provided in **Attachment B**.

The property is currently a vacant land and bounded by Goreway Drive to the east, Etude Drive to the north and residential developments to the south and east. Goreway Drive has been ascribed a north-south alignment to help provide clarity throughout this letter. The site location and surrounding area are illustrated in Figure 1.

The first submission TOL was based on a previous site plan (dated July 28, 2017) proposal of 14 condominium townhouses and 33 parking spaces. However, the current proposal consists of 15 condominium townhouses and 34 parking spaces (i.e., 2 per unit and 4 visitor parking spaces). The development will be served by a single full moves site access connection to Etude Drive located on the western limits of the property. Refer to Figure 2 for the site plan prepared by Jardin Design Group Inc. (dated February, 16, 2022).

#### 2.0 EXISTING CONDITIONS

#### 2.1 Boundary Road Network

Goreway Drive is a north-south roadway with a five-lane cross-section at the site frontage, two lanes per travel direction and a two-way left turn median lane. Goreway Drive is under the jurisdiction of the City of Mississauga and is defined as a major collector roadway per the City of Mississauga Schedule 5 Long Term Road Network. The roadway has a posted speed limit of 60 km/h and concrete sidewalks located on both sides, separated from the roadway by a boulevard strip.

Etude Drive is an east-west roadway with a two-lane cross-section, one lane per direction. Etude Drive is under the jurisdiction of the City of Mississauga and is defined as a minor collector roadway per the City of Mississauga Schedule 5 Long Term Road Network. The roadway has a posted speed limit of 50 km/h and concrete sidewalks located on both sides of the roadway.

The four-legged intersection of Goreway Drive at Etude Drive is signalized. The northbound and southbound approaches (Goreway Drive) have an exclusive left-turn storage lane, one through lane and a shared through/right-turn lane. The eastbound approach (Etude Drive) has an exclusive left-turn storage lane and a shared through/right-turn lane. The westbound approach (Etude Drive) has one through lane and exclusive left-turn and right-turn storage lanes.

#### 2.2 Traffic Data

Turning movement counts at the intersection of Goreway Drive at Etude Drive were surveyed by Ontario Traffic Inc. on Tuesday May 30<sup>th</sup>, 2017 between 7 a.m. to 10 a.m. and 3 p.m. to 7 p.m. The peak a.m. and p.m. hours occurred between 7:45 a.m. to 8:45 a.m. and 4:45 p.m. to 5:45 p.m. respectively. Summary of the turning movement counts are added to **Attachment C**.

#### 2.3 Public Transit

At the time of preparing the original TOL, multiple MiWay Transit bus routes service the immediate surrounding area of the site. Route 11- Westwood operates all week, providing two-way services on Goreway Drive between Westwood mall and Toronto Transit Commission (TTC) Islington subway

station. Route 12- Rexdale operates Monday to Friday on Goreway Drive between Westwood mall and Islington Avenue. Route 24- Northwest operates Monday to Friday during rush hour on Goreway Drive between Westwood mall and Skymark Hub. Route 42-Derry operates all week, providing two-way services on Goreway Drive between Westwood mall and Meadowvale Town Centre. Route 59-Airport infield operates Monday to Friday during rush hour between Westwood mall and Toronto Pearson Airport. All bus stops are within approximately 90 metres of the subject property. These bus routes are subject to change over time and either similar or an increase in transit provision can be forecasted for the future. Relevant maps are included in **Attachment B**.

#### 2.4 Traffic Modelling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual" using Synchro 9 modeling software. Intersections are assessed using a Level of Service metric, with ranges of delay assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be measured in the commuter peak hours when greater vehicle volumes cause longer travel times. The Level of Service (LOS) definitions for signalized and stop-controlled intersections are included the **Attachment D**.

#### 2.5 Intersection Operations

The 2017 existing traffic operations at the intersection of Goreway Drive at Etude Drive was analyzed based on the existing traffic volumes illustrated in Figure 3. Detailed capacity analyses are provided in **Attachment E.** Table 1 outlines the 2017 existing traffic levels of service.

Intersection	Control	Peak Level of Hour Service		Average Delay per Vehicle(s)	V/C Ratio <sup>1</sup>	95 <sup>th</sup> %ile Queues > Storage Length		
Goreway Drive at Etude Drive	Cionaliza d	A.M.	С	27.3 s	0.81 (SBT)	42.1 m (WBL) 26.3 m (SBL)		
	Signalized	P.M.	С	25.9 s	0.91 (SBL)	41.4 m (WBL) 33.9 m (SBL)		

Table 1: 2017 Existing Levels of Service

Note:

[1] V/C Ratio – illustrates the maximum volume to capacity ratio and other volume to capacity ratios greater than 0.90. The Level of Service of a signalized intersection is based on the average control delay per vehicle. Signal timing plans provided by the City of Mississauga were used. The 95th percentile queue analysis was completed using Sim-Traffic with 60 minutes recording time, 10 minutes seeding time, and an average of three runs.

As illustrated in Table 1, the intersection of Goreway Drive at Etude Drive operates at a Level of Service "C" during the weekday a.m. and p.m. peak periods. The maximum average delay per vehicle is 27.3 seconds during the weekday a.m. peak hour, with a maximum volume-to-capacity ratio of 0.91 for the southbound left-turn movement. The 95<sup>th</sup> percentile queue forecast indicates that, the westbound left-turn and southbound left-turn queues occasionally extend beyond the storage lane into the tapers and adjacent through lanes during the peak hours.

The City's comments request that trips from the existing adjacent church to be captured in the analysis. Trips from the existing church are captured in the traffic counts if there are any during the typical a.m. and p.m. peak hours of the study intersection. Furthermore, analysis of a Sunday peak hour is irrelevant to this development due to the proposed land use and low number of units.

#### 3.0 SITE GENERATED TRIPS AND DISTRIBUTION

Site generated traffic for the proposed development was calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, Land Use Category (LUC) 230 "Residential Condominium/Townhouse". Table 2 below summarizes the trips generated by the proposed development.

**Table 2: Original Site Generated Trips** 

Type of Use	Number of Units	Peak Hour	In (%)	Out (%)	Total
Residential Condominium/	1 4	Weekday A.M.	2 (17%)	10 (83%)	12
Townhouse (LUC 230)	14	Weekday P.M.	8 (67%)	4 (33%)	12

Vehicles entering and exiting the site were distributed based on Transportation Tomorrow Survey data at the study intersections. The site trip distribution and trip assignment volumes are illustrated in Figures 4 and 5, respectively.

The original trip generation and traffic analysis for the previously proposed 14 units has been maintained herein in this Addendum TOL as the change in units per the current site plan (15 units proposed) is immaterial to the results and findings of the original TOL. Moreover, if new trips were to be generated for the 15 units using the current ITE Trip Generation Manual, 10th Edition, fewer trips are forecast as illustrated in Table 3. The greater trip generation between the fitted curve equation and the average rate methodology are presented herein.

**Table 3: New Site Generated Trips** 

Type of Use	Number of Units	Peak Hour	In (%)	Out (%)	Total
Multifamily Housing Low-Rise	1.5	Weekday A.M.	2 (23%)	6 (77%)	8
(LUC 220)	15	Weekday P.M.	7 (63%)	4 (37%)	11

Therefore, maintaining the original trip generation and analysis herein is conservative and consistent with the scope that was coordinated with the City of Mississauga staff.

#### 4.0 TOTAL TRAFFIC OPERATIONS

Traffic operations at the study intersections of Etude Drive with Goreway Drive and the Site Access were assessed with the addition of site generated traffic. The operations of the study intersections were analyzed based on the 2017 total traffic volumes illustrated in Figure 6. Table 4 outlines the total traffic levels of service. Detailed capacity analyses are provided in **Attachment E**.

C.F. Crozier & Associates Ltd. Project No. 1346-4573

Table 4: 2017 Total Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio <sup>1</sup>	95 <sup>th</sup> %ile Queues > Storage Length
Goreway Drive		A.M.	С	22.1 s	0.83 (WBL)	42.4 m (WBL)
at Etude Drive	Signalized	P.M.	С	21.6 s	0.84 (WBL)	43.9 m (WBL) 29.9 m (SBL)
Full Moves Site	Stop	A.M.	Α	9.6 s	0.01 (NB)	None
Access at Etude Drive	(Minor)	P.M.	Α	9.6 s	0.01 (NB)	None

Note:

[1] V/C Ratio – illustrates the maximum volume to capacity ratio and other volume to capacity ratios greater than 0.90. The Level of Service of a signalized intersection is based on the average control delay per vehicle. Optimized signal timing plans were used. The Level of Service of a Stop-Controlled intersection is based on the delay associated with the critical minor approach. The 95th percentile queue analysis was completed using Sim-Traffic with 60 minutes recording time, 10 minutes seeding time, and an average of three runs.

As illustrated in Table 4, the addition of site generated traffic to the roadway system will have no material impact on traffic operations at the study intersection. The intersection of Goreway Drive at Etude Drive is projected to operate at the same Level of Service "C" during the weekday a.m. and p.m. peak periods similar to the existing conditions. With the optimized signal timing, a maximum average delay per vehicle of 22.1 seconds is projected during the weekday a.m. peak hour, a decrease of 5.2 seconds compared to the 2017 existing traffic conditions. A maximum volume-to-capacity ratio of 0.84 for the westbound left-turn movement is projected during the weekday p.m. peak hour.

Similar to the existing conditions, the 95<sup>th</sup> percentile queues projects that the westbound left-turn (WBL) and southbound left-turn (SBL) queues will occasionally extend beyond the storage lanes into the tapers and adjacent through lanes during the peak hours. It is noted that the proposed development does not contribute traffic to the WBL and SBL movements. Additionally, the proposed development adds only a total of 8 and 11 two-way trips during the a.m. and p.m. peak hours, respectively.

The intersection of Etude Drive at the proposed full-moves site access is projected to operate below capacity at a Level of Service "A" during the weekday a.m. and p.m. peak hours. A maximum average vehicle delay of 9.6 seconds is projected for vehicles exiting the site during the weekday peak hours.

#### 5.0 SITE ACCESS SAFETY REVIEW

This section reviews the proposed site access as well as for internal site circulation from a safety and operational feasibility perspective.

#### 5.1 Sight Distance Assessment

The available sight distance on Etude Drive at the proposed site access location was measured from an online Geographic Information System (GIS) mapping tool. The following assumptions were made regarding the available sight distance measurements:

• A standard driver eye height of 1.08 m for a passenger car.

• A 4.4 m setback from the edge of the outer lane to represent a vehicle waiting to exit the connecting roadway.

The standards set out in the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC-GDGCR) Section 9.9 was used to assess the adequacy of available sight distances. Per the TAC-GDGCR, minimum required intersection sight distance is calculated using equation 9.9.1 as outlined below:

Where:

ISD = Intersection Sight Distance

V major = design speed of roadway (km/h)

tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Etude Drive is fairly flat; therefore, the assessment herein assumed the road's longitudinal slope to be within 3%.

Table 5: Sight Distance Analysis

	Table 5: Sight Distance Analys	SIS
Feature	Site Access at Etude Drive	Goreway Drive at Etude Drive (Proposed 10m X 10m Sight Triangle)
Access Type	Full-Moves	Full-Moves
Posted Speed Limit of Roadway	50 km/h (assumed)	60 km/h (assumed)
Assumed Design Speed	60 km/h	70 km/h
Base Time Gap	7.5 s (facing east) 6.5 s (facing west)	7.5 s (facing south) 6.5 s (facing north)
Additional Time Gap	None	1.0 s (south - time to cross centre lanes for a left turn lane)
Grade of Roadway	Assumed as 3%	Assumed as 3%
Horizontal Alignment of Roadway	Fairly straight with slight curvature	Fairly straight
Sight Distance Required	130 m (east) 110 m (west)	170 m (south) 130 m (north)
Available Sight Distance	> 130 m (east) > 110 m (west)	> 170 m (south) > 130 m (north) Without encroaching proposed sight triangle
Minimum Sight Distance Satisfied?	Yes	Yes

As presented in Table 5, the minimum sight distance requirements are satisfied at the proposed site access connection to Etude Drive. Similarly, though not a typically requirement at a signalized intersection, sight distances from Etude Drive are adequate under the 10m-by-10m sight triangle proposed by the site at the south-west corner of the Goreway Drive and Etude Drive intersection.

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#### 5.2 Access Spacing and Corner Clearance

Figure 8.8.2 in the TAC GDGCR outlines minimum recommended corner clearances to accesses from intersections. Etude Drive is classified as a "minor collector" roadway. The recommended minimum intersection corner clearance from signalized intersection for the site access is 55 m and a minimum of 25 m from a stop-controlled intersection.

The proposed site access location results in a corner clearance of approximately 65 m from the signalized intersection at Goreway Drive; and approximately 50 m from the stop-controlled intersection at Minotola Avenue. Therefore, the proposed site access satisfies the minimum recommended intersection corner clearance and spacing per the TAC GDGCR.

The longest 95<sup>th</sup> percentile queue for the eastbound approach movements including the eastbound left-turn at the intersection of Goreway Drive and Etude Drive is 49.4 m (eastbound through) during the p.m. peak hour. Therefore, the proposed full moves site access located approximately 60 m from the stop line on Etude Drive is not expected to be blocked by the eastbound traffic queues at the intersection of Etude Drive and Goreway Drive.

Furthermore, along Etude Drive and the surrounding roads, close proximity driveways on either side of the property lines are typical. With queueing not anticipated to block the access, nor materially impact the LOS and delay at the access intersection, the site access location can be supported from a traffic operations perspective.

#### 5.3 Access Configuration and Vehicle Maneuverability

Vehicle turning plans using the Region of Peel front-end bin loading waste vehicle and an aerial fire truck as the design vehicles were prepared to assess the ability of the site to accommodate circulation of expected waste collection and emergency vehicles. The vehicle turning plans are presented in the **Attachment F.** 

The configuration of the site accesses satisfies the radii and lane width requirements of the TAC GDGCR and the Ontario Provincial Standard Drawing (OPSD) 350.010. Additionally, the site access and travel path for the waste removal satisfy the route requirements of the Region of Peel for waste collection. The access route to the garbage collection point has a 4.4 m overhead clearance, a centre line turning radius of 13 m and the driveway longitudinal slope shall not exceed 2%.

C.F. Crozier & Associates Ltd. Project No. 1346-4573

### 6.0 CONCLUSION AND RECOMMENDATIONS

This Addendum Traffic Opinion Letter has assessed the transportation impacts of the proposed residential development at the 7170 Goreway Drive site in the City of Mississauga. The analysis herein regarding the proposed development has resulted in the following key findings:

- Under 2017 existing traffic conditions, the study intersection of Goreway Drive at Etude Drive
  operates at a Level of Service (LOS) "C" during the weekday a.m. and p.m. peak hours. The
  maximum average vehicle delay is 27.3 seconds during the peak hours, with a maximum
  volume-to-capacity (v/c) ratio of 0.91 for the southbound left-turn movement.
- The proposed residential development is projected to generate a total of 8 and 11 two-way auto-trips during the weekday a.m. and p.m. peak hours, respectively.
- Under 2017 total traffic conditions (includes site generated traffic) the study intersection of Goreway Drive at Etude Drive is forecast to operate similarly as under existing conditions. A LOS "C" is forecast during the weekday a.m. and p.m. peak hours.
- With the optimized signal timings, a maximum average delay per vehicle of 22.1 seconds is projected during the weekday a.m. peak hour, a decrease of 5.2 seconds compared to 2017 existing traffic conditions. A maximum v/c ratio of 0.84 for the westbound left-turn movement is projected during the weekday p.m. peak hour.
- The proposed full moves site access at Etude Dive is expected to serve the site without any
  safety issues related to sightlines, corner clearances, access conflicts and transit operational
  conflicts.
- Additionally, the site can accommodate circulation of the Peel Region front-end waste collection vehicle that is expected to serve the site as well as an aerial fire truck.
- The site is located within an area with good transit service, pedestrian facilities and within a 200 m walking distance of a large commercial service area. These existing facilities are expected to encourage transit use, walking and reduce auto trips at the proposed development.

Based on this study findings, it is our conclusion that the traffic generated from the proposed residential development at 7170 Goreway Drive will not materially impact operations of the boundary road network. The Official Plan Amendment, Zoning By-Law Amendment and Site Plan Applications can be supported from a haffic operations perspective as the boundary road system can accommodate the increase in the control of the proposed development.

Submitted by,

C.F. CROZIER & ASSOCIAT

9NOP. A. APASNORE 100521492

C.F. CROZIER & ASSOCIATES INC.

Peter Apasnore MASc., P.Eng.,

Project Engineer

R. Aaron Wignall
Associate, Transportation

# Attachment A

### 7170 Goreway Road, City of Mississauga Comment Response Matrix – File. No. OZ/OPA 18 13 & 21T-M 18 3 Third Submission

City of Mississauga, Transportation and Works, Traffic Review (PPP)	
COMMENT	RESPONSE
[Sept 2021 Update ] - Updated Traffic Opinion Letter prepared by Crozier, dated July 2021 has been reviewed, and the following comments remain outstanding. In addition to the sightline analysis provided, please evaluate stopping sight distance and turning sight distance at the proposed access in accordance with TAC methodology, and considering any surrounding obstructions adjacent to the access (e.g. fencing, trees, foliage). Please confirm whether the minimum sightline distances outlined in the	The current site plan proposes a 10X10m sight triangle, consistent with the request of City staff. The new 10X10m sight triangle was coordinated with City staff and further agreed upon through a meeting and email correspondence with staff. The latest site plan and expects of correspondence with City staff is included in the Updated Traffic Opinion Letter (TOL).
TAC manual are met, whether the access will operate safely, and any recommendations/mitigation measures necessary. Please contact Jim Kartsomanis, Supervisor, Traffic Systems & ITS (jim.kartsomanis@mississauga.ca, T 905-615-3200 ext.3964) for signal timing plan.	The intersection sight distance is the same as a turning sight distance and is more conservative compared to the stopping sight distance. As discussed in Section 5.1 of the TOL, the available intersection (or turning) and stopping sight distances are adequate at the proposed site access and no obstructions are proposed near the access.
[TRAFFIC OPINION LETTER]	(i) A sightline assessment was included in <b>Section 5.1</b> of the previous and current TOL.
The following shall be included and/or updated in the Traffic Opinion Letter prepared by Crozier, dated December 2017:	(ii) The original existing (2017) signal timing plan that was
(i) A sightline analysis at the proposed access is referenced as part of the review but was not provided in the letter/study.	obtained from the City and used could not be retrieved. However, the signal timing plan and 2017 existing traffic operations are immaterial and irrelevant to the discussion as it
(ii) Include the Signal Timing Plan in the attachments.	is in the past. Further, the 2017 total traffic operations forecasted indicate adequate levels of service at that time and
Additional comments may be provided as a result of new and updated information.	the intersection operated below capacity. Further the trips from this site are low, thus 8 and 11 during the a.m. and p.m. peak hours.
[Sept 2021 Update] - This comment still remains outstanding. The site access curb radii must not extend beyond the projection of the property line. All plans must be revised accordingly.	Noted and revised on the latest site plan.
[SITE ACCESS]	

### 7170 Goreway Road, City of Mississauga Comment Response Matrix – File. No. OZ/OPA 18 13 & 21T-M 18 3 Third Submission

City of Mississauga, Transportation and Works, Traffic Review (PPP)	
COMMENT	RESPONSE
(i) Curb returns shall be contained within the site frontage. Please revise.	
[Sept 2021 Update] - This comment still remains outstanding. As per City of Mississauga Standards, the higher order road classification determines sight triangle dimensions for the intersection. Goreway Drive is classified as a Major Collector, the Draft Plan of Subdivision shall be revised to include a 15 by 15 metre sight triangle at the southwest corner of Goreway Drive and Etude Drive.  [ DRAFT PLAN OF SUBDIVISION APPROVAL]  The Draft Plan of Subdivision shall be revised to include a block for the 15 by 15 metre sight triangle at the south-west corner of Goreway Drive and Etude Drive.	Based on discussions with City staff a 10X10m sight triangle was investigated and found to be adequate for the subject intersection and satisfies the TAC sight distance requirements. Excerpts of correspondence with staff is included in Attachment A of the TOL.  The current site plan proposes a 10X10m sight triangle, consistent with the request of City staff. Refer to Figure 2 of the TOL for the latest site plan.
[T PLAN REVISIONS]  (i) The plans are to be revised to illustrate the required Land Dedications & Conveyances including the Lot/Block or Part numbers.	Addressed in the previous Submission.
It appears as though portions of the north-east corner of the development are encroaching within the municipal right of way. These encroachments are to be removed from the municipal right-of-way.	Addressed in the previous Submission.

#### 7170 Goreway Road, City of Mississauga Comment Response Matrix – File. No. OZ/OPA 18 13 & 21T-M 18 3 Third Submission

City of Mississauga,	
Transportation and Works, Traffic Review (PPP)  COMMENT	RESPONSE
[LAND CONVEYANCES] The Owner will be required to gratuitously dedicate the following to the City of Mississauga:  (A) SIGHT TRIANGLES / ROUNDINGS	
(i) A 15 metre sight triangle at the (south-west) corner of Goreway Drive and Etude Drive.	
B) 0.3 METRE RESERVES	(A) As noted above, a 10X10m sight triangle was confirmed
(i) A 0.3 m reserve across the East frontage of Goreway Drive. The dimensions related to right-of-way widths and required widenings are to be verified by the City's O.L.S., Al Jeraj at 905-615-3200 ext. 5789.	with City staff and as shown on the site plan, this will be dedicated to the City accordingly.  (B) The 0.3m reserve is incorporate in the site plan accordingly.
The Owner is to contact Valeriya Danylova, Environmental Technologist (valeriya.danylova@mississauga.ca, 905-615-3200 ext. 5930) to ensure the required land dedication has no environmental conflicts.	
This condition will be cleared upon receipt of confirmation from Legal Services identifying that the transfer has taken place and associated fees have been paid.	

**Note:** Responses to remaining Traffic review and other department are not relevant to the Traffic Opinion Letter and therefore not included here. For all other comments, refer to the combined comments responses submitted by Weston Consulting as part of this resubmission.

#### **Peter Apasnore**

From: Bo Yu <BoYang.Yu@mississauga.ca>

Sent: January 24, 2022 2:31 PM

To: Mallory Nievas

Cc: Kurt Franklin; Peter Apasnore; Aaron Wignall; Ryan Au; Tara Sinden; Cameron Maybee;

Matthew Shilton

Subject: RE: 7170 Goreway Dr - Sight Triangle

**Attachments:** RE: 7170 Goreway Drive - Comments (OZ/OPA 18 13 & 21T-M 18 3)

Hi Mallory,

Staff are currently reviewing and in discussion of the recently revised 10x10m sight triangle drawing and its encroachment; I will provide a response back to you as soon as possible.

Thank you,

Во



#### Bo Yang Yu, C.Tech

Technologist-in-training T 905-615-3200 ext. 4784 boyang.yu@mississauga.ca

City of Mississauga | Transportation & Works Department 201 City Centre Drive, Suite 800 | Mississauga ON | L5B 2T4

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From: Mallory Nievas <mnievas@westonconsulting.com>

Sent: Monday, January 24, 2022 10:57 AM

To: Bo Yu <BoYang.Yu@mississauga.ca>; Ryan Au <Ryan.Au@mississauga.ca>

Cc: Kurt Franklin < kfranklin@westonconsulting.com>; papasnore@cfcrozier.ca; awignall@cfcrozier.ca

Subject: RE: 7170 Goreway Dr - Sight Triangle

Good morning Bo and Ryan,

Hope you both had a great weekend. I am kindly following up on the below. Please let me know your thoughts when you have a moment.

Thanks!

#### MALLORY NIEVAS, BA, MES PI

**PLANNER** 

VAUGHAN 905.738.8080 x275 TORONTO 416.640.9917 x275 WESTONCONSULTING.COM





From: Mallory Nievas

Sent: January 20, 2022 12:31 PM

To: BoYang.Yu@mississauga.ca; Ryan.Au@mississauga.ca

Cc: Kurt Franklin < kfranklin@westonconsulting.com >; papasnore@cfcrozier.ca; awignall@cfcrozier.ca

Subject: 7170 Goreway Dr - Sight Triangle

Hi Bo and Ryan,

I am following up on the discussion you had with Peter at Crozier regarding the Sight Triangle. We are glad that a 10 x 10 triangle will work here. Thanks for your input on this. However, we would like to maintain the walkway for that last unit where it is located as moving it wouldn't be feasible due to the location of the risers. Also a direct walkway to the sidewalk would be preferably from an accessibility point of view. We can confirm that no part of the walkway will be elevated, thus no impact on the 10 x 10 triangle. We understand an encroachment agreement with the City would be necessary. Please let me know if this works with the City.

#### Thank you!

#### MALLORY NIEVAS, BA, MES PI

**PLANNER** 

VAUGHAN 905.738.8080 x275 TORONTO 416.640.9917 x275 WESTONCONSULTING.COM





#### **Peter Apasnore**

From: Bo Yu <BoYang.Yu@mississauga.ca>

**Sent:** January 19, 2022 10:58 AM

**To:** Peter Apasnore

**Cc:** Ryan Au; Aaron Wignall

**Subject:** RE: 7170 Goreway Drive - Comments (OZ/OPA 18 13 & 21T-M 18 3)

Hi Peter,

As discussed over the phone, would you please provide a revised plan showing no encroachment within the municipal right-of-way?

Thank you,



#### Bo Yang Yu, C.Tech

Technologist-in-training T 905-615-3200 ext. 4784 boyang.yu@mississauga.ca

<u>City of Mississauga</u> | Transportation & Works Department 201 City Centre Drive, Suite 800 | Mississauga ON | L5B 2T4

Please consider the environment before printing.

From: Peter Apasnore <papasnore@cfcrozier.ca>
Sent: Wednesday, January 19, 2022 10:15 AM

To: Bo Yu <BoYang.Yu@mississauga.ca>

**Cc:** Ryan Au <Ryan.Au@mississauga.ca>; Aaron Wignall <awignall@cfcrozier.ca> **Subject:** RE: 7170 Goreway Drive - Comments (OZ/OPA 18 13 & 21T-M 18 3)

Hi Bo,

Attached is a plan showing the 10X10m sight triangle. Let me know if you need anything else.

Regards,

**Peter Apasnore**, M.A.Sc., P.Eng., PTOE | Project Engineer 211 Yonge Street, Suite 301 | Toronto, ON M5B 1M4 T: 416.477.3392



Crozier Connections: f y in

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From: Bo Yu <BoYang.Yu@mississauga.ca>

Sent: January 19, 2022 9:15 AM

To: Peter Apasnore < papasnore@cfcrozier.ca>

Cc: Aaron Wignall <a href="mailto:csca">awignall@cfcrozier.ca</a>; Ryan Au <Ryan.Au@mississauga.ca</a> Subject: RE: 7170 Goreway Drive - Comments (OZ/OPA 18 13 & 21T-M 18 3)

Hi Peter,

Pleasure as always. Thank you for performing the exercise for the feasibility of a 10x10m sight triangle at the subject intersection. However, do you have a plan that you can share with this design? We would just like to ensure there are no other glaring concerns and make you create another set of design packages with a new sight triangle again.

Please do not hesitate to contact me if you have any questions.

Thank you,



#### Bo Yang Yu, C.Tech

Technologist-in-training T 905-615-3200 ext. 4784 boyang.yu@mississauga.ca

City of Mississauga | Transportation & Works Department 201 City Centre Drive, Suite 800 | Mississauga ON | L5B 2T4

Please consider the environment before printing.

From: Peter Apasnore <papasnore@cfcrozier.ca>

Sent: Tuesday, January 18, 2022 5:18 PM

To: Ryan Au < Ryan. Au@mississauga.ca >; Bo Yu < BoYang. Yu@mississauga.ca >

Cc: Tara Sinden <Tara.Sinden@mississauga.ca>; Kurt Franklin <kfranklin@westonconsulting.com>; Aaron Wignall

<a wignall@cfcrozier.ca>; Matthew Shilton < Matthew.Shilton@mississauga.ca>; Cameron Maybee

<<u>Cameron.Maybee@mississauga.ca</u>>

Subject: 7170 Goreway Drive - Comments (OZ/OPA 18 13 & 21T-M 18 3)

Hi All,

A pleasure chatting with you yesterday.

@Ryan and @Bo Yu As advised, we have explored alternative options to the previously proposed 8X15m and found that a 10X10m sight triangle at the subject intersection is feasible and satisfies intersection sightlines per TAC requirements. Considering a design speed of 70 km/h (on Goreway Drive), the intersection sight distance requirements at the eastbound approach of Etude Drive are 170m (south) and 130m (north). The 10X10m provides visibility of the intersection and allows for visibility beyond the noted TAC intersection sightlines.

I hope this clears the City's concerns regarding the sightlines – Please confirm so we can proceed with the 10X10m sight triangle in the resubmission. Happy to discuss further if you have any question.

Many Thanks,

#### **Peter Apasnore**

**From:** Peter Apasnore

Sent: September 1, 2020 12:23 PM
To: Ryan.Au@mississauga.ca

Subject: RE: 7170 Goreway Road (PA/ZBA 18 13 & Subdivision 21T-M 18 3)

Hi Ryan,

As discussed on phone, our update of the Traffic Letter will focus on addressing the comments and the following is agreed.

- We will keep a horizon of 2017 as requested per the original scope
- We will provide a rationale for analyzing only a.m. and p.m. peak hours
- The 8m X 15m sight triangle meets TAC and the City's Sign By-Law 54-02 requirements. We will provide further sightline review to support this as well as the proposed site access.
- Address all other minor comments received.

#### Regards,

From: Peter Apasnore

**Sent:** August 31, 2020 11:29 AM **To:** Ryan.Au@mississauga.ca

Subject: 7170 Goreway Road (PA/ZBA 18 13 & Subdivision 21T-M 18 3)

Hi Ryan,

I left you a voicemail, but thought I follow up with an email too.

We are looking to address the comments and update the TOL, but I will like to clarify some of the comments prior. If you or the staff the made the comments can contact me for a quick chat, that will be great.

Thank you,

#### Junaid Khan

From:

Linda Wu <Linda.Wu@mississauga.ca>

Sent:

Friday, June 16, 2017 2:18 PM

To:

Junaid Khan

Cc:

Leslie Green: Giancarlo Tedesco

Subject:

RE: 7170 Goreway Drive Terms of Reference (CFC#1346-4573)

**Attachments:** 

A100 - Development Concept.pdf

Follow Up Flag:

Follow up Flagged

Flag Status:

Hi Junaid,

We agree that a Traffic Opinion Letter is sufficient in this case. Please see our comments below regarding the TofR:

#### Site Access

- 1) The proposed access on Etude Drive is to be restricted to right-in-right-out only due to its proximity to the intersection of Goreway Drive and Etude Drive.
- 2) We are not supportive of the proposed right-in-right-out access on Goreway Drive due to the following reasons:
  - The proposed Etude Drive access would be sufficient to accommodate the future site traffic;
  - The proposed Goreway Drive would conflict with the existing Enbridge utility box on Goreway Drive, please note that any resultant utility relocation would be at the applicant's expense.

As such, the Goreway Drive access is to be removed.

#### Signal Timing

Please contact the following city staff for signal timing plans:

Jim Kartsomanis, Traffic Signal System Coordinator

Tel: 905-615-3200 ext. 3964

E-mail: Jim.Kartsomanis@mississauga.ca

#### Site Circulation

Truck turning templates are required if Fire or Waste Collection trucks need to enter/exit the subject site.

#### The ePlans (pre-consultation) comments provided by City staff based on the attached plan

This Section is of the opinion that the proposed access is to be restricted to a Right-in-Right-out only due to its proximity to the intersection of Goreway Drive and Etude Drive.

However, the applicant may explore a full-movement access by relocating the proposed access to the west limit of the subject property and this would require an access operational analysis. The traffic consultant should provide the scope of work for the analysis to this Section for review and receive confirmation prior to commencing of the study.

The applicant is advised that Enbridge is proposing to relocate infrastructure near the subject property. The applicant is strongly advised to contact Enbridge for further information.

Please see "Submission Requirements" folder for further information.

All landscaping and grading within close proximity to the proposed access points is to be designed to ensure that adequate sight distances are available for all approaching and exiting motorists and pedestrians.

Driveway accesses shall maintain a 1.5m setback from aboveground features such as utilities and trees.

Any above ground utilities located within 1.5m of a proposed access are to be relocated at the applicant's expense.

The applicant is to provide the rationale for proposing 8m by 15m daylight triangle.

Thanks,

Linda

From: Junaid Khan [mailto:jkhan@cfcrozier.ca]

**Sent:** 2017/05/29 2:50 PM **To:** Giancarlo Tedesco **Cc:** Aaron Wignall; Linda Wu

**Subject:** [WARNING: ATTACHMENT UNSCANNED]7170 Goreway Drive Terms of Reference (CFC#1346-4573)

Hi Giancarlo,

I hope my email finds you well. We have been retained to complete a Traffic Impact Study for a proposed residential development located at 7170 Goreway Drive in the City of Mississauga. The proposed development consists of 13 condominium townhouse units, a total supply of 30 parking spaces, including four visitor parking spaces (one being a barrier free accessible parking space). Two site accesses are proposed, one right-in/right-out access to Goreway Drive and one full-moves access to Etude Drive. Attached is the most recent Site Plan for your reference. I have detailed below our Terms of Reference for the requested study. We kindly request your feedback regarding our study assumptions.

The proposed development is expected to generate a total of 10 a.m. and 11 p.m. trips based on ITE Trip Generation (Landuse Category 230). Due to the small scale of the proposed development, would the submission of a Traffic Opinion Letter rather than a Traffic Impact Study be adequate? To complete the Traffic Opinion Letter, we will:

- Analyze the a.m. and p.m. peak hours to reflect the residential use of the development;
- Analyze the study intersection of Goreway Drive at Etude Drive;
- The study intersection will be analyzed under 2017 existing conditions and 2017 total traffic conditions;
- The site trip generation will be completed based on Institute of Transportation Engineers(ITE) data;
- Trip distribution will be based on Transportation Tomorrow Survey data and supported by existing travel
  patterns.

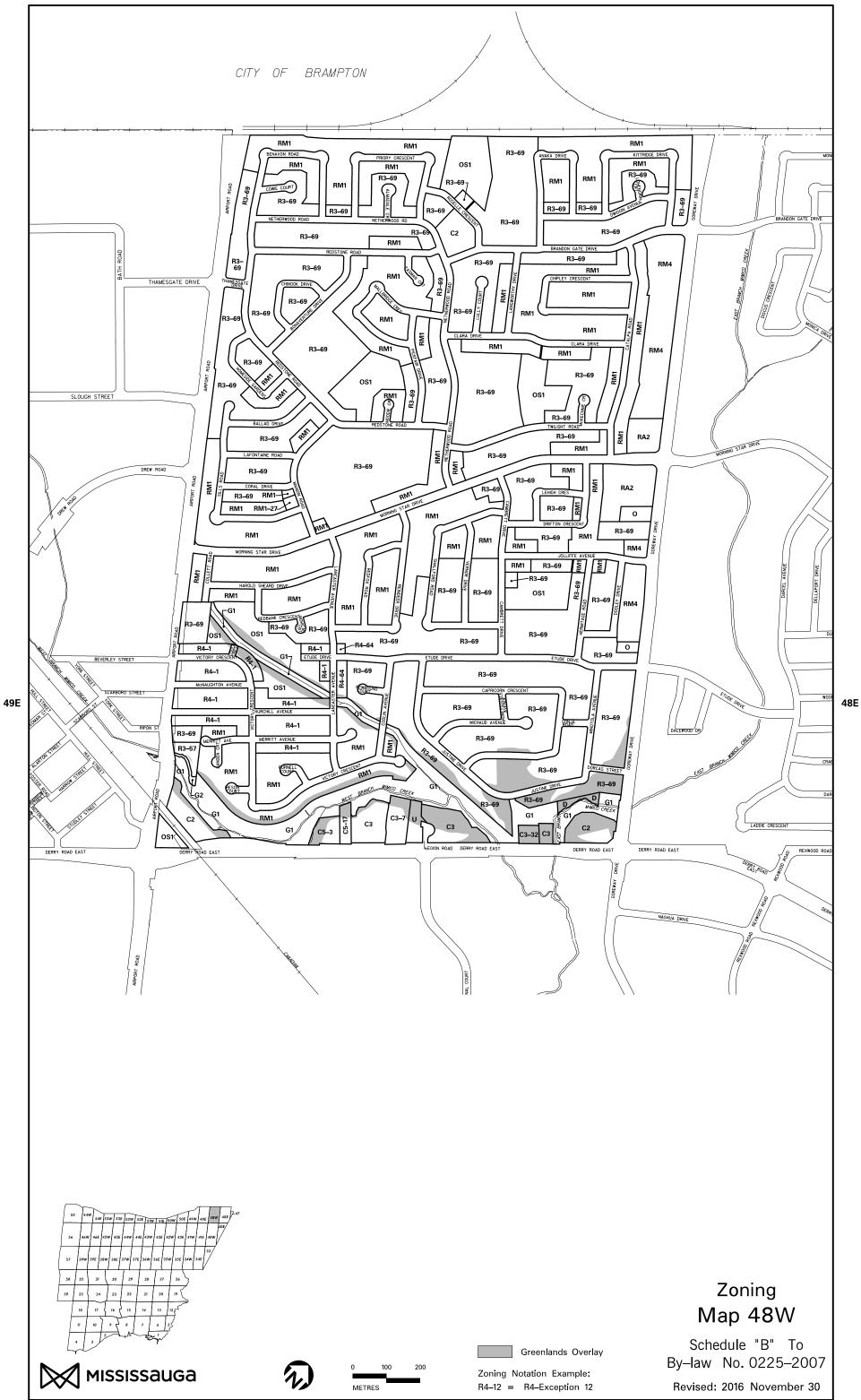
Also, if you could provide me a contact email to get the signal timings for the Goreway Drive at Etude Drive Road intersection that would greatly appreciated.

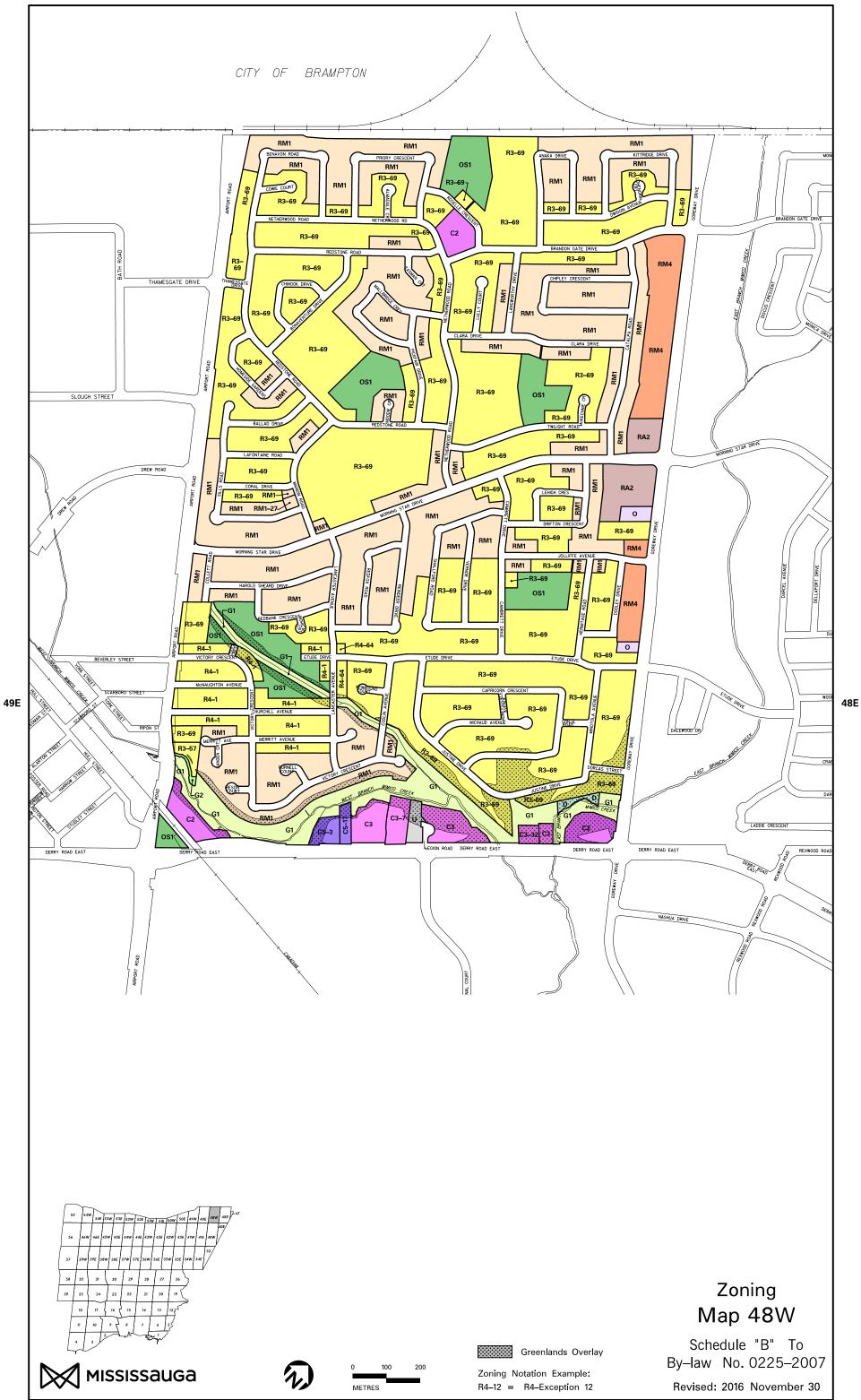
I hope the above is acceptable. Should you have any questions or concerns please feel free to contact myself or my colleague Aaron Wignall copied on this email.

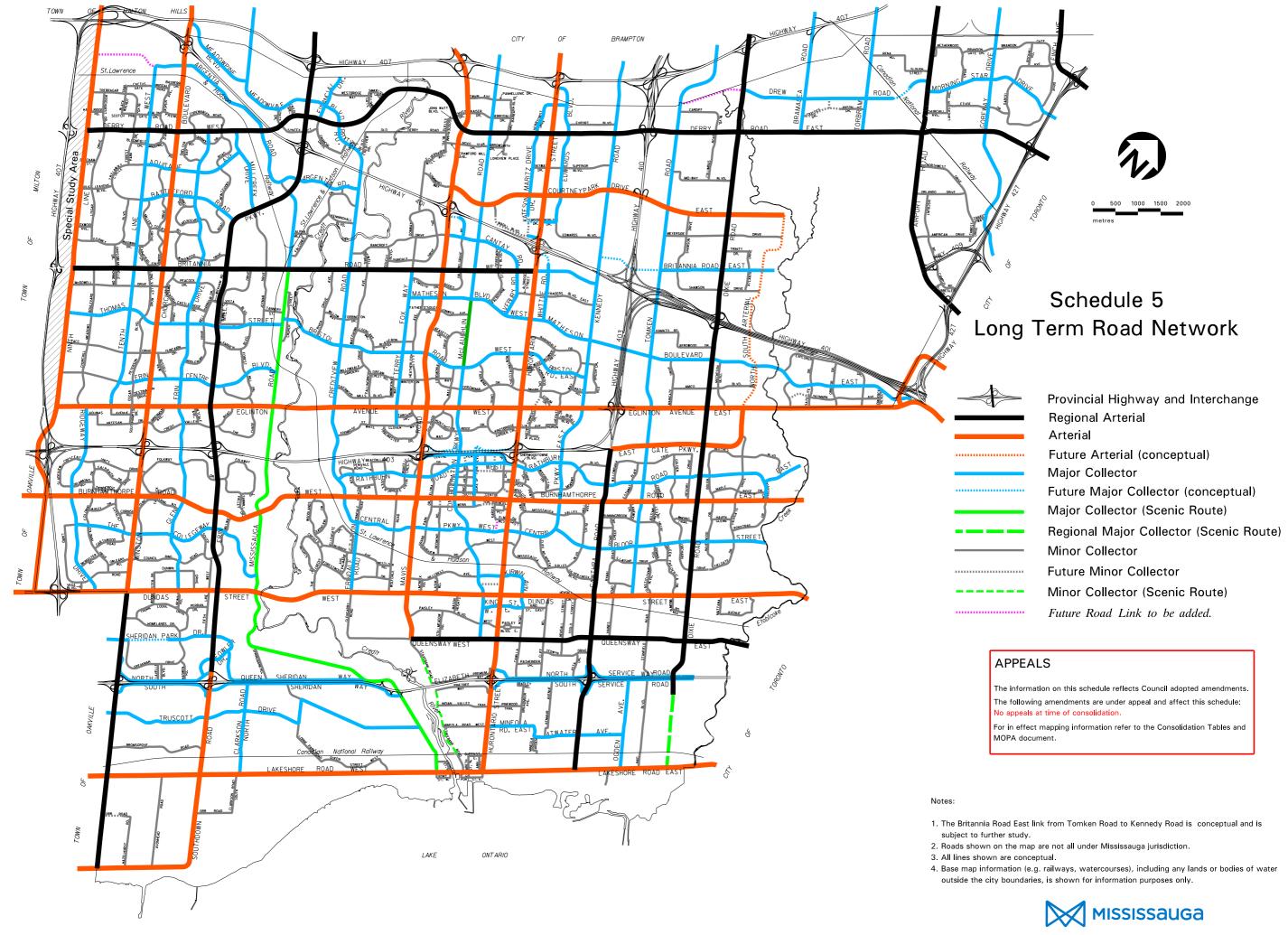
Thanks for your time,

| JUNAID KHAN | TRANSPORTATION EIT | C.F. CROZIER & ASSOCIATES | 2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4 | cfcrozier.ca | jkhan@cfcrozier.ca | tel 905 875 0026

# Attachment B











### 11 Westwood

**Monday-Sunday Service** 

Effective: January 28, 2013

Islington

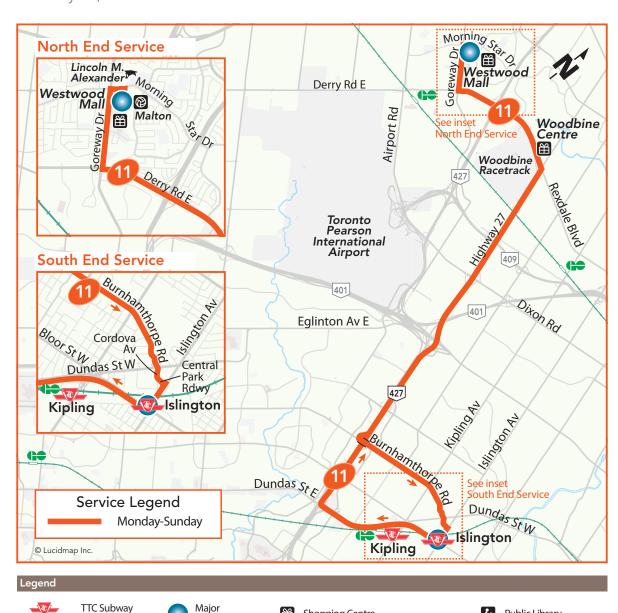
Clarkson

Station

**GO Train Station** 

**Transitway Station** 







Transit Terminal

Hospital

Ice Rink

**Shopping Centre** 

High School, University or College

Recreation or Community Centre



Public Library

Living Arts Centre

Civic Centre (City Hall)





## 12 Rexdale

## Monday-Friday Service

Effective: January 28, 2013

Islington

Clarkson

Station

**GO Train Station** 

**Transitway Station** 







Transit Terminal

Hospital

Ice Rink

**Shopping Centre** 

High School, University or College

Recreation or Community Centre



Public Library

Living Arts Centre

Civic Centre (City Hall)





## 24 Northwest

## Monday-Friday Service

**GO Train Station** 

Transitway Station

Clarkson 

Hospital

... Ice Rink

Effective: June 29, 2015







High School, University or College

Recreation or Community Centre



Living Arts Centre

Civic Centre (City Hall)





# 42 Derry

## **Monday-Sunday Service**

Effective: January 28, 2013









High School, University or College

Recreation or Community Centre

**Shopping Centre** 

Find a schedule or trip plan

Living Arts Centre

Civic Centre (City Hall)

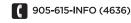




**GO Train Station** 

Transitway Station

Station





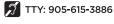






Islington

Clarkson 



Transit Terminal

Hospital

... Ice Rink





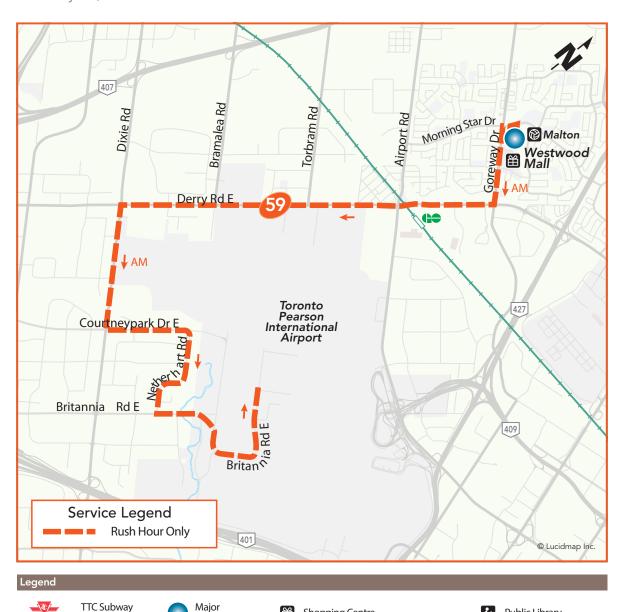


# 59 Airport Infield

Monday-Friday Service

Effective: January 28, 2013





**Transitway Station** ... Ice Rink

Customer Service - We're here to help



High School, University or College

Recreation or Community Centre

**Shopping Centre** 

#### Find a schedule or trip plan

Public Library

Living Arts Centre

Civic Centre (City Hall)



Station

**GO Train Station** 



Transit Terminal

Hospital





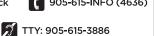






Islington

Clarkson



# Attachment C

#### Ontario Traffic Inc. **Morning Peak Diagram Specified Period One Hour Peak** From: 7:45:00 From: 7:00:00 To: 10:00:00 To: 8:45:00 Weather conditions: Municipality: Mississauga Site #: 1715800001 Intersection: Person(s) who counted: Goreway Dr & Etude Dr TFR File #: Count date: 30-May-17 \*\* Signalized Intersection \*\* Major Road: Goreway Dr runs N/S North Leg Total: 1819 Heavys 0 0 0 Heavys 0 East Leg Total: 464 Trucks 5 58 North Entering: 1325 41 12 Trucks 49 East Entering: 279 North Peds: 32 Cars 23 1199 45 1267 Cars 445 East Peds: 28 $\mathbb{Z}$ Totals 28 Peds Cross: ⋈ 1240 57 Totals 494 Peds Cross: Goreway Dr Heavys Trucks Cars Totals Trucks Heavys Totals Cars 154 163 0 56 72 0 73 139 11 150 Etude Dr 259 O Heavys Trucks Cars Totals Etude Dr 0 1 42 43 0 63 69 110 111 Trucks Heavys Totals 0 1 Cars 0 215 165 20 185 Goreway Dr $\mathbb{X}$ Peds Cross: 471 Peds Cross: $\bowtie$ Cars 1448 Cars 59 355 57 45 West Peds: 10 Trucks 53 Trucks 3 40 2 South Peds: 19 Heavys 0 0 West Entering: 223 Heavys 0 0 South Entering: 516 West Leg Total: 386 Totals 62 South Leg Total: 2017 Totals 1501 **Comments**

#### Ontario Traffic Inc. **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:45:00 To: 17:45:00 19:00:00 To: Weather conditions: Municipality: Mississauga Site #: 1715800001 Intersection: Person(s) who counted: Goreway Dr & Etude Dr TFR File #: Count date: 30-May-17 \*\* Signalized Intersection \*\* Major Road: Goreway Dr runs N/S North Leg Total: 2121 Heavys 0 0 Heavys 0 East Leg Total: 727 51 Trucks 2 2 North Entering: 780 47 Trucks 35 East Entering: 297 East Peds: North Peds: 59 Cars 36 611 81 728 Cars 1306 68 $\mathbb{Z}$ Totals 38 Peds Cross: Peds Cross: ⋈ 659 83 Totals 1341 Goreway Dr Heavys Trucks Cars Totals Trucks Heavys Totals Cars 282 290 0 45 107 106 0 144 0 145 Etude Dr 294 0 Heavys Trucks Cars Totals Etude Dr 0 1 47 48 0 0 124 124 2 70 72 Trucks Heavys Totals 0 Cars 0 241 426 430 Goreway Dr $\mathbb{X}$ Peds Cross: Cars 825 Peds Cross: $\bowtie$ Cars 140 1215 221 1576 40 West Peds: 17 Trucks 50 Trucks 5 33 2 South Peds: 20 0 0 West Entering: 244 Heavys 1 Heavys 0 South Entering: 1616 West Leg Total: 534 Totals 876 Totals 145 1248 South Leg Total: 2492 **Comments**

## **Total Count Diagram**

Municipality: Mississauga Site #:

1715800001

Intersection: Goreway Dr & Etude Dr

TFR File #:

Count date: 30-May-17

#### Weather conditions:

Person(s) who counted:

#### \*\* Signalized Intersection \*\*

North Leg Total: 12384

North Entering: 6120 North Peds: 329

Peds Cross: ⋈ Heavys 0 3 0 3 347 Trucks 20 303 24 Cars 203 5208 359

5514

5770 383

Goreway Dr

Heavys 0 Trucks 342 Cars 5922

Totals 6264

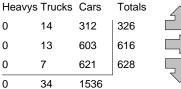
Major Road: Goreway Dr runs N/S

East Leg Total: 3988 East Entering: 1939 East Peds: 379  $\mathbb{Z}$ Peds Cross:

Heavys Trucks Cars Totals 47 1409 1456



Etude Dr





Totals 223





Etude Dr

Trucks Heavys Totals Cars 25 0 362 626 11 0 0 951 Λ

Goreway Dr

Trucks Heavys Totals Cars 51 1997 2049

 $\mathbb{X}$ Peds Cross: West Peds: 107 West Entering: 1570 West Leg Total: 3026

0

0

0

Cars 6756 Trucks 334 Heavys 3 Totals 7093

Cars 591 5273 1035 6899 Trucks 16 303 14 333 Heavys 0 1 1 Totals 607 5576 1050

Peds Cross:  $\bowtie$ South Peds: 127 South Entering: 7233 South Leg Total: 14326

#### **Comments**

# Ontario Traffic Inc. Traffic Count Summary

Hour Ending 7:00:00 8:00:00 9:00:00 10:00:00	Include Left	Appro es Cars, T	ach Tota	als													
7:00:00 8:00:00 9:00:00	Left	s Cars, T	oko 0 II.				South Approach Totals Includes Cars, Trucks, & Heavys										
7:00:00 8:00:00 9:00:00			rucks, & n			North/South											
8:00:00 9:00:00		Thru	Right	Grand Total	Total Peds	Total Approaches	Hou Endi		Left	Thru	Right	Grand Total	Total Peds				
9:00:00	1	5	0	6	0	6	7:00	0:00	0	0	0	0	0				
	32	1091	14	1137	41	1568	8:00:00		8:00:00		8:00:00		33	334	64	431	16
10.00.00	56	1206	24	1286	36	1794	9:00		69	382	57	508	15				
	38	656	20	714	25		10:00		39	379	80	498	9				
15:00:00	1	6	1	8	0		15:00		0	1040	0	1000	0				
16:00:00 17:00:00	49 63	749 624	50 30	848 717	29 61	2141	16:00 17:00		85 130	1016 1217	192 221	1293 1568	29 25				
18:00:00	72	628	35	735	58		18:00		137	1217	221	1585	13				
19:00:00	71	539	49	659	79		19:00		111	1003	211	1325	20				
Totals:			223 ach Tota		329	13319					1046 ach Tota		127				
Hour	Include	s Cars, I	rucks, & H	eavys Grand	Total	East/West Total	Hou		Include	s Cars, II	rucks, & H	eavys Grand	Total				
Ending	Left	Thru	Right	Total	Peds	Approaches	Endi	ng	Left	Thru	Right	Total	Peds				
7:00:00	0	1	0	1	0	1	7:00		0	0	0	0	0				
8:00:00	116	32	45	193	21	361	8:00		21	36	111	168	12				
9:00:00	162 124	76 36	53 31	291 191	32 46	512 355	9:00		43 37	77 49	101 78	221 164	8 8				
15:00:00	0	0	1	191	0		15:00		1	6	2	9	0				
16:00:00	136	120	74	330	87		16:00		53	111	87	251	17				
17:00:00	139	112	73	324	75		17:00		66	106	80	252	13				
18:00:00	145	121	43	309	58		18:00		53	107	80	240	15				
19:00:00	129	127	42	298	58	563	19:00	0:00	52	124	89	265	32				
Totals:	951	625	362	1938	377	3508			326	616	628	1570	105				
. 5.0.0.	50.	323				or Traffic Cr	ossin	a Ma			320	.5.5					
Hours End	lina:	8:00	9:00	10:00	15:00			<b>9 m</b> 3:00	17:00	18:00	19:00						
Crossing V		230	333	244	7			367	403	390	407						

Count Date: 30-May-17 Site #: 1715800001

		Passenç	ger Cars -	North Ap	proach			Tru	icks - Nor	h Appro	ach			Hea	ıvys - Nor	th Appro	ach		Pedestrians		
Interval	Lef	ft	Thr	u	Rig	ht	Le	ft	Th	ru	Rig	ght	Le	ft	Thi	ru	Rig	ıht	North	Cross	
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	
7:00:00	1	1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	14	13	280	275	3	3	1	1	11	11	0	0	0	0	0	0	0	0	13	13	
7:30:00	19	5	484	204	7	4	2	1	18	7	1	1	0	0	0	0	0	0	19	6	
7:45:00	20	1	776	292	8	1	3	1	33	15	1	0	0	0	0	0	0	0	37	18	
8:00:00	29	9	1053	277	11	3	4	1	43	10	3	2	2 0	0	0	0	0	0	41	4	
8:15:00	37	8	1363	310	17	6	8	4	54	11	4	1		0	0	0	0	0	51	10	
8:30:00	57	20	1692	329	26	9	12	4	65	11	6	2		0	0	0	0	0	61	10	
8:45:00	65	8	1975	283	31	5	15	3		9	6	0		0		0	0	0	69	8	
9:00:00	74	9	2215	240	32	1	15	0		13	6	0		0	0	0	0	0	77	8	
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15:30:00	129	14	3169	222	73	10	21	2		11	10	1		0	1	0	0	0	118	8	
15:45:00	143	14	3358	189	88	15	21	0		15	11	1		0		0	0	0		5	
16:00:00	156	13	3535	177	98	10	21	0		11	11	0	-	0	1	0	0	0	131	8	
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17:15:00	232	14	4261	149	129	5	22	0		13	16	1		0	3	1	0	0	209	17	
17:30:00	254	22	4426	165	139	10	24	2		9	16	0	-	0	3	0	0	0	222	13	
17:45:00	271	17	4559	133	150	11	24	0		10	16	0		0	3	0	0	0		11	
18:00:00	288	17	4694	135	157	7	24	0		13	17	1		0	3	0	0	0	250	17	
18:15:00	318	30	4836	142	170	13	24	0		7	18	1		0	3	0	0	0	273	23	
18:30:00	330	12 10	4976	140	188	18	24	0		11	18	0	_	0	3	0	0	0	299	26	
18:45:00	340		5090	114	194	6	24	0		10	19	<u>1</u>		0	3	0	0	0	306	7	
19:00:00	359	19	5199	109	203	9	24	0		6	20	•	-	0	3	0		0	329	23	
19:00:23	359	0	5208	9	203	0	24	0		1 0	20	0		0	3	0	0		329	0	
19:00:38	359	0	5208	0	203	0	24	0	303	0	20	0	0	0	3	0	0	0	329	0	

Count Date: 30-May-17 Site #: 1715800001

		Passen	ger Cars -	East Ap	proach			Tre	ucks - Eas	st Approa	ach		Heavys - East Approach							Pedestrians		
Interval	Lef	ft	Thi	ru	Rig	ht	Le	ft	Th	ru	Rig	ght	Le	ft	Thi	ru	Rig	ıht	East 0	cross		
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr		
7:00:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:15:00	24	24	8	7	6	6	1	1	0	0	1	1	0	0	0	0	0	0	3	3		
7:30:00	52	28	11	3	13	7	1	0	1	1	1	0	0	0	0	0	0	0	6	3		
7:45:00	82	30	19	8	30	17	3	2	1	0	2	1	0	0	0	0	0	0	11	5		
8:00:00	109	27	32	13	42	12	7	4	1	0		1	0	0	0	0	0	0	21	10		
8:15:00	149	40	46	14	55	13	8	1	1	0	-	4		0	0	0	0	0	26	5		
8:30:00	180	31	62	16	65	10	10	2			9	2		0	0	0	0	0	33	7		
8:45:00	221	41	91	29	78	13	14	4		0		1		0		0	0	0	39	6		
9:00:00	262	41	107	16	87	9	16	2		0		1		0	0	0	0	0	53	14		
9:15:00	282	20	112	5	93	6	17	1	2	0				0	0	0	0	0	64	11		
9:30:00	310	28	123	11	99	6	17	0						0		0	0	0	79	15		
9:45:00	349	39	133	10	110	11	17	0		0				0	0	0	0	0	84	5		
10:00:00	384	35	143	10	112	2	18	1	2	0	1	1		0	0	0	0	0	99	15		
10:00:23	384	0	143	0	112	0	18	0			1			0	0	0	0	0	99	0		
10:00:25	384	0	143	0	112	0	18	0		0		0		0	0	0	0	0	99	0		
15:00:00	384	0	143	0	113	1	18	0		0		0		0	0	0	0	0	99	0		
15:15:00	424	40	170	27	132	19	19	1	5	3	17	0		0	0	0	0	0	124	25		
15:30:00	453	29	191	21	147	15	20	1	6	1	19	2		0	0	0	0	0	154	30		
15:45:00	478	25	211	20	163	16	20	0	_	0		1		0		0	0	0		20		
16:00:00	517	39	257	46	184	21	21	1	8	2		0	-	0		0	0	0	186	12		
16:15:00	568	51	287	30	210	26	22	1	8	0		0		0	0	0	0	0	210	24		
16:30:00	592	24	325	38	231	21	22	0		0				0		0	0	0		14		
16:45:00	623	31	351	26	243	12	22	0		0		2		0	0	0	0	0	243	19		
17:00:00	655	32	369	18	253	10	22	0		0		0	_	0		0	0	0		18		
17:15:00	695	40	398	29	267	14	22	0		0		1		0	0	0	0	0	280	19		
17:30:00	731	36	427	29	277	10	22	0		0		0	-	0	0	0	0	0	300	20		
17:45:00	767	36	457	30	287	10	23	1	9	1	25	0		0		0	0	0		11		
18:00:00	799	32	489	32	295	8	23	0		0		0		0	0	0	0	0	319	8		
18:15:00	838	39	521	32	311	16	23	0		1	25	0		0	0	0	0	0	331	12		
18:30:00	855	17	555	34	312	1	23	0		0			_	0	0	0	0	0	351	20		
18:45:00	898	43	585	30	321	9	24	1	11	1	25	0		0	0	0	0	0		11		
19:00:00	927	29	614	29	337	16	24	0		0		0		0	0	0	0	0	377	15		
19:00:23	927	0	614	0	337	0	24	0		0				0		0	0	0		0		
19:00:38	927	0	615	1	337	0	24	0	11	0	25	0	0	0	0	0	0	0	379	2		

Count Date: 30-May-17 Site #: 1715800001

		Passeng	jer Cars -	South A <sub>l</sub>	proach			Tru	ıcks - Sou	th Appro	ach			Hea	vys - Sou	th Appro	ach		Pedestrians		
Interval	Lef	ft	Thi	u	Rig	ht	Le	ft	Th	ru	Rig	ght	Le	ft	Thi	ru	Rig	ıht	South	Cross	
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	6	6	62	62	17	17	0	0	5	5	1	1	0	0	0	0	0	0	0	0	
7:30:00	9	3	136	74	28	11	0	0	13	8	2	1	0	0	0	0	0	0	6	6	
7:45:00	22	13	206	70	42	14	1	1	23	10	4	2	2 0	0	0	0	0	0	11	5	
8:00:00	31	9	300	94	60	18	2	1	34	11	4	0	0	0	0	0	0	0	16	5	
8:15:00	51	20	390	90	71	11	2	0	44	10		0		0	0	0	0	0	22	6	
8:30:00	66	15	477	87	86	15	3	1	51	7	5	1		0	0	0	0	0	25	3	
8:45:00	81	15	561	84	99	13	4	1	63	12		1		0	0	0	0	0	30	5	
9:00:00	98	17	644	83	115	16	4	0		9		0		0	0	0	0	0	31	1	
9:15:00	106	8	726	82	135	20	4	0		14		0	-	0	0	0	0	0	31	0	
9:30:00	118	12	813	87	158	23	4	0		12		1	_	0	0	0	0	0	31	0	
9:45:00	128	10	889	76	180	22	5	1	112	14		1		0	0	0	0	0	36	5	
10:00:00	135	7	968	79	193	13	6	1	127	15		0		0	0	0	0	0	40	4	
10:00:23	135	0	968	0	193	0	6	0		0		0	_	0	0	0	0	0	40	0	
10:00:25	135	0	969	1	193	0	6	0		0		0		0	0	0	0	0	40	0	
15:00:00	135	0	969	0	193	0	6	0		0		0		0	0	0	0	0	40	0	
15:15:00	155	20	1153	184	250	57	7	1	141	14		0		0	0	0		0	41	1	
15:30:00	169	14	1420	267	284	34	7	0		12		1		0	0	0	0	0	54	13	
15:45:00	186	17	1696	276	331	47	9	2		21	9	0	-	0	0	0		1	63	9	
16:00:00	216	30	1928	232	383	52	10	1		10		0	-	0	0	0	1	0	69	6	
16:15:00	239	23	2205	277	440	57	10	0		9		0	-	0	0	0	1	0	80	11	
16:30:00	272	33	2488	283	499	59	10	0		12		1		0	0	0	1	0	86	6	
16:45:00	305	33	2778	290	548	49	10	0		19		0	-	0	0	0	1	0	86	0	
17:00:00	343	38	3097	319	602	54	13	3		8		1		0	0	0		0	94	8	
17:15:00	377	34	3365	268	656	54	14	1	241	9		1		0	0	0	1	0	100	6	
17:30:00	408	31	3676	311	705	49	15	1	251	10		0		0	0	0	1	0	104	4	
17:45:00	445	37	3993	317	769	64	15	0		6		0		0	0	0	1	0		2	
18:00:00	478	33	4287	294	822	53	15	0		12	1	0		0	0	0	1	0	107	1	
18:15:00	509	31	4512	225	874	52	15	0		4	12	0		0	0	0	1	0	112	5	
18:30:00	538	29	4822	310	922	48	16	1		14		1		0	0	0		0		10	
18:45:00	557	19	5010	188	975	53	16	0		4	13	0		0	0	0	1	0	122	0	
19:00:00	588	31	5257	247	1031	56	16	0		11	14	1		0	0	0	1	0	127	5	
19:00:23	588	0	5257	0	1031	0	16	0		0		0		0	0	0		0		0	
19:00:38	591	3	5273	16	1035	4	16	0	303	1	14	0	0	0	0	0	1	0	127	0	

# Ontario Traffic Inc.

Count Date: 30-May-17 Site #: 1715800001

		Passen	ger Cars -	West Ap	proach			Tru	ıcks - We	st Appro	ach			Hea	avys - Wes	st Appro	ach		Pedestrians	
Interval	Lef	ft	Thi	ru	Rig	ht	Le	ft	Th	ru	Rig	ght	Le	ft	Thi	ru	Rig	ıht	West 0	Cross
Time	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	2	2	8	8	27	27	1	1	0	0	0	0	0	0	0	0	0	0	2	2
7:30:00	6	4	18	10	55	28	1	0	0	0	0	0	0	0	0	0	0	0	5	3
7:45:00	15	9	25	7	81	26	2	1	1	1	0	0	0	0	0	0	0	0	9	4
8:00:00	19	4	35	10	111	30	2	0	1	0	0	0	0	0	0	0	0	0	12	3
8:15:00	30	11	47	12	146	35	3	1	3	2	0	0		0	0	0	0	0	12	0
8:30:00	42	12	63	16	172	26	3	0		2	0	0		0	0	0	0	0	15	3
8:45:00	57	15	88	25	191	19	3	0		2		1		0		0	0	0	19	4
9:00:00	60	3		16	211	20	4	1	9	2		0		0	0	0	0	0	20	1
9:15:00	67	7	113	9	236	25	4	0		0		0		0		0	0	0	21	1
9:30:00	74	7	123	10	253	17	4	0	9	0	1	0	0	0		0	0	0	23	2
9:45:00	84	10	137	14	270	17	6	2		0	1	0		0	0	0	0	0	26	3
10:00:00	94	10	153	16	287	17	7	1	9	0		2		0	0	0	0	0	28	2
10:00:23	95	1	157	4	289	2	7	0		0		0		0	0	0	0	0	28	0
10:00:25	95	0	157	0	289	0	7	0		0	3	0	,	0		0	0	0	28	0
15:00:00	95	0		2	289	0	7	0		0		0		0	0	0	0	0	28	0
15:15:00	108	13		30	306	17	7	0		0				0	0	0	0	0	35	7
15:30:00	115	7	209	20	343	37	7	0		1	3	0	_	0	0	0	0	0	37	2
15:45:00	137	22	235	26	357	14	7	0		1	3			0		0	0	0	42	5
16:00:00	147	10		33	374	17	8	1	11	0	_	2		0		0	0	0	45	3
16:15:00	164	17	291	23	394	20	8	0			5	0		0	0	0	0	0	46	1
16:30:00	176	12	306	15	416	22	9	1	13			0		0		0	0	0	47	1
16:45:00	193	17	331	25	438	22	10	1	13	0		0		0	0	0	0	0	52	5
17:00:00	210	17	372	41	454	16	11	1				0		0		0	0	0	58	6
17:15:00	221	11	407	35	475	21	11	0				1		0	0	0	0	0	59	1
17:30:00	228	7	422	15	487	12	11	0			-	1		0		0	0	0	65	6
17:45:00	240	12	455	33	508	21	11	0				0		0		0	0	0	69	4
18:00:00	262	22	479	24	532	24	12	1	13					0	0	0	0	0	73	4
18:15:00	274	12	527	48	553	21	12	0			1			0	0	0	0	0	81	8
18:30:00	289	15		26	578	25	13	1						0	0	0	0	0	95	14
18:45:00	299	10		26	595	17	14	1	13					0		0	0	0	97	2
19:00:00	312	13	603	24	621	26	14	0		0	7			0	0	0	0	0	105	8
19:00:23	312	0		0	621	0	14	0						0		0	0	0		2
19:00:38	312	0	603	0	621	0	14	0	13	0	7	0	0	0	0	0	0	0	107	0
			-												·					

# Attachment D

## Level of Service Definitions

# Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation					
		EXCELLENT. Large and frequent gaps in					
А	≤ 10	traffic on the main roadway. Queuing on					
		the minor street is rare.					
		VERY GOOD. Many gaps exist in traffic on					
В	$> 10$ and $\le 15$	the main roadway. Queuing on the minor					
		street is minimal.					
		GOOD. Fewer gaps exist in traffic on the					
С	$> 15$ and $\le 25$	main roadway. Delay on minor approach					
		becomes more noticeable.					
		FAIR. Infrequent and shorter gaps in traffic					
D	$> 25$ and $\le 35$	on the main roadway. Queue lengths					
		develop on the minor street.					
		POOR. Very infrequent gaps in traffic on					
E	$> 35$ and $\le 50$	the main roadway. Queue lengths					
		become noticeable.					
		UNSATISFACTORY. Very few gaps in traffic					
F	> 50	on the main roadway. Excessive delay					
Г	> 30	with significant queue lengths on the					
		minor street.					

Adapted from Highway Capacity Manual 2000, Transportation Research Board

# Level of Service Definitions

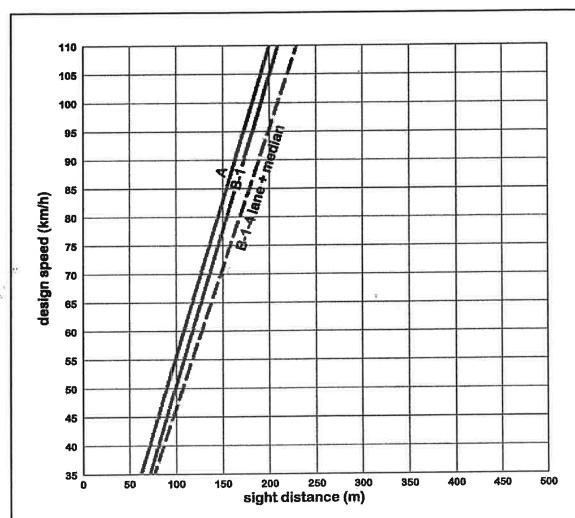
# Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
А	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
В	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
С	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board



Figure 2.3.3.4a Sight Distance for Crossing Movements and Vehicles Turning Left across Passenger Vehicle approaching from the Left



 $\mathsf{A}-\mathsf{sight}$  distance for passenger vehicle crossing a two –lane roadway from stop.

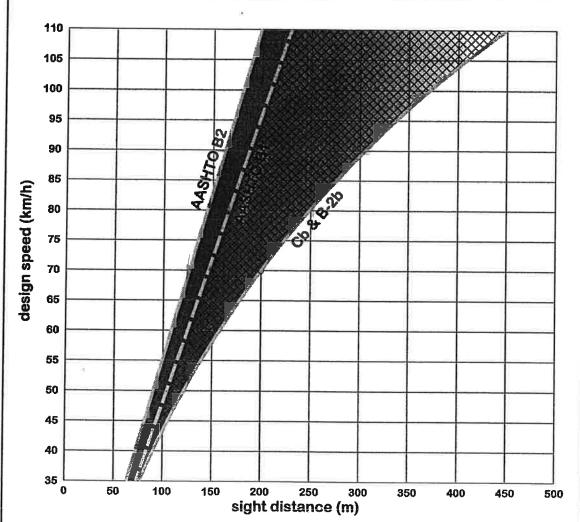
B-1 — sight distance for passenger vehicle turning left onto a two-lane roadway across passenger vehicle approaching from the left.

B-1-4 lane + median – sight distance for passenger vehicle turning left onto a four-lane roadway across passenger vehicle approaching from the left when median width is less than the vehicle length.



Figure 2.3.3.4b

Sight Distance for Turning Movements with Vehicles approaching in the Intended Direction of Travel 110



Area bounded by AASHTO B1 and B-2b (crosshatched) – design domain for sight distance for passenger vehicle to turn left onto a two-lane roadway without being overtaken by a vehicle approaching from the right.

Area bounded by AASHTO B2 and Cb (shaded) - design domain for sight distance for passenger vehicle to turn right onto a two-lane roadway without being overtaken by a vehicle approaching from the left.

# Attachment E

	۶	<b>→</b>	-	•	<b>4</b>	*	1	<b>†</b>	1	1	ļ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	- ↑		ň	1→		ሻ	<b>↑</b> β-		ሻ	<b>1</b>	
Traffic Volume (vph)	43	69	111	150	73	56	62	395	59	57	1240	28
Future Volume (vph)	43	69	111	150	73	56	62	395	59	57	1240	28
ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Storage Length (m)	55.0		0.0	35.0		0.0	0.0		0.0	25.0	,,,,,	0.0
Storage Lanes	1		0	1	I NOT	0	1	N. ELSON	0	1	97 55	0.0
Taper Length (m)	2.5			2.5			2.5			2.5		•
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.97	0.98		0.98	0.98	,,,,,	1.00	0.99	0.00	0.98	1.00	0.00
Frt		0.908			0.935	i fis		0.981		0.00	0.997	10.0
Flt Protected	0.950			0.950			0.950	0.001		0.950	0.001	2121
Satd. Flow (prot)	1789	1642	0	1706	1641	0	1738	3261	0	1508	3520	0
Flt Permitted	0.670			0.583	1011		0.072	OLUT		0.479	0020	U
Satd. Flow (perm)	1224	1642	- 0	1030	1641	0	132	3261	0	749	3520	0
Right Turn on Red			Yes		1011	Yes	IOL	OLOT	Yes	170	0020	Yes
Satd. Flow (RTOR)		68	All Dist		32	100		24	103		2	163
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		237.8	W 1177	. 15.17	202.3			57.3			147.3	
Travel Time (s)		17.1			14.6	3.5	40000	3.4			8.8	
Confl. Peds. (#/hr)	32		19	19		32	10	0.4	28	28	0.0	10
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
Heavy Vehicles (%)	2%	9%	1%	7%	2%	14%	5%	10%	3%	21%	3%	18%
Adj. Flow (vph)	45	73	117	158	77	59	65	416	62	60	1305	29
Shared Lane Traffic (%)		II SAUL	THE STATE	100		00	N POLICE	410	02	00	1303	29
Lane Group Flow (vph)	45	190	0	158	136	0	65	478	0	60	1334	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)		3.7			3.7	g	2011	3.7	ragni	Loit	3.7	riigitt
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)	4-36	1.6			1.6			1.6			1.6	
Two way Left Turn Lane					1.0			1.0			1.0	
Headway Factor	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19
Turning Speed (k/h)	24		14	24	0.00	14	24	0.00	14	24	0.00	14
Turn Type	Perm	NA	-11	Perm	NA	1000	pm+pt	NA	AL POSE I	Perm	NA	17
Protected Phases		4			8		5	2		1 01111	6	
Permitted Phases	4			8			2			6		1.25 13
Minimum Split (s)	42.0	42.0		42.0	42.0		12.0	63.0		63.0	63.0	
Total Split (s)	42.0	42.0		42.0	42.0	2000	15.0	63.0		63.0	63.0	1. 1.
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		52.5%	52.5%	
Maximum Green (s)	35.0	35.0		35.0	35.0		8.0	56.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lead/Lag					7.0		Lead	1.0		Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	13.0	13.0		13.0	13.0		, 00	42.0		42.0	42.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	

	<i>▶</i>	-	*	1	<b>—</b>	•	1	<b>†</b>		-	<b>↓</b>	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	35.0	35.0	in layer	35.0	35.0	Territ	71.0	71.0	1114	56.0	56.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.59	0.59		0.47	0.47	
v/c Ratio	0.13	0.36		0.53	0.27	BIE.	0.35	0.25		0.17	0.81	ANIE
Control Delay	32.6	23.4		43.1	26.5		15.7	11.5		20.3	32.4	
Queue Delay	0.0	0.0		0.0	0.0	1000	0.0	0.0		0.0	0.0	1 12 1
Total Delay	32.6	23.4		43.1	26.5		15.7	11.5		20.3	32.4	
LOS	C	C		D	C		В	В	CP II	C	C	N. I
Approach Delay		25.2			35.4			12.0			31.8	
Approach LOS	1 2 - 1 -	C	la City	La U	D			В		COLUMN TO A STATE OF	C	

Intersection Summary

Area Type:

Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 10 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

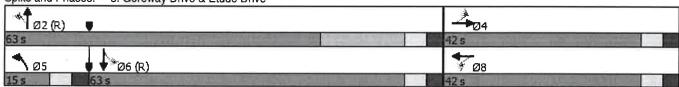
Natural Cycle: 120 Control Type: Pretimed Maximum v/c Ratio: 0.81

Intersection Signal Delay: 27.3 Intersection Capacity Utilization 104.0%

Intersection LOS: C
ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Goreway Drive & Etude Drive



	۶	<b>→</b>	•	•	<b>←</b>	•	•	†	~	<b>\</b>	<b>↓</b>	<b>√</b>
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	1>		7	<b>f</b> >		7	<b>†</b>		7	<b>1</b>	
Traffic Volume (vph)	48	124	72	145	107	45	145	1248	223	83	659	38
Future Volume (vph)	48	124	72	145	107	45	145	1248	223	83	659	38
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Storage Length (m)	55.0	1000	0.0	35.0	1000	0.0	0.0	1000	0.0	25.0	1000	0.0
Storage Lanes	1		0.0	1	2000	0.0	1		0.0	1	all liver	0.0
Taper Length (m)	2.5			2.5			2.5			2.5		•
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.95	0.99	1.00	0.98	0.98	1.00	0.99	0.99	0.00	0.99	1.00	0.00
Frt	0.00	0.945		0.50	0.956		0.00	0.977		0.55	0.992	XI July
Flt Protected	0.950	0.040		0.950	0.000		0.950	0.577		0.950	0.002	
Satd. Flow (prot)	1789	1773	0	1807	1772	0	1755	3424	0	1789	3380	0
Flt Permitted	0.631	1770	U	0.556	1/12	U	0.269	0424	U	0.110	0000	U
Satd. Flow (perm)	1127	1773	0	1041	1772	0	494	3424	0	206	3380	0
Right Turn on Red	1121	1775	Yes	1041	1112	Yes	777	3424	Yes	200	3300	Yes
Satd. Flow (RTOR)		25	168		18	res		30	168		CHUR7	res
		50							10/10	DW.	7	
Link Speed (k/h)					50			60			60	
Link Distance (m)		237.8	11 010		202.3			57.3			147.3	
Travel Time (s)	50	17.1	00	00	14.6	50	4=	3.4	00	00	8.8	31 PH
Confl. Peds. (#/hr)	59		20	20		59	17		68	68		17
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
Heavy Vehicles (%)	2%	0%	3%	1%	1%	2%	4%	3%	1%	2%	7%	5%
Adj. Flow (vph)	51	131	76	153	113	47	153	1314	235	87	694	40
Shared Lane Traffic (%)		ALC: NO	4-11						FILE	18	3 - 1	
Lane Group Flow (vph)	51	207	0	153	160	0	153	1549	0	87	734	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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	WHE
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2	10 10		6		
Minimum Split (s)	39.0	39.0		39.0	39.0		11.0	63.0		63.0	63.0	
Total Split (s)	42.0	42.0		42.0	42.0		15.0	63.0		63.0	63.0	200
Total Split (%)	35.0%	35.0%		35.0%	35.0%		12.5%	52.5%		52.5%	52.5%	
Maximum Green (s)	35.0	35.0		35.0	35.0	_ 10	8.0	56.0		56.0	56.0	K LE F
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3 4 1 4 1	3.0	3.0		3.0	3.0		3.0	3.0	SIL
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	G-5 (C)	7.0	7.0	1 7 7 7	7.0	7.0	
Lead/Lag	1.0	7.0		1.0	7.0		Lead	7.0		Lag	Lag	
Lead-Lag Optimize?							Yes	14.50		Yes	Yes	
Walk Time (s)	13.0	13.0		13.0	13.0		169	42.0		42.0	42.0	
Flash Dont Walk (s)												
	19.0	19.0		19.0	19.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	

	•	$\rightarrow$	•	6	•	•	4	<b>†</b>	-	-	<b>↓</b>	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	35.0	35.0		35.0	35.0		71.0	71.0		56.0	56.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.59	0.59		0.47	0.47	
v/c Ratio	0.16	0.39		0.50	0.30		0.41	0.76	14 5	0.91	0.46	172
Control Delay	33.2	32.2		42.3	31.0		14.4	20.9		103.4	22.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	SHA
Total Delay	33.2	32.2		42.3	31.0		14.4	20.9		103.4	22.8	
LOS	С	C		D	C		В	С		F	C	Bar.
Approach Delay		32.4			36.5			20.3			31.3	
Approach LOS		C			D		100	C		100	C	11,000

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: 115 Control Type: Pretimed Maximum v/c Ratio: 0.91

Intersection Signal Delay: 25.9
Intersection Capacity Utilization 112.7%

Intersection LOS: C
ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 3: Goreway Drive & Etude Drive



## Intersection: 3: Goreway Drive & Etude Drive

Movement	EB	EB	WB	WB	NB	NB	NB	B6	B10	B10	SB	SB
Directions Served	L	TR	L	TR	L	Т	TR	T	Т	Т	L	T
Maximum Queue (m)	44.5	65.8	37.2	76.4	24.9	45.8	48.2	2.0	2.2	13.6	27.3	147.8
Average Queue (m)	12.7	32.4	29.1	31.0	11.0	24.7	20.7	0.1	0.1	0.5	10.4	109.9
95th Queue (m)	29.5	54.8	42.1	64.5	21.2	42.7	40.3	1.4	1.6	5.6	26.3	149.4
Link Distance (m)		226.9		190.9	44.2	44.2	44.2	62.4	19.5	19.5		140.1
Upstream Blk Time (%)						0	0			0		2
Queuing Penalty (veh)						0	0			0		0
Storage Bay Dist (m)	55.0		35.0	1/-							25.0	
Storage Blk Time (%)	0	1	11	3							0	42
Queuing Penalty (veh)	0	0	14	4							1	24

# Intersection: 3: Goreway Drive & Etude Drive

SB	
TR	
133.5	
88.5	
128.2	
140.1	
1	
0	
	133.5 88.5 128.2

## Intersection: 10: Bend

Movement	SB	SB	
Directions Served	T	T	
Maximum Queue (m)	3.1	5.8	
Average Queue (m)	0.1	0.2	
95th Queue (m)	2.2	3.0	
Link Distance (m)	54.0	54.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

## **Network Summary**

# Intersection: 3: Goreway Drive & Etude Drive

Movement	EB	EB	WB	WB	NB	NB	NB	B6	B6	B11	B10	B10
Directions Served	L	TR	L	TR	L	Т	TR	Т	Т	Т	Т	T
Maximum Queue (m)	52.7	75.5	37.3	73.1	44.9	66.1	63.8	48.2	52.6	55.4	31.1	32.5
Average Queue (m)	13.2	34.3	28.1	32.3	19.5	58.3	58.3	21.3	22.3	4.7	16.0	22.6
95th Queue (m)	31.4	58.8	41.4	59.7	36.2	66.8	66.5	44.7	46.8	32.6	31.8	33.6
Link Distance (m)		226.9		190.9	44.2	44.2	44.2	62.4	62.4	54.0	19.5	19.5
Upstream Blk Time (%)					0	20	23			0	6	19
Queuing Penalty (veh)					0	0	0			0	0	0
Storage Bay Dist (m)	55.0		35.0									
Storage Blk Time (%)	0	1	8	5								
Queuing Penalty (veh)	0	1	12	7								

# Intersection: 3: Goreway Drive & Etude Drive

Movement	B10	SB	SB	SB	
Directions Served		L	Τ	TR	
Maximum Queue (m)	21.7	27.3	131.6	119.8	
Average Queue (m)	9.0	23.1	93.0	78.1	
95th Queue (m)	22.0	33.9	157.3	144.4	
Link Distance (m)	19.5		140.1	140.1	
Upstream Blk Time (%)	1		13	3	
Queuing Penalty (veh)	0		0	0	
Storage Bay Dist (m)		25.0			
Storage Blk Time (%)		48	26		
Queuing Penalty (veh)		156	22		

## Intersection: 6: Bend

Movement	SB	
Directions Served	T	
Maximum Queue (m)	2.2	
Average Queue (m)	0.1	
95th Queue (m)	1.5	
Link Distance (m)	44.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

#### **Network Summary**

	•	<b>→</b>	<b>*</b>	•	<b>←</b>	•	4	<b>†</b>	1	<b>&gt;</b>	ļ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	1>		ħ	<b>\$</b>		*1	1		7	<b>ተ</b> ኈ	
Traffic Volume (vph)	45	69	118	150	73	56	64	395	59	57	1240	28
Future Volume (vph)	45	69	118	150	73	56	64	395	59	57	1240	28
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Storage Length (m)	55.0		0.0	35.0		0.0	0.0		0.0	25.0		0.0
Storage Lanes	1.		0			0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.97	0.98		0.99	0.98		1.00	0.99		0.99	1.00	
Frt		0.906			0.935			0.981			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1640	0	1706	1642	0	1738	3262	0	1508	3520	0
Flt Permitted	0.670			0.532			0.112			0.479		
Satd. Flow (perm)	1226	1640	0	941	1642	0	205	3262	0	749	3520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		74			33			26			3	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		54.0			202.3			57.3			147.3	
Travel Time (s)		3.9			14.6			3.4			8.8	
Confl. Peds. (#/hr)	32		19	19		32	10		28	28		10
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
Heavy Vehicles (%)	2%	9%	1%	7%	2%	14%	5%	10%	3%	21%	3%	18%
Adj. Flow (vph)	47	73	124	158	77	59	67	416	62	60	1305	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	197	0	158	136	0	67	478	0	60	1334	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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	- 1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		Cl+Ex	CI+Ex		CI+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			CI+Ex			CI+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

		$\rightarrow$	*	1	_	_	1	Ŧ		-	¥	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	and all by	Perm	NA		pm+pt	NA		Perm	NA	71
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	39.0	39.0		39.0	39.0		11.0	63.0		63.0	63.0	
Total Split (s)	39.0	39.0		39.0	39.0		13.0	76.0		63.0	63.0	
Total Split (%)	33.9%	33.9%		33.9%	33.9%		11.3%	66.1%		54.8%	54.8%	
Maximum Green (s)	32.0	32.0		32.0	32.0		6.0	69.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lead/Lag							Lead			Lag	Lag	
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	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)	13.0	13.0		13.0	13.0			42.0		42.0	42.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	21.2	21.2		21.2	21.2		69.3	69.3		59.1	59.1	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.66	0.66		0.57	0.57	
v/c Ratio	0.19	0.50		0.83	0.38		0.30	0.22		0.14	0.67	
Control Delay	35.1	26.5		72.5	29.2		11.3	7.7		15.5	20.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.1	26.5		72.5	29.2		11.3	7.7		15.5	20.3	
LOS	D	С		Ε	С		В	Α		В	С	
Approach Delay		28.2			52.4			8.1			20.1	
Approach LOS		С			D			Α			С	

#### Intersection Summary

Area Type:

Other

Cycle Length: 115

Actuated Cycle Length: 104.6

Natural Cycle: 115

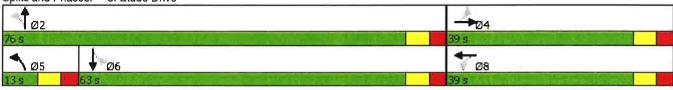
Control Type: Semi Act-Uncoord Maximum v/c Ratio: 0.83 Intersection Signal Delay: 22.1

Intersection Capacity Utilization 97.9%

Intersection LOS: C ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Etude Drive



## Intersection: 3: Etude Drive

Movement	EB	EB	WB	WB	NB	NB	NB	B6	B10	B10	SB	SB
Directions Served	L	TR	L	TR	L	Т	TR	Т	T		L	T
Maximum Queue (m)	38.9	43.6	37.3	107.2	26.6	52.2	52.7	1.8	11.6	2.6	27.2	144.0
Average Queue (m)	11.7	25.2	29.7	33.0	12.7	25.1	21.6	0.1	0.5	0.1	9.4	92.4
95th Queue (m)	28.6	44.2	42.4	75.4	22.7	44.9	43.5	1.5	5.1	1.6	23.8	137.0
Link Distance (m)		39.6		190.9	44.2	44.2	44.2	62.4	19.5	19.5		140.2
Upstream Blk Time (%)	0	5				1	1		0			1
Queuing Penalty (veh)	0	11				0	0		0			0
Storage Bay Dist (m)	55.0		35.0								25.0	
Storage Blk Time (%)	0	5	14	3							0	33
Queuing Penalty (veh)	0	2	18	5							2	19

## Intersection: 3: Etude Drive

Movement	SB	
Directions Served	TR	
Maximum Queue (m)	118.0	
Average Queue (m)	73.2	
95th Queue (m)	113.2	
Link Distance (m)	140.2	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

## Intersection: 8: Full Moves

Movement	EB	WB	NB	
Directions Served	TR	LT	LR	
Maximum Queue (m)	40.6	2.2	9.1	
Average Queue (m)	4.1	0.1	2.4	
95th Queue (m)	21.8	1.4	9.0	
Link Distance (m)	146.2	39.6	43.8	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

## Network Summary

Intersection	100	13 119	livto	S NIII	U.	
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1-			स	74	
Traffic Vol, veh/h	223	0	2	163	1	9
Future Vol, veh/h	223	0	2	163	1	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-		. 100	None	-	None
Storage Length		110110		-	0	-
Veh in Median Storage	,# 0			0	1	_
Grade, %	, # 0		-	0	0	
Peak Hour Factor	100	100	100	100	100	100
	2					
Heavy Vehicles, %		2	2	160	2	2
Mvmt Flow	223	0	2	163	1	9
Major/Minor N	/ajor1		Major2	1	Minor1	Litar
Conflicting Flow All	0	0	223	0	390	223
Stage 1					223	AT U
Stage 2		( <b>4</b> )	:=:	-	167	2
Critical Hdwy	:::		4.12		6.42	6.22
Critical Hdwy Stg 1	740				5.42	-
Critical Hdwy Stg 2			- 1		5.42	
Follow-up Hdwy			2.218		3.518	
Pot Cap-1 Maneuver			1346		614	817
Stage 1		-	1040		814	
	(♥)		•	-		
Stage 2		•			863	•
Platoon blocked, %	5 <b>4</b> ):	-	40.10		615	0.15
Mov Cap-1 Maneuver	*		1346	P. 8	613	817
Mov Cap-2 Maneuver	-			ž	661	ě
Stage 1		-		- 8	814	
Stage 2					861	
Approach	EB	at of	WB	100	NB	1.7
		100				
HCM Control Delay, s	0		0.1		9.6	
HCM LOS					Α	
Minor Lane/Major Mvmt	1	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		798			1346	
HCM Lane V/C Ratio		0.013	3			-
HCM Control Delay (s)		9.6			7.7	0
HCM Lane LOS		A			A	A
HCM 95th %tile Q(veh)		0			0	

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	۶	$\rightarrow$	•	1	-	•	4	<b>†</b>	1	-	ļ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Ť	Դ		ሻ	1>		F.	<b>↑</b> Ъ		Ť	<b>↑</b> Ъ	
Traffic Volume (vph)	49	124	75	145	107	45	151	1248	223	83	659	39
Future Volume (vph)	49	124	75	145	107	45	151	1248	223	83	659	39
Ideal Flow (vphpl)	1900	1900	1640	1900	1900	1640	1900	1900	1640	1900	1900	1640
Storage Length (m)	55.0		0.0	35.0		0.0	0.0		0.0	25.0		0.0
Storage Lanes	1		0	3.1		0	1		0	a 1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.97	0.99		0.99	0.99	.,,,	1.00	0.99		1.00	1.00	
Frt		0.944			0.956			0.977			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1690	0	1706	1717	0	1738	3250	0	1508	3481	0
Flt Permitted	0.621	1000		0.509			0.301	0200		0.133	0.01	·
Satd. Flow (perm)	1138	1690	0	901	1717	0	549	3250	0	211	3481	0
Right Turn on Red	1100	1000	Yes	001		Yes	0.10	0200	Yes		0101	Yes
Satd. Flow (RTOR)		26			18	100		32	100		7	100
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		53.6			202.3			57.3			147.3	
Travel Time (s)		3.9			14.6			3.4			8.8	
Confl. Peds. (#/hr)	32	0.0	19	19	14.0	32	10	0.4	28	28	0.0	10
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
Heavy Vehicles (%)	2%	9%	1%	7%	2%	14%	5%	10%	3%	21%	3%	18%
Adj. Flow (vph)	52	131	79	153	113	47	159	1314	235	87	694	41
Shared Lane Traffic (%)	32	101	13	130	110	7/	133	1314	200	07	034	41
Lane Group Flow (vph)	52	210	0	153	160	0	159	1549	0	87	735	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	
Median Width(m)	Len	3.7	rugnt	Leit	3.7	riigiit	Leit	3.7	riigiii	Leit	3.7	Right
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
		1.0			1.0			1.0			0.1	
Two way Left Turn Lane Headway Factor	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	1.19	0.99	0.99	4.40
Turning Speed (k/h)	24	0.99	1.19	24	0.99	1.19	24	0.99	1.19	24	0.99	1.19
Number of Detectors	1	2	14	1	2	14	1	2	14	1	2	14
Detector Template Leading Detector (m)	Left 6.1	Thru 30.5		Left	Thru 30.5		Left	Thru		Left 6.1	Thru	
	0.0			6.1 0.0			6.1	30.5 0.0		0.0	30.5	
Trailing Detector (m)	0.0	0.0			0.0		0.0				0.0	
Detector 1 Position(m) Detector 1 Size(m)	6.1	0.0 1.8		0.0 6.1	0.0 1.8		0.0 6.1	0.0 1.8		0.0 6.1	0.0	
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex			CI+Ex			1.8	
Detector 1 Channel	CITEX	CI+Ex		CITEX	CITEX		Cl+Ex	CITEX		Cl+Ex	Cl+Ex	
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
, ,											0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			Cl+Ex			Cl+Ex			CI+Ex	
Detector 2 Channel		0.0			0.0							
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

	*	-	•		-	*	1	†	~	-	<b>↓</b>	1
Lane Group	EBL	EBT	EBR W	BL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Pe	rm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	39.0	39.0	3	9.0	39.0		11.0	62.5		63.0	63.0	
Total Split (s)	39.0	39.0	3	9.0	39.0		11.0	76.0		65.0	65.0	
Total Split (%)	33.9%	33.9%	33.	9%	33.9%		9.6%	66.1%		56.5%	56.5%	
Maximum Green (s)	32.0	32.0	3.	2.0	32.0		4.0	69.5		58.0	58.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	3.5		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	1100 100	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	6.5		7.0	7.0	
Lead/Lag							Lead			Lag	Lag	
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	
Recall Mode	None	None	No	ne	None		None	Max		Max	Max	
Walk Time (s)	13.0	13.0	1	3.0	13.0			42.0		42.0	42.0	
Flash Dont Walk (s)	19.0	19.0	1	9.0	19.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	21.3	21.3	2	1.3	21.3		69.3	69.8		58.2	58.2	
Actuated g/C Ratio	0.20	0.20	0	.20	0.20		0.66	0.67		0.56	0.56	
v/c Ratio	0.23	0.58	0	.84	0.44		0.39	0.71		0.74	0.38	
Control Delay	36.0	38.7	7-	4.8	35.3		11.2	14.4		60.5	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.0	38.7	7	4.8	35.3		11.2	14.4		60.5	14.6	
LOS	D	D		Е	D		В	В		Е	В	
Approach Delay		38.2			54.6			14.1			19.4	
Approach LOS		D			D			В			В	

## Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 104.6

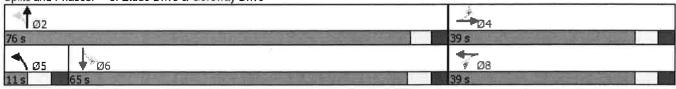
Natural Cycle: 115

Control Type: Semi Act-Uncoord Maximum v/c Ratio: 0.84 Intersection Signal Delay: 21.6 Intersection Capacity Utilization 105.2%

Intersection LOS: C ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Etude Drive & Goreway Drive



# Intersection: 3: Etude Drive & Goreway Drive

Movement	EB	EB	WB	WB	NB	NB	NB	B6	B6	B6	B11	B11
Directions Served	L	TR	L	TR	Ł	Т	TR	Т	T	T	Т	T
Maximum Queue (m)	38.5	42.8	37.3	124.7	60.3	70.0	70.2	15.6	48.8	52.3	24.2	74.3
Average Queue (m)	13.6	31.4	28.6	40.4	24.3	59.2	58.7	0.7	21.6	21.7	1.3	22.0
95th Queue (m)	33.4	49.4	43.9	95.3	47.0	70.5	71.1	7.0	44.9	46.9	15.4	75.1
Link Distance (m)		38.8		190.9	44.2	44.2	44.2	62.4	62.4	62.4	54.0	54.0
Upstream Blk Time (%)	0	9			3	18	21		0	0	0	2
Queuing Penalty (veh)	0	23			0	0	0		0	0	0	0
Storage Bay Dist (m)	55.0		35.0									
Storage Blk Time (%)	0	9	15	6								
Queuing Penalty (veh)	0	5	23	9								

## Intersection: 3: Etude Drive & Goreway Drive

Movement	810	B10	B10	SB	SB	SB	
Directions Served	Т	T		L	T	TR	
Maximum Queue (m)	31.2	34.2	25.4	27.4	155.8	147.8	
Average Queue (m)	12.9	21.6	10.3	26.5	134.4	116.5	
95th Queue (m)	31.8	39.5	25.3	29.9	172.0	163.1	
Link Distance (m)	19.5	19.5	19.5		140.0	140.0	
Upstream Blk Time (%)	4	20	2		36	3	
Queuing Penalty (veh)	0	0	0		0	0	
Storage Bay Dist (m)				25.0			
Storage Blk Time (%)				75	37		
Queuing Penalty (veh)				247	31		

#### Intersection: 8: Access

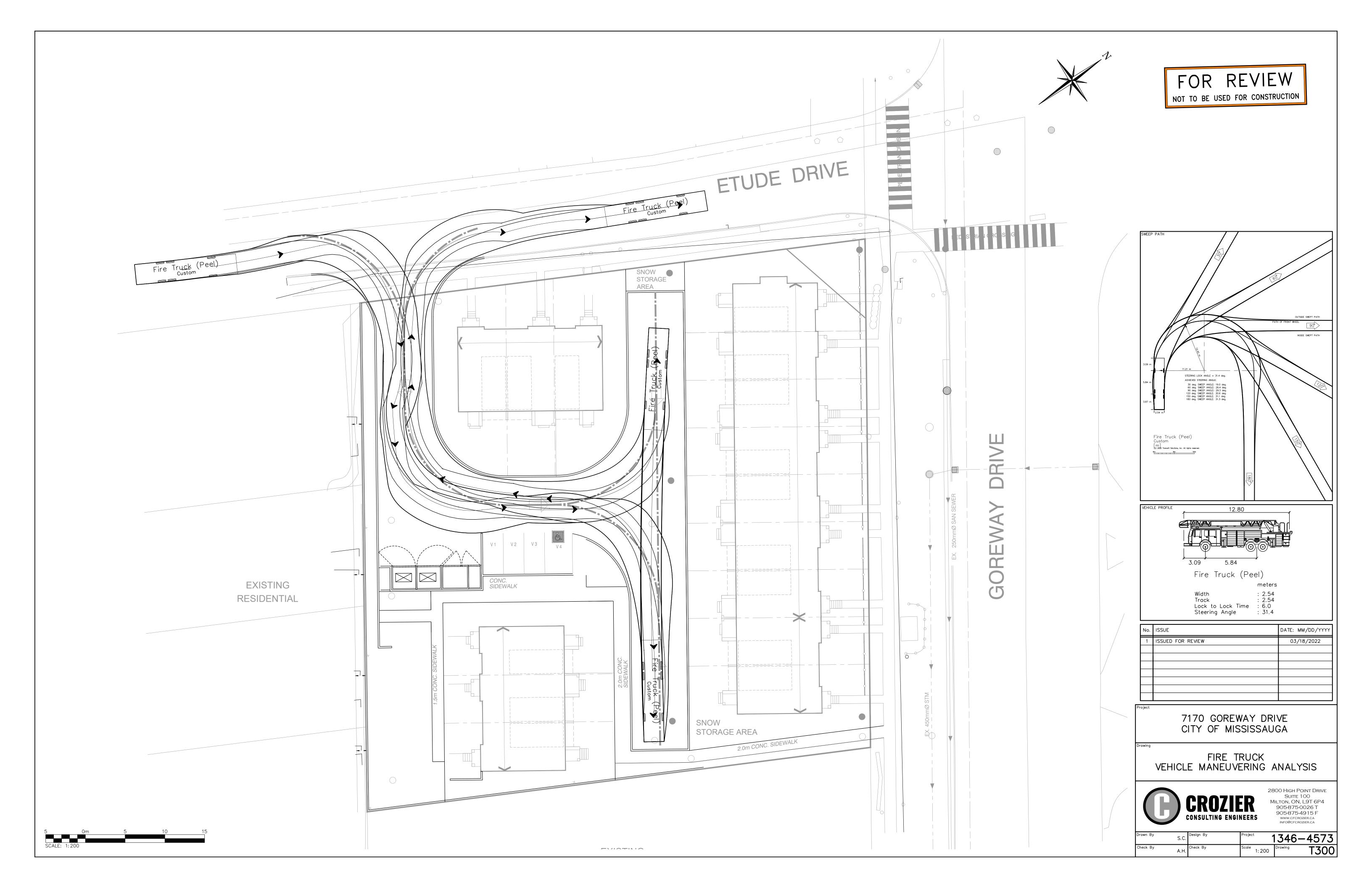
Movement	EB	WB	NB	
Directions Served	TR	LT	LR	
Maximum Queue (m)	40.8	17.6	9.1	
Average Queue (m)	6.4	0.8	1.0	
95th Queue (m)	24.3	6.7	5.6	
Link Distance (m)	146.2	38.8	59.1	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

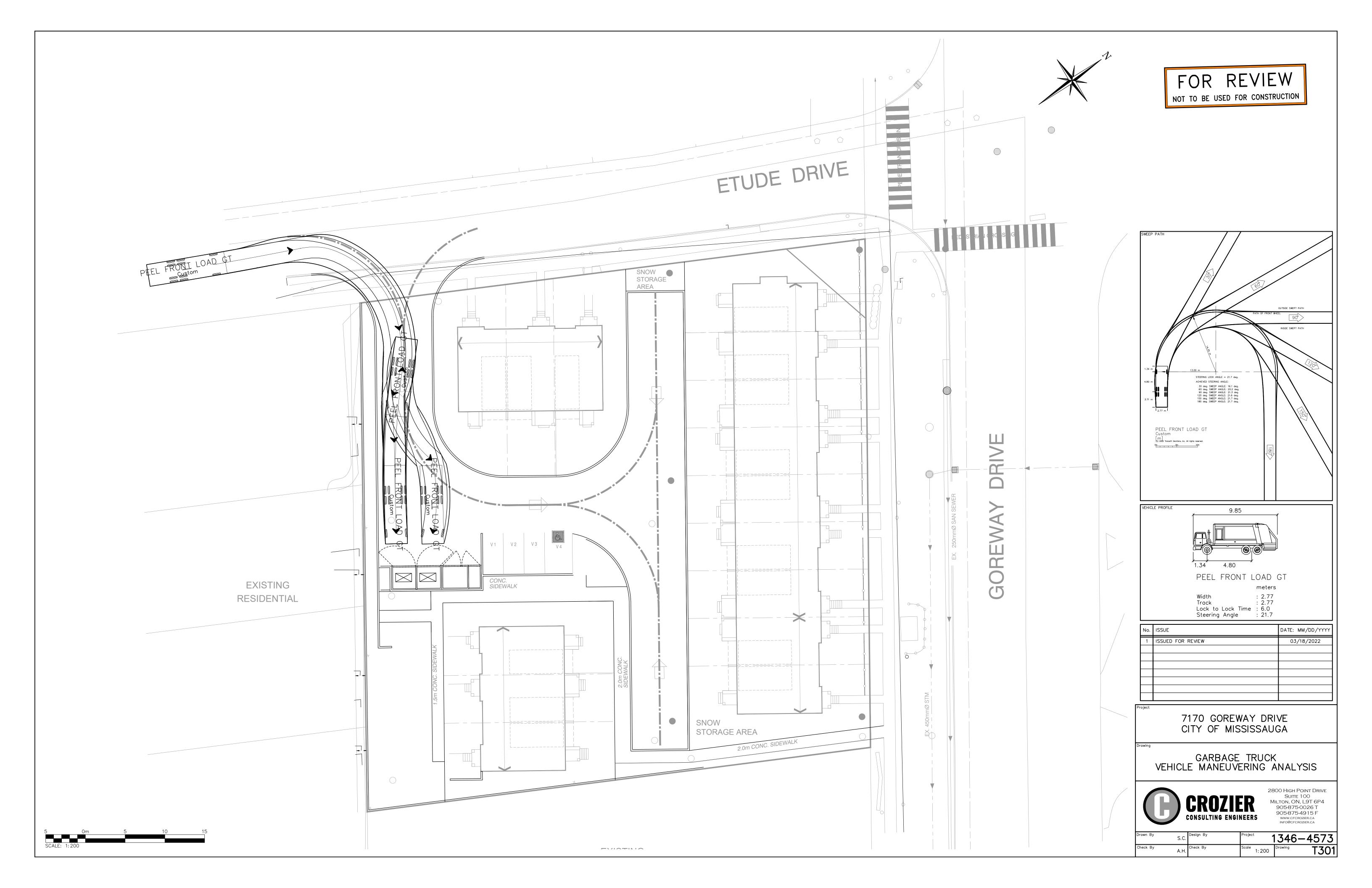
#### **Network Summary**

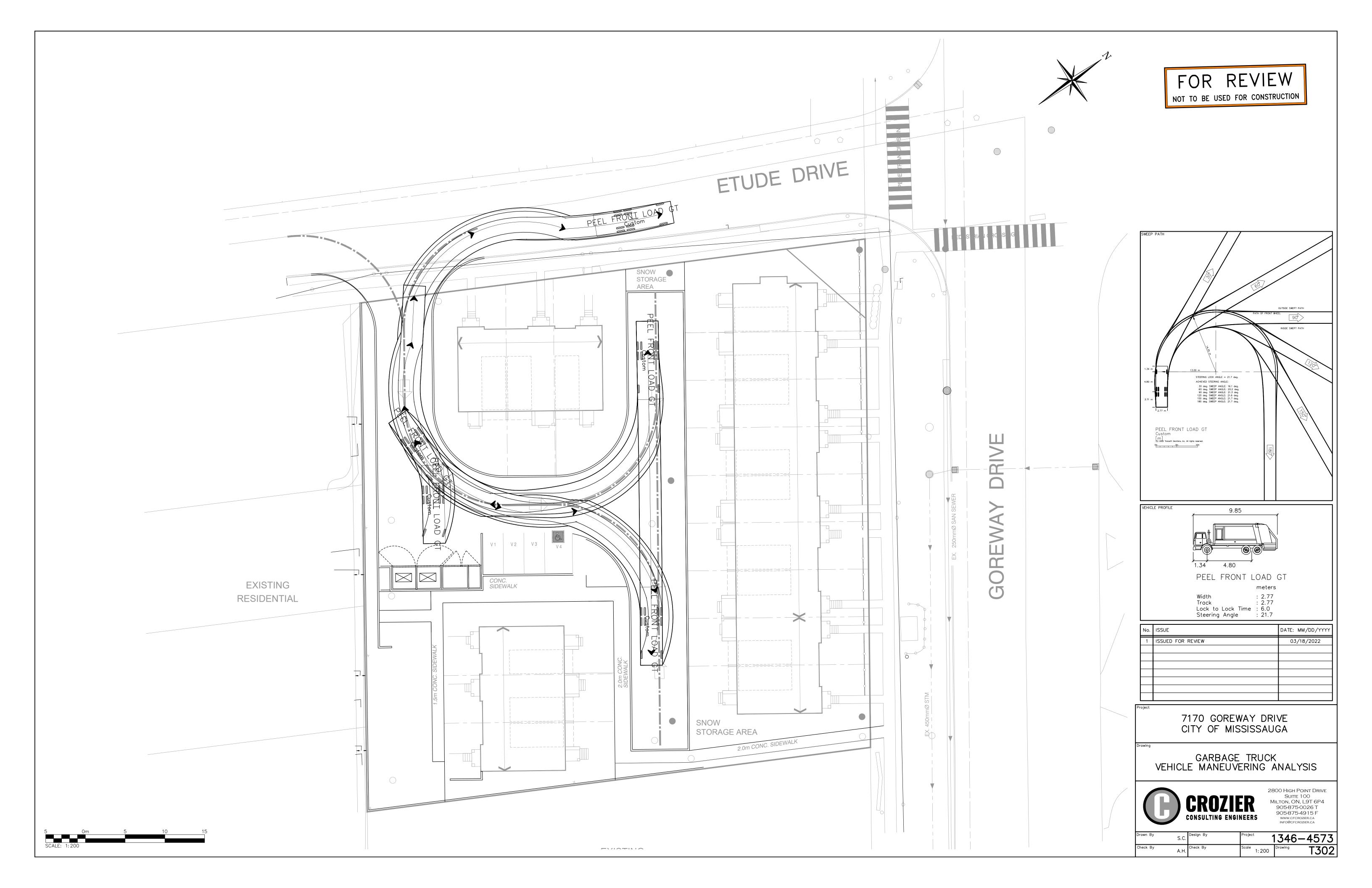
Int Delay, s/veh   0.2   Int Delay, s/veh   0.2   Int Delay, s/veh   0.2   Int Delay, s/veh   Int Delay, s
raffic Vol, veh/h
raffic Vol, veh/h
raffic Vol, veh/h
uture Vol, veh/h conflicting Peds, #/hr conflicting Length  - None
Conflicting Peds, #/hr   O   O   O   O   O   O   O   O   O
ign Control Free Free Free Free Free Stop Stop T Channelized - None - None - None torage Length 0 0 0 0 0 0 0 0 0 0 0 0
TChannelized - None - None - None torage Length 0 0 0
torage Length
eh in Median Storage, # 0 0 0 - erack, % 0 0 0 0 - eak Hour Factor 95 95 95 92 100 100 eavy Vehicles, % 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Paragraphic
eak Hour Factor 95 95 95 92 100 100 eavy Vehicles, % 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Payor Vehicles, %   2   2   2   2   2   2   2   2   2
Items
Algor   Major   Major   Minor   Major   Minor
Stage 1 257 - Stage 2 330 - ritical Hdwy 4.12 - 6.42 6.22 ritical Hdwy Stg 1 5.42 - 5.42 - 1111 5.42 - 5.42 - 1111 5.42 -
Stage 1 257 - Stage 2 330 - ritical Hdwy 4.12 - 6.42 6.22 ritical Hdwy Stg 1 5.42 - ritical Hdwy Stg 2 5.42 -
Stage 1 257 - Stage 2 330 - ritical Hdwy 4.12 - 6.42 6.22 ritical Hdwy Stg 1 5.42 - ritical Hdwy Stg 2 5.42 -
Stage 1       -       -       257       -         Stage 2       -       -       330       -         ritical Hdwy       -       4.12       -       6.42       6.22         ritical Hdwy Stg 1       -       -       -       5.42       -         ritical Hdwy Stg 2       -       -       -       5.42       -         collow-up Hdwy       -       2.218       -       3.518       3.318         ot Cap-1 Maneuver       -       1307       -       472       782         Stage 1       -       -       -       728       -         stage 1       -       -       -       469       782         ov Cap-2 Maneuver       -       -       -       469       -         Stage 2       -       -       -       724       -         ov Cap-2 Maneuver       -       -       -       724       -         opproach       EB       WB       NB         CM LOS       A     Inor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  apacity (veh/h)  782  - 1307  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.
Stage 2       -       -       330       -         ritical Hdwy       -       4.12       -       6.42       6.22         ritical Hdwy Stg 1       -       -       -       5.42       -         ritical Hdwy Stg 2       -       -       -       5.42       -         ollow-up Hdwy       -       2.218       -       3.518       3.318         ot Cap-1 Maneuver       -       1307       -       472       782         Stage 1       -       -       -       728       -         stage 2       -       -       1307       -       469       782         ov Cap-1 Maneuver       -       1307       -       469       782         ov Cap-2 Maneuver       -       -       786       -         Stage 1       -       -       724       -         opproach       EB       WB       NB         CM Control Delay, s       0       0.2       9.6         CM LOS       A     Interval Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  A  Interval Lane V/C Ratio  O.005  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.006  - 0.007  - 0.006  - 0.007  - 0.007  - 0.007  - 0.007
ritical Hdwy Stg 1 5.42 5.42
ritical Hdwy Stg 1 5.42 - ritical Hdwy Stg 2 5.42 - collow-up Hdwy - 2.218 - 3.518 3.318 cot Cap-1 Maneuver - 1307 - 472 782 Stage 1 786 - Stage 2 728 - latoon blocked, % cov Cap-1 Maneuver - 1307 - 469 782 ov Cap-2 Maneuver 1307 - 469 782 ov Cap-2 Maneuver 786 - Stage 1 786 - Stage 1 786 - Stage 2 724 -  coproach EB WB NB  CM Control Delay, s 0 0.2 9.6 CM LOS A  inor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT apacity (veh/h) 782 - 1307 - CM Lane V/C Ratio 0.005 - 0.006 -
ritical Hdwy Stg 2 5.42 - collow-up Hdwy - 2.218 - 3.518 3.318 ot Cap-1 Maneuver - 1307 - 472 782 Stage 1 786 - Stage 2 728 - datoon blocked, % 600 Cap-1 Maneuver - 1307 - 469 782 ov Cap-2 Maneuver 1307 - 469 - 5tage 1 786 - 5tage 2 724 724 724 724 724 725 CM LOS - A  Sinor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT apacity (veh/h) 782 - 1307 - CM Lane V/C Ratio 0.005 - 0.006
collow-up Hdwy       -       -       2.218       -       3.518       3.318         cot Cap-1 Maneuver       -       1307       -       472       782         Stage 1       -       -       -       786       -         Stage 2       -       -       -       728       -         alatoon blocked, %       -
ot Cap-1 Maneuver       -       1307       -       472       782         Stage 1       -       -       -       786       -         Stage 2       -       -       -       728       -         latoon blocked, %       -       -       -       -         ov Cap-1 Maneuver       -       1307       -       469       782         ov Cap-2 Maneuver       -       -       -       469       -         Stage 1       -       -       -       786       -         Stage 2       -       -       -       724       -         opproach       EB       WB       NB         CM Control Delay, s       0       0.2       9.6         CM LOS       A         inor Lane/Major Mvmt       NBLn1       EBT       EBR       WBL       WBT         apacity (veh/h)       782       -       1307       -       -         CM Lane V/C Ratio       0.005       -       0.006       -
Stage 1       -       -       -       786       -         Stage 2       -       -       -       728       -         latoon blocked, %       -       -       -       -       -         ov Cap-1 Maneuver       -       -       1307       -       469       782         ov Cap-2 Maneuver       -       -       -       469       -         Stage 1       -       -       -       786       -         Stage 2       -       -       -       724       -         oproach       EB       WB       NB         CM Control Delay, s       0       0.2       9.6         CM LOS       A     Interpretation of the control Delay of th
Stage 2       -       -       728       -         latoon blocked, %       -       -       -       -         ov Cap-1 Maneuver       -       -       1307       -       469       782         ov Cap-2 Maneuver       -       -       -       469       -         Stage 1       -       -       -       786       -         Stage 2       -       -       -       724       -         oproach       EB       WB       NB         CM Control Delay, s       0       0.2       9.6         CM LOS       A       Interpretation of the control Delay is approached by the control Delay is approa
Action blocked, %
Action blocked, %
ov Cap-1 Maneuver         -         -         1307         -         469         782           ov Cap-2 Maneuver         -         -         -         469         -           Stage 1         -         -         -         786         -           Stage 2         -         -         -         724         -           oproach         EB         WB         NB           CM Control Delay, s         0         0.2         9.6           CM LOS         A           inor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         1307         -           CM Lane V/C Ratio         0.005         -         0.006         -
ov Cap-2 Maneuver         -         -         469         -           Stage 1         -         -         -         786         -           Stage 2         -         -         -         724         -           opproach         EB         WB         NB           CM Control Delay, s         0         0.2         9.6           CM LOS         A           inor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         1307         -           CM Lane V/C Ratio         0.005         -         0.006         -
Stage 1         -         -         -         786         -           Stage 2         -         -         -         724         -           opproach         EB         WB         NB           CM Control Delay, s         0         0.2         9.6           CM LOS         A           inor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         1307         -           CM Lane V/C Ratio         0.005         -         0.006         -
Stage 2         -         -         -         724         -           oproach         EB         WB         NB           CM Control Delay, s         0         0.2         9.6           CM LOS         A        inor Lane/Major Mvmt     NBLn1     EBT     EBR     WBL     WBT     apacity (veh/h)     782     - 1307     -     CM Lane V/C Ratio     0.005     - 0.006     -
Deproach   EB   WB   NB   NB   CM Control Delay, s   0   0.2   9.6   CM LOS   A
CM Control Delay, s         0         0.2         9.6           CM LOS         A   inor Lane/Major Mvmt           NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         1307         -           CM Lane V/C Ratio         0.005         -         0.006         -
CM Control Delay, s 0 0.2 9.6  CM LOS A  inor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT  apacity (veh/h) 782 - 1307 -  CM Lane V/C Ratio 0.005 - 0.006 -
CM Control Delay, s         0         0.2         9.6           CM LOS         A           inor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         -         1307         -           CM Lane V/C Ratio         0.005         -         0.006         -
CM LOS         A           inor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           apacity (veh/h)         782         -         -         1307         -           CM Lane V/C Ratio         0.005         -         -         0.006         -
inor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT apacity (veh/h) 782 1307 - CM Lane V/C Ratio 0.005 0.006 -
apacity (veh/h) 782 1307 - CM Lane V/C Ratio 0.005 0.006 -
apacity (veh/h) 782 1307 - CM Lane V/C Ratio 0.005 0.006 -
CM Lane V/C Ratio 0.005 0.006 -
Divi Control Delay (5)
CM Lane LOS A A A
CM 95th %tile Q(veh) 0 0 -
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# Attachment F







# **FIGURES**



