Beachwood Road
Town of Wasaga Beach

Traffic Impact Study for
Beachwood Development Inc.

Type of Document:
Final Report

Project Number:
JDE – 20016

Date Submitted:
July 10th, 2020

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Executive Summary

This report summarizes the traffic impact study prepared for the proposed residential development located on the north side of Beachwood Road, west of 74th Street North, in the Town of Wasaga Beach [Town]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner. A reduction in the proposed parking supply, in context with the Town's requirements, was also assessed.

The proposed development includes the construction of 216 residential units, including 34 single-detached, 48 townhouse and 134 apartment units. It is anticipated that ultimate build-out will occur by 2023.

The proposed development will include one full-movement access driveway onto Beachwood Road, directly across from Joan Avenue [South Access] and a secondary access onto the proposed extension of Betty Boulevard, directly across from a future access for the Wasaga Shores Subdivision [North Access].

The scope of this analysis includes a review of the following intersections:

- South Access & Jean Avenue / Beachwood Road; and
- North Access & Wasaga Shores Access Betty Boulevard.

Conclusions

1. The proposed development is expected to generate a total of 101 AM and 125 PM peak hour trips.
2. Detailed midblock counts were completed on Beachwood Road, adjacent the subject site on Thursday February 13th & Friday February 14th, 2020.
3. An intersection operation analysis was completed at the study area intersections, using the existing and background (2023, 2028 and 2033) traffic volumes, with the adjacent development traffic and without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. The following transportation infrastructure improvements are recommended within the study area:

   Background (2023)

   Beachwood Road / Joan Avenue

   - Implementation of a westbound left turn lane

4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following transportation infrastructure improvements are recommended within the study area:

   Total (2023)

   Beachwood Road / Joan Avenue & South Access

   - Implementation of an eastbound left turn lane to ensure lane balance through the intersection

6. The following summarizes the recommended left turn lanes on Beachwood Road at Joan Avenue / South Access:

    - Westbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 30 metre storage length and a 15 metre offset to the centre of the intersection; and
    - Eastbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 15 metre storage length and a 15 metre offset to the centre of the intersection.

7. An alternate scenario whereby the subject site is developed prior to the construction of Joan Avenue was also analyzed to evaluate the necessity of the eastbound left turn lane to facilitate the subject site. After review, it is evident that the eastbound left turn lane is not necessary from an operational standpoint. The eastbound turn lane is only recommended from a lane balance perspective.

    It is recommended that the construction of the eastbound and westbound turn lanes be completed together, with the cost for the improvements distributed proportionately between the all benefiting parties, proportionately based on the projected volume of left turn traffic at the intersection.

8. The proposed Site Accesses will operate efficiently with one-way stop control for egress movements. A single lane for ingress and egress movements will provide the necessary capacity to convey the traffic volume generated by the proposed development.

9. The sight distance available for the proposed Site Accesses is suitable for the intended use.

10. The proposed parking supply for the apartment units within the subject site is 1.54 parking spaces / unit, less that the Town's By-Law requirement of 1.75 parking spaces / unit. Based on our parking analysis, the proposed parking supply considered sufficient for the intended use.

11. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

Beachwood Development Inc. [The Developer] is proposing a residential development on a site located on the east side of Beachwood Road, west of 74th Street North, in the Town of Wasaga [Town]. The proposed development includes the construction of 216 residential units, including 34 single-detached, 48 townhouse and 134 apartment units.

It is anticipated that ultimate build-out will occur by 2023.

The proposed development will include one full-movement access driveway onto Beachwood Road, directly across from Joan Avenue [South Access] and a secondary access onto the proposed extension of Betty Boulevard, directly across from a future access for the Wasaga Shores Subdivision [North Access].

The Developer has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

1.2 Study Area

Figure 1 shows the location of the subject site and study area intersections in relation to the surrounding area. The Draft Plan of Subdivision by Jones Consulting Group Ltd. is provided in **Appendix A**.

The subject site is bound by Beachwood Road to the south and existing residential property to the north, east and west.

Through consultation with the Town and the Ontario Ministry of Transportation [MTO], the following intersections are included in the traffic impact study:

- South Access & Joan Avenue / Beachwood Road; and
- North Access & Wasaga Shores Access / Betty Boulevard.

Figure 1 – Proposed Site Location and Study Area

1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site accesses and on the surrounding roadway network. The study analysis includes the following tasks:

- Consult with the Town to address any traffic-related issues or concerns they have with the proposed development;
- Determine existing traffic volumes and circulation patterns;

- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Review the proposed parking supply and assess the suitability for the proposed development;
- Review the available sight distance at the proposed site access driveways; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing year, ultimate buildout horizon year (2023), 5-year post-buildout horizon year (2028) and 10-year post-buildout horizon year (2033) were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

2 Information Gathering

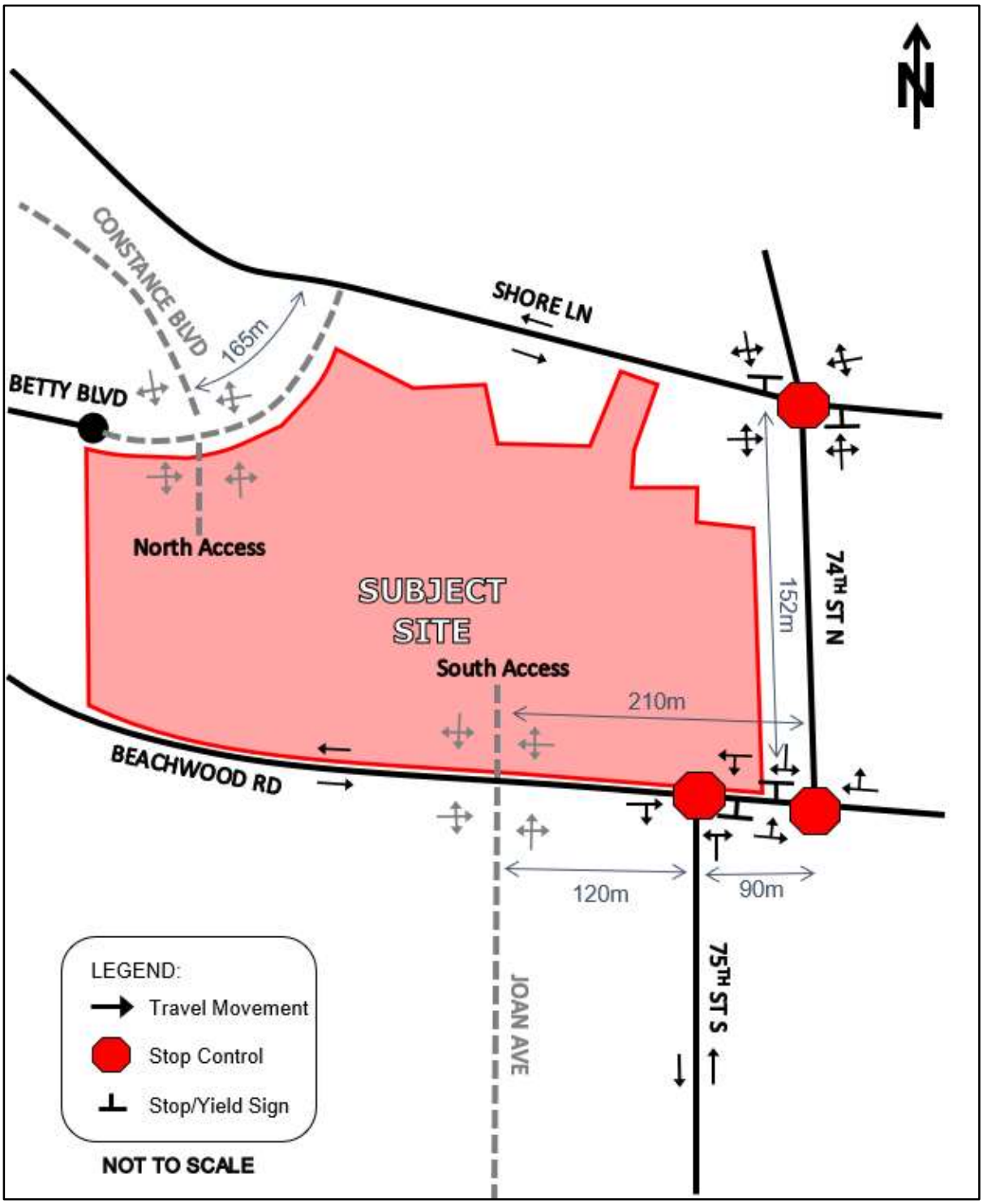
2.1 Street and Intersection Characteristics

Beachwood Road (formerly Highway 26) is designated as a Provincial Highway/Future Collector Road within the *Official Plan of the Town of Wasaga Beach* (Office Consolidation January 2020) with a posted speed limit of 80km/h within the study area. Approximately 190 metres west of 74 Street North, the speed limit transitions to 60km/h travelling east. Beachwood Road provides a two-lane rural cross-section with asphalt/gravel shoulders and open ditches. Beachwood Road is currently under the jurisdiction of MTO. It is understood that the roads ownership is planned to be "downloaded" to the Town of Wasaga Beach and Town of Collingwood in the near future.

Betty Boulevard is a two-lane local municipal road with an assumed (unposted) speed limit of 50km/h within the study area. Betty Boulevard has a rural cross-section with grassed shoulders on both sides of the road. Betty Boulevard currently terminates approximately 175 metres east of Thomas Street. Betty Boulevard is under the jurisdiction of the Town.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing (2020) Intersection Spacing and Lane Configuration with in Study Area



2.2 Local Transportation Infrastructure Improvements

Based on the Town's 2020 Capital Projects Map, there are no planned improvements to the existing road network in the study area. It is noted that the mapping highlights both the West End Public Works Depot and Water Tower projects that are set to occur on the south side of Beachwood Road, adjacent the subject site. As per the *West End Public Works Depot and Water Tower Traffic Brief* (further referenced in Section 2.4 of this report), the project will include the construction of Joan Avenue within the unopened municipal right-of-way, located approximately 120 metres west of 75th Street S. Joan Avenue will extend between Beachwood Road and Ayling Reid Court and provide access to the public works depot, water tower, business and industrial blocks on the west side of the road and single detached housing on the east side of the road.

2.3 Transit Access

Simcoe County Linx Transit provides one bus route within the study area. Route No. 4 provides bus service between Collingwood (Downtown) and Wasaga Beach (25 45th Street South) travelling along Beachwood Road in the study area.

Route No. 4 operates between 06:00 – 20:25 on weekdays and Saturdays with daytime service every 60 minutes. On Sundays, the route operates between 07:00 – 20:00 and provides service every 60 minutes. The closest bus stop to the subject site for Route No. 4 is located in the northwest and south east corner of the Beachwood Road / 74th Street North intersection. It is noted that with the construction of the proposed development, it is expected that an additional bus stop will be placed adjacent the subject site.

2.4 Other Developments within the Study Area

Through correspondence with Town staff and in review of the Town's Development Map, the following planned developments were noted for consideration with respect to impacts on the local traffic volumes / infrastructure capacity:

- Wasaga Shores Subdivision;
- Whitehead Development;
- West End Public Works Depot and Water Tower; and
- Sergautis Townhouse Development.

The proceeding sections outline the developments and their anticipated traffic generation.

2.4.1 Wasaga Shores Subdivision

The Wasaga Shores Subdivision is located a 2320 Shore Lane (north of the subject site) and consists of 22 single family detached units with access provided through extensions of Betty Boulevard and Constance Boulevard. It is noted that the roadway extensions will create a 4-leg intersection with the proposed North Access, with stop control on the north (Constance Boulevard) and south approaches (North Access). The residential lots will have connection to the adjacent roadways via individual private driveways. Trip generation and distribution for the development have been established based on the *Wasaga Shores Subdivision Traffic Brief* (C.C. Tatham & Associates Ltd., December 12, 2017), excerpts of which are provided in **Appendix B**. The AM and PM peak hour traffic volumes are illustrated in **Figure 3**. Build-out of the Wasaga Shores Subdivision has been assumed by 2023.

2.4.2 West End Public Works Depot & Water Tower

The West End Public Works Depot and Water Tower is located on the south side of Beachwood Drive (adjacent the subject site) and will include a water tower, a stormwater management pond, material storage structure and the potential for a future building with a small office and garage. Development of the Depot and Water Tower will include the construction of Joan Avenue within the existing unopened right-of-way located approximately 120 metres west of 75th Street South. Access to the development will be via direct connection on the west side of Joan Avenue, approximately 200 metres south of Beachwood Road.

Trip generation and distribution for the development has been established based on the *West End Public Works Depot and Water Tower Traffic Brief* (Ainley & Associates Limited, August 7, 2018), excerpts of which are provided in **Appendix B**. Further traffic generation was considered within the traffic brief for Block 4 and 5, which flank the development on its north and east side and additional lands on the east side of Joan Avenue. Blocks 4 and 5 were assumed to be developed as a business park/office/industrial land use, whereas the 15 lots on the east side of Joan Avenue were assumed as single-family detached units. It is noted that Block 4 encompasses the Whitehead Development lands, which has been considered separately in this study, based on latest correspondence with the Town. As such, the traffic generation for Block 4 has been removed from the traffic brief's trip generation. The AM and PM peak hour traffic volumes are illustrated in **Figure 4.** Build-out has been assumed by 2023.

2.4.3 Whitehead Development

Whitehead Development is located at 8813 Beachwood Road (adjacent the subject site), north of the proposed public works and water tower. Through correspondence with the Town staff it is understood that the development status is preliminary at this stage, with no formal submission at this time. Based on the pre-consultation meeting in the summer of 2019, the concept plan includes the development of approximately 230 townhouse units. Access to the site is expected to be via the construction of Joan Avenue. Build-out has been assumed for 2023.

The number of vehicle trips generated by Whitehead Development has been determined based on type of use, unit count, and trip generation equations as per the ITE Trip Generation Manual 10th Edition. Based on the site, the multi-family housing (low-rise) (ITE code 220) land-use has been applied. The corresponding trip generation equations and associated trip estimates are provided in **Table 1**.

Table 1 – Estimated Traffic Generation of Adjacent Development (Whitehead Development)

Land Use	Trip Basis	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Low-Rise) ITE Land Use: 220	equation	Ln(T) = 0.95 Ln(X) - 0.51			Ln(T) = 0.89 Ln(X) - 0.02		
	distribution	23%	77%	100%	63%	37%	100%
	estimate	24	81	105	78	46	124

Upon full build-out, the Whitehead Development is anticipated to generate 105 and 124 trips during the AM and PM peak hours, respectively.

The development trips have been distributed and assigned to the road network based on the trip distribution assumptions detailed in Section 4.2, and are illustrated in **Figure 5**.

2.4.4 Sergautis Townhouse Development

The Sergautis Townhouse Development is noted as a 55-lot subdivision on the Town's Proposed Development Map (dated February 2018). The Town's Engineering and Planning Staff have indicated that no applications or pre-consultations have followed the interest shown in 2018. Given the conceptual nature and unknown timeline for the development, the Sergautis Townhouse Development has not been accounted for specifically in this analysis.

2.4.5 Overall Adjacent Development

The total adjacent development volumes are illustrated in **Figure 6** (2023 horizon).

2.5 Betty & Constance Boulevard Extensions

As previously mentioned, the Betty and Constance Boulevard extensions will provide access to the Wasaga Shores development and create a 4-legged intersection with the North Access. In addition to servicing the development traffic, the extension will allow for existing traffic in the local area to change their travel pattern and utilize the new travel route.

Based on our review of the existing local road network and existing development, catchment areas were established to estimate the volume of traffic that would use the new extensions. The estimated number of lots for each catchment area is as follows:

- West Section (Betty Boulevard, East of Bayswater Drive) – 19 lots;
- East Section (Shore Lane, West of 74th St N) – 42 lots; and
- North Section (Constance Boulevard, East of Bayswater Drive) – 23 lots.

The above numbers reflect the lots along Shore Lane, Betty Boulevard, Constance Boulevard and Thomas Street that are in close enough proximity to the extensions to make utilizing the new roadways a potential alternative to the existing route. However, it is noted that not all travelers in these areas will choose to change their travel patterns and transverse the intersection, especially when considering the close proximity and easy access to the east-west travel corridor along Beachwood Road. As such, it was assumed that 50% of the catchment area lots will choose to utilize the new extensions.

Traffic volumes through the Betty Boulevard and Constance Boulevard extension were estimated based on the above lot numbers, the noted utilization assumption of 50% and trip generation rates for the single-detached land use (ITE code 210), as per the ITE Trip Generation Manual 10th Edition.

The corresponding trip generation equations and associated trip estimates are provided in **Table 2**.

Table 2 – Estimated Traffic Generation of Betty Boulevard & Constance Boulevard Extensions

Land Use / Section		Trip Basis / units	AM Peak Hour			PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Single Family Detached ITE Land Use: 210		equation	(T) = 0.71 (X) + 4.80			Ln(T) = 0.96 Ln(X) + 0.2		
		distribution	25%	75%	100%	63%	37%	100%
West Section	50% utilization	19 units	3	7	10	7	4	11
East Section		42 units	5	13	18	14	8	22
North Section		23 units	3	8	11	8	5	13

The above noted trips were distributed through road way extensions based on a 50/50 eastbound westbound split in context with lot location. It is noted that not all of the generated traffic will make its way through the extensions when considering the direction of travel (i.e. westbound traffic from west section and eastbound traffic from east section will not utilize the new roadways.)

The assignment of traffic through the Betty Boulevard and Constance Boulevard extension is illustrated in **Figure 7**.

2.6 Background Traffic Growth

Future traffic volumes in the study area have been estimated based on population projections in the Town's *Offical Plan Review Community Engagement & Consolation Summary Report* (dated September 2017). The report projected the Town's 2016 population of 20,675 will increase to 27,500 in 2031, translating to a growth rate of 1.92% per annum. We have assumed the same growth rate for traffic volume on Beachwood Road through the 2033 horizon year.

2.7 Traffic Counts

Detailed turning movement traffic and pedestrian counts were commissioned by JD Engineering on Beachwood Road approximately 120 metres west of 75th Street South from 07:00 -10:00 and 16:00-19:00 on Thursday February 13th and Friday February 14th, 2020.

Given the timing of the counts (winter) the peak hour volumes were compared to those available within the *West End Public Works Depot and Water Tower Traffic Brief*, conducted on Wednesday June 13, 2018 (summer). In review of the June counts, it is evident that a significant seasonal traffic fluctuation is experienced on Beachwood Road (upwards of a 60% increase). Rather than applying a blanket seasonal adjustment factor, it was chosen to utilize the available June counts, recognizing that they are less than 2 years old. The detailed traffic count data can be found in **Appendix C**.

Heavy vehicle percentages from the traffic count data have also been included in the Synchro analysis.

2.8 Existing Traffic Volumes

The 2020 existing AM and PM peak hour traffic volumes on Beachwood Road are illustrated in **Figure 8**, established based on the 2018 June counts, adjusted to reflect the annual background growth rate of 1.92%.

2.9 Horizon Year Traffic Volumes

The background (2023, 2028 and 2033) horizon year traffic volumes are illustrated in **Figure 9** through **Figure 11**. The background volumes are based on the June 2018 traffic volumes, adjusted to reflect the annual background growth rate of 1.92%, in addition to the adjacent development traffic volumes (outlined in Section 2.4) and Betty and Constance Boulevard extensions (outlined in Section 2.5).

3 Intersection Operation without Proposed Development

3.1 Introduction

Existing and background horizon operational conditions were established to determine how the street network within the study area is currently functioning without the proposed development. This provides a base case scenario to compare with future development scenarios. Traffic operations within the study area were evaluated using the existing and future background traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 10, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 9 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 3**. A description of traffic performance characteristics is included for each LOS.

Table 3 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

3.2 Existing Intersection Operation

Recognizing that the existing road network does not include any intersection movements, the operations have been limited to a review of the midblock traffic volumes. As per **Figure 8**, traffic volumes on Beachwood Road, adjacent the subject site, are in the range of 263 to 348 and 292 to 485 vehicles per lane during the AM and PM peak hours, respectively. In context with the capacity of a typical rural highway (1,000 vehicles per hour per lane), the road way is operating below 50% capacity. As such, no improvements are necessary to facilitate the existing conditions.

3.3 Background (2023) Intersection Operation

The results of the LOS analysis under background (2023) traffic volumes during the AM and PM peak hour can be found below in **Table 4**. Basic, two-lane intersection geometry and unsignalized traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 4 – Background (2023) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue / Beachwood Road (unsignalized)	-	2.5	A	-	2.4	B
EB	0.00	0.0	-	0.00	0.0	-
WB	0.03	1.0	A	0.07	2.2	A
NB	0.27	16.0	C	0.27	21.4	C
Constance Boulevard / Betty Boulevard (unsignalized)	-	4.7	A	-	2.8	A
EB	0.00	1.2	A	0.00	2.4	A
WB	0.00	0.0	-	0.00	0.0	-
SB	0.02	8.6	A	0.01	8.7	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

An analysis was completed for left turn movements at the unsignalized intersections, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. A design speed of 100km/h was utilized for the westbound direction (speed limit + 20 km/h for lower speed roads). Based on MTO DS criteria, a westbound left-turn lane with 25 metres of storage is warranted on Beachwood Road at the intersection of Joan Avenue (results provided in **Appendix G**). For a design speed of 100 km/h, left turns lanes are recommended to include a 115 metre taper, 40 metre parallel lane, minimum 15 metre storage length and 15 metre offset to the centre of the intersection.

A review of the need for auxiliary right turn lanes at unsignalized intersections was completed as part of our analysis. Right turn lanes are not recommended at the study intersections.

3.4 Background (2028) Intersection Operation

The results of the LOS analysis under background (2028) traffic volumes during the AM and PM peak hour can be found below in **Table 5**. The provision of a westbound left turn lane on Beachwood Road at the intersection with Joan Avenue has been included. It is noted that the recommend storage length remains at from 25 metres under the 2028 background volumes (results provided in **Appendix G**). Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 5 – Background (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue / Beachwood Road (unsignalized)	-	2.4	B	-	2.2	C
EB	0.00	0.0	-	0.00	0.0	-
WBL	0.03	8.1	A	0.08	9.2	A
WBT	0.29	0.0	-	0.22	0.0	-
NB	0.29	17.4	C	0.31	24.4	C
Constance Boulevard / Betty Boulevard (unsignalized)	-	4.7	A	-	2.8	A
EB	0.00	1.2	A	0.00	2.4	A
WB	0.00	0.0	-	0.00	0.0	-
SB	0.02	8.6	A	0.01	8.7	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

No additional improvements are recommended within the study area.

3.5 Background (2033) Intersection Operation

The results of the LOS analysis under background (2033) traffic volumes during the AM and PM peak hour can be found below in **Table 6**. The provision of a westbound left turn lane on Beachwood Road at the intersection with Joan Avenue has been included. It is noted that the recommended storage length increases to 30 metres under the 2033 background volumes

Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 6 – Background (2033) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue / Beachwood Road (unsignalized)	-	2.4	B	-	2.3	C
EB	0.00	0.0	-	0.00	0.0	-
WBL	0.03	8.2	A	0.08	9.5	A
WBT	0.32	0.0	-	0.24	0.0	-
NB	0.32	19.3	C	0.35	28.6	D
Constance Boulevard / Betty Boulevard (unsignalized)	-	4.7	A	-	2.8	A
EB	0.00	1.2	A	0.00	2.4	A
WB	0.00	0.0	-	0.00	0.0	-
SB	0.02	8.6	A	0.01	8.7	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

No additional improvements are recommended within the study area.

4 Proposed Development Traffic Generation and Assignment

4.1 Traffic Generation

The traffic generation for the subject site has been based on the ITE Trip Generation Manual. The following ITE land use has been applied to estimate the traffic from the proposed development:

- ITE land use 210 (Single Family Detached);
- ITE land use 220 (Multifamily Housing (Low-Rise)); and
- ITE land use 221 (Multifamily Housing (Mid-Rise)).

The estimated trip generation of the proposed development for the ultimate development is illustrated below in **Table 7**. The AM and PM peak traffic generation for the proposed development is not anticipated to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 7 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached ITE Land Use: 210	34 units	7	22	29	23	13	36
Multifamily Housing (Low-Rise) ITE Land Use: 220	48 units	6	18	24	19	11	30
Multifamily Housing (Mid-Rise) ITE Land Use: 221	134 units	12	36	48	36	23	59
Total		**25**	**76**	**101**	**78**	**47**	**125**

No transportation modal split has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all residential traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour. The distribution of traffic has been calculated based on the 2016 Transportation Tomorrow Survey [TTS] data for traffic zone 8609 retrieved using the TTS Internet Data Retrieval System [IDRS] (output attached as **Appendix E**). TTS data provides historical origin and destination work trip percentages for specific areas within the County and the Greater Toronto and Hamilton Area [GTHA].

The above-noted methodology provides an estimate of the distribution of ingress trips. We have assumed that the distribution of egress trips will follow the inverse of the ingress traffic distribution. For each of the destination zones identified in the TTS data, we have selected the probable route of travel, recognizing that people will select their route primarily based on travel time.

The distribution of trips is illustrated in **Table 8** using the methodology outlined above.

Table 8 – Proposed Development Traffic Distribution

Travel Direction (to / from)	Percent of Total Traffic Generation
East via Beachwood Road	60%
West via Beachwood Road	40%
TOTAL	**100%**

The distribution of traffic entering each access location is based on the site's internal parking and driveway configuration, in conjunction with the external traffic distribution.

The site traffic assignment for buildout of the proposed developments for the AM and PM peak hour is illustrated in **Figure 12**.

4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2023, 2028 and 2033) horizon year traffic volumes, the proposed development traffic was added to the background (2023, 2028 and 2033) traffic volumes. The resulting total (2023, 2028 and 2033) horizon year traffic volume for the AM and PM peak hour are illustrated in **Figure 13** through **Figure 15**.

5 Intersection Operation with Proposed Development

5.1 Turn Lane Analysis

A review was completed to assess the warrant for left turn lanes at the Beachwood Road / Joan Avenue & South Access intersection as per the MTO DS. As previously noted, a westbound left turn lane is warranted at the intersection under 2023 background conditions with 25 metres of storage (increasing to 30 metres under background 2033 conditions). It is noted this westbound left turn lane is triggered once the westbound left turn movement on Beachwood Road at Joan Avenue reach 5% of the advancing traffic volume for the PM peak hour (this threshold is met with the full operation of the West End Public Works & Water Tower facility or at approximately 30% buildout of the Whitehead Development).

The following additional analysis was completed to assess the warrant for an eastbound left turn lane on Beachwood Road at the South Access, with and without the background development on Joan Avenue.

5.1.1 Joan Avenue Construction Exclusive

The need for an eastbound left turn lane was analyzed for a scenario whereby the subject site is developed prior to the construction of Joan Avenue and corresponding development on the south side of Beachwood Road.

The total (2033) horizon year volumes (considered to worst-case scenario) with the removal of the West End Public Works & Water Tower and Whitehead Development volumes have been utilized for the analysis, along with a design speed of 100 km/h. Results are provided in **Appendix G**.

The percentages of eastbound left turn movements range from 2.2% to 2.6% during the AM peak hour and 3.6% to 4.3% during the PM peak hour for the 2023 and 2033 horizon year, respectively. Since the volume of left turn movements does not exceed 5% of the advancing traffic, a left turn lane is not recommended.

An additional LOS analysis was completed to consider the operation of the south access without a left turn lane (i.e. shared eastbound through/left turn lane). Stop control has been assumed at the Site Access egress movements. The results of the analysis can be found in **Table 9**. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 9 – Total (2033) LOS (Joan Avenue Construction Exclusive)

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue & South Access / Beachwood Road (unsignalized)	-	1.3	A	-	1.1	A
EBTL	0.01	0.3	A	0.02	0.6	A
WBTR	0.32	0.0	-	0.27	0.0	-
SB	0.18	17.3	C	0.15	20.1	C

The Synchro analysis confirms that the provision of an eastbound left turn lane is not necessary from an operational standpoint, should the subject site be developed prior to the construction of Joan Avenue.

5.1.2 Joan Avenue Construction Inclusive

A review was completed to assess the warrant for an eastbound left turn lane on Beachwood Road at the South Access intersection, per the MTO DS, using the total horizon year volumes and a design speed of 100 km/h in both directions (speed limit + 20 km/h for higher speed roads) (results provided in **Appendix G**).

The analysis utilized nomographs for 5% left turns in the advancing volumes (the lowest percentage available in the MTO DS) while actual percentages of left turns range from 2.2% to 2.6% during the AM peak hour and 3.6% to 4.3% during the PM peak hour for the 2023 and 2033 horizon year, respectively. A left turn lane is typically not recommended if the volume of left turn traffic is less than 5% of the advancing traffic. In this case, we have conservatively assumed the left turn volume exceeds the 5% threshold, since we know a westbound left turn lane will be required and an eastbound left turn lane would mirror the westbound lane and provide lane balance through the intersection.

Assuming the 5% eastbound left turn threshold is met, the advancing and opposing traffic volumes warrant a left turn lane under the total 2023, 2028 and 2033 conditions, during the PM peak hour.

The anticipated 95th percentile queue length for the eastbound left turn movement for the 2033 horizon is less than 10 metres long year for the critical PM scenario, based on the Synchro analysis. Based on the Synchro analysis and the conservative approach used for the left turn volume, the minimum storage of 15 metres is considered sufficient to accommodate the eastbound left turning volumes.

The following summarizes the recommended left turn lane configuration on Beachwood Road at Joan Avenue / South Access:

- Westbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 30 metre storage length and a 15 metre offset to the centre of the intersection; and
- Eastbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 15 metre storage length and a 15 metre offset to the centre of the intersection.

It is recommended that both turn lanes are constructed once the warrant for the westbound left turn lane is met. The cost for the improvements should be distributed proportionately between the all benefiting parties, proportionately based on the projected volume of left turn traffic at the intersection.

5.2 Total (2023) Intersection Operation

The results of the LOS analysis under total (2023) traffic volumes during the AM and PM peak hour can be found below in **Table 10**. Left turn lanes at the intersection of Beachwood Road / Joan Avenue & Site Access as discussed in Section 5.1.1 have been included in analysis. Stop control has been assumed at the Site Access egress movements. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 10 – Total (2023) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue & South Access / Beachwood Road (unsignalized)	-	3.7	A	-	3.2	A
EBL	0.01	8.3	A	0.02	8.1	A
EBTR	0.19	0.0	-	0.36	0.0	-
WBL	0.03	8.0	A	0.07	9.0	A
WBTR	0.27	0.0	-	0.23	0.0	-
NB	0.29	17.2	C	0.30	23.8	C
SB	0.22	20.7	C	0.20	27.0	D
Constance Boulevard & North Access / Betty Boulevard (unsignalized)	-	5.8	A	-	3.8	A
EB	0.00	0.9	A	0.00	1.7	A
WB	0.00	1.5	A	0.01	2.2	A
NB	0.02	8.5	A	0.01	8.6	A
SB	0.02	8.7	A	0.01	8.8	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

No additional improvements are recommended within the study area.

5.3 Total (2028) Intersection Operation

The results of the LOS analysis under total (2028) traffic volumes during the AM and PM peak hour can be found below in **Table 11**. Left turn lanes at the intersection of Beachwood Road / Joan Avenue & Site Access as discussed in Section 5.1.1 have been included in analysis. Stop control has been assumed at the Site Access egress movements. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 11 – Total (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue & South Access / Beachwood Road (unsignalized)	-	3.8	A	-	3.4	A
EBL	0.01	8.4	A	0.02	8.2	A
EBTR	0.21	0.0	-	0.39	0.0	-
WBL	0.03	8.1	A	0.08	9.2	A
WBTR	0.30	0.0	-	0.25	0.0	-
NB	0.31	18.9	C	0.34	27.6	D
SB	0.25	23.2	C	0.23	31.4	D
Constance Boulevard & North Access / Betty Boulevard (unsignalized)	-	5.8	A	-	3.8	A
EB	0.00	0.9	A	0.00	1.7	A
WB	0.00	1.5	A	0.01	2.2	A
NB	0.02	8.5	A	0.01	8.6	A
SB	0.02	8.7	A	0.01	8.8	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

No additional improvements are recommended within the study area.

5.4 Total (2033) Intersection Operation

The results of the LOS analysis under total (2033) traffic volumes during the AM and PM peak hour can be found below in **Table 12**. Left turn lanes at the intersection of Beachwood Road / Joan Avenue & Site Access as discussed in Section 5.1.1 have been included in analysis. Stop control has been assumed at the Site Access egress movements. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 12 – Total (2033) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Joan Avenue & South Access / Beachwood Road (unsignalized)	-	4.0	A	-	3.7	A
EBL	0.01	8.6	A	0.02	8.3	A
EBTR	0.23	0.0	-	0.43	0.0	-
WBL	0.03	8.2	A	0.08	9.5	A
WBTR	0.32	0.0	-	0.27	0.0	-
NB	0.35	21.3	C	0.40	32.9	D
SB	0.28	26.5	D	0.27	37.6	E
Constance Boulevard & North Access / Betty Boulevard (unsignalized)	-	5.8	A	-	3.8	A
EB	0.00	0.9	A	0.00	1.7	A
WB	0.00	1.5	A	0.01	2.2	A
NB	0.02	8.5	A	0.01	8.6	A
SB	0.02	8.7	A	0.01	8.8	A

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at either Site Access intersections (results are provided in **Appendix H**).

No additional improvements are recommended within the study area.

5.5 Site Accesses

The North and South Site Accesses will operate efficiently as a full-movement driveway, with one-way stop control for the egress movements. Single ingress and egress lane will provide the necessary capacity to service the proposed development.

The proposed spacing between the proposed North and South Accesses and their closest intersections (Shore Lane and 75th Street South) are in excess of the minimum intersection spacing requirements as identified in the Transportation Association of Canada Design Guide for Canadian Roads (2017) [TAC Guidelines] – Sections 9.4.2.2 and 9.4.2.3 – 60 metres for Collector and Local roads.

5.6 Sight Distance Review

A review of the available sight distances for the proposed North and South Accesses was completed as part of this analysis.

The sight distance east and west of the South Access is greater than both the minimum sight stopping and intersection sight distance requirements as identified in the TAC Guidelines for a design speed of 100km/h (185 and 210 meters, respectively).

In review of the site plan, the sight lines east and west of the proposed North Access are expected to exceed both the minimum sight stopping and intersection sight distance requirements as identified in the TAC Guidelines for a design speed of 60km/h (85 meters and 130 metres, respectively).

As such, there are no issues with the sight distances available for the proposed Site Accesses.

6 Parking Analysis

6.1 Scope

The proposed parking supply for the apartment units is 1.54 parking spaces / unit. The proposed parking supply for the single detached and townhouse units is at least 2.0 spaces / unit. Additional parking spaces may be provided for some units, depending on the driveways size.

The purpose of this analysis is to confirm that the proposed parking supply is sufficient to service the proposed development.

6.2 Wasaga Beach By-law

The Town of Wasaga Comprehensive Zoning By-Law 2003-60 [ZBL] (Office Consolidation February 2016) provides parking requirements for a variety of building types and land uses. **Table 13** summarizes the parking requirement, according to the ZBL, for the proposed development.

Table 13 - Zoning By-law Parking Requirements

Category	Zoning By-Law Section	Parking Standard	Size	Required	Provided	Net Parking Supply
Residential Uses	3.38.9	2.0 space per unit	82 units	164 spaces	164 spaces	-
Apartment Uses	3.38.9	1.75 space per unit	134 units	235 spaces	206 spaces	-29 spaces
TOTAL PARKING SPACES				**399 spaces**	**370 spaces**	**-29 spaces**

As indicated, the proposed apartment parking supply is less than the Town's requirements by 29 spaces.

6.3 Parking Justification

The following justification is provided in support of the parking supply for the proposed apartment units.

6.3.1 Site Characteristics

A review of the site has been undertaken to consider the various characteristics of the site and local area that may influence the parking generation of the site.

As previously noted, Route No. 4 of the Simcoe County Linx Transit provides service between Collingwood (Downtown) and Wasaga Beach (25 45th Street South) travelling along Beachwood Road. It is expected that an additional bus stop will be constructed at the entrance of the subject site, providing convenient transit access for the residents of the subject site.

In consideration of the existing access to transit and proximity to local amenities at the intersection of 45th Street / Mosley Street, there is an opportunity for reduced reliance on the private automobile trips for residents of the proposed apartment units. Consequently, a reduced parking supply can justified.

6.3.2 Parking Standards in Local Municipalities

A review of parking standards adopted by surrounding and similar municipalities for multi-unit residential land-use indicates that several municipalities have adopted rates consistent with those proposed. **Table 14** summarizes the review.

Table 14 – Local Municipalities Parking Requirements

Municipality	By-Law	Land Use	Parking Requirement
City of Collingwood	ZBL 2010-040	Apartment	1.0 resident + 0.25 visitor = 1.25 spaces per unit
Town of Midland	ZBL 2004-09	Apartment	1.25 resident + 0.25 visitor = 1.50 spaces per unit
Town of Penetanguishene	ZBL 2000-02	Apartment	1.50 resident spaces per unit
Town of Gravenhurst	ZBL 2010-04	Multiple Dwelling	1.0 resident + 0.25 visitor = 1.25 spaces per unit
City of Orillia	ZBL 2014-44	Multiple Dwelling	1.25 resident + 0.25 visitor = 1.50 spaces per unit
Town of The Blue Mountains	ZBL 2018-65	Apartment	1.0 (bachelor), 1.25 (1-bed), 1.75 (2-bed) + 0.25 visitor

As indicated, parking rates for apartment/multi-dwelling units within local municipalities range from 1.25 spaces to 1.5 spaces per unit. which is consistent with the proposed parking supply. Based on the parking practices currently in place in a number of other similarly municipalities, the proposed parking rate of 1.54 spaces per unit will be sufficient to accommodate the parking demand generated by the apartment units within the subject site.

6.4 Recommendations

In consideration of the above, the proposed parking supply of 206 spaces or 1.54 spaces per unit for the proposed apartment units is adequate to accommodate the subject site.

7 Summary

Beachwood Development Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed residential development in the Town of Wasaga. The proposed Site Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development includes the construction of 216 residential units, including 34 single-detached, 48 townhouse and 134 apartment units. It is anticipated that ultimate build-out will occur by 2023.

1. The proposed development is expected to generate a total of 101 AM and 125 PM peak hour trips.
2. Detailed midblock counts were completed on Beachwood Road, adjacent the subject site on Thursday February 13th & Friday February 14th, 2020.
3. An intersection operation analysis was completed at the study area intersections, using the existing and background (2023, 2028 and 2033) traffic volumes, with the adjacent development traffic and without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. The following transportation infrastructure improvements are recommended within the study area:

   Background (2023)

   Beachwood Road / Joan Avenue

   - Implementation of a westbound left turn lane

4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following transportation infrastructure improvements are recommended within the study area:

   Total (2023)

   Beachwood Road / Joan Avenue & South Access

   - Implementation of an eastbound left turn lane to ensure lane balance through the intersection

6. The following summarizes the recommended left turn lanes on Beachwood Road at Joan Avenue / South Access:

   - Westbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 30 metre storage length and a 15 metre offset to the centre of the intersection; and
   - Eastbound (100km/h design speed): 160 metre taper, 70 metre parallel lane, minimum 15 metre storage length and a 15 metre offset to the centre of the intersection.

7. An alternate scenario whereby the subject site is developed prior to the construction of Joan Avenue was also analyzed to evaluate the necessity of the eastbound left turn lane to facilitate the subject site. After review, it is evident that the eastbound left turn lane is not

necessary from an operational standpoint. The eastbound turn lane is only recommended from a lane balance perspective.

It is recommended that the construction of the eastbound and westbound turn lanes be completed together, with the cost for the improvements distributed proportionately between the all benefiting parties, proportionately based on the projected volume of left turn traffic at the intersection.

8. The proposed Site Accesses will operate efficiently with one-way stop control for egress movements. A single lane for ingress and egress movements will provide the necessary capacity to convey the traffic volume generated by the proposed development.
9. The sight distance available for the proposed Site Accesses is suitable for the intended use.
10. The proposed parking supply for the apartment units within the subject site is 1.54 parking spaces / unit, less that the Town's By-Law requirement of 1.75 parking spaces / unit. Based on our parking analysis, the proposed parking supply considered sufficient for the intended use.
11. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Figure 3: Adjacent Development Traffic Volumes – Wasaga Shores Subdivision (2023)

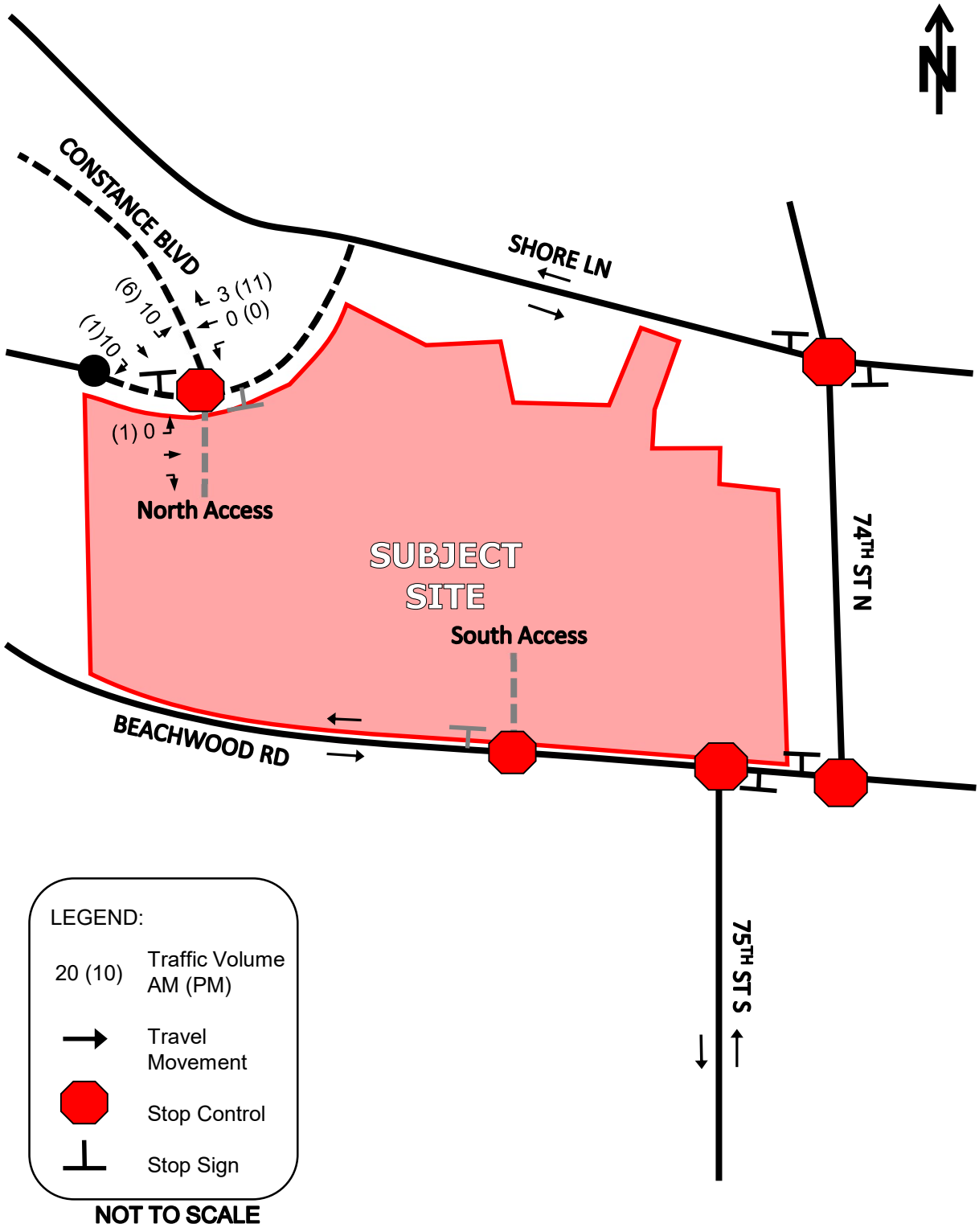


Figure 4: Adjacent Development Traffic Volumes – West End Public Works Depot & Water Tower (2023)

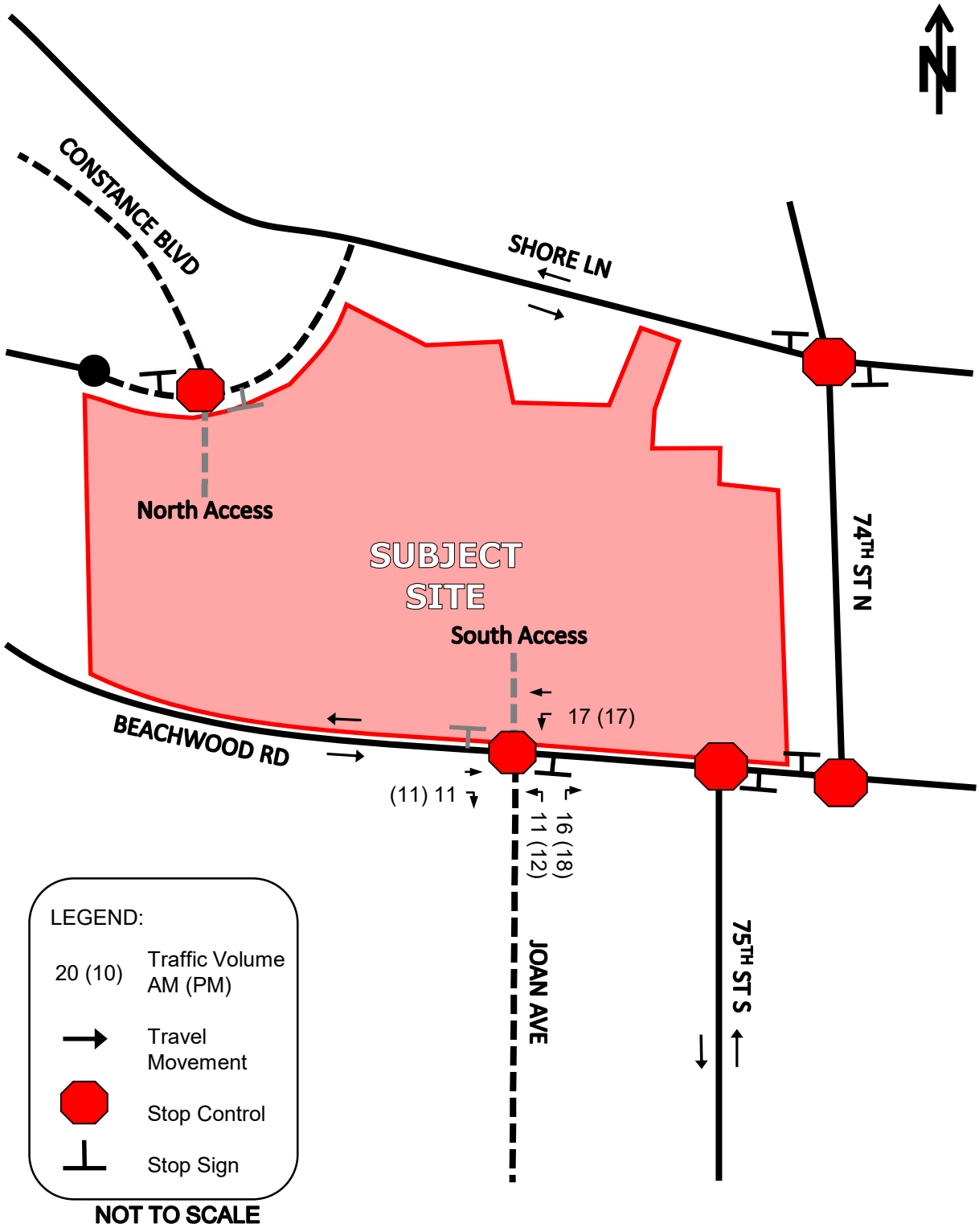


Figure 5: Adjacent Development Traffic Volumes – Whitehead Development (2023)

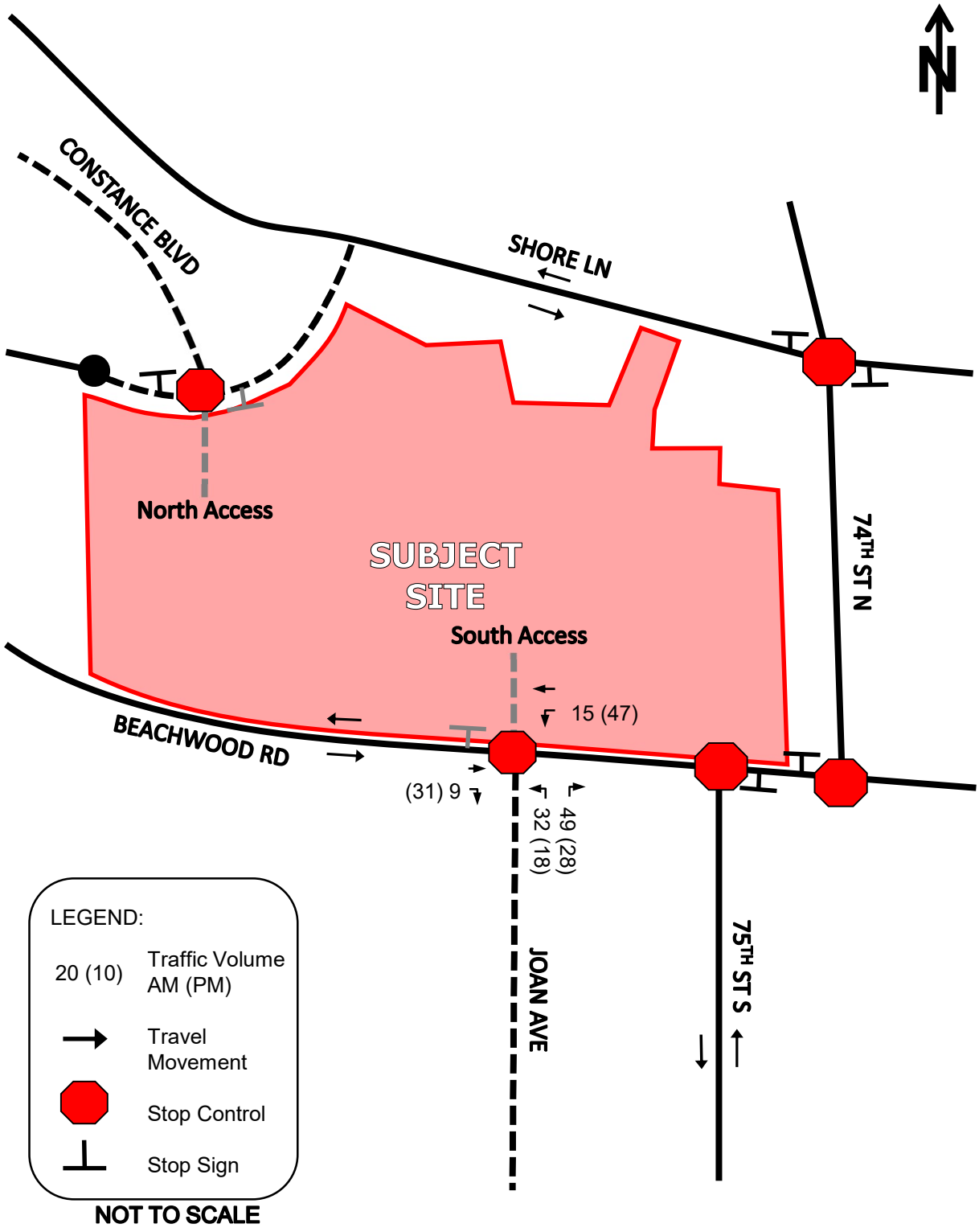


Figure 6: Adjacent Development Traffic Volumes – Total (2023)

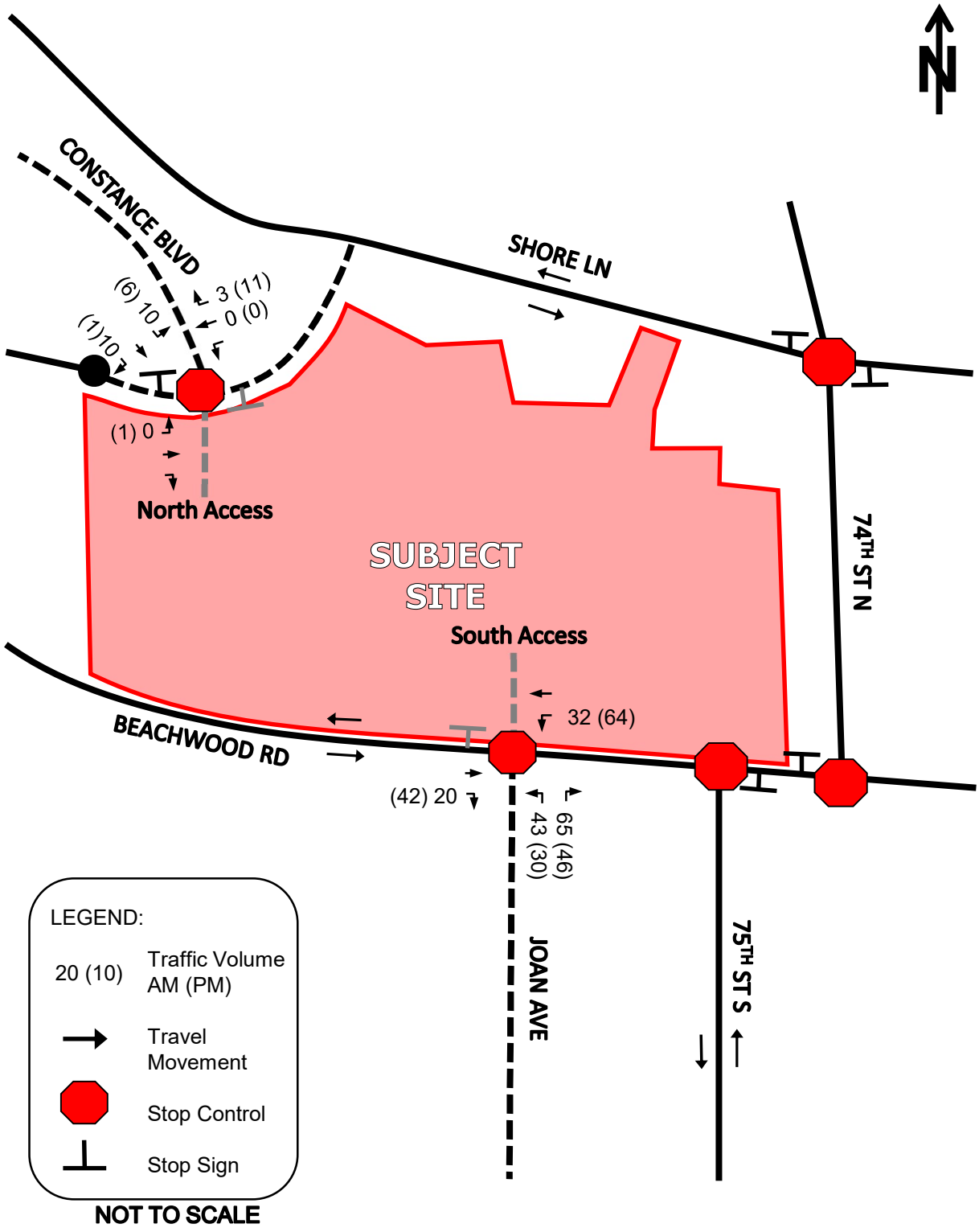


Figure 7: Betty Boulevard & Constance Boulevard Extension Traffic Volumes

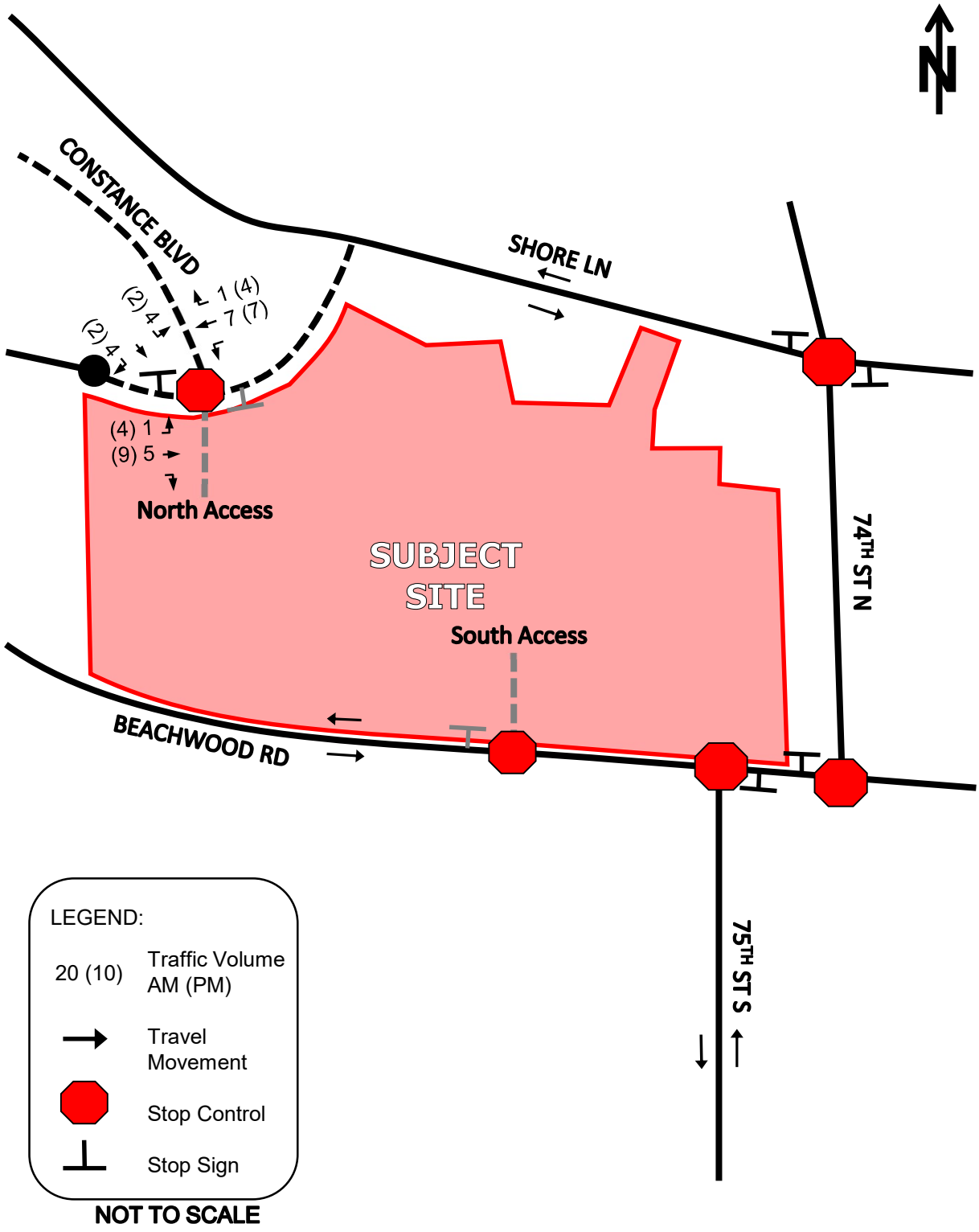


Figure 8: Existing (2020) Traffic Volumes

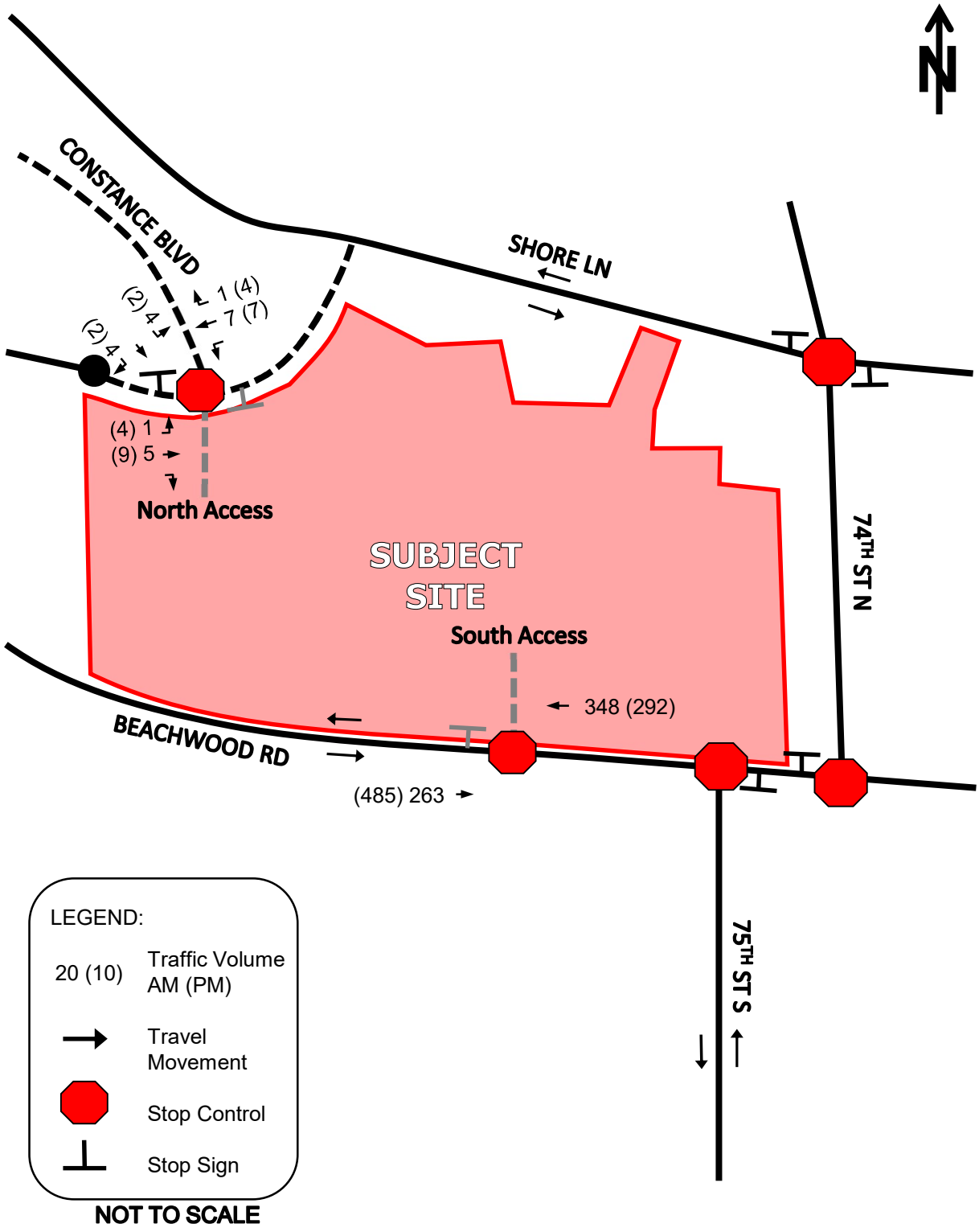


Figure 9: Background (2023) Traffic Volumes

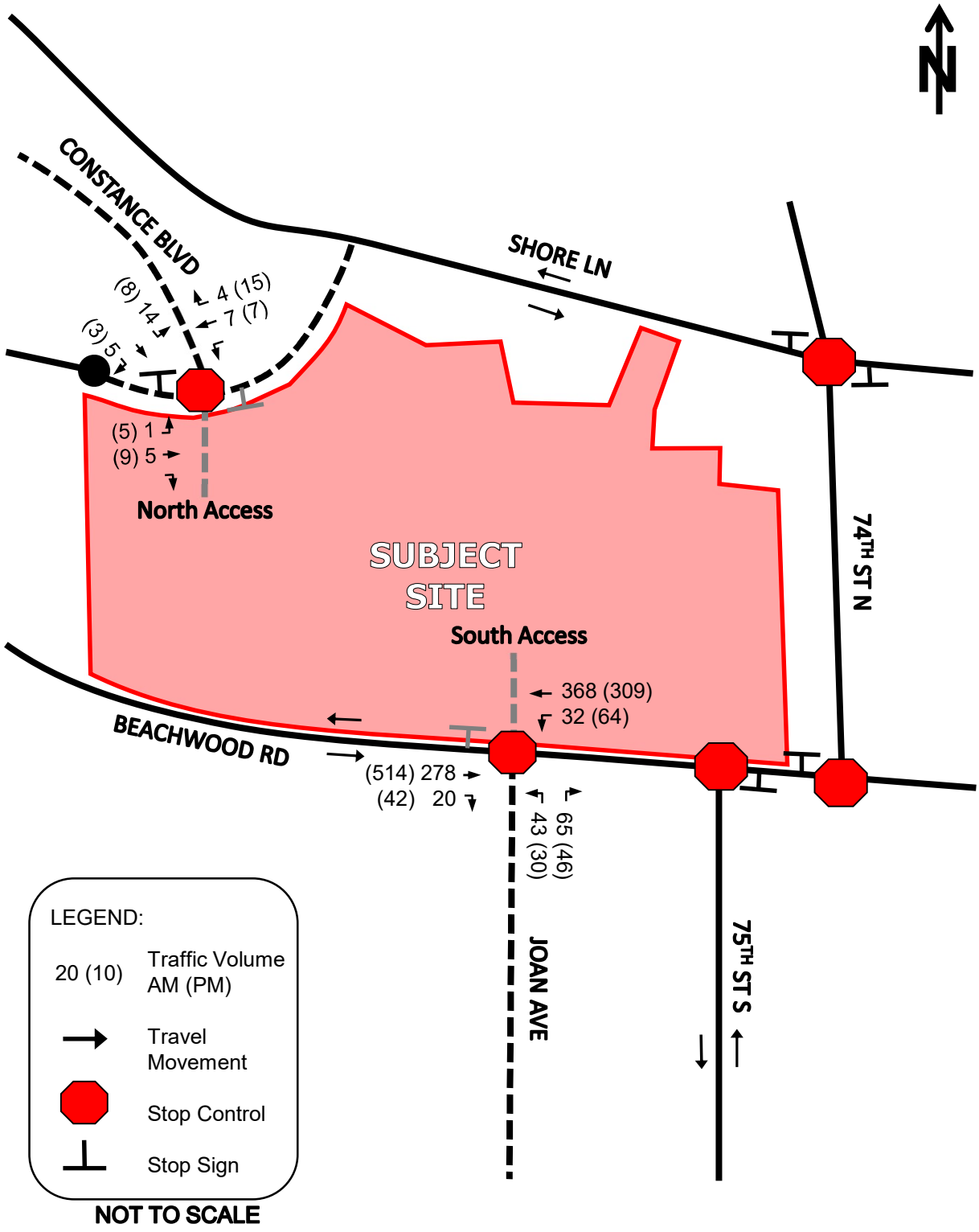


Figure 10: Background (2028) Traffic Volumes

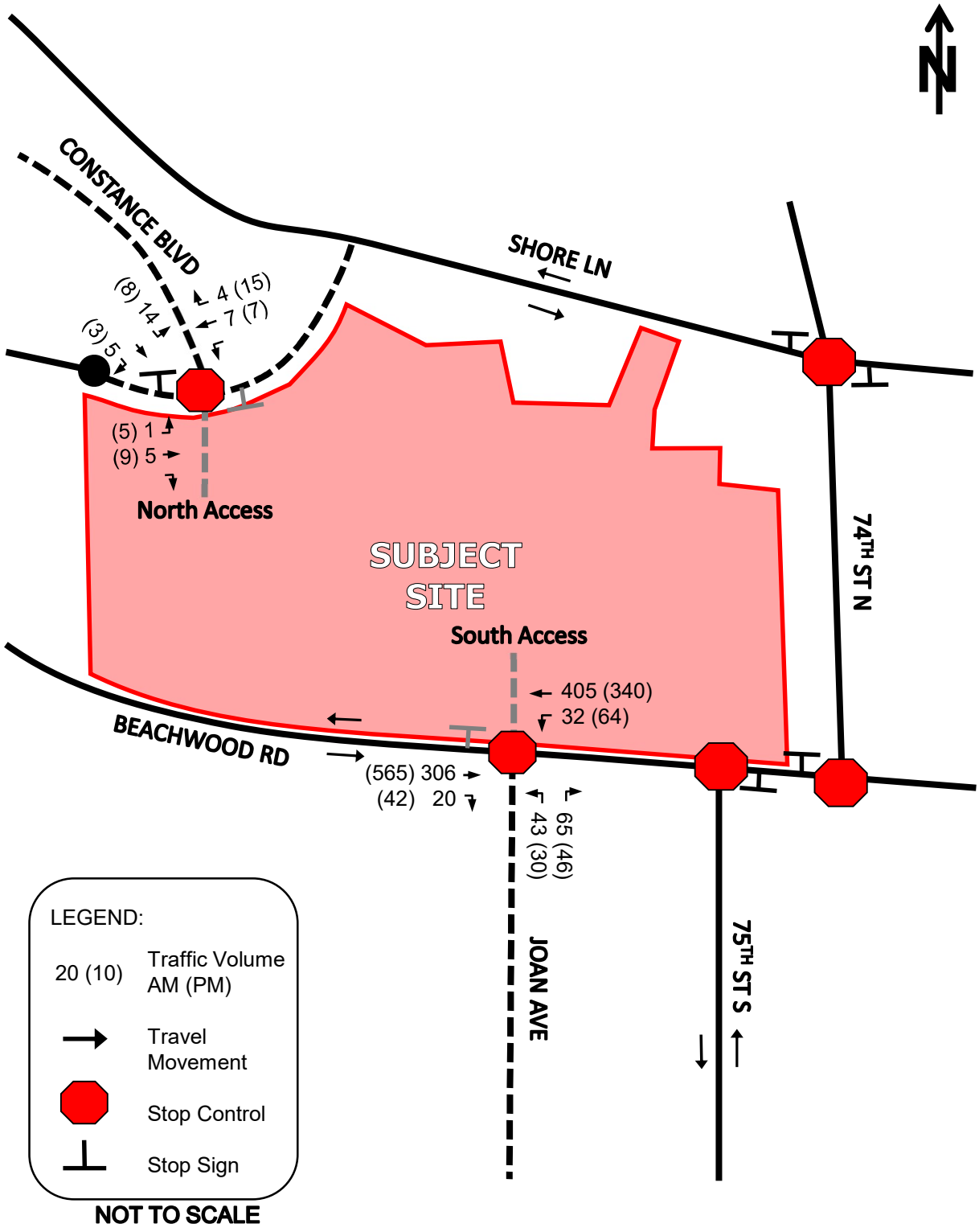


Figure 11: Background (2033) Traffic Volumes

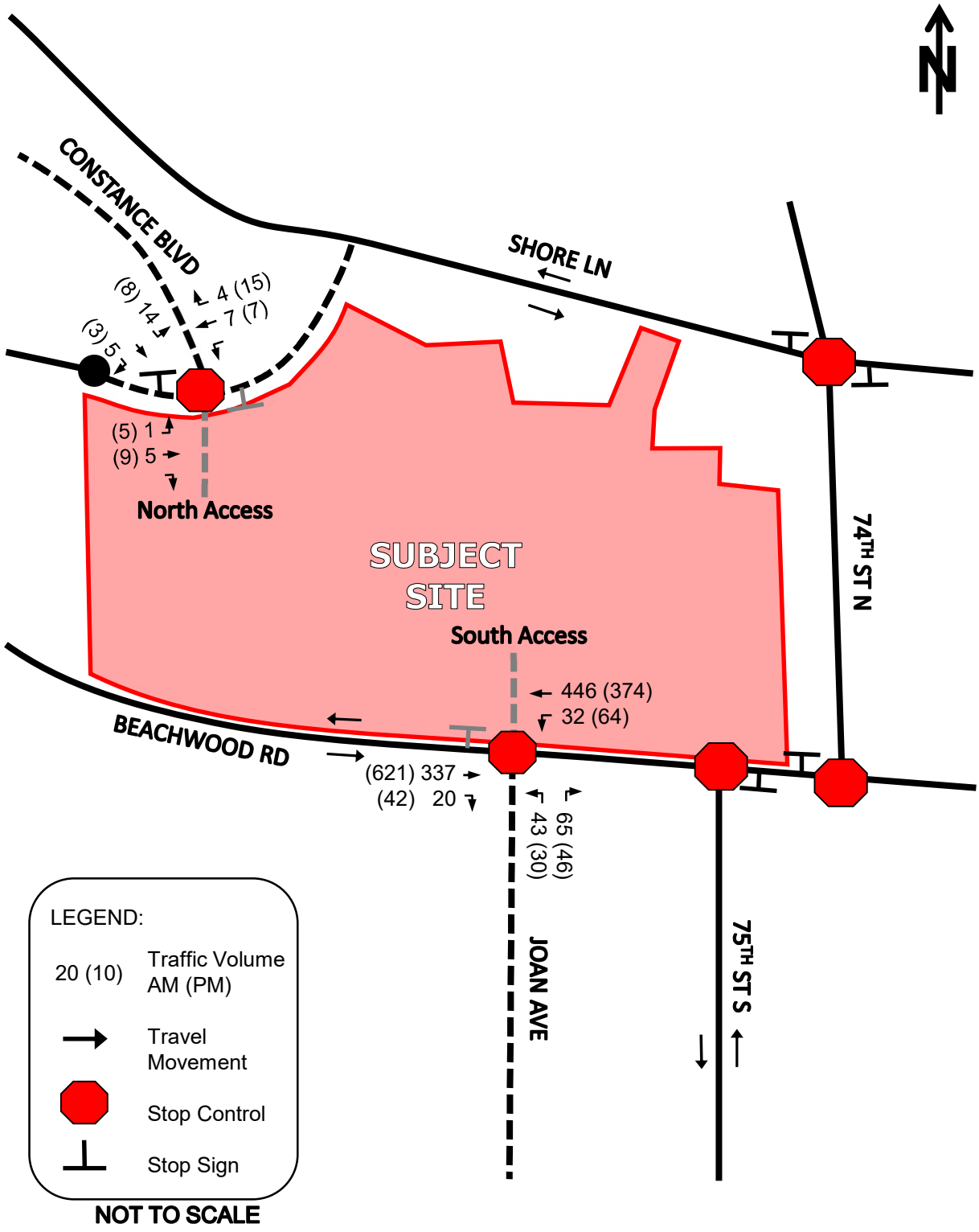


Figure 12: Site Traffic Assignment

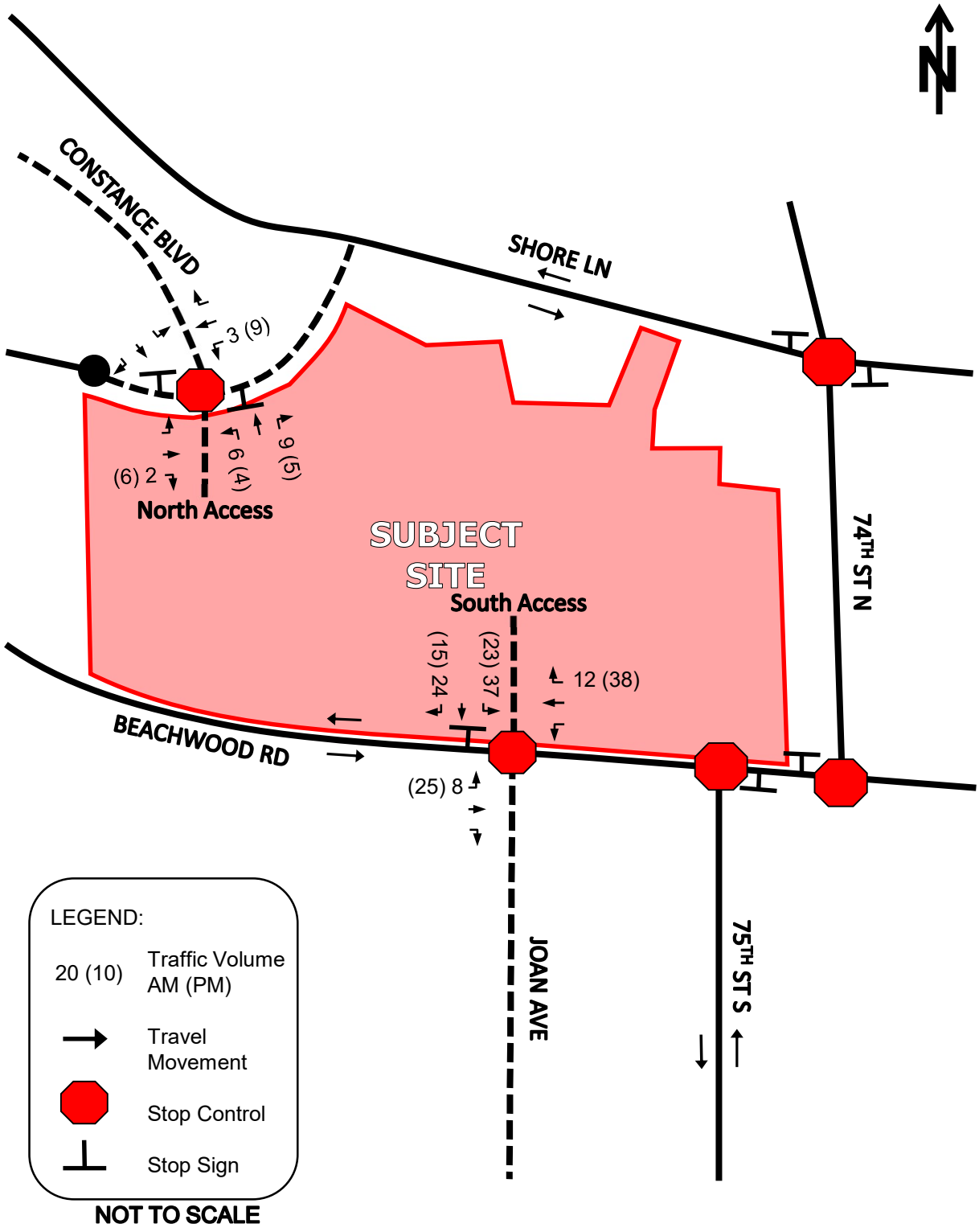


Figure 13: Total (2023) Traffic Volumes

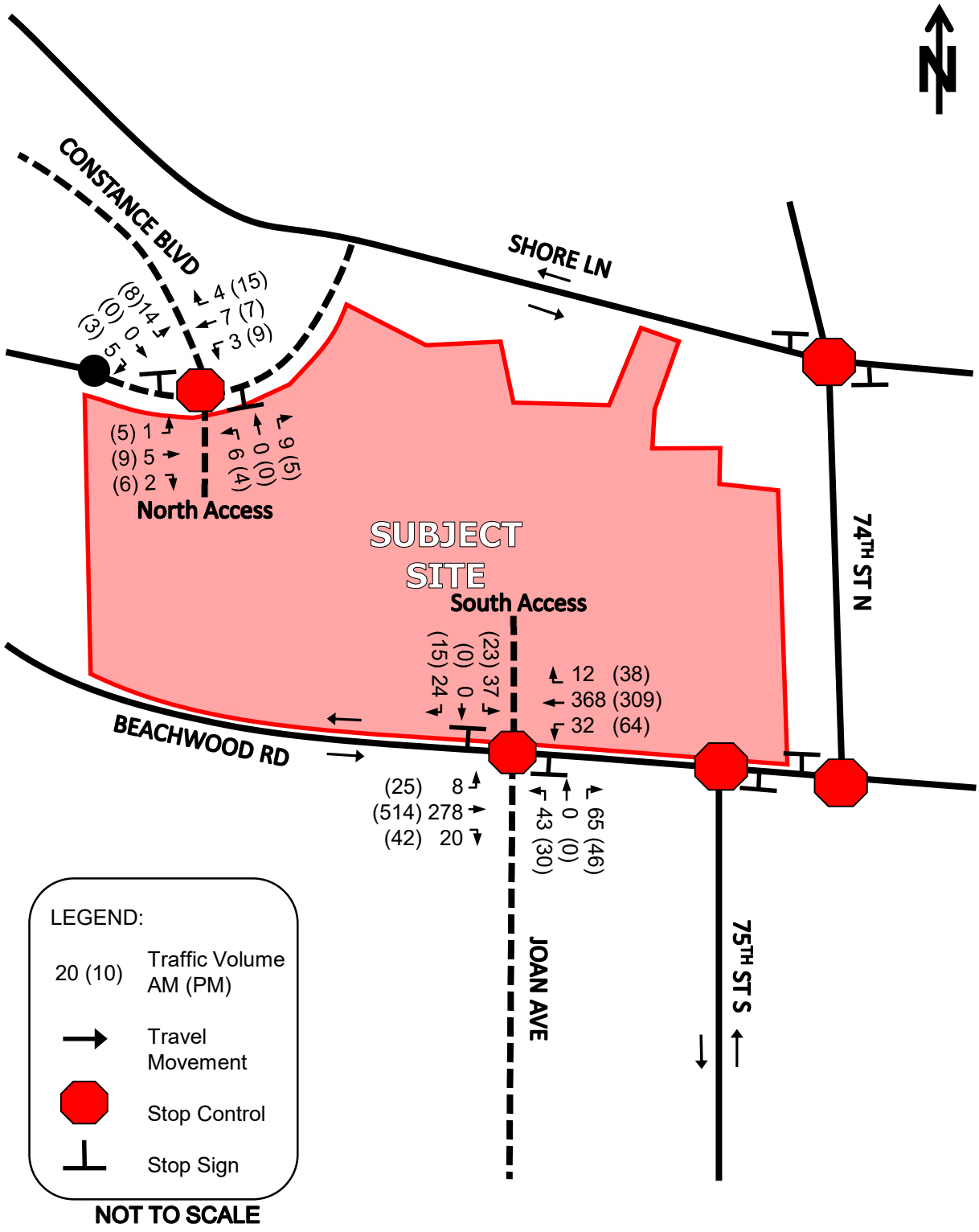


Figure 14: Total (2028) Traffic Volumes

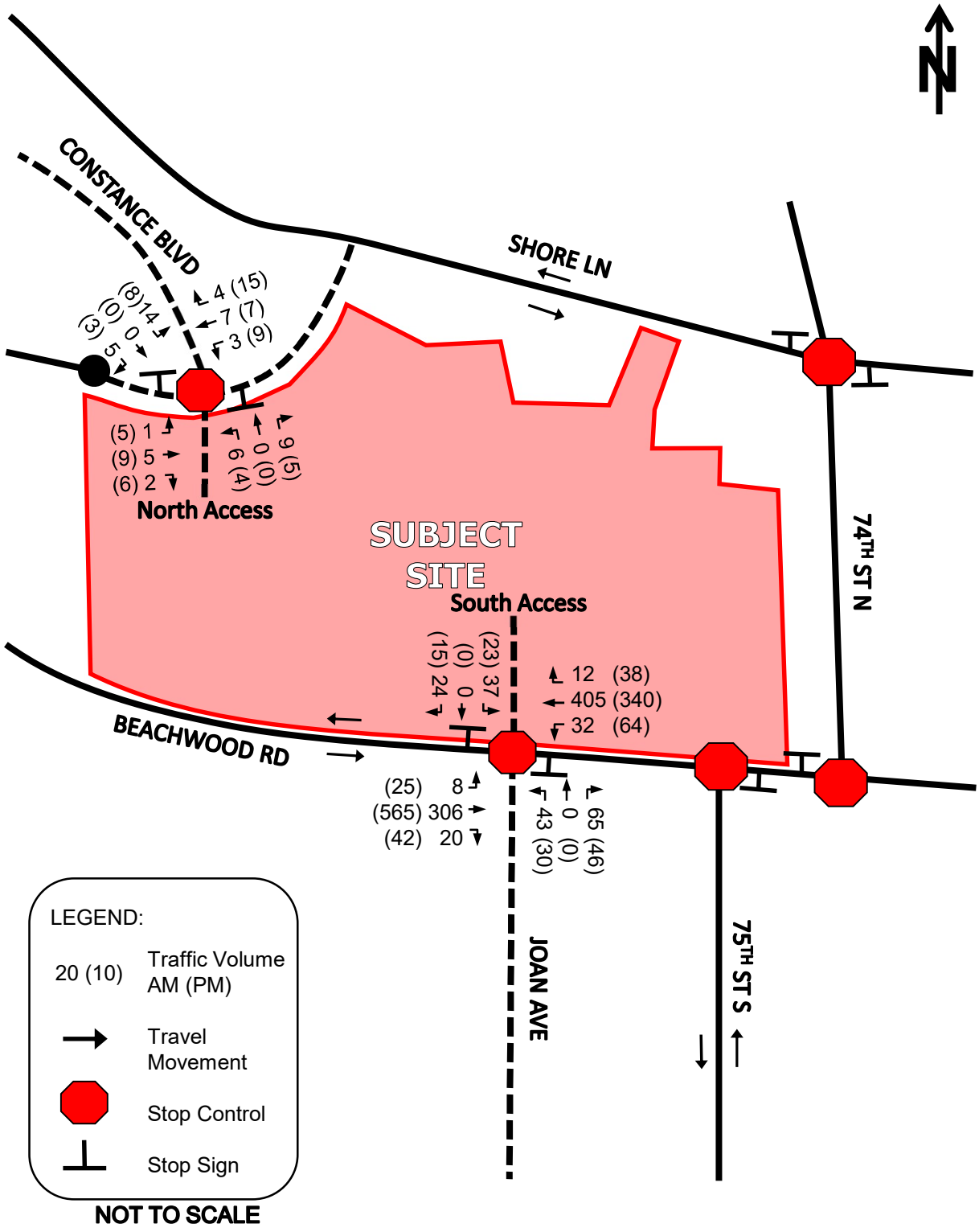
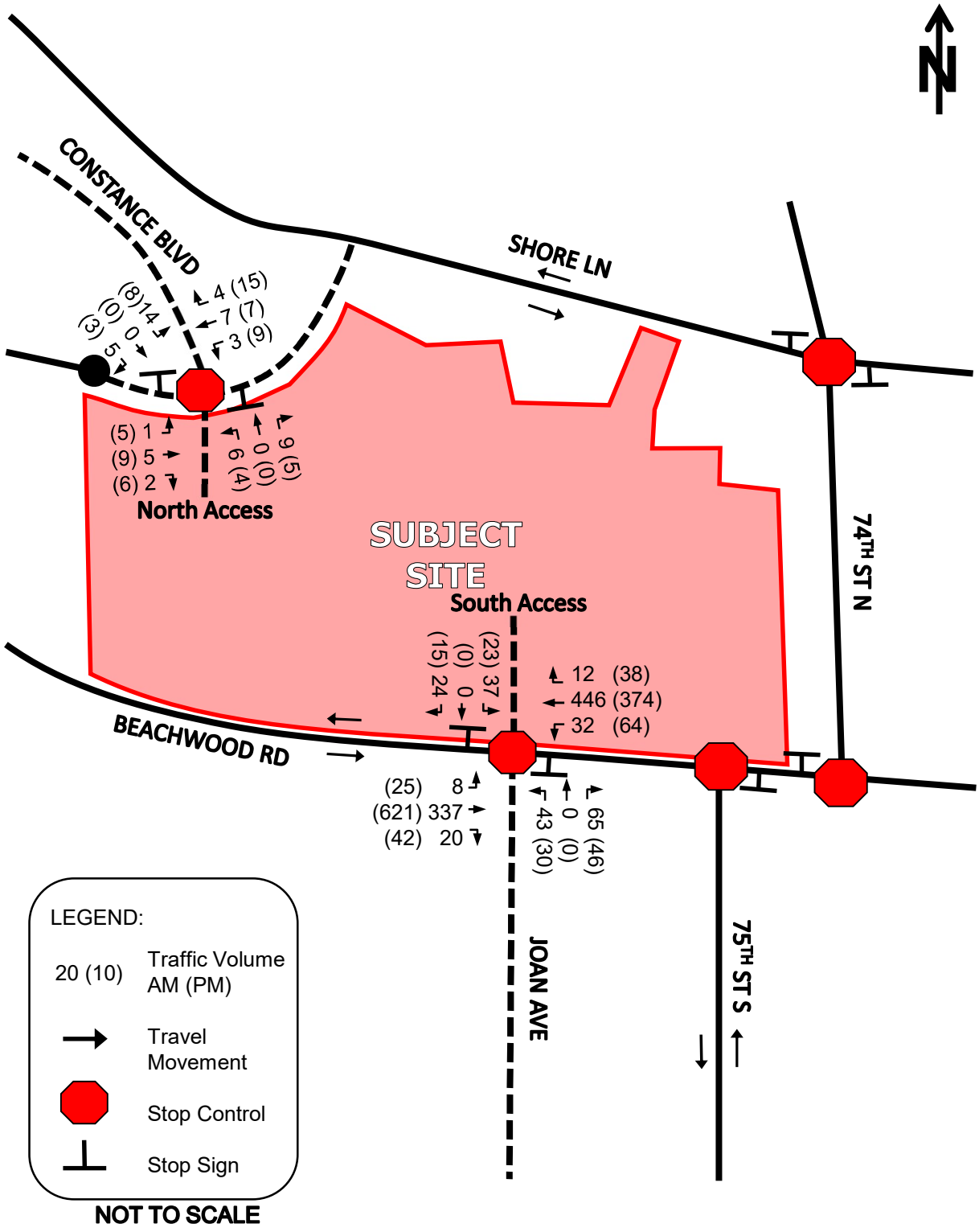
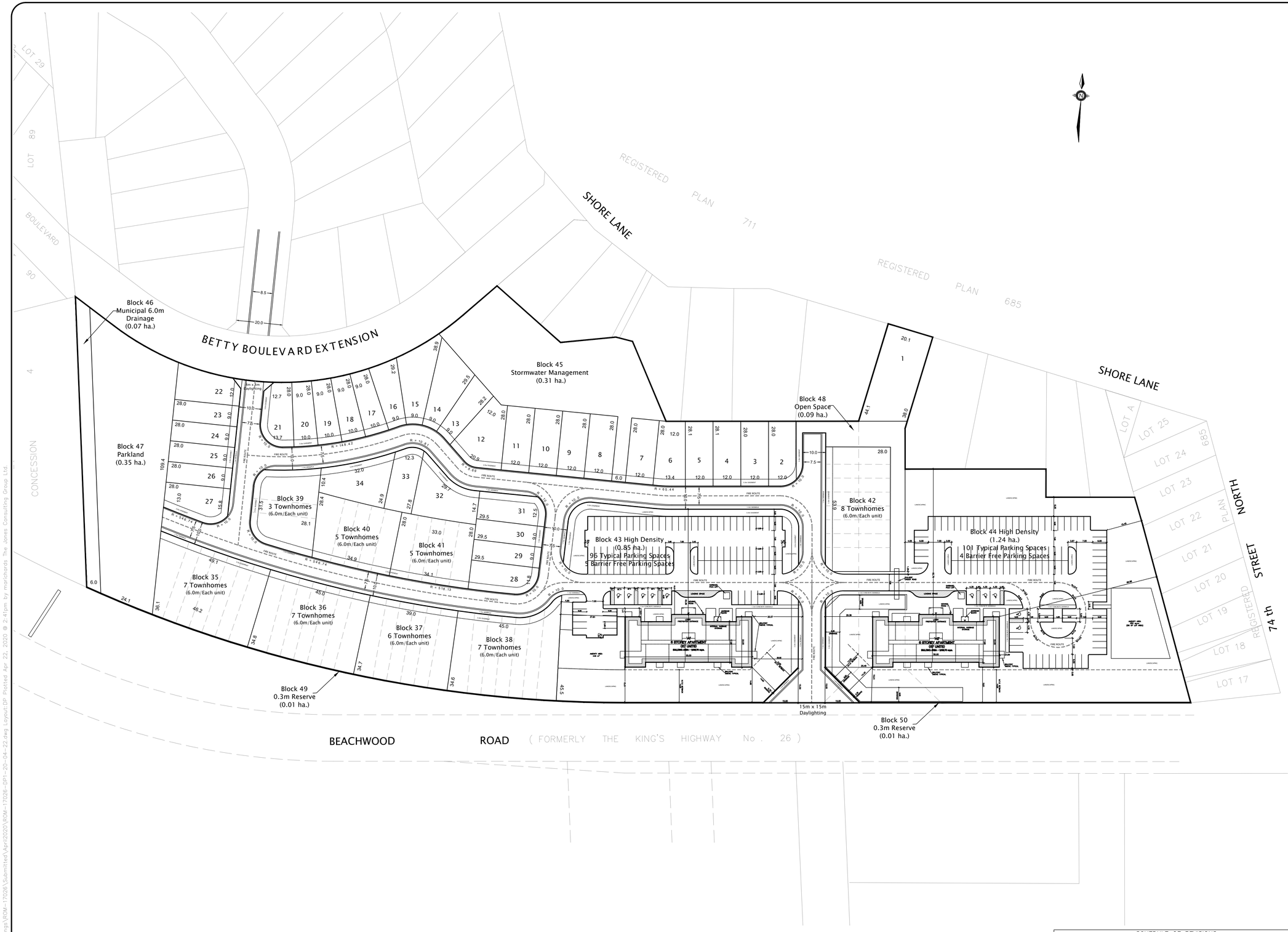
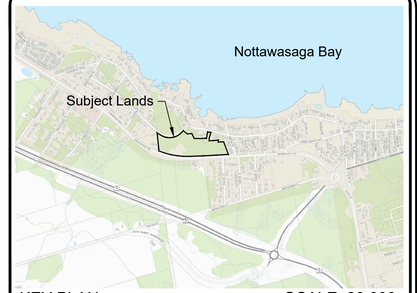


Figure 15: Total (2033) Traffic Volumes



Appendix A – Site Plan





KEY PLAN SCALE: 20,000

Proposed Draft Plan of Subdivision
Part of Lot 34, Concession 3
Town of Wasaga Beach
County of Simcoe
2020

OWNERS' CERTIFICATE

WE, THE UNDERSIGNED, BEING THE REGISTERED OWNERS OF THE SUBJECT LANDS, HEREBY AUTHORIZE THE JONES CONSULTING GROUP LTD., TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE TOWN OF WASAGA BEACH FOR APPROVAL.

DATE — M. ROMANIN CONTRACTING LTD.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

APRIL 1, 2020
DATE — DINO R.S. ASTRI, B.Sc., OLS, OLIP
ONTARIO LAND SURVEYOR

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON DRAFT PLAN
b) SHOWN ON DRAFT PLAN
c) SHOWN ON KEY PLAN
d) RESIDENTIAL, PARKLAND, SWM & DRAINAGE
e) SHOWN ON DRAFT PLAN
f) SHOWN ON DRAFT PLAN
g) SHOWN ON DRAFT PLAN
h) MUNICIPAL PIPED WATER TO BE PROVIDED
i) SAND
j) SHOWN ON DRAFT PLAN
k) ALL MUNICIPAL SERVICES TO BE PROVIDED
l) NONE

SUBDIVISION STATISTICS	AREA (ha.)	UNITS
Low Density Residential	3.00 ha.	82 units
High Density Residential	2.10 ha.	134 units
Parkland	0.35 ha.	
Stormwater Management	0.31 ha.	
Municipal Drainage	0.07 ha.	
County Daylighting	0.03 ha.	
0.3m Reserves	0.01 ha.	
TOTAL	5.88 ha.	216 units

0 5 10 50M
SCALE 1 : 750 (A1)

BEACHWOOD DEVELOPMENTS INC.
WASAGA BEACH

PROPOSED DRAFT PLAN OF SUBDIVISION

Brandi L. Clemens
REGISTERED PROFESSIONAL PLANNER
R.P.P.

Date Issued:	APRIL 22, 2020
Checked By:	BC
Project No.:	ROM-17026
Drawn By:	m.c.r.
Drawing Name:	ROM-17026-DP1-20-04-22.dwg

SCHEDULE OF REVISIONS

DATE	DESCRIPTION	DRAWN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
Phone: 705-734-2538 Fax: 705-734-1056
www.jonesconsulting.com

BEACHWOOD DEVELOPMENTS INC.
TOWN OF WASAGA BEACH

C:\Planning Drawings\ROM-17026\Submitted\April2020\ROM-17026-DP1-20-04-22.dwg Layout:DP Plotted Apr 22, 2020 @ 2:41pm by marichards The Jones Consulting Group Ltd.

Appendix B –
Adjacent Development Excerpts

Table 1: Existing Traffic Volumes

Land Use	Units	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Betty Blvd.	7	1	4	5	4	3	7
Constance Blvd.	6	1	3	5	4	2	6
Shore Lane	26	5	15	20	16	10	26

Proposed Development

Development Plan

The proposed residential development will consist of 22 single family detached units. As previously noted, access to the subdivision will be provided through the extensions of Betty Boulevard and Constance Boulevard. The extension of Betty Boulevard will also provide access to the wider road network via its connection to Shore Lane. The proposed residential lots will have private driveways with direct connection to the adjacent street.

A preliminary site plan is provided in Figure 4.

Site Generated Trips

The number of vehicle trips to be generated by the proposed residential development has been determined based on the development size, land use and trip generation rates provided in the *ITE Trip Generation Manual, 9th Edition.* Based on the proposed residential use, the *single family detached housing* (ITE code 210) land use has been applied to development.

The associated trip rates and trip estimates are provided Table 1. The rates represent the weekday AM and PM peak hour of the adjacent street.

Table 2: Trip Generation

Land Use	rate/ estimate	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
single family detached housing	units	0.19	0.56	0.75	0.63	0.37	1.00
(ITE code 210)	22	4	13	17	14	8	22

As indicated, the proposed development is expected to generate 17 trips during the weekday AM peak hour and 22 trips during the weekday PM peak hour.

The distribution of the new trips generated by the site has been developed based on the results of the *Transportation Tomorrow Survey* (TTS) completed in 2011. The TTS is a telephone interview of a random sampling of 5% of the households in the Greater Toronto Area and surrounding area of Central Ontario, including the Town of Wasaga Beach. Based on a review of the TTS data with respect to trips to/from Wasaga Beach, the following trip distribution was identified:

- to/from locations within Wasaga Beach – 60%;
- to/from locations east of Wasaga Beach – 2%;
- to/from locations west of Wasaga Beach – 15%;
- to/from locations north of Wasaga Beach – 3%; and
- to/from locations south of Wasaga Beach – 20%.

As indicated, 60% of the trips remain wholly within Wasaga Beach, whereas 40% originate from, or are destined to, areas outside of the Town. The trips that remain within the Town were distributed based on the location of the site with respect to the employment/commercial areas within the Town (primarily to the east of the site).

The assignment of the site generated trips to the area road network is based on the trip distribution noted above with consideration given to the expected travel routes. The resulting site generated traffic assignment to the road network is illustrated in Figure 5.

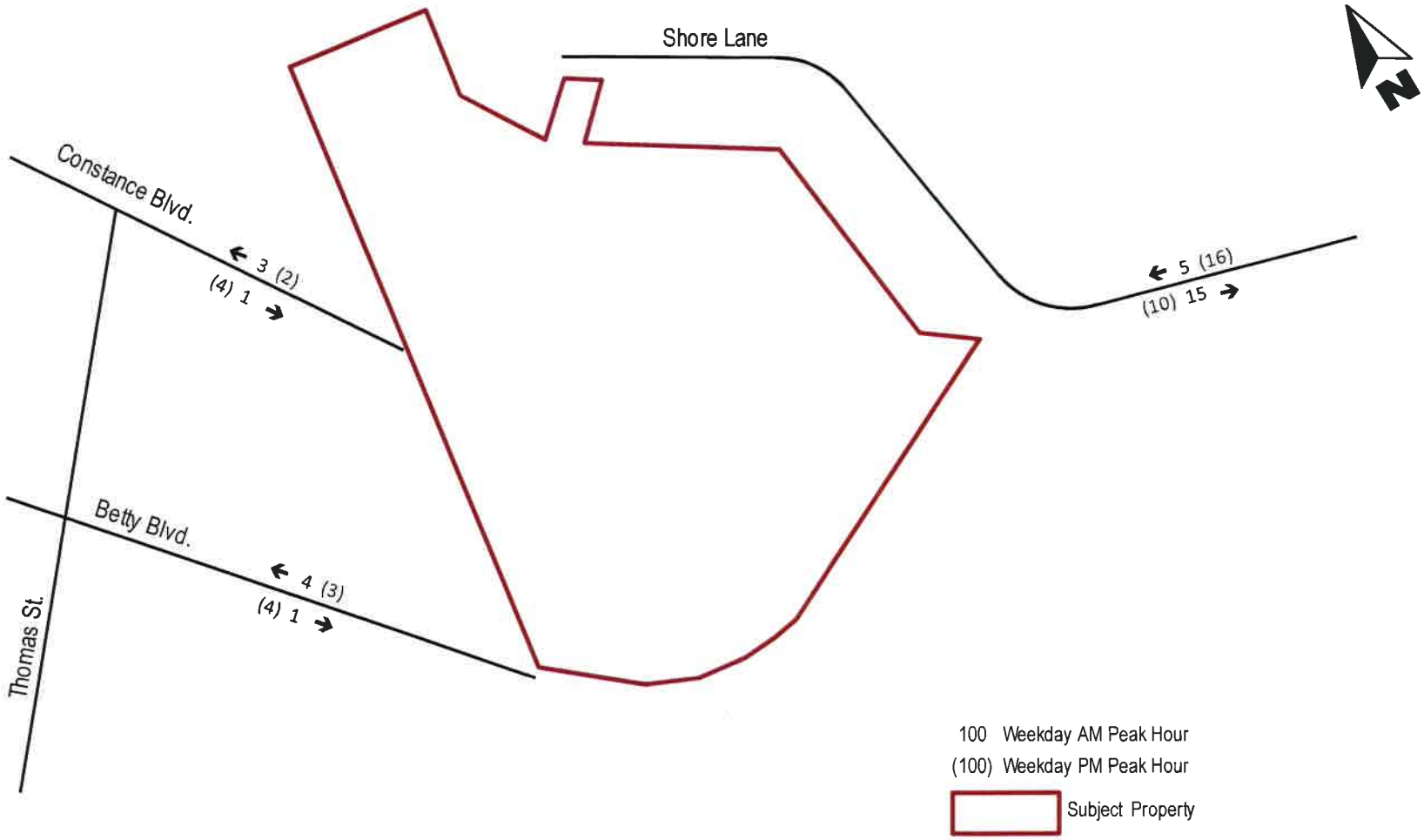
Traffic Operations Assessment

Road Section Operations

As previously noted, the area road network is operating at less than 5% capacity during the peak hour periods (based on the estimated 2017 volumes). The site generated volumes are not significant and, given the excess reserve capacity on the local road network, will be readily accommodated with no appreciable impacts.

Intersection Operations

The proposed development will result in the creation of two new 'T' intersections – Constance Boulevard with Betty Boulevard and Shore Lane with Betty Boulevard. It is anticipated that the intersection of Constance Boulevard with Betty Boulevard will operate with stop control on Constance Boulevard (considered the minor movement); similarly, the intersection of Shore Lane with Betty Boulevard will operate with stop control on Betty Boulevard. Given the anticipated traffic volumes through the area, single lane approaches will be sufficient with the intersections expected to provide excellent operations.



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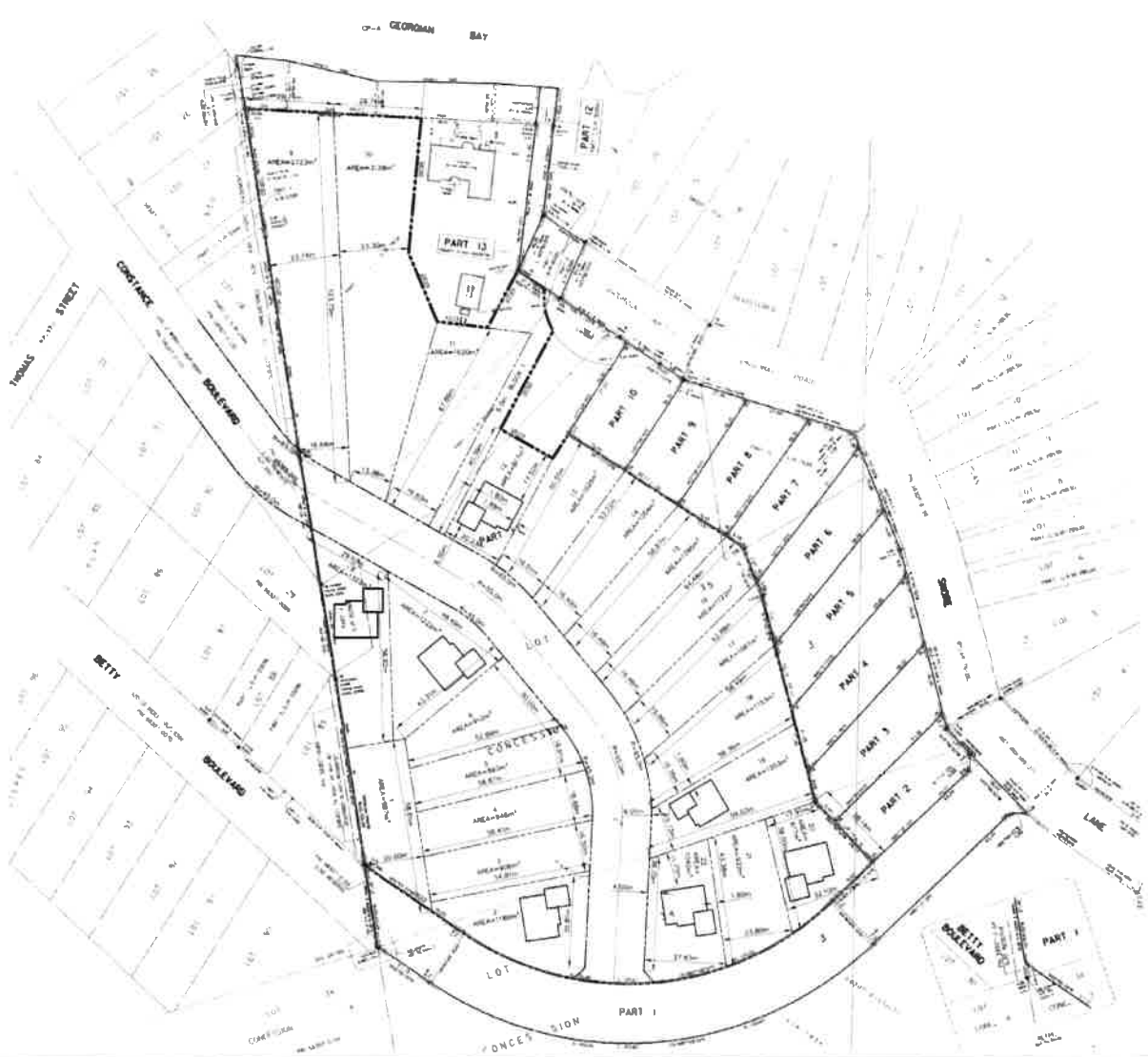
Consulting Engineers

Wasaga Shores Subdivision, Traffic Brief

2017 Traffic Volumes

Figure

3



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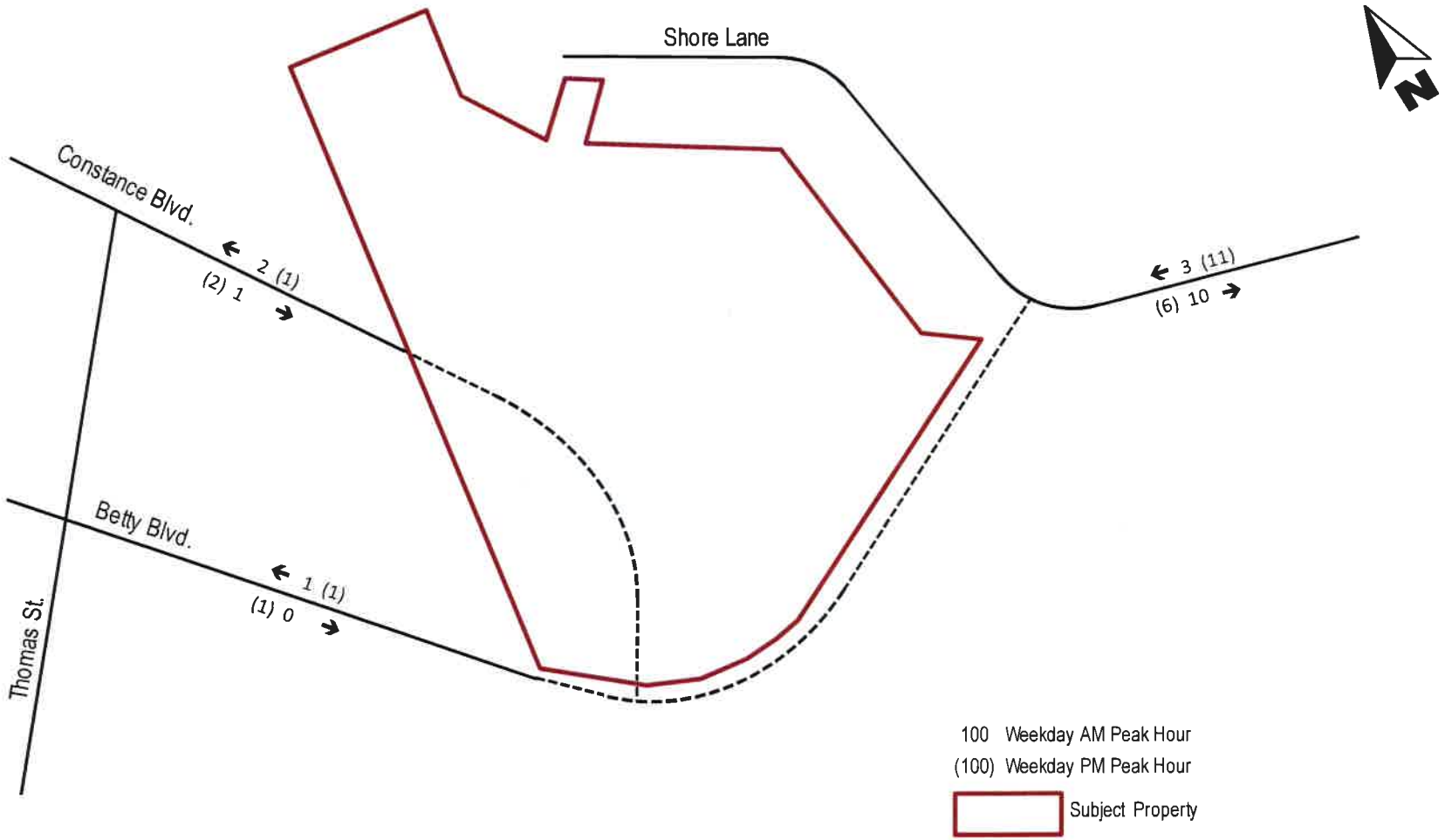
C.C. Tatham & Associates Ltd.
Consulting Engineers

Wasaga Shores Subdivision, Traffic Brief

Site Plan

Figure

4



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Consulting Engineers

Wasaga Shores Subdivision, Traffic Brief

Site Generated Traffic

Figure

5

Notwithstanding recommended spacing requirements (e.g. should the MTO consider Beachwood Road to be more of an arterial road), as noted above, Joan Avenue is an existing unopened right-of-way and as such, the spacing from 75th Street is fixed. Furthermore, the spacing is consistent with the intersection spacing between 75th, 74th and 73rd Streets.

Proposed Land Use & Phasing

The site will include a water tower, a storm water management pond, material storage structure, and potentially in the future include a building with a small office and a garage, 20 regular parking spaces and 11 large vehicle parking spaces. The first phase of construction is site grading for the water tower and material storage facility is anticipated to be completed around 2020; however, the office and garage building is not expected to be constructed until later, and it is anticipated that the Town of Wasaga Beach will have ownership of Beachwood Road by this time. Given the minimal traffic volume that would be generated by the office and garage building, for the purpose of this traffic brief and effect of the building together with future background, we have assumed that full build out year of the site is 2020.

Site Generated Trips

Site trip generation estimates were based on information provided by the Town such as the number of office staff will work at the office, anticipated operational vehicles activities, number of visitors during the peak hours etc. as presented in Table 1. In total, the development is expected to generate 24 trips in the AM peak hour and 24 trips in the PM peak hour (both inbound and outbound trips).

TABLE 1 – SITE TRIP GENERATION ESTIMATES

Land Use	Rate/ Estimate	Unit/ Size	WEEKDAY AM PEAK			WEEKDAY PM PEAK		
			In	Out	Total	In	Out	Total
Equipment and operators	estimate	17	9	9	17	9	9	17
Office staff	estimate	3	3	0	3	0	3	3
Visitors	estimate	2	2	2	4	2	2	4
Total			14	11	24	11	14	24

The distribution of the trip to be generated by the proposed development has been developed based on its location (at the west end of the Town) and its service areas (west of Sunnidale Road). The following distribution is assumed:

- 25% to/from the west
- 75% to/from the east

It is assumed that all site traffic would arrive and leave the site via Joan Avenue, thus, all site traffic are assigned to it. The resulting site generated traffic volumes are illustrated in Figure 3.

Background Developments Generated Trips

As shown in Figure 2, other lands that will have accesses on Joan Avenue include Blocks 4, and 5, and lands on the east side of Joan Avenue. It is assumed that lands on the east side of Joan Avenue would be developed as residential single family detach housing (15 units); lands on the west side of Joan Avenue would be developed as business park use including offices, light industrial, warehouse etc. For the business park use, a 25% lot coverage was assumed. The total gross floor area for Blocks 4, and 5 was calculated as 76,424 square feet ((1.15 + 1.69) x 3.28^2 x 10000 x 25% = 76,385).

Trip generation rates have been determined from the Institute of Transportation Engineer's *Trip Generation Manual*. As per the assumed land uses and applicable ITE land use category, trip rates correspond to "residential single family detached housing" and "business park" (ITE land use codes 210 and 770) have been employed. The applicable trip rates and corresponding trip estimates for the peak hours of the adjacent road are provided in Table 2. In total, the background developments are expected to generate 42 trips in the AM peak hour and 47 trips in the PM peak hour (both inbound and outbound trips).

TABLE 2 – BACKGROUND DEVELOPMENT TRIP GENERATION ESTIMATES

Land Use	Rate/ Estimate	Unit/ Size	WEEKDAY AM PEAK			WEEKDAY PM PEAK		
			In	Out	Total	In	Out	Total
Single family detached	rate	unit	0.19	0.55	0.74	0.62	0.37	0.99
	estimate	15	3	8	11	9	6	15
Business park	rate	1000 ft^2 GFA	0.24	0.16	0.40	0.19	0.23	0.42
	estimate	76.385	19	12	31	15	17	32
Total			22	20	42	24	23	47

The distribution of the trips to be generated by the background developments has been developed based on the existing traffic pattern on Beachwood Road west of 75th Street S. The following distribution is assumed:

- 40% to/from the west
- 60% to/from the east

It is assumed that all background development traffic would arrive and leave via Joan Avenue, thus, all background development traffic are assigned to it, although it is noted that residents could leave the area via Ayling-Reid Court. The resulting background development generated traffic volumes are illustrated in Figure 4.

Existing Road Network

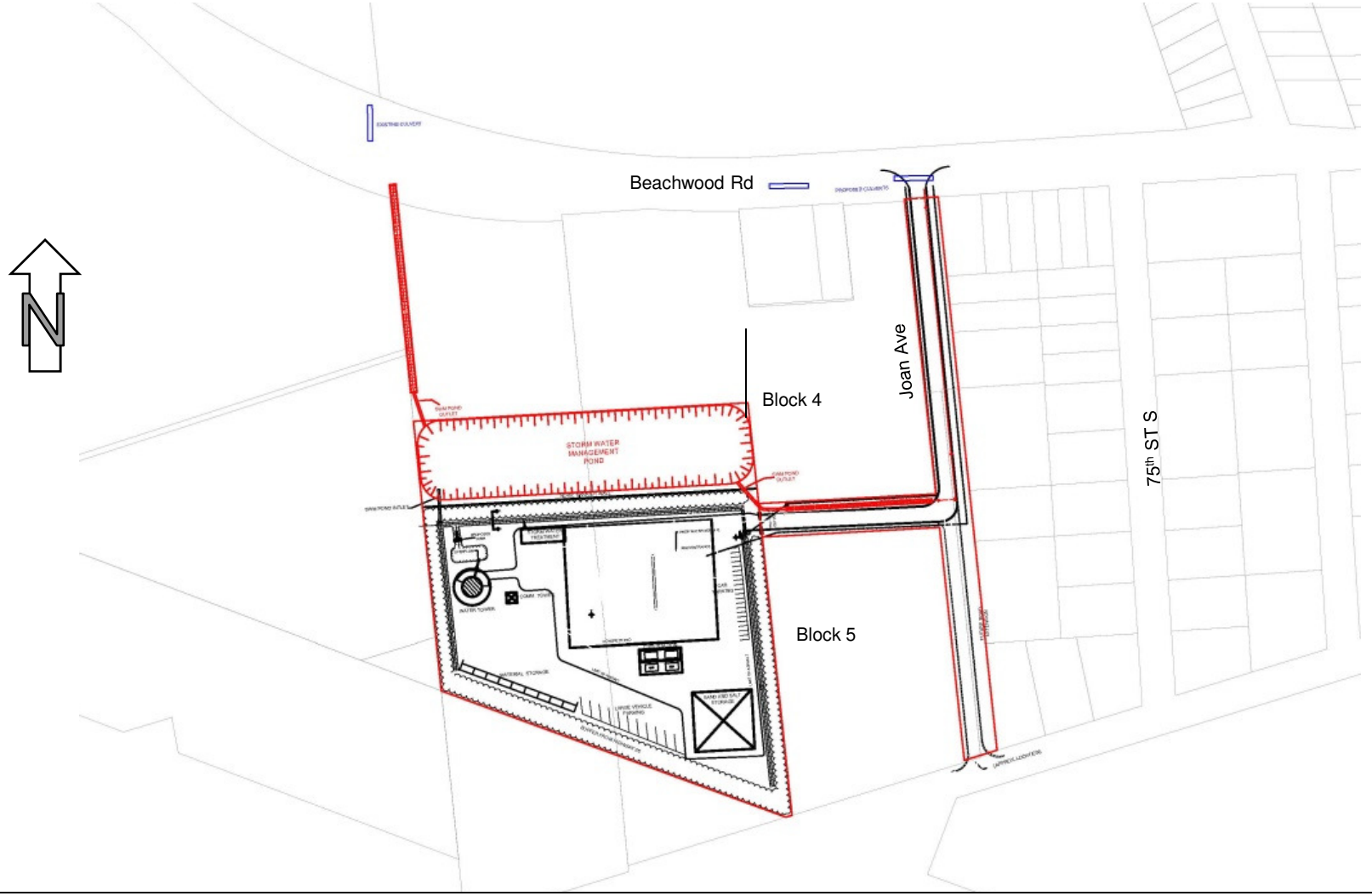
The road network to be addressed by this report consists of Beachwood Road. Before the new alignment of Highway 26 was built, Beachwood Road was Highway 26. As noted above, Beachwood Road is still currently under the jurisdiction of MTO.

Through the study area, Beachwood Road is a provincial highway/future collector road as identified in the Town's Official Plan. The road has one lane in each direction and a rural cross-section with a 2.0 m paved shoulder and a 1-2 m gravel shoulder on both sides. The alignment of Beachwood Road in the area is relatively flat; however, there is a horizontal curve to the west. The road has a posted speed limit of 60 km/h east of Joan Avenue and 80 km/h west of Joan Avenue. Design speeds of 70 km/h and 100km/h have been assumed respectively (speed limit + 10 km/h for lower speed roads; and speed limit + 20 km/h for higher speed roads).

Existing Traffic Volumes

To assess road improvement needs, typical weekday AM and PM peak hours have been considered.

Traffic counts were conducted at the intersection of Beachwood Road with 75th Street S on Wednesday

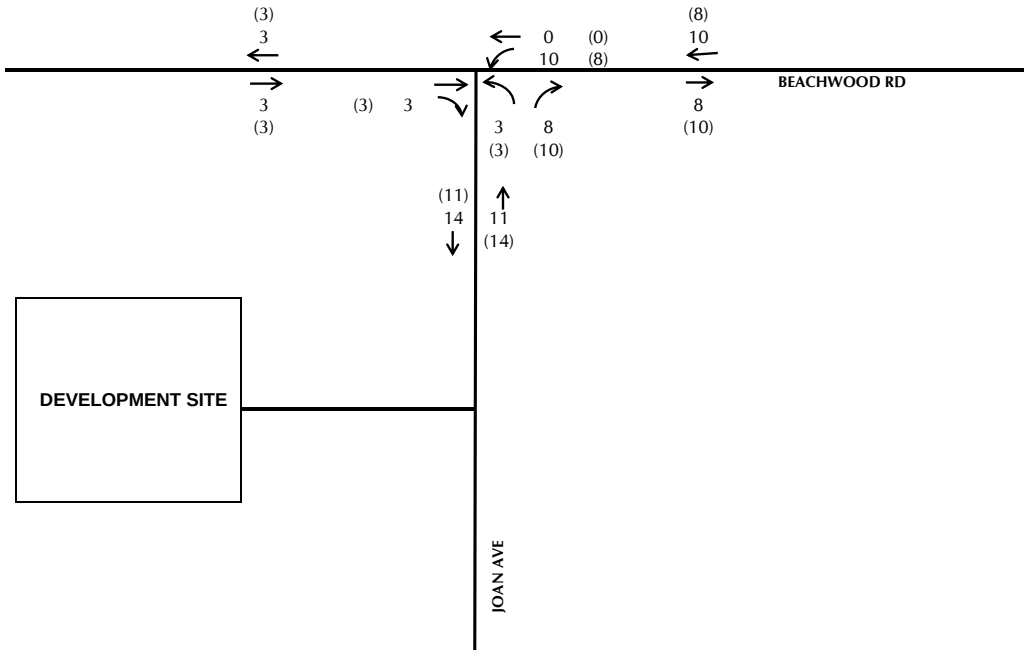


Ainley GROUP CONSULTING ENGINEERS PLANNERS

TOWN OF WASAGA BEACH

WEST END PUBLIC WORKS DEPOT DEVELOPMENT TRAFFIC IMPACT STUDY

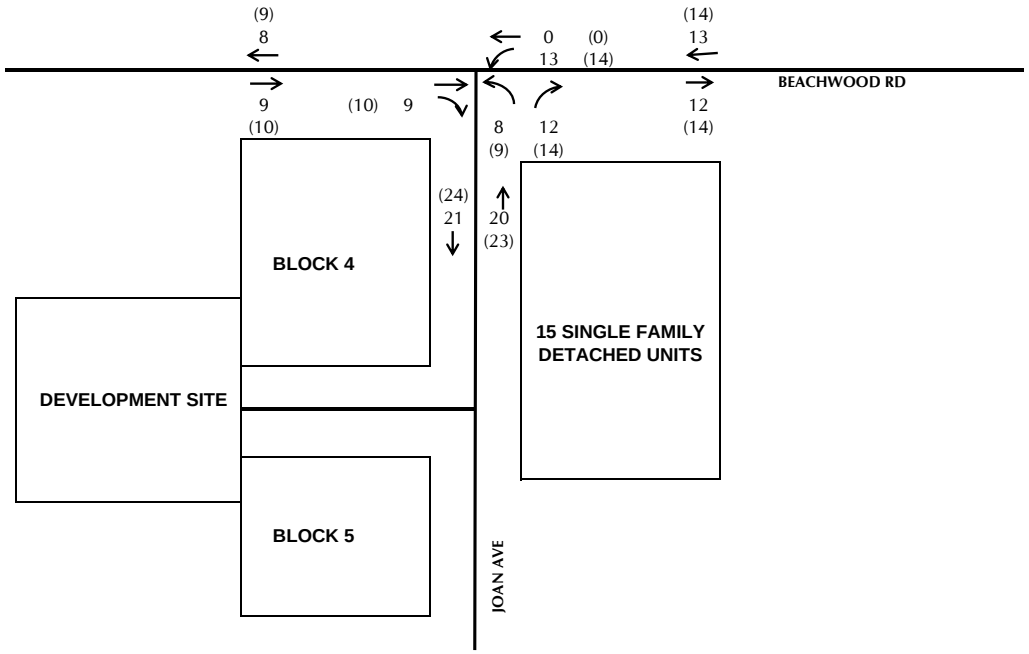
FIGURE 2 – SITE CONCEPT PLAN



100 (100) AM (PM) Peak Hour

Figure 3
Site Generated Traffic Volumes
West End Public Works Depot Traffic Impact Study
Town of Wasaga Beach

Ainley GROUP CONSULTING ENGINEERS PLANNERS



100 (100) AM (PM) Peak Hour

Figure 4

Background Development Generated Traffic Volumes

West End Public Works Depot Traffic Impact Study

Town of Wasaga Beach

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Appendix C –
Traffic Count Data

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period	One Hour Peak
From: 7:00:00	**From:** 8:45:00
To: 10:00:00	**To:** 9:45:00

Municipality: Wasaga Beach
Site #: 1807800001
Intersection: Beachwood Rd & 75th St S
TFR File #: 1
Count date: 13-Jun-18

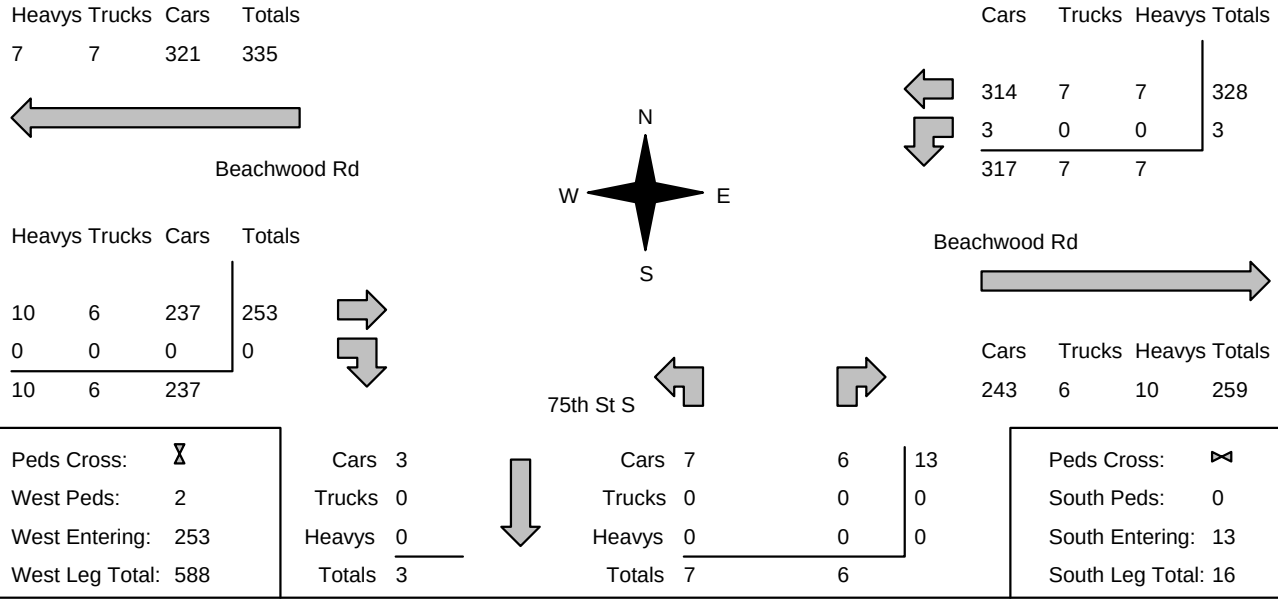
Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Beachwood Rd runs W/E

East Leg Total: 590
East Entering: 331
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 2
West Entering: 253
West Leg Total: 588

Cars	3		
Trucks	0		
Heavys	0		
Totals	3		
Cars	7	6	13
Trucks	0	0	0
Heavys	0	0	0
Totals	7	6	

Peds Cross: ⋈
South Peds: 0
South Entering: 13
South Leg Total: 16

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: Wasaga Beach
Site #: 1807800001
Intersection: Beachwood Rd & 75th St S
TFR File #: 1
Count date: 13-Jun-18

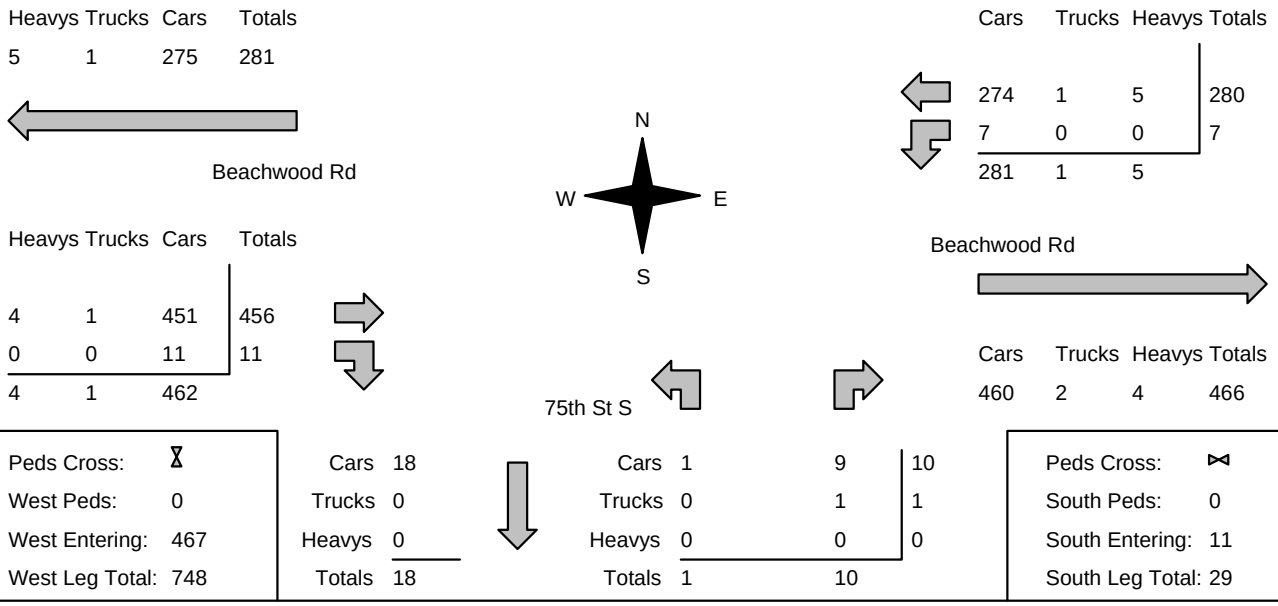
Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Beachwood Rd runs W/E

East Leg Total: 753
East Entering: 287
East Peds: 2
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 467
West Leg Total: 748

Cars 18
Trucks 0
Heavys 0
Totals 18

Cars 1 9 10
Trucks 0 1 1
Heavys 0 0 0
Totals 1 10

Peds Cross: ⋈
South Peds: 0
South Entering: 11
South Leg Total: 29

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:45:00
To: 9:45:00

Municipality: Wasaga Beach
Site #: 2003200001
Intersection: Beachwood Rd &
TFR File #: 1
Count date: 14-Feb-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Beachwood Rd runs W/E

North Leg Total:	0
North Entering:	0
North Peds:	0
Peds Cross:	⋈

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	

Heavys	0
Trucks	0
Cars	0
Totals	0

East Leg Total:	474
East Entering:	318
East Peds:	0
Peds Cross:	⧖

Heavys	Trucks	Cars	Totals
13	2	303	318

Cars	Trucks	Heavys	Totals
0	0	0	0
303	2	13	318
0	0	0	0
303	2	13	

Beachwood Rd

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	0	0
6	3	147	156
0	0	0	0
6	3	147	

Beachwood Rd

Cars	Trucks	Heavys	Totals
147	3	6	156

Peds Cross:	⧖
West Peds:	0
West Entering:	156
West Leg Total:	474

Cars	0
Trucks	0
Heavys	0
Totals	0

Cars	0	0	0	0
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	0	

Peds Cross:	⋈
South Peds:	0
South Entering:	0
South Leg Total:	0

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 19:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: Wasaga Beach
Site #: 2003200001
Intersection: Beachwood Rd &
TFR File #: 1
Count date: 13-Feb-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Beachwood Rd runs W/E

North Leg Total: 0
North Entering: 0
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	

Heavys	0
Trucks	0
Cars	0
Totals	0

East Leg Total: 619
East Entering: 240
East Peds: 0
Peds Cross: ⧖

Heavys	Trucks	Cars	Totals
4	0	236	240

Beachwood Rd

Heavys	Trucks	Cars	Totals
0	0	0	0
1	2	376	379
0	0	0	0
1	2	376	

N
W E
S

Cars	Trucks	Heavys	Totals
0	0	0	0
236	0	4	240
0	0	0	0
236	0	4	

Beachwood Rd

Cars	Trucks	Heavys	Totals
376	2	1	379

Peds Cross: ⧖
West Peds: 0
West Entering: 379
West Leg Total: 619

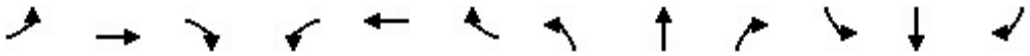
Cars	0
Trucks	0
Heavys	0
Totals	0

Cars	0	0	0	0
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	0	

Peds Cross: ⋈
South Peds: 0
South Entering: 0
South Leg Total: 0

Comments

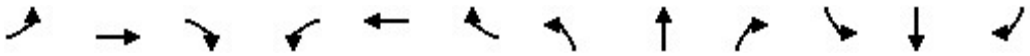
Appendix D –
Synchro Analysis Output –
Background Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	278	20	32	368	0	43	0	65	0	0	0
Future Volume (Veh/h)	0	278	20	32	368	0	43	0	65	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	302	22	39	443	0	47	0	71	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	443			324			834	834	313	905	845	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	443			324			834	834	313	905	845	443
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			83	100	90	100	100	100
cM capacity (veh/h)	1117			1236			281	294	727	227	290	615

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	324	482	118	0
Volume Left	0	39	47	0
Volume Right	22	0	71	0
cSH	1117	1236	445	1700
Volume to Capacity	0.00	0.03	0.27	0.00
Queue Length 95th (m)	0.0	0.7	8.0	0.0
Control Delay (s)	0.0	1.0	16.0	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	1.0	16.0	0.0
Approach LOS			C	A

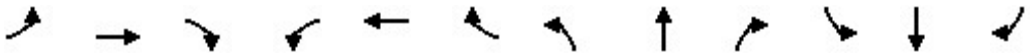
Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Future Volume (Veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	0	0	8	4	0	0	0	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			5			22	19	5	17	17	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			5			22	19	5	17	17	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1607			1616			985	874	1078	997	877	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	6	12	0	20
Volume Left	1	0	0	15
Volume Right	0	4	0	5
cSH	1607	1616	1700	1015
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.5
Control Delay (s)	1.2	0.0	0.0	8.6
Lane LOS	A		A	A
Approach Delay (s)	1.2	0.0	0.0	8.6
Approach LOS			A	A

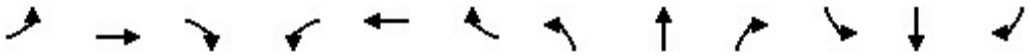
Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	514	42	64	309	0	30	0	46	0	0	0
Future Volume (Veh/h)	0	514	42	64	309	0	30	0	46	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	565	46	71	343	0	33	0	50	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	343			611			1073	1073	588	1123	1096	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			611			1073	1073	588	1123	1096	343
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			82	100	90	100	100	100
cM capacity (veh/h)	1216			968			187	204	509	156	198	700

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	611	414	83	0
Volume Left	0	71	33	0
Volume Right	46	0	50	0
cSH	1216	968	302	1700
Volume to Capacity	0.00	0.07	0.27	0.00
Queue Length 95th (m)	0.0	1.8	8.3	0.0
Control Delay (s)	0.0	2.2	21.4	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	2.2	21.4	0.0
Approach LOS			C	A

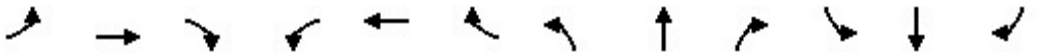
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Future Volume (Veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	0	0	8	16	0	0	0	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			10			39	44	10	36	36	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			10			39	44	10	36	36	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1591			1610			960	845	1071	968	854	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	15	24	0	12
Volume Left	5	0	0	9
Volume Right	0	16	0	3
cSH	1591	1610	1700	990
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.3
Control Delay (s)	2.4	0.0	0.0	8.7
Lane LOS	A		A	A
Approach Delay (s)	2.4	0.0	0.0	8.7
Approach LOS			A	A

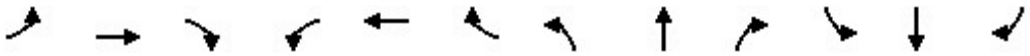
Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	14.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	306	20	32	405	0	43	0	65	0	0	0
Future Volume (Veh/h)	0	306	20	32	405	0	43	0	65	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	333	22	39	488	0	47	0	71	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	488			355			910	910	344	981	921	488
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	488			355			910	910	344	981	921	488
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			81	100	90	100	100	100
cM capacity (veh/h)	1075			1204			249	266	699	200	262	580

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	355	39	488	118	0
Volume Left	0	39	0	47	0
Volume Right	22	0	0	71	0
cSH	1075	1204	1700	406	1700
Volume to Capacity	0.00	0.03	0.29	0.29	0.00
Queue Length 95th (m)	0.0	0.8	0.0	9.0	0.0
Control Delay (s)	0.0	8.1	0.0	17.4	0.0
Lane LOS		A		C	A
Approach Delay (s)	0.0	0.6		17.4	0.0
Approach LOS				C	A

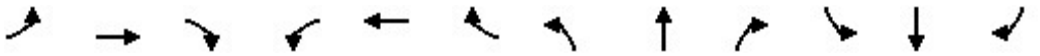
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Future Volume (Veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	0	0	8	4	0	0	0	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			5			22	19	5	17	17	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			5			22	19	5	17	17	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1607			1616			985	874	1078	997	877	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	6	12	0	20
Volume Left	1	0	0	15
Volume Right	0	4	0	5
cSH	1607	1616	1700	1015
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.5
Control Delay (s)	1.2	0.0	0.0	8.6
Lane LOS	A		A	A
Approach Delay (s)	1.2	0.0	0.0	8.6
Approach LOS			A	A

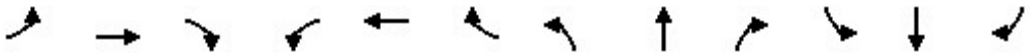
Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	565	42	64	340	0	30	0	46	0	0	0
Future Volume (Veh/h)	0	565	42	64	340	0	30	0	46	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	621	46	71	378	0	33	0	50	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	378			667			1164	1164	644	1214	1187	378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378			667			1164	1164	644	1214	1187	378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			80	100	89	100	100	100
cM capacity (veh/h)	1180			923			161	179	473	133	174	669

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	667	71	378	83	0
Volume Left	0	71	0	33	0
Volume Right	46	0	0	50	0
cSH	1180	923	1700	267	1700
Volume to Capacity	0.00	0.08	0.22	0.31	0.00
Queue Length 95th (m)	0.0	1.9	0.0	9.7	0.0
Control Delay (s)	0.0	9.2	0.0	24.4	0.0
Lane LOS		A		C	A
Approach Delay (s)	0.0	1.5		24.4	0.0
Approach LOS				C	A

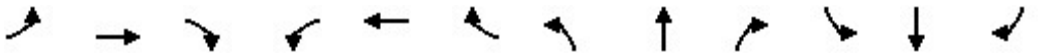
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	64.3%	ICU Level of Service		C
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Future Volume (Veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	0	0	8	16	0	0	0	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			10			39	44	10	36	36	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			10			39	44	10	36	36	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1591			1610			960	845	1071	968	854	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	15	24	0	12
Volume Left	5	0	0	9
Volume Right	0	16	0	3
cSH	1591	1610	1700	990
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.3
Control Delay (s)	2.4	0.0	0.0	8.7
Lane LOS	A		A	A
Approach Delay (s)	2.4	0.0	0.0	8.7
Approach LOS			A	A

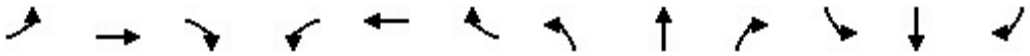
Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	14.9%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	337	20	32	446	0	43	0	65	0	0	0
Future Volume (Veh/h)	0	337	20	32	446	0	43	0	65	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	366	22	39	537	0	47	0	71	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	537			388			992	992	377	1063	1003	537
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537			388			992	992	377	1063	1003	537
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			79	100	89	100	100	100
cM capacity (veh/h)	1031			1170			219	238	670	175	234	544

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	388	39	537	118	0
Volume Left	0	39	0	47	0
Volume Right	22	0	0	71	0
cSH	1031	1170	1700	368	1700
Volume to Capacity	0.00	0.03	0.32	0.32	0.00
Queue Length 95th (m)	0.0	0.8	0.0	10.3	0.0
Control Delay (s)	0.0	8.2	0.0	19.3	0.0
Lane LOS		A		C	A
Approach Delay (s)	0.0	0.6		19.3	0.0
Approach LOS				C	A

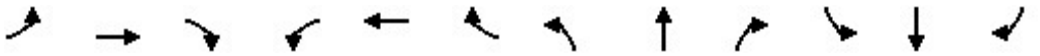
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	39.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Future Volume (Veh/h)	1	5	0	0	7	4	0	0	0	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	0	0	8	4	0	0	0	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			5			22	19	5	17	17	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			5			22	19	5	17	17	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1607			1616			985	874	1078	997	877	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	6	12	0	20
Volume Left	1	0	0	15
Volume Right	0	4	0	5
cSH	1607	1616	1700	1015
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.5
Control Delay (s)	1.2	0.0	0.0	8.6
Lane LOS	A		A	A
Approach Delay (s)	1.2	0.0	0.0	8.6
Approach LOS			A	A

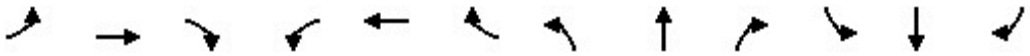
Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	621	42	64	374	0	30	0	46	0	0	0
Future Volume (Veh/h)	0	621	42	64	374	0	30	0	46	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	682	46	71	416	0	33	0	50	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	416			728			1263	1263	705	1313	1286	416
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	416			728			1263	1263	705	1313	1286	416
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			76	100	89	100	100	100
cM capacity (veh/h)	1143			876			137	156	436	112	151	637

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	728	71	416	83	0
Volume Left	0	71	0	33	0
Volume Right	46	0	0	50	0
cSH	1143	876	1700	234	1700
Volume to Capacity	0.00	0.08	0.24	0.35	0.00
Queue Length 95th (m)	0.0	2.0	0.0	11.6	0.0
Control Delay (s)	0.0	9.5	0.0	28.6	0.0
Lane LOS		A		D	A
Approach Delay (s)	0.0	1.4		28.6	0.0
Approach LOS				D	A

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	64.3%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Future Volume (Veh/h)	5	9	0	0	7	15	0	0	0	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	0	0	8	16	0	0	0	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			10			39	44	10	36	36	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			10			39	44	10	36	36	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1591			1610			960	845	1071	968	854	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	15	24	0	12
Volume Left	5	0	0	9
Volume Right	0	16	0	3
cSH	1591	1610	1700	990
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.0	0.3
Control Delay (s)	2.4	0.0	0.0	8.7
Lane LOS	A		A	A
Approach Delay (s)	2.4	0.0	0.0	8.7
Approach LOS			A	A

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	14.9%	ICU Level of Service		A
Analysis Period (min)	15			

Appendix E –
Transportation Tomorrow Survey – Excerpt

2006 GTA Zone of Destination: 8609

Outside Wasaga Beach Planning District		Distribution N	S	E	W	Total
PD 3 of Toronto	9				9	9
PD 8 of Toronto	12				12	12
Barrie	69				69	69
New Tecumseth	7				7	7
Clearview	26				26	26
Grey	38					38	38
Collingwood	370				56	315	370
Wasaga Beach	347						0
	531		0	0	178.5	352.5	531
Within Wasaga Beach 2006 GTA zone of Origin		Distribution N	S	E	W	Total
8569	103				103		103
8570	168				168		168
8610	16				16		16
8611	53				53		53
8612	8				8		
							0
	348		0	0	348	0	348
Totals	879		0	0	526.5	352.5	879
Distribution %			0%	0%	60%	40%	100%

```
Thu Apr 02 2020 14:14:16 GMT-0400 (Eastern Daylight Time) - Run Time: 2251ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Planning district of origin - pd_orig


Filters:
(2006 GTA zone of destination - gta06_dest In 8609)

Trip 2016
Table:

,PD 3 of Toronto,PD 8 of Toronto,Barrie,New Tecumseth,Clearview,Grey,Collingwood,Wasaga Beach
8609,9,12,69,7,26,38,370,347
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Thu Apr 02 2020 14:29:32 GMT-0400 (Eastern Daylight Time) - Run Time: 2552ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig


Filters:
(2006 GTA zone of destination - gta06_dest In 8609
and
Planning district of origin - pd_orig In 128, )

Trip 2016
Table:

,8569,8570,8610,8611,8612
8609,103,168,16,53,8
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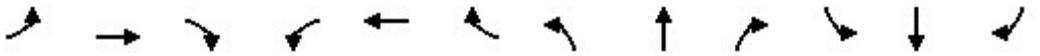
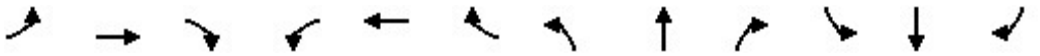
Appendix F –
Synchro Analysis Output –
Total Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	278	20	32	368	12	43	0	65	37	0	24
Future Volume (Veh/h)	8	278	20	32	368	12	43	0	65	37	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	302	22	39	443	14	47	0	71	40	0	26
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	457			324			878	866	313	919	870	450
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	457			324			878	866	313	919	870	450
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			81	100	90	82	100	96
cM capacity (veh/h)	1104			1236			249	280	727	220	278	609

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	324	39	457	118	66
Volume Left	9	0	39	0	47	40
Volume Right	0	22	0	14	71	26
cSH	1104	1700	1236	1700	412	294
Volume to Capacity	0.01	0.19	0.03	0.27	0.29	0.22
Queue Length 95th (m)	0.2	0.0	0.7	0.0	8.9	6.4
Control Delay (s)	8.3	0.0	8.0	0.0	17.2	20.7
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.6		17.2	20.7
Approach LOS					C	C

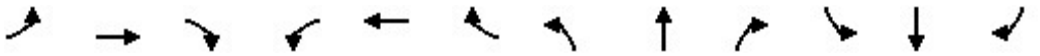
Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Future Volume (Veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	2	3	8	4	7	0	10	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			7			29	26	6	34	25	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			7			29	26	6	34	25	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	99	98	100	100
cM capacity (veh/h)	1607			1614			974	865	1077	962	866	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	15	17	20
Volume Left	1	3	7	15
Volume Right	2	4	10	5
cSH	1607	1614	1032	987
Volume to Capacity	0.00	0.00	0.02	0.02
Queue Length 95th (m)	0.0	0.0	0.4	0.5
Control Delay (s)	0.9	1.5	8.5	8.7
Lane LOS	A	A	A	A
Approach Delay (s)	0.9	1.5	8.5	8.7
Approach LOS			A	A

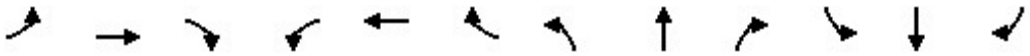
Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	514	42	64	309	38	30	0	46	23	0	15
Future Volume (Veh/h)	25	514	42	64	309	38	30	0	46	23	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	565	46	71	343	42	33	0	50	25	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	385			611			1143	1169	588	1175	1171	364
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	385			611			1143	1169	588	1175	1171	364
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			79	100	90	82	100	98
cM capacity (veh/h)	1173			968			160	175	509	141	174	681

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	27	611	71	385	83	41
Volume Left	27	0	71	0	33	25
Volume Right	0	46	0	42	50	16
cSH	1173	1700	968	1700	273	204
Volume to Capacity	0.02	0.36	0.07	0.23	0.30	0.20
Queue Length 95th (m)	0.5	0.0	1.8	0.0	9.5	5.5
Control Delay (s)	8.1	0.0	9.0	0.0	23.8	27.0
Lane LOS	A		A		C	D
Approach Delay (s)	0.3		1.4		23.8	27.0
Approach LOS					C	D

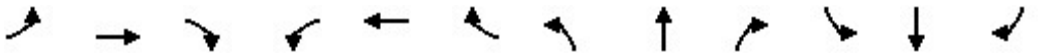
Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Future Volume (Veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	7	10	8	16	4	0	5	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			17			62	68	14	64	63	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			17			62	68	14	64	63	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	99	100	100
cM capacity (veh/h)	1591			1600			923	815	1067	918	820	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	34	9	12
Volume Left	5	10	4	9
Volume Right	7	16	5	3
cSH	1591	1600	998	951
Volume to Capacity	0.00	0.01	0.01	0.01
Queue Length 95th (m)	0.1	0.1	0.2	0.3
Control Delay (s)	1.7	2.2	8.6	8.8
Lane LOS	A	A	A	A
Approach Delay (s)	1.7	2.2	8.6	8.8
Approach LOS			A	A

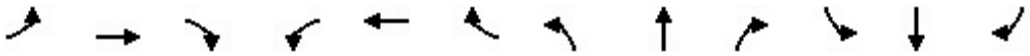
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	306	20	32	405	12	43	0	65	37	0	24
Future Volume (Veh/h)	8	306	20	32	405	12	43	0	65	37	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	333	22	39	488	14	47	0	71	40	0	26
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	502			355			954	942	344	995	946	495
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	502			355			954	942	344	995	946	495
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			79	100	90	79	100	95
cM capacity (veh/h)	1062			1204			221	252	699	195	251	575

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	355	39	502	118	66
Volume Left	9	0	39	0	47	40
Volume Right	0	22	0	14	71	26
cSH	1062	1700	1204	1700	375	263
Volume to Capacity	0.01	0.21	0.03	0.30	0.31	0.25
Queue Length 95th (m)	0.2	0.0	0.8	0.0	10.1	7.3
Control Delay (s)	8.4	0.0	8.1	0.0	18.9	23.2
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.6		18.9	23.2
Approach LOS					C	C

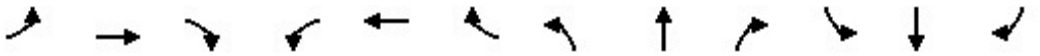
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Future Volume (Veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	2	3	8	4	7	0	10	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			7			29	26	6	34	25	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			7			29	26	6	34	25	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	99	98	100	100
cM capacity (veh/h)	1607			1614			974	865	1077	962	866	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	15	17	20
Volume Left	1	3	7	15
Volume Right	2	4	10	5
cSH	1607	1614	1032	987
Volume to Capacity	0.00	0.00	0.02	0.02
Queue Length 95th (m)	0.0	0.0	0.4	0.5
Control Delay (s)	0.9	1.5	8.5	8.7
Lane LOS	A	A	A	A
Approach Delay (s)	0.9	1.5	8.5	8.7
Approach LOS			A	A

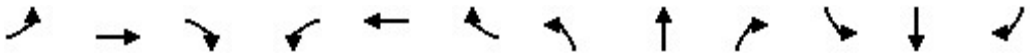
Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	565	42	64	340	38	30	0	46	23	0	15
Future Volume (Veh/h)	25	565	42	64	340	38	30	0	46	23	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	621	46	71	378	42	33	0	50	25	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	420			667			1234	1260	644	1266	1262	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	420			667			1234	1260	644	1266	1262	399
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			76	100	89	79	100	98
cM capacity (veh/h)	1139			923			138	154	473	121	153	651

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	27	667	71	420	83	41
Volume Left	27	0	71	0	33	25
Volume Right	0	46	0	42	50	16
cSH	1139	1700	923	1700	241	177
Volume to Capacity	0.02	0.39	0.08	0.25	0.34	0.23
Queue Length 95th (m)	0.6	0.0	1.9	0.0	11.1	6.6
Control Delay (s)	8.2	0.0	9.2	0.0	27.6	31.4
Lane LOS	A		A		D	D
Approach Delay (s)	0.3		1.3		27.6	31.4
Approach LOS					D	D

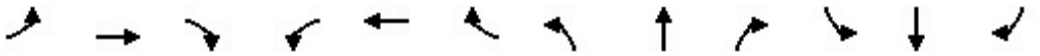
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	50.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Future Volume (Veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	7	10	8	16	4	0	5	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			17			62	68	14	64	63	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			17			62	68	14	64	63	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	99	100	100
cM capacity (veh/h)	1591			1600			923	815	1067	918	820	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	34	9	12
Volume Left	5	10	4	9
Volume Right	7	16	5	3
cSH	1591	1600	998	951
Volume to Capacity	0.00	0.01	0.01	0.01
Queue Length 95th (m)	0.1	0.1	0.2	0.3
Control Delay (s)	1.7	2.2	8.6	8.8
Lane LOS	A	A	A	A
Approach Delay (s)	1.7	2.2	8.6	8.8
Approach LOS			A	A

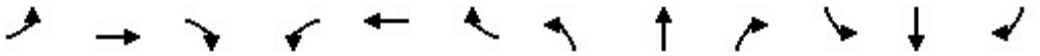
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	337	20	32	446	12	43	0	65	37	0	24
Future Volume (Veh/h)	8	337	20	32	446	12	43	0	65	37	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	366	22	39	537	14	47	0	71	40	0	26
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	551			388			1036	1024	377	1077	1028	544
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	551			388			1036	1024	377	1077	1028	544
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			76	100	89	76	100	95
cM capacity (veh/h)	1019			1170			193	225	670	170	224	539

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	388	39	551	118	66
Volume Left	9	0	39	0	47	40
Volume Right	0	22	0	14	71	26
cSH	1019	1700	1170	1700	338	233
Volume to Capacity	0.01	0.23	0.03	0.32	0.35	0.28
Queue Length 95th (m)	0.2	0.0	0.8	0.0	11.6	8.6
Control Delay (s)	8.6	0.0	8.2	0.0	21.3	26.5
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		0.5		21.3	26.5
Approach LOS					C	D

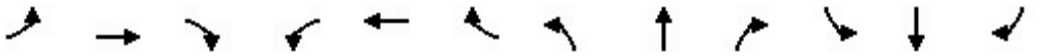
Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Future Volume (Veh/h)	1	5	2	3	7	4	6	0	9	14	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	2	3	8	4	7	0	10	15	0	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	12			7			29	26	6	34	25	10
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			7			29	26	6	34	25	10
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	99	98	100	100
cM capacity (veh/h)	1607			1614			974	865	1077	962	866	1071

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	15	17	20
Volume Left	1	3	7	15
Volume Right	2	4	10	5
cSH	1607	1614	1032	987
Volume to Capacity	0.00	0.00	0.02	0.02
Queue Length 95th (m)	0.0	0.0	0.4	0.5
Control Delay (s)	0.9	1.5	8.5	8.7
Lane LOS	A	A	A	A
Approach Delay (s)	0.9	1.5	8.5	8.7
Approach LOS			A	A

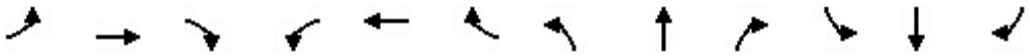
Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	621	42	64	374	38	30	0	46	23	0	15
Future Volume (Veh/h)	25	621	42	64	374	38	30	0	46	23	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	682	46	71	416	42	33	0	50	25	0	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	458			728			1333	1359	705	1365	1361	437
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	458			728			1333	1359	705	1365	1361	437
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			72	100	89	75	100	97
cM capacity (veh/h)	1103			876			118	133	436	102	133	620

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	27	728	71	458	83	41
Volume Left	27	0	71	0	33	25
Volume Right	0	46	0	42	50	16
cSH	1103	1700	876	1700	210	151
Volume to Capacity	0.02	0.43	0.08	0.27	0.40	0.27
Queue Length 95th (m)	0.6	0.0	2.0	0.0	13.4	7.9
Control Delay (s)	8.3	0.0	9.5	0.0	32.9	37.6
Lane LOS	A		A		D	E
Approach Delay (s)	0.3		1.3		32.9	37.6
Approach LOS					D	E

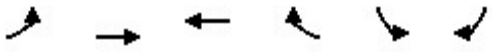
Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	53.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Future Volume (Veh/h)	5	9	6	9	7	15	4	0	5	8	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	10	7	10	8	16	4	0	5	9	0	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			17			62	68	14	64	63	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			17			62	68	14	64	63	16
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	99	100	100
cM capacity (veh/h)	1591			1600			923	815	1067	918	820	1063

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	34	9	12
Volume Left	5	10	4	9
Volume Right	7	16	5	3
cSH	1591	1600	998	951
Volume to Capacity	0.00	0.01	0.01	0.01
Queue Length 95th (m)	0.1	0.1	0.2	0.3
Control Delay (s)	1.7	2.2	8.6	8.8
Lane LOS	A	A	A	A
Approach Delay (s)	1.7	2.2	8.6	8.8
Approach LOS			A	A

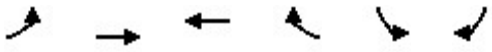
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	337	446	12	37	24
Future Volume (Veh/h)	8	337	446	12	37	24
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.92	0.92
Hourly flow rate (vph)	9	366	537	14	40	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	551				928	544
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551				928	544
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				86	95
cM capacity (veh/h)	1019				295	539

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	375	551	66
Volume Left	9	0	40
Volume Right	0	14	26
cSH	1019	1700	359
Volume to Capacity	0.01	0.32	0.18
Queue Length 95th (m)	0.2	0.0	5.0
Control Delay (s)	0.3	0.0	17.3
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	17.3
Approach LOS			C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

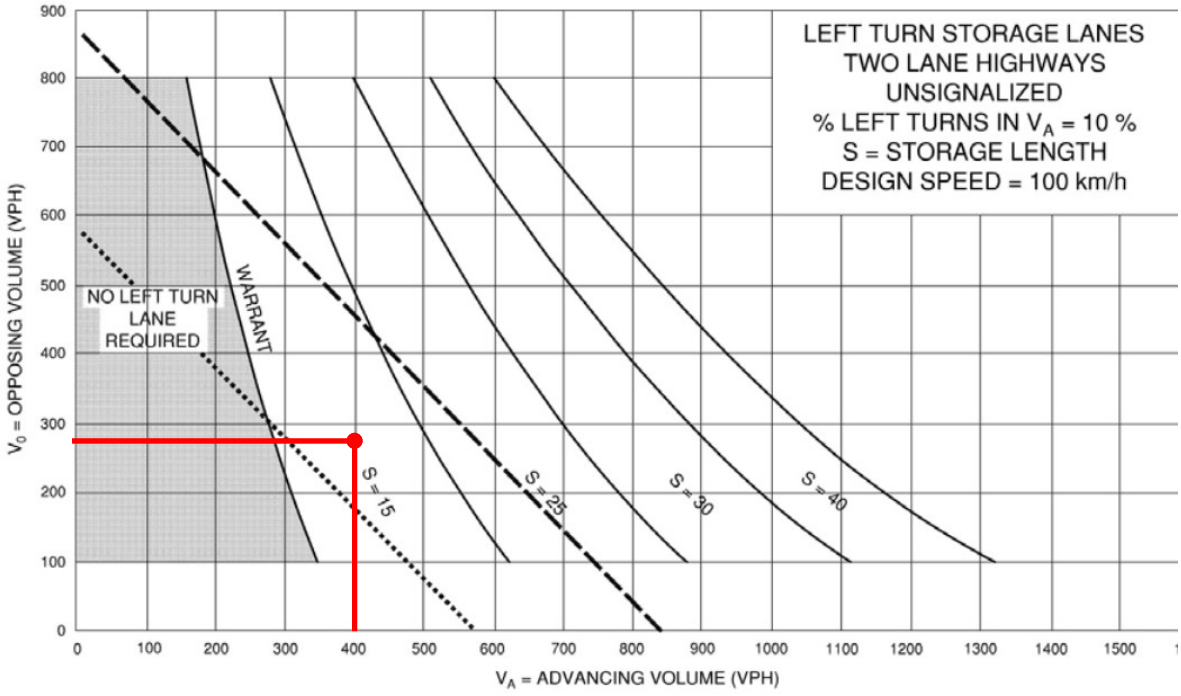


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	621	374	38	23	15
Future Volume (Veh/h)	25	621	374	38	23	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.92	0.92
Hourly flow rate (vph)	27	682	416	42	25	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	458				1173	437
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	458				1173	437
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				88	97
cM capacity (veh/h)	1103				207	620

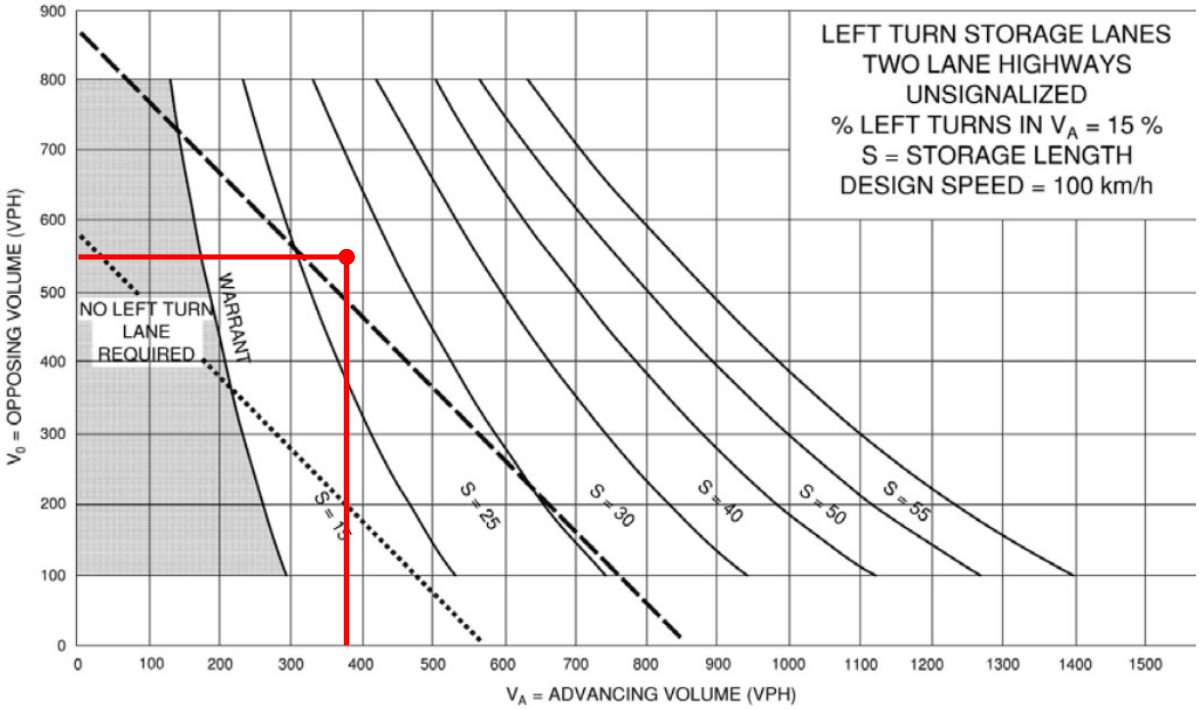
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	709	458	41
Volume Left	27	0	25
Volume Right	0	42	16
cSH	1103	1700	280
Volume to Capacity	0.02	0.27	0.15
Queue Length 95th (m)	0.6	0.0	3.8
Control Delay (s)	0.6	0.0	20.1
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	20.1
Approach LOS			C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

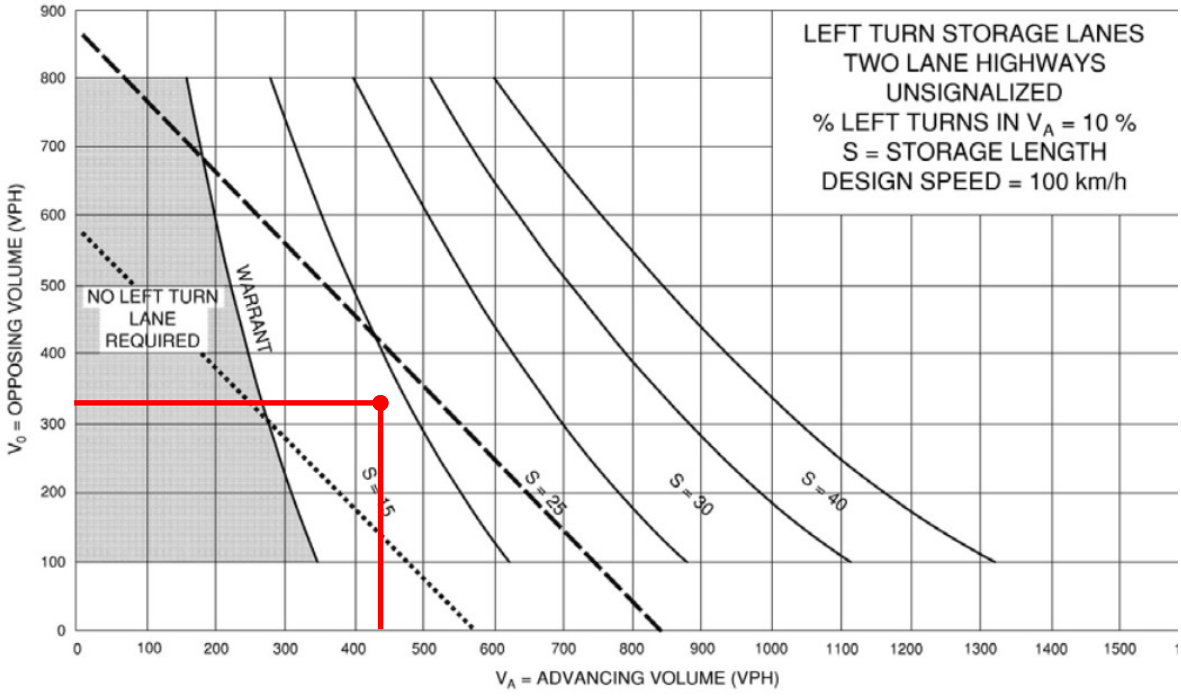
Appendix G –
MTO Left Turn Analysis



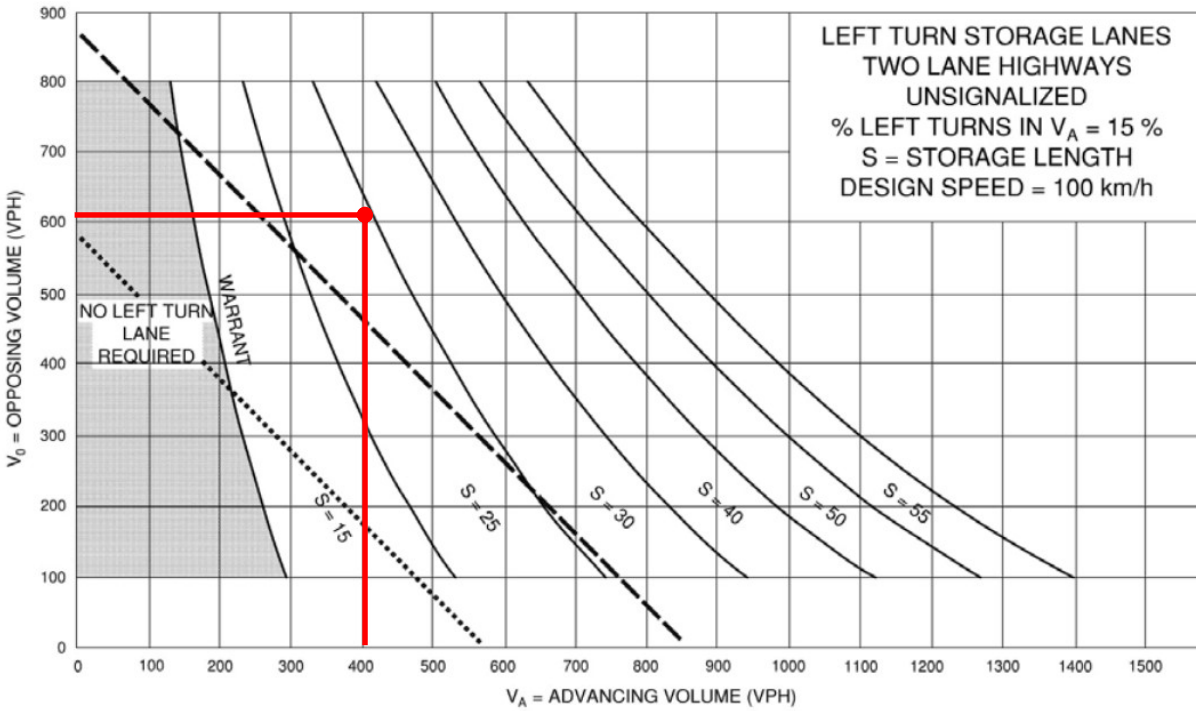
Background (2023) AM Peak – Westbound on Beachwood Road



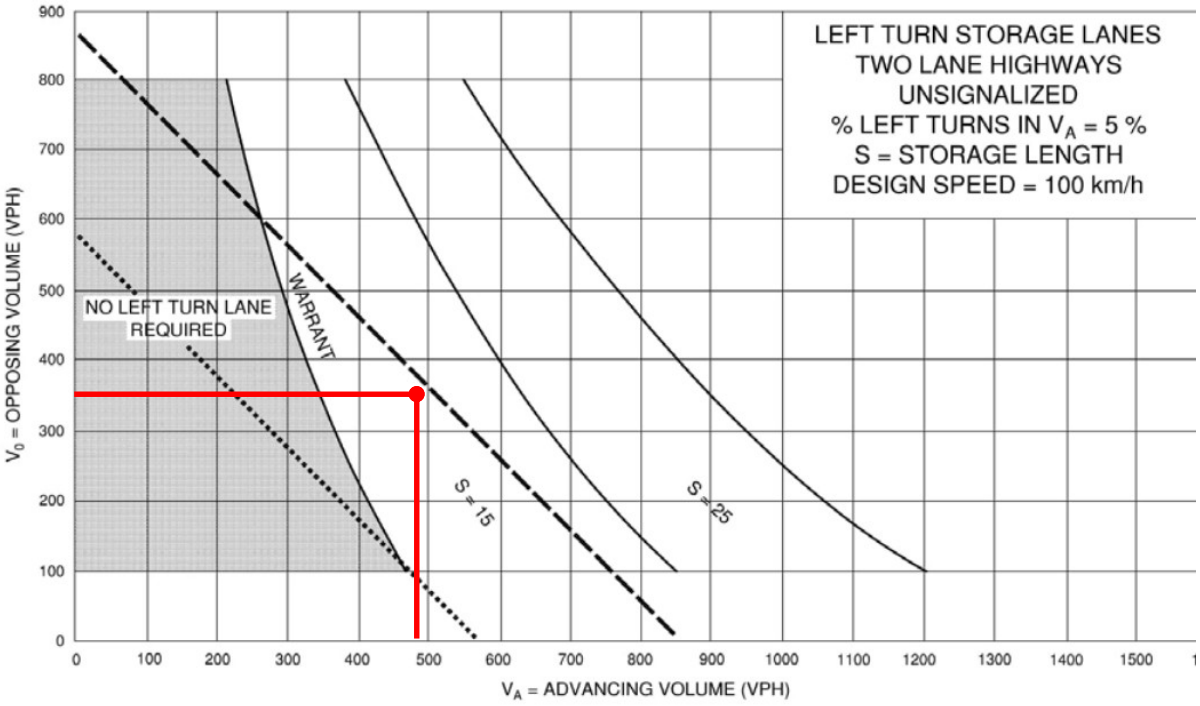
Background (2023) PM Peak – Westbound on Beachwood Road



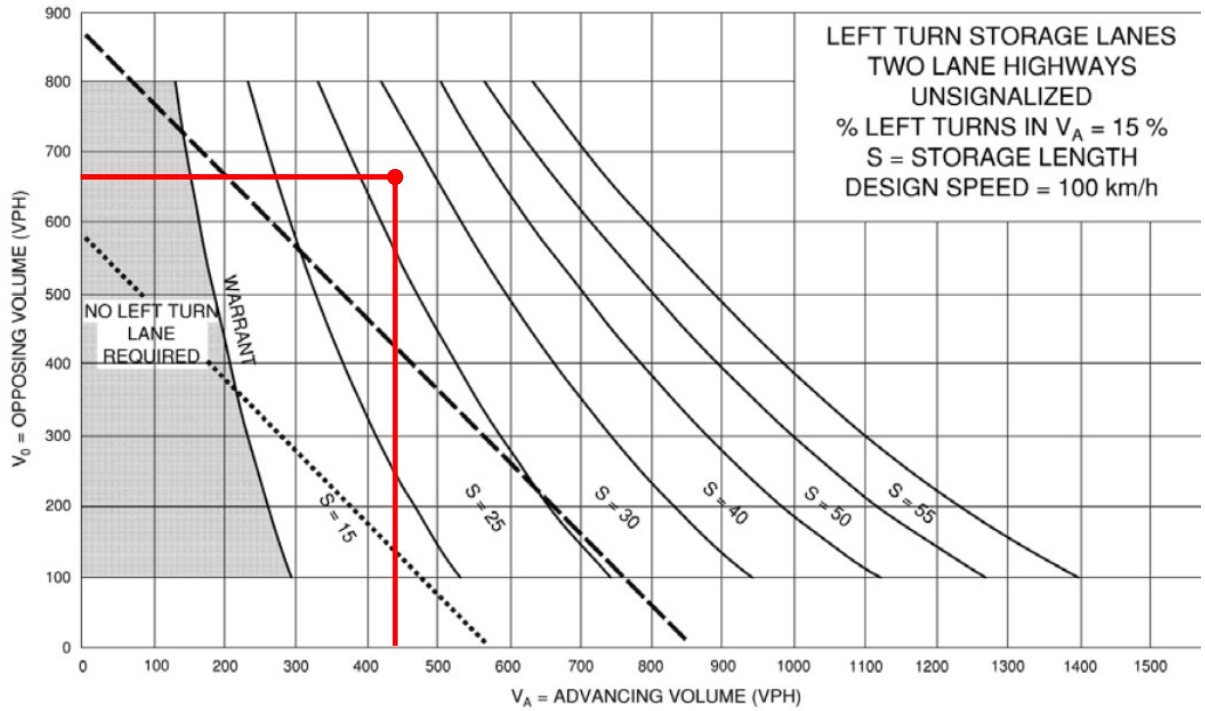
Background (2028) AM Peak – Westbound on Beachwood Road



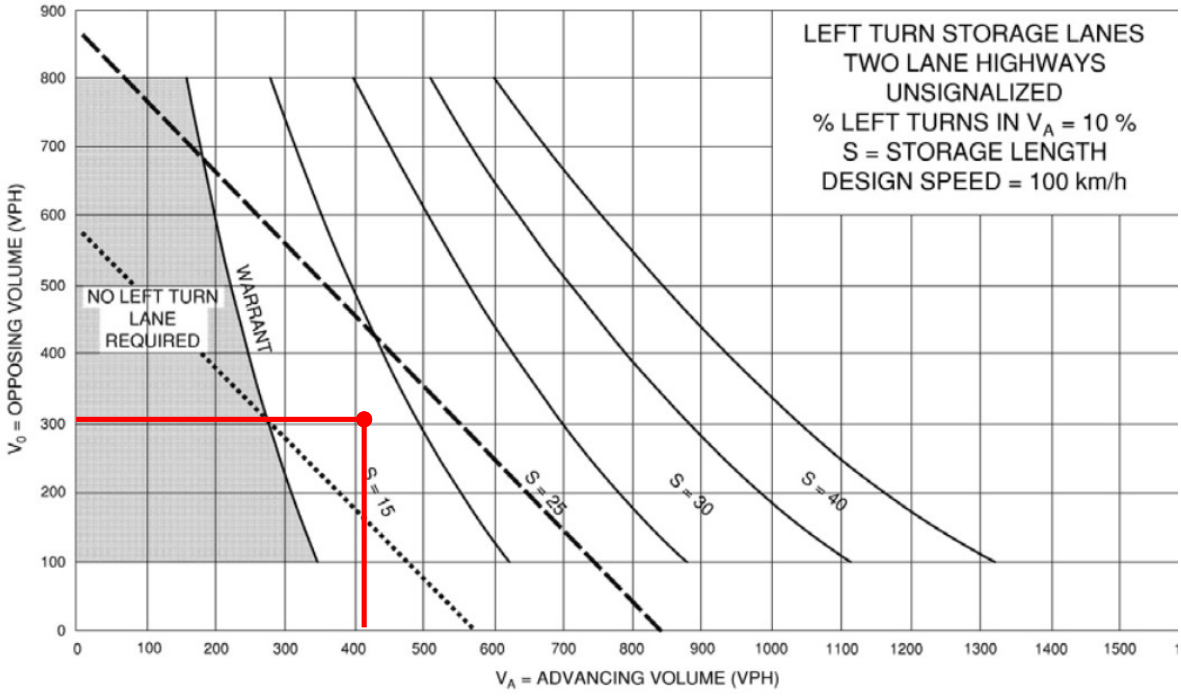
Background (2028) PM Peak – Westbound on Beachwood Road



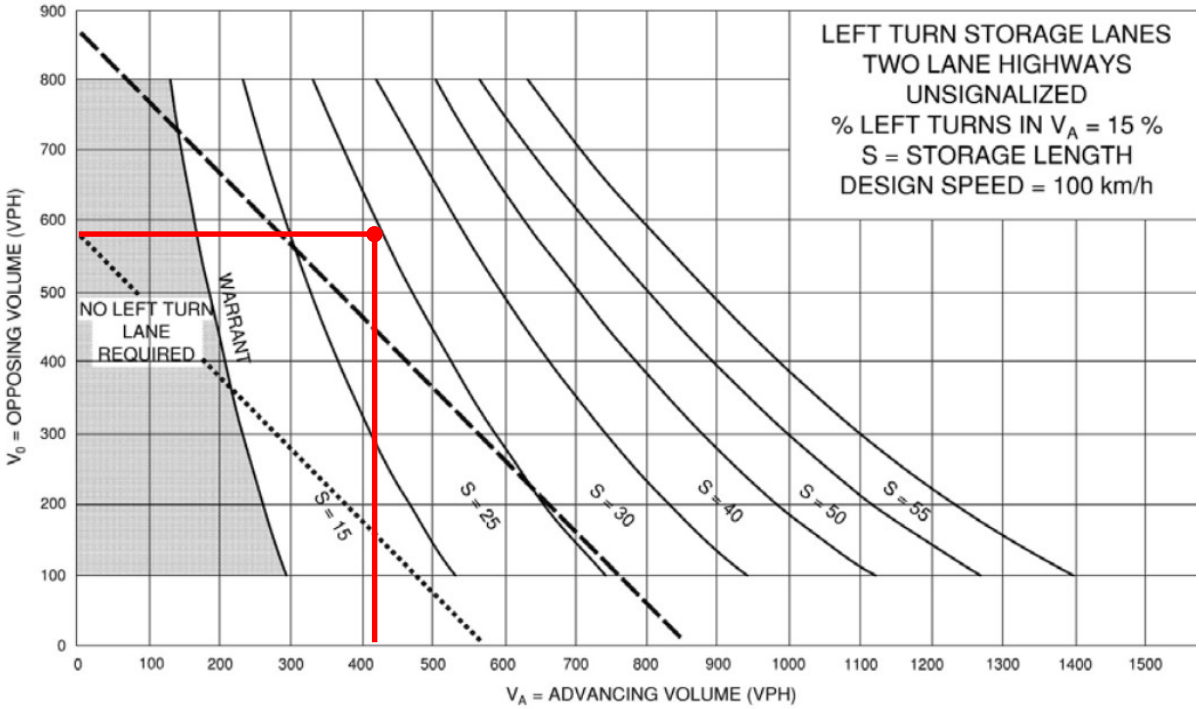
Background (2033) AM Peak – Westbound on Beachwood Road



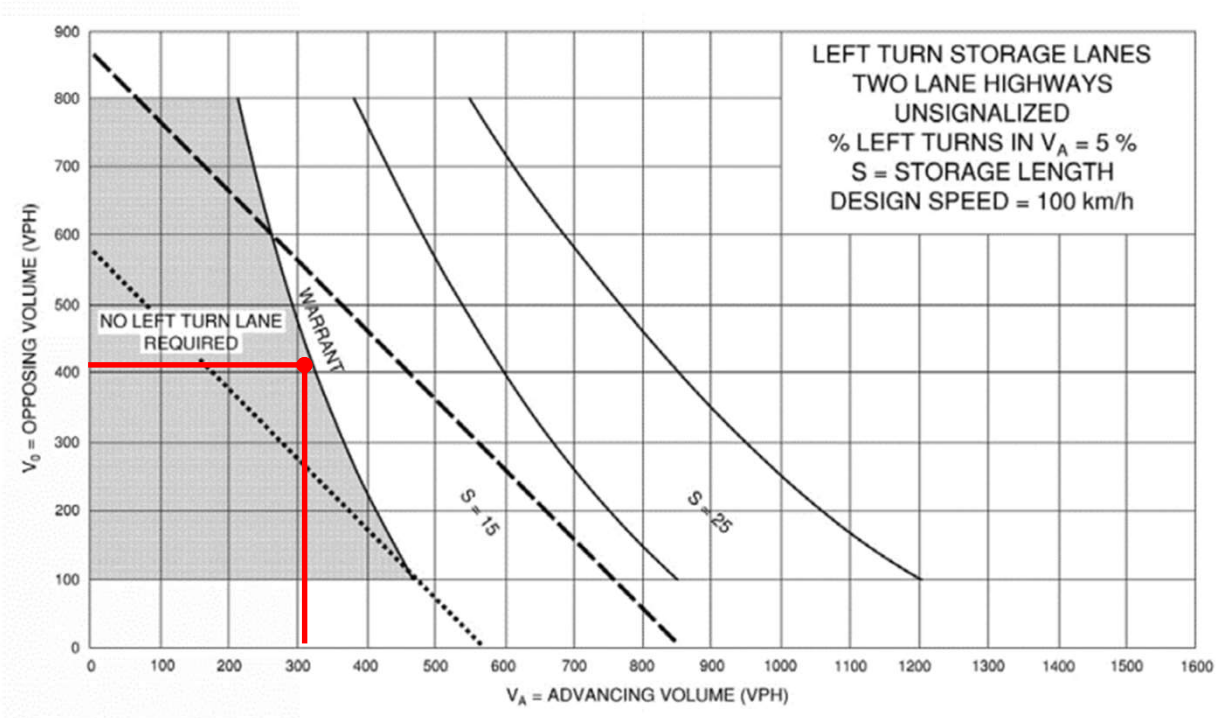
Background (2033) PM Peak – Westbound on Beachwood Road



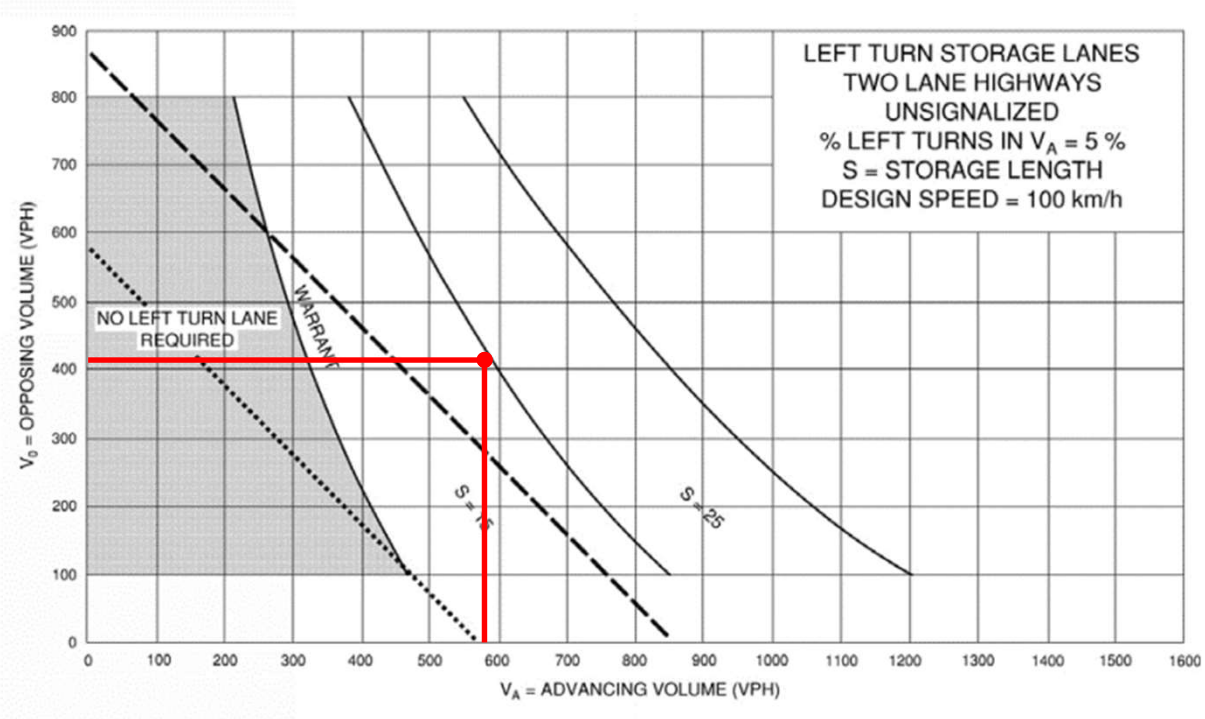
Total (2023) AM Peak – Westbound on Beachwood Road



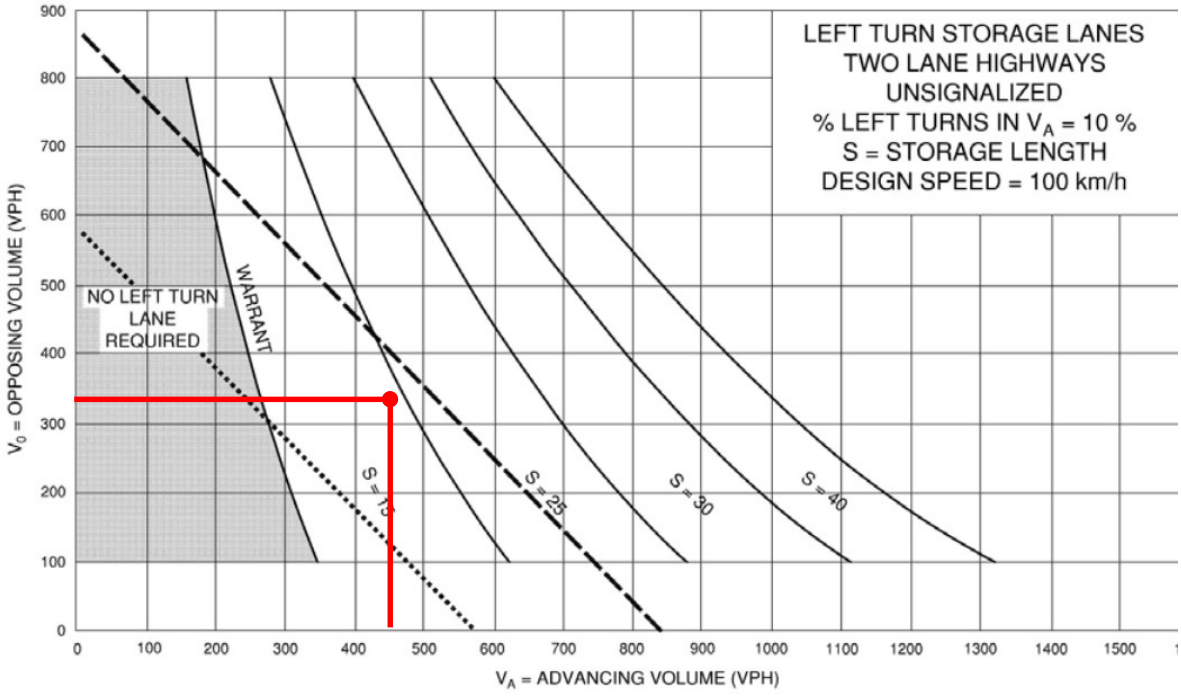
Total (2023) PM Peak – Westbound on Beachwood Road



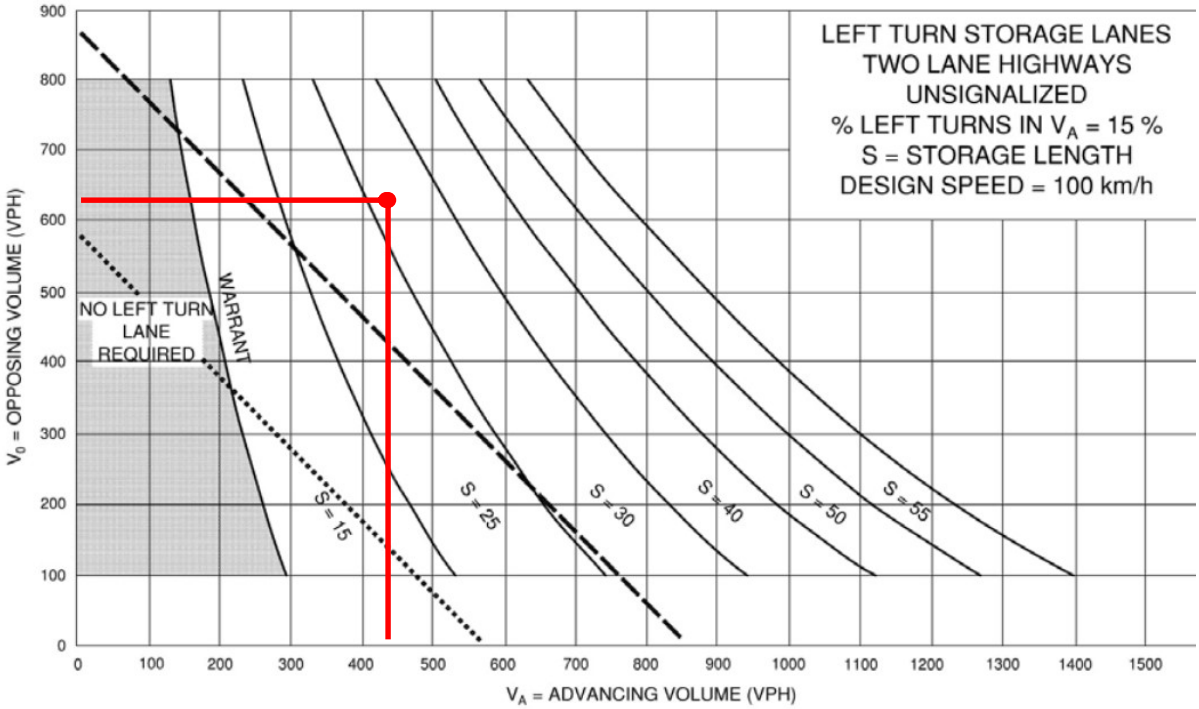
Total (2023) AM Peak – Eastbound on Beachwood Road



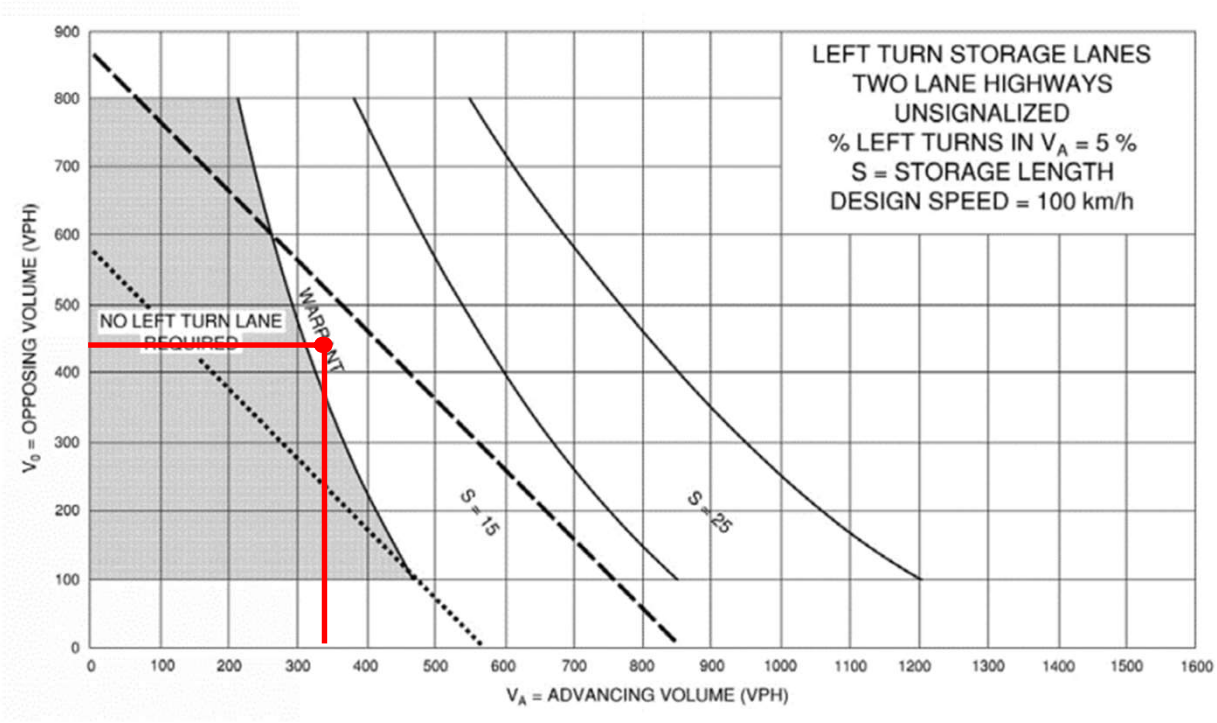
Total (2023) PM Peak – Eastbound on Beachwood Road



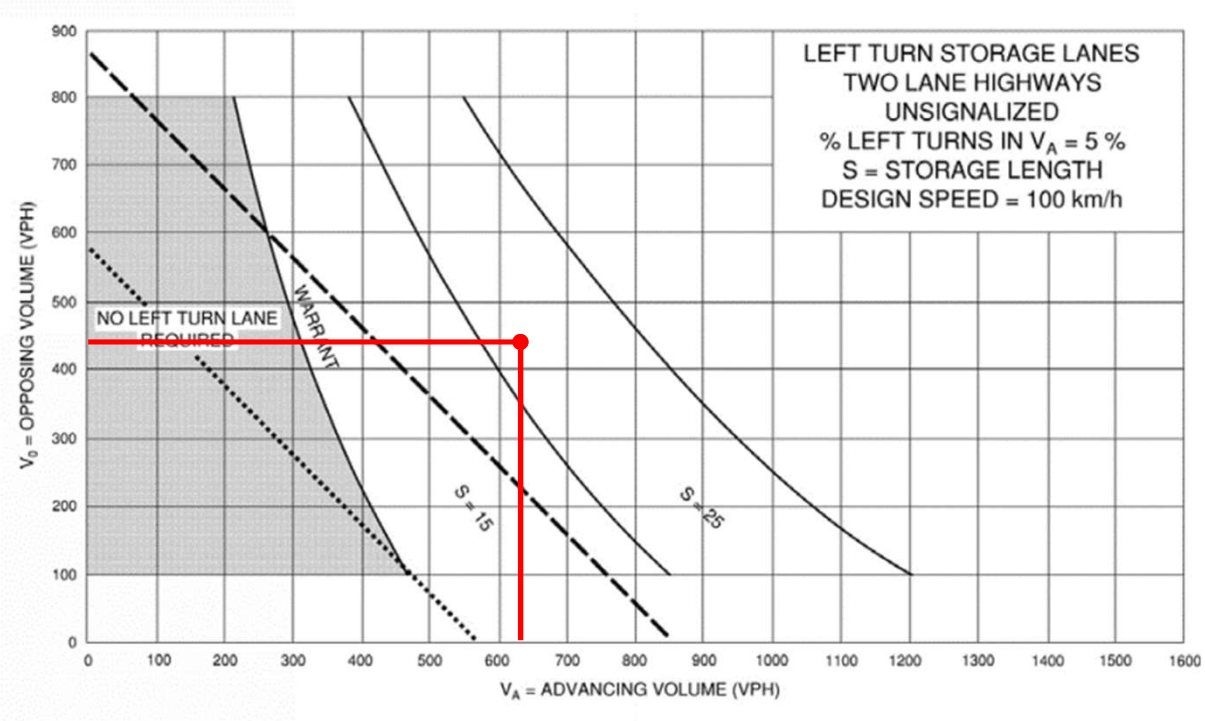
Total (2028) AM Peak – Westbound on Beachwood Road



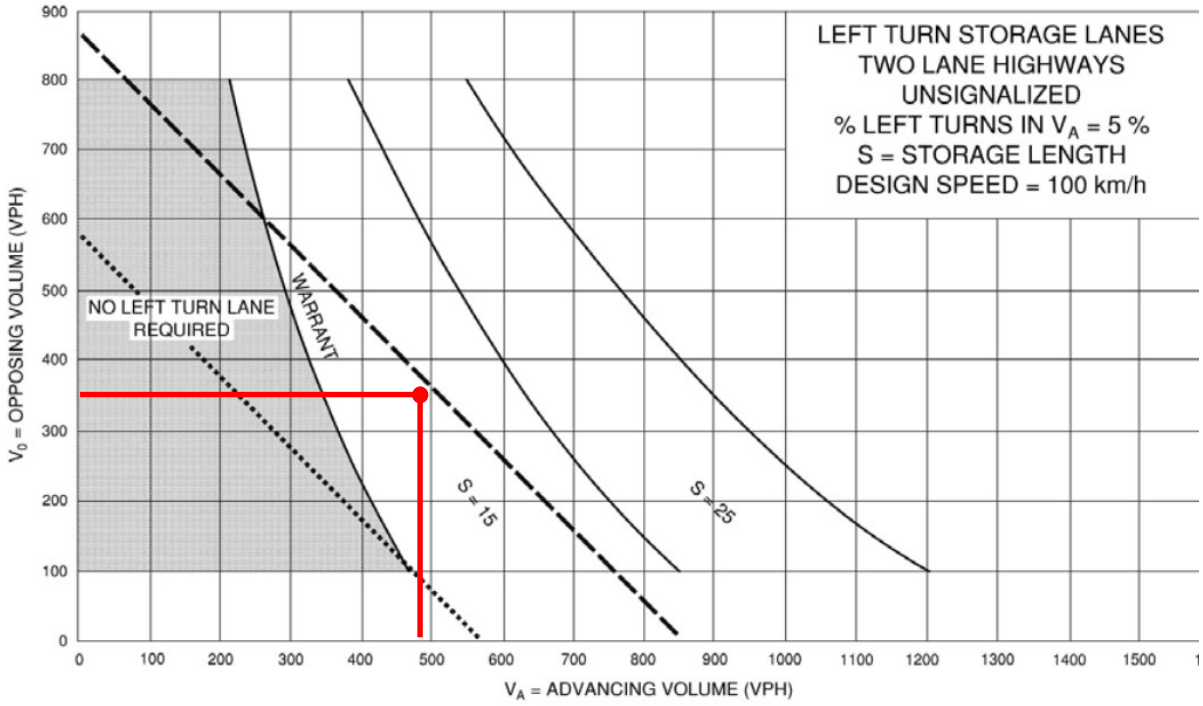
Total (2028) PM Peak – Westbound on Beachwood Road



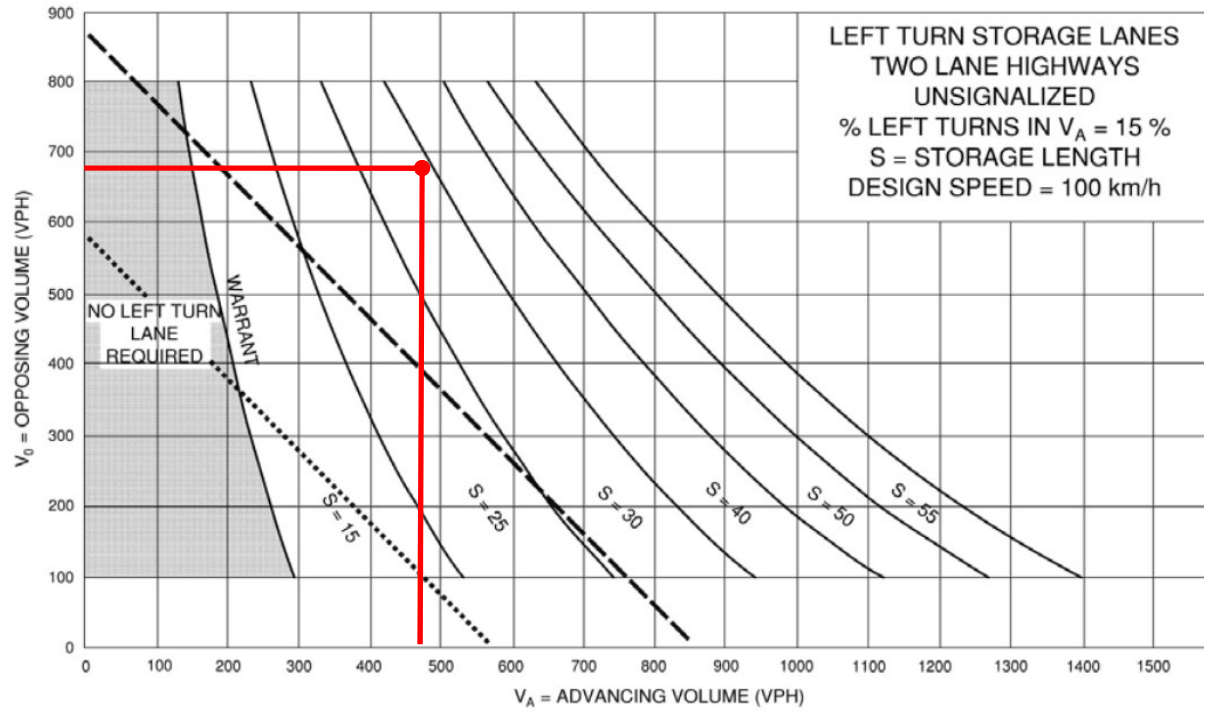
Total (2028) AM Peak – Eastbound on Beachwood Road



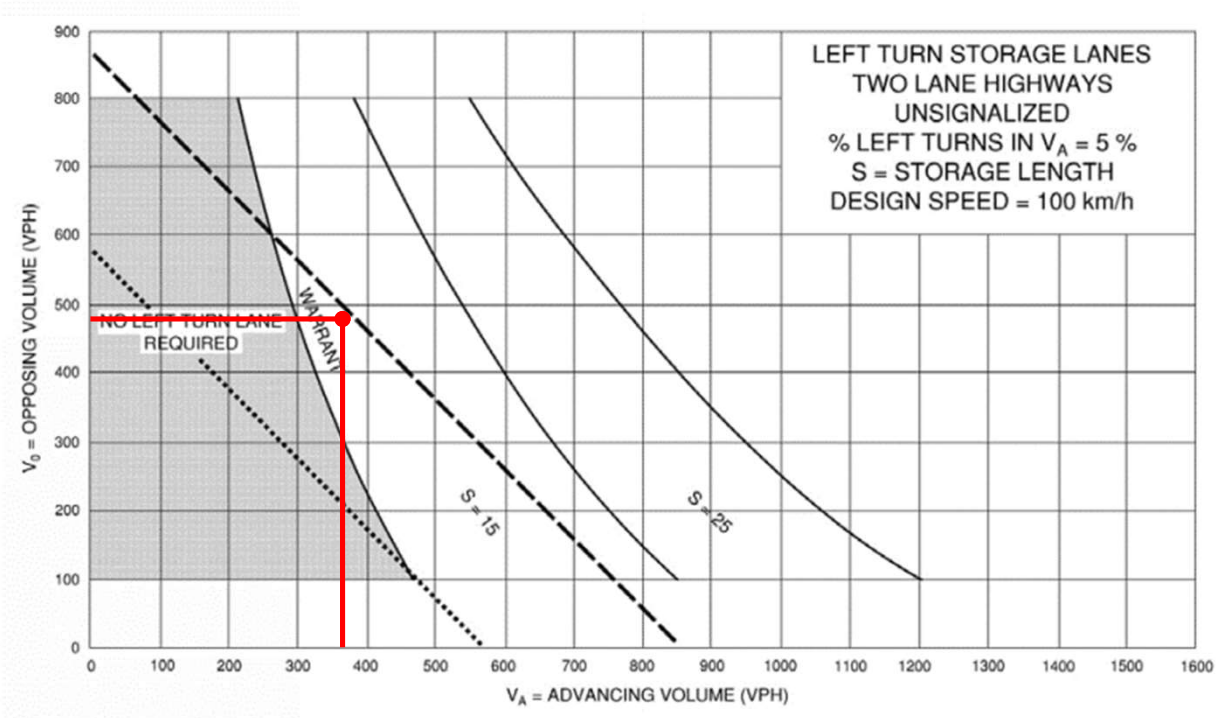
Total (2028) PM Peak – Eastbound on Beachwood Road



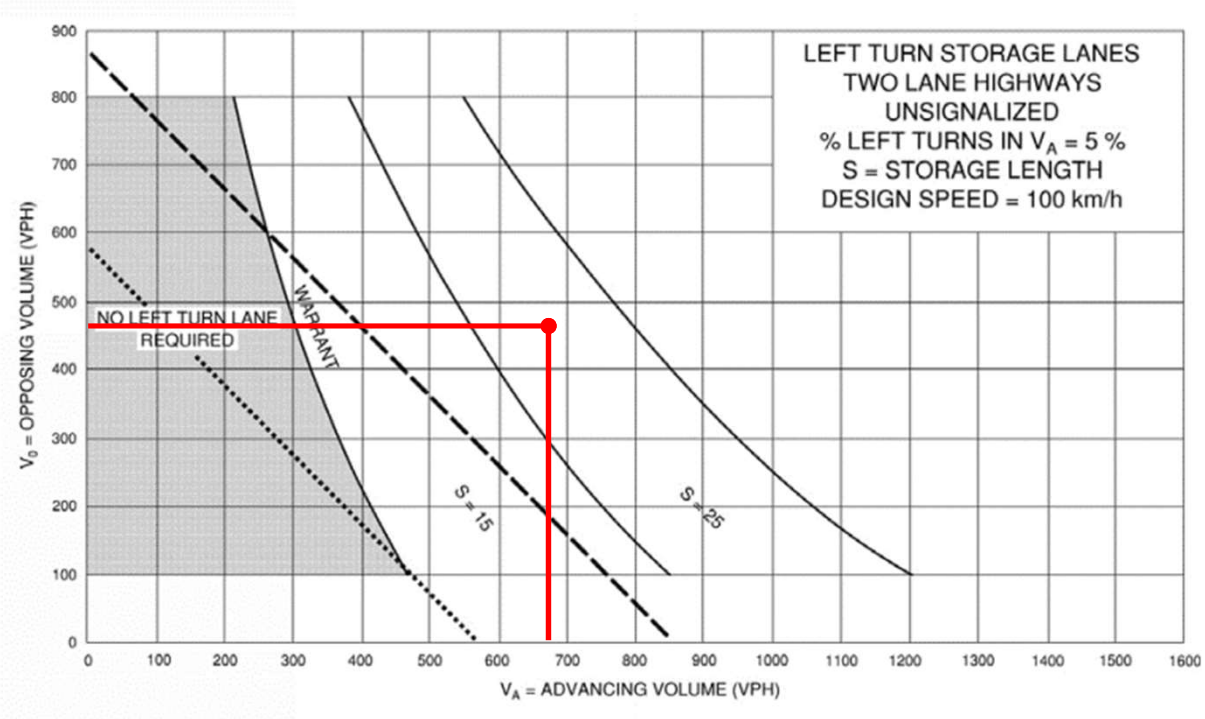
Total (2033) AM Peak – Westbound on Beachwood Road



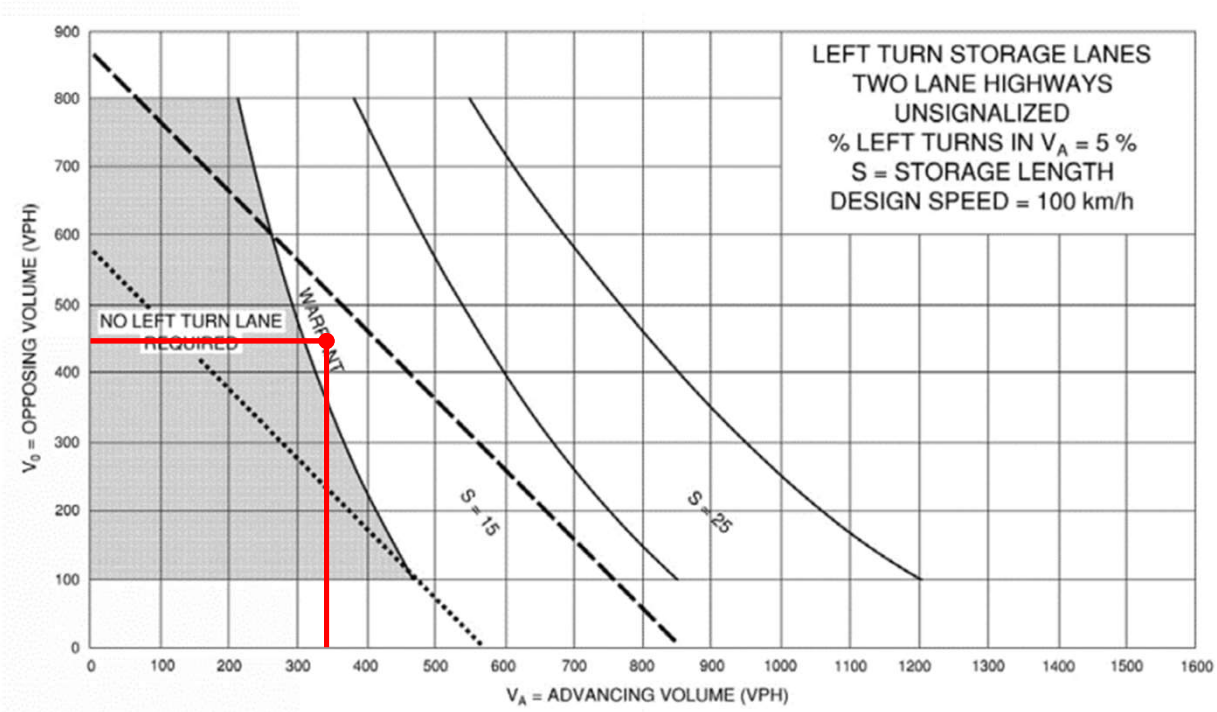
Total (2033) PM Peak – Westbound on Beachwood Road



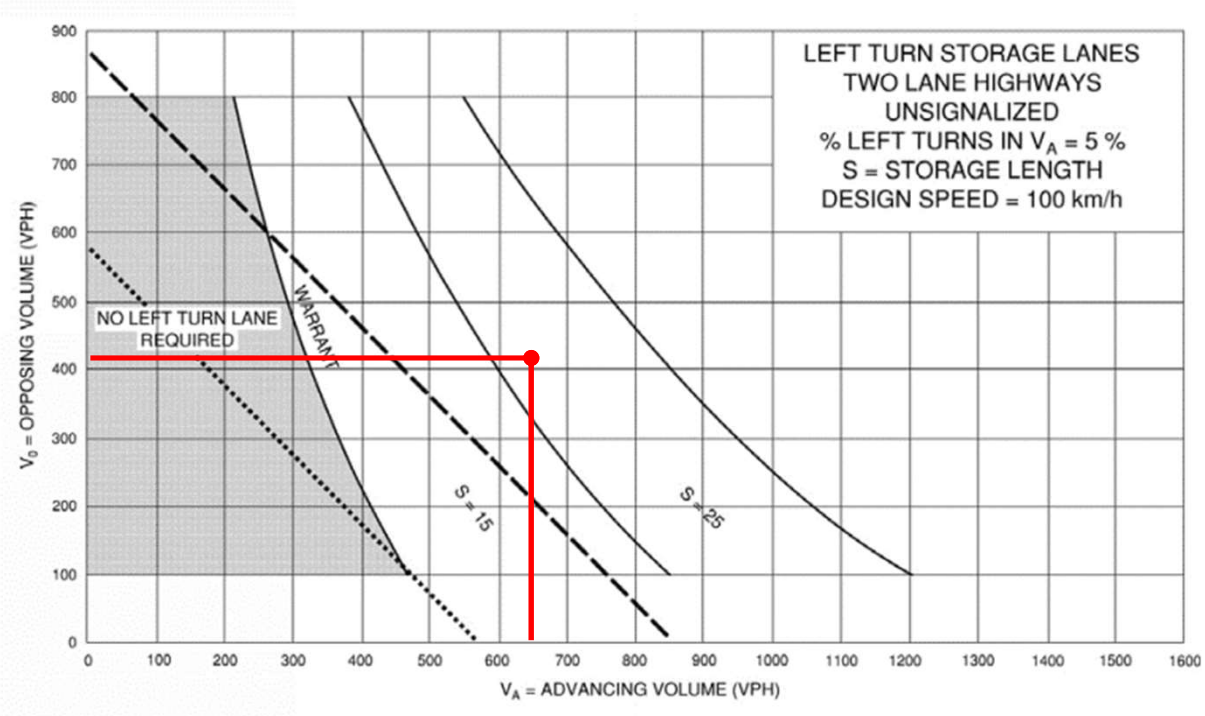
Total (2033) AM Peak – Eastbound on Beachwood Road



Total (2033) PM Peak – Eastbound on Beachwood Road



Total (2033) AM Peak – Eastbound on Beachwood Road (Joan Avenue Development Excluded)



Total (2033) PM Peak – Eastbound on Beachwood Road (Joan Avenue Development Excluded)

Appendix H –
OTM Signal Justification Sheets

Justification No. 7 - Total (2033) Traffic

North Access & Constance Blvd / Betty Blvd Ext.

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	32	4%	3%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	170	14	8%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	12	2%	1%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	8	11%		NO	NO

Justification No. 7 - Total (2033) Traffic

South Access / Beachwood Road

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Free Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	575	120%	39%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	120	71	59%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	477	99%	44%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	33	66%		NO	NO