

445 ANNDAL ROAD CITY OF WATERLOO

Proposed Residential Development
Transportation Impact Study



Prepared For: KPMB Architects

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1.0 INTRODUCTION

1.1 Overview

BA Group is retained by KPMB Architects to provide transportation consulting services in relation to the proposed residential development located at 445 Anndale Road in the City of Waterloo. A Zoning By-law Amendment (“ZBA”) application is being made to the City for the proposed development.

1.2 The Site

The site is located on the northwest corner of the Lexington Road / Anndale Road intersection, and is bound by a detached residential dwelling to the north, Lexington Road to the south, Anndale Road to the east, and Davenport Road to the west.

The site is currently occupied by the Christ Lutheran Church. The church is serviced by an existing surface parking lot comprising a total of 42 line marked car parking spaces. A gravel area provides additional informal parking for an estimated 20 vehicles, resulting in a total supply of approximately 62 spaces. There are two existing driveways to Anndale Road providing access to the surface parking lot. In addition, there is a curb cut to Davenport Road at the northwest corner of the site, however this is not used for site access.

The site location is illustrated in **Figure 1**.

1.3 Proposed Development

The development proposal contemplates the construction of 5 townhouse blocks comprising a total of 57 rental units, including 42 stacked townhouses and 15 linear townhouses. In addition to the proposed townhouse blocks, the existing church is proposed to be retained.

Site access is proposed via two new driveways to Anndale Road. The north driveway is proposed to operate one-way inbound only, and the south driveway is proposed to operate two-way. The existing driveways will be reinstated with curb and boulevard as required.

A total of 92 car parking spaces are proposed at grade, including 57 resident spaces and 35 spaces for shared use between residential visitors and the church on a non-exclusive basis. The proposed car parking supply comprises a total of 4 accessible spaces (2 Type A and 2 Type B) and includes 4 electric vehicle (“EV”) charging stations.

A total of 46 bicycle parking spaces are proposed across the site, including 18 Type A spaces within combined bin and bicycle enclosures, and 28 Type B spaces at grade.

A Type A loading space is proposed and will be available for move in/out activities and deliveries.

Residential waste collection is proposed to be undertaken by a private contractor via curbside collection. A staging area is provided for Block 1 where there is limited space available for curbside collection. Church waste will continue to be collected by municipal services from Anndale Road, consistent with existing conditions.



A private road is proposed to loop around the site and will provide access to the car parking and loading spaces. The private road is proposed to operate one-way counterclockwise, with a width of 4.6 metres. An adjacent 1.5 metre sidewalk is proposed flush with the private road, which increases the driveable width to 6.1 metres. This proposed arrangement accommodates circulation by emergency and waste collection vehicles, provides sufficient drive aisle width for access to the car parking spaces, and satisfies fire route requirements.

A shared vehicle and pedestrian space is proposed to extend west from the private road along the north side of the church in order to provide pick up/drop off at the primary church entrance and to satisfy fire route requirements. A bulb within the shared space allows for pick up/drop off vehicles to turn around.

A severance is proposed to create:

- 1 block comprising the existing church, the southeast part of the private road, part of the shared vehicle and pedestrian space, and 44 car parking spaces; and
- 1 block comprising the townhouse blocks, the balance of the private road, the balance of the shared vehicle and pedestrian space, 48 car parking spaces, and the Type A loading space. This block is proposed to be rezoned to Residential Eight Zone (“R8”).

Appropriate easements and parking agreements will be implemented to allow use of the private road and parking spaces by the residential units and church as required.

A summary of the proposed development statistics is provided in **Table 1**. The site plan is illustrated in **Figure 2**, and a copy of the architectural plans (not to scale) are provided in **Appendix A**, including details of the combined bin and bicycle enclosures.



Table 1 Proposed Development Statistics

Use		Statistics	
	Residential Units	1-bedroom	14 units
		2-bedroom	28 units
		3-bedroom	15 units
		Total	57 units
	Church (existing to be retained)	715 m ²	
	Car Parking	Resident	57 spaces
		Residential Visitor/Church	35 spaces
		Total	92 spaces
	Bicycle Parking	Type A	18 spaces
		Type B	28 spaces
		Total	46 spaces
	Loading	1 Type A space	





FIGURE 1 SITE LOCATION



2.0 AREA CONTEXT

2.1 Existing Street Network

2.1.1 Overview

The following sections provide an overview of the existing street network, as shown graphically in **Figure 3**.

2.1.2 Lexington Road

Lexington Road is a Major Collector operated by the City of Waterloo, extending generally in an east-west direction from University Avenue East to Marsland Drive. West of Marsland Drive, Lexington Road continues as Columbia Street East.

In the vicinity of the site, Lexington Road operates with a single traffic lane and a single bicycle lane in each direction, separated by a painted central median. Left turn lanes are provided within the median at a number of intersections in the vicinity of the site, and localized widening is provided at Davenport Road for a right turn lane. Sidewalks are provided along both sides of the road.

The posted speed limit adjacent the site is 50 kilometres per hour.

2.1.3 Davenport Road

Davenport Road is operated by the City of Waterloo, extending generally in a north-south direction from Lexington Road to Baffin Place. The section of Davenport Road between Lexington Road and Northfield Drive East (including along the site frontage) is a Major Collector.

In the vicinity of the site, Davenport Road operates with a single traffic lane and a single bicycle lane in each direction, separated by a central median. Left turn lanes are provided within the median at a number of intersections in the vicinity of the site. Sidewalks are provided along both sides of the road.

The posted speed limit adjacent the site is 50 kilometres per hour.

2.1.4 Anndale Road

Anndale Road is a Local Road operated by the City of Waterloo, extending generally in a north-south direction from Lexington Road to Anndale Court.

In the vicinity of the site, Anndale Road provides for a single lane of traffic in each direction, with a sidewalk provided along the west side. On Sundays, “No Parking” restrictions are in effect for approximately 35 metres north of Anndale Road on the east curb and approximately 60 metres north of Anndale Road on the west curb. Outside of this, parking is permitted along both curbs.

The posted speed limit adjacent the site is 40 kilometres per hour.



2.2 Existing Transit Network

The site has good access to bus routes operated by Grand River Transit in the vicinity of the site, which subsequently provide connections to higher order transit services operating within the Region of Waterloo, including the 301 ION Light Rail and GO Train services at the Kitchener GO Station. The existing transit network is summarized in **Table 2** and illustrated in **Figure 4**.

Table 2 Existing Transit Network

Route	Route Description	Approximate Peak Headways	Nearest Stop	Approximate Walk Distance and Time ¹
Grand River Transit				
29 Keats-University	Operates between The Boardwalk Station in the City of Kitchener and Conestoga Station in the City of Waterloo. Provides connections to the 301 ION Light Rail. Operates 7 days a week.	30 mins	Lexington Rd / Davenport Rd	Directly adjacent site
31 Columbia	Operates between the Columbia Street West / Sundew Drive intersection in the City of Waterloo and Conestoga Station in the City of Waterloo. Provides connections to the 301 ION Light Rail. Operates 7 days a week.	30 mins	Lexington Rd / Davenport Rd	Directly adjacent site
6 Bridge-Courtland	Operates between Conestoga Station in the City of Waterloo and Fairway Station in the City of Kitchener. Provides connections to the 301 ION Light Rail and Kitchener GO Station. Operates 7 days a week.	30 mins	Bridge St W / Lexington Rd	800 m (11-12 mins)

Notes:

1. Approximate walk time estimated based on assumed walk speed of 1.2 metres per second

2.3 Existing and Proposed Cycling Network

The site has good access to bicycle infrastructure, with bicycle lanes on both Lexington Road and Davenport Road in the vicinity of the site. This infrastructure provides access to the broader cycling network within the City of Waterloo and beyond.

The City of Waterloo Transportation Master Plan 2020 Update identifies the bicycle lanes on Lexington Road east of Davenport Road and on Davenport Road will be upgraded to a physically separated bikeway. Both projects are identified to occur in the short-term.

The existing and proposed cycling network is illustrated in **Figure 5**.

2.4 Pedestrian Context

Pedestrians are accommodated in the area by sidewalks on a number of roads, including Anndale Road, Lexington Road and Davenport Road. The nearest signalized pedestrian crossing is located at the Lexington Road / Davenport Road intersection.



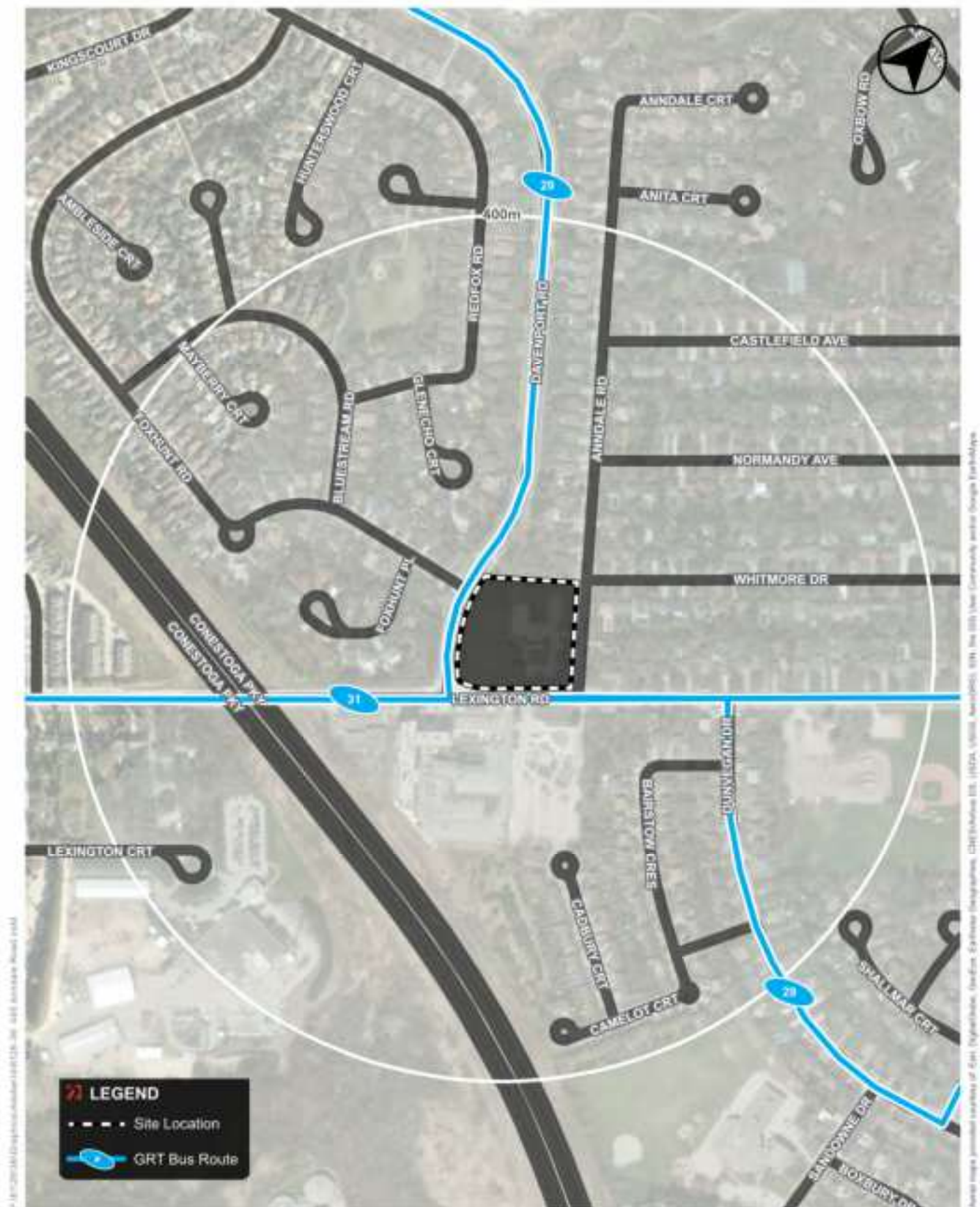


FIGURE 4 EXISTING TRANSIT NETWORK



FIGURE 5 EXISTING AND PROPOSED CYCLING NETWORK

3.0 CAR PARKING

3.1 Car Parking Requirements

3.1.1 City of Waterloo Zoning By-law 2018-050

3.1.1.1 Overall Car Parking

The site is subject to the car parking requirements of the City of Waterloo Zoning By-law 2018-050, as outlined in **Table 3**. The proposed development has a requirement to provide a total of 125 car parking spaces, including 57 resident spaces, 10 residential visitor spaces and 58 church spaces.

Table 3 City of Waterloo Zoning By-law 2018-050 Car Parking Requirements

Use		Number of Units / Floor Area	Minimum Rate	Minimum Requirement ¹
Residential				
Residential ²		57 units	1 space / unit	57 spaces
Subtotal				57 spaces
Non-Residential				
Residential Visitor ²	Townhouse	15 units	0.33 spaces / unit	5 spaces
	Stacked Townhouse	42 units	0.1 spaces / unit	5 spaces
Church (Spiritual Use)		715 m ²	8 spaces / 100 m ²	58 spaces
Subtotal				68 spaces
Total				125 spaces

Notes:

1. Rounded up to the nearest whole number in accordance with section 3.R.6.1a.) of the City of Waterloo Zoning By-law 2018-050
2. Based on car parking requirements for R8 zone

3.1.1.2 Accessible Car Parking

For the proposed car parking supply of 92 spaces, the City of Waterloo Zoning By-law 2018-050 requires a total of 4 accessible spaces, including 2 Type A spaces and 2 Type B spaces.

3.1.1.3 Electric Vehicle Car Parking

For the proposed car parking supply of 92 spaces, the City of Waterloo Zoning By-law 2018-050 requires a total of 3 EV spaces.



3.2 Proposed Car Parking Supply

A total of 92 car parking spaces are proposed, including 57 resident spaces and 35 spaces for shared use between residential visitors and the church on a non-exclusive basis.

The proposed resident car parking supply satisfies the resident car parking requirements. However the proposed 35 spaces for shared use between residential visitors and the church represents a shortfall of 33 spaces from the Zoning requirement.

An accessible parking supply of 4 spaces is proposed, including 2 Type A spaces and 2 Type B spaces. This satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.

A total of 4 EV charging stations is proposed, which satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.

3.3 Parking Standards Review

3.3.1 Residential Visitor Parking Demand Assessment

For the purpose of this assessment, the by-law requirement of 10 residential visitor spaces has been adopted as the peak residential visitor parking demand.

3.3.2 Church Parking Demand Assessment

3.3.2.1 Existing Church Parking Demand Data

Parking demand surveys were undertaken at the existing church on Tuesday, January 24, 2025 between 7:00am-6:00pm and on Sunday, July 13, 2025 between 9:00am-2:00pm during the Sunday service which commences at 10:00am. The results are summarized in **Table 4** and the raw data is attached in **Appendix B**.

Table 4 Existing Church Parking Demands

Address	Size	Study Date	Sunday Service Attendance	Observed Peak Parking Demand	Parking Demand Ratio	
					Per 100 m ²	Per Person (Sunday Service)
445 Anndale Rd, Waterloo (existing church to be retained)	715 m ²	Tues, Jun 24, 2025	N/A	15 spaces	2.10 spaces / 100 m ²	N/A
		Sun, Jul 13, 2025	27 people	14 spaces	1.96 spaces / 100 m ²	0.52 spaces / person



3.3.2.2 Adopted Church Parking Demand

BA Group have been advised that the Sunday service attendance during the parking demand surveys undertaken on Sunday, July 13, 2025 (27 people) was on the low end of the typically observed attendance. It's understood that attendance during Sunday service is typically in the range of 30-50 people, and across May and June, 2025, the peak attendance was 54 people, occurring on May 4, 2025.

Based on the above, the Sunday service demand ratio of 0.52 spaces per person as identified by the parking demand surveys has been applied to the peak attendance of 54 people across May and June, 2025, resulting in an estimated peak parking demand of 28 spaces during Sunday service.

Outside of Sunday service, a peak parking demand of 15 spaces is assumed, consistent with the surveys undertaken on Tuesday, January 24, 2025.

3.3.3 Sharing of Non-Residential Parking

As discussed in **Section 3.1.1.2**, it's proposed for the non-residential spaces to be shared between residential visitors and the church on a non-exclusive basis.

The estimated peak residential visitor parking demand is 10 spaces. However, this peak residential visitor parking demand is not expected to occur at all times, and would be limited to peak residential visitor times (typically evenings). In this respect, guidance has been sought from Urban Land Institute Shared Parking 3rd Edition ("ULI Manual"). Notably, on weekend mornings (i.e. during Sunday service), the ULI Manual estimates residential visitor parking demands up to 20% of the peak residential visitor parking demands, which in this case equates to 2 visitor spaces. The estimated peak church parking demand during Sunday service is 28 spaces. Based on the foregoing, a combined residential visitor and church peak parking demand of 30 spaces is estimated during Sunday service.

While variances in parking demands would also occur outside of Sunday service, for the purpose of this assessment, shared parking demands have been assessed on the basis of the estimated peak residential visitor parking demand of 10 spaces, and the measured church peak parking demand outside of Sunday service of 15 spaces. Based on the foregoing, a combined residential visitor and church peak parking demand of 25 spaces is estimated outside of Sunday service.

The proposed non-residential car parking supply of 35 spaces is sufficient to satisfy the estimated combined residential visitor and church peak parking demands both during and outside of Sunday service.

A summary of the estimated shared parking demands is provided in **Table 5**.



Table 5 Shared Non-Residential Parking Assessment

Use	Sunday Church Service (10am)	Outside of Sunday Church Service
Residential Visitor	20% x 10 spaces = 2 spaces	10 spaces
Church	28 spaces	15 spaces
Total	30 spaces	25 spaces
Proposed Shared Supply	35 spaces	35 spaces

Notes:

1. Shared parking formula based on ULI 3rd Edition

3.4 Assessment of Proposed Parking Supply

3.4.1 Resident Parking Assessment

As discussed in **Section 3.1.1.2**, a total of 57 resident spaces are proposed which satisfies the resident car parking requirements. The proposed resident parking supply is acceptable.

3.4.2 Non-Residential Parking Assessment

As discussed in **Section 3.1.1.2**, a total of 35 spaces are proposed for shared use between residential visitors and the church on a non-exclusive basis.

As outlined in **Section 3.3.3**, a combined residential visitor and church peak parking demand of 30 spaces and 25 spaces is estimated during Sunday service and outside of Sunday service respectively. The proposed non-residential car parking supply of 35 spaces satisfies these demands and is acceptable.



4.0 BICYCLE PARKING

4.1 Bicycle Parking Requirements

4.1.1 City of Waterloo Zoning By-law 2018-050

The site is subject to the bicycle parking requirements of the City of Waterloo Zoning By-law 2018-050, as outlined in **Table 6**.

The proposed development has a requirement to provide a total of 40 bicycle parking spaces, including 36 residential spaces (18 Type A and 18 Type B) and 4 church spaces (4 Type B). The City of Waterloo Zoning By-law 2018-050 defines Type A and Type B bicycle spaces as follows:

- **Type A:** Secure bicycle parking located indoors or within a bike locker
- **Type B:** Bicycle parking other than Type A bicycle parking.

Table 6 City of Waterloo Zoning By-law 2018-050 Bicycle Parking Requirements

Use	Number of Units / Car Parking Supply	Minimum Rate	Minimum Requirement ¹
Residential	57 units	0.3 Type A spaces / unit 0.3 Type B spaces / unit	18 Type A spaces 18 Type B spaces
Church (Spiritual Use)	35 spaces	10% of car parking (Type A or Type B spaces) ²	4 Type B spaces
Total			18 Type A spaces 22 Type B spaces

Notes:

1. Rounded up to the nearest whole number in accordance with section 3.R.6.1a.) of the City of Waterloo Zoning By-law 2018-050
2. Section 6.6.2 c.) iv.) A.) of the City of Waterloo Zoning By-law 2018-050 specifies that this requirement can be satisfied by Type A or Type B bicycle parking. For the purpose of this assessment, these spaces have been assumed as Type B spaces.

4.2 Proposed Bicycle Parking Supply

A total of 46 bicycle parking spaces are proposed across the site, including 18 Type A spaces within combined bin and bicycle enclosures, and 28 Type B spaces at grade. This supply satisfies the above requirements.



5.0 LOADING

5.1 Loading Requirements

5.1.1 City of Waterloo Zoning By-law 2018-050

The site is subject to the loading requirements of the City of Waterloo Zoning By-law 2018-050, as outlined in Table 7.

The proposed development has a requirement to provide 1 Type A loading space. The City of Waterloo Zoning By-law 2018-050 notes that a Type A loading space accommodates smaller vehicles such as delivery vans.

Table 7 City of Waterloo Zoning By-law 2018-050 Loading Requirements

Use	Number of Bedrooms / Floor Area	Minimum Rate	Minimum Requirement
Residential	115 bedrooms	1 Type A space for 76-900 bedrooms	1 Type A space
Church (Spiritual Use)	715 m ²	N/A ¹	0 spaces
Total			1 Type A space

Notes:

1. Section 6.9.1 of the City of Waterloo Zoning By-law 2018-050 specifies that for an existing building, existing structure or existing use, the minimum required loading spaces under the by-law shall be the lesser of the actual loading spaces on the lot that lawfully existed on the date of passing the by-law, or the minimum loading spaces required by the by-law. As there are no loading spaces for the existing church, the loading requirement for the church remains 0 spaces.

5.2 Proposed Loading Supply

A total of 1 Type A loading space is proposed and will be available for move in/out activities and deliveries, which satisfies the above requirement. Vehicle manoeuvring diagrams demonstrating access into and out of the loading space are attached in **Appendix C**.

5.3 Waste Collection

Residential waste collection is proposed to be undertaken by a private contractor via curbside collection. A staging area is provided for Block 1 where there is limited space available for curbside collection. Vehicle manoeuvring diagrams demonstrating circulation by a waste collection vehicle are attached in **Appendix C**.

Church waste will continue to be collected by municipal services from Anndale Road, consistent with existing conditions.



6.0 MULTIMODAL ANALYSIS

6.1 Multimodal Site Trip Generation

6.1.1 Residential

6.1.1.1 Residential Vehicle Trip Generation

Residential vehicle trip generation rates were adopted from the ITE Trip Generation Manual (“ITE”) 11th Edition for the Land Use Code 220 (multifamily housing – low-rise), as summarized in **Table 8**. It’s noted that the definition for Land Use Code 220 (multifamily housing – low-rise) specifies “apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors”. This definition aligns with the proposed townhouse blocks, which each comprise in the range of 11-13 units, and are 2-3 floors.

Based on the adopted residential vehicle trip generation rates, the projected site residential vehicle trip generation is in the order of 25 and 30 two-way trips during the morning and afternoon peak hours, respectively.

Table 8 Residential Vehicle Trip Generation

Source	Vehicle Trip Generation (vehicle trips per unit)					
	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
ITE 11 th Edition Land Use Code 220 – Multifamily Housing (Low-Rise) General Urban/Suburban Not Close to Rail Transit	0.10	0.30	0.40	0.32	0.19	0.51
Residential Vehicle Trip Generation (57 units)	5	20	25	20	10	30

Notes:

1. Vehicle Trips are rounded to the nearest 5 trips.



6.1.1.2 Residential Mode Split

The adopted residential mode split is based on the results of the 2022 Transportation Tomorrow Survey (“TTS”), as summarized in **Table 9**.

Table 9 Residential Mode Split

Mode	AM Peak	PM Peak
Auto (Driver)	63%	68%
Auto (Passenger)	21%	19%
Pick Up/Drop Off	0%	0%
Transit	1%	1%
Walk	13%	11%
Cycle	2%	1%
Total	100%	100%

Notes:

1. Home-based trips, 2022 TTS Zones 12048, 12074-12076

6.1.1.3 Site Residential Multimodal Trip Generation

Based on the projected residential vehicle trip generation and adopted residential mode split, the projected site residential multimodal trip generation is summarized in **Table 10**.

The proposed development is projected to generate in the order of 40 and 45 two-way person trips during the weekday morning and afternoon peak hours, respectively.

Table 10 Site Residential Multimodal Trip Generation

Mode	Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Auto (Driver)	5	20	25	20	10	30
Auto (Passenger)	5	5	10	5	5	10
Pick Up/Drop Off	0	0	0	0	0	0
Transit	0	0	0	0	0	0
Walk	0	5	5	5	0	5
Cycle	0	0	0	0	0	0
Total	10	30	40	30	15	45

Notes:

1. Vehicle Trips are rounded to the nearest 5 trips.



6.1.2 Church Vehicle Trip Generation

As outlined in **Section 1.3**, the existing church is proposed to be retained. Therefore, no changes to the existing trip generation associated with the church are expected. The existing church vehicle trips are outlined in **Table 11**.

Table 11 Existing Church Vehicle Trip Generation

	Vehicle Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Existing Church Vehicle Trip Generation	15	0	15	10	5	15



6.2 Traffic Assessment

6.2.1 Scope

Traffic analysis has been completed for the following scenarios during the AM and PM peak hour:

- Existing Conditions
- Future Background Conditions (5-Year Horizon)
- Future Total Conditions (5-Year Horizon)

Intersections included within the analysis study area are listed below:

- Lexington Road / Anndale Road
- Lexington Road / Dunvegan Drive
- Lexington Road / Lee Avenue
- Anndale Road / North Site Driveway
- Anndale Road / South Site Driveway

The existing and future lane configurations and traffic control are shown in **Figure 6**.

6.2.2 Existing Traffic Volumes

6.2.2.1 Traffic Counts

Existing traffic volumes were established based on traffic counts undertaken by Spectrum Traffic Data. The intersections which were counted are summarized in **Table 12**. The baseline existing traffic volumes are provided in **Figure 7** and the raw traffic counts are attached in **Appendix D**.

Table 12 Existing Traffic Data Sources

Intersection	Count Date	Count Times	Source
Lexington Rd / Anndale Rd	Tuesday, June 24, 2025	7:00am-9:00am 4:00pm-6:00pm	Spectrum Traffic Data
Anndale Rd / North Site Driveway			
Anndale Rd / South Site Driveway			
Lexington Rd / Dunvegan Dr	Thursday, June 26, 2025		
Lexington Rd / Lee Ave			



6.2.3 Future Background Traffic Volumes

6.2.3.1 Corridor Growth

As requested by City staff, a corridor growth rate of 1% per annum has been applied to Lexington Road.

Corridor growth traffic volumes are shown in **Figure 8**.

6.2.3.2 Background Development Growth

Background development traffic allowances have been made as outlined in **Table 13**. Traffic volume assumptions are based information outlined in the Transportation Impact Study ("TIS") prepared for the development.

Background development traffic volumes are shown in **Figure 9**.

Table 13 Background Developments

Development	Development Statistics	Study
215 & 229 Lexington Rd	663 retirement home units	TIS prepared by IBI Group, dated July 22, 2022

6.2.3.3 Future Background Traffic Volumes

The future background traffic volumes are determined by adding existing traffic volumes, corridor growth traffic volumes and background development traffic volumes. The future background traffic volumes are shown in **Figure 10**.

6.2.4 Site Traffic Forecasts

6.2.4.1 Site Vehicle Trip Generation

The projected site vehicle trip generation was outlined in **Section 6.1** and is summarized in **Table 14**. As noted in **Section 1.3**, the existing church is proposed to be retained and therefore no changes to the existing trip generation associated with the church are expected.

Table 14 Site Vehicle Trip Generation

	Vehicle Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential						
New Residential Vehicle Trips	5	20	25	20	10	30
Existing Church						
Existing Church Vehicle Trips	15	0	15	10	5	15
Total Site Vehicle Trips	20	20	40	30	15	45
Net New Site Vehicle Trips	5	20	25	20	10	30



6.2.4.2 Vehicle Trip Distribution

Residential site traffic was assigned onto the area road network based on the results of the 2022 TTS. The adopted distribution is summarized in **Table 15**.

Table 15 Site Trip Distribution

Road	Direction	Residential ¹	
		Inbound	Outbound
Lexington Rd	East	51%	52%
	West	49%	48%
Total		100%	100%

Notes:

1. Site trip distributions based on home-based trips for 2022 TTS Zones 12048, 12074-12076. The inbound and outbound distributions are derived from data based on the peak direction of travel (i.e. inbound is based on the pm peak and outbound is based on the am peak).

6.2.4.3 Net New Site Traffic Volumes

Based on the above, the net new (i.e. residential) site traffic volumes are shown in **Figure 11**.

6.2.5 Future Total Traffic Volumes

The future total traffic volumes are determined by adding future background traffic volumes and net new site traffic volumes. The future total traffic volumes are shown in **Figure 12**.



FIGURE 6 EXISTING AND FUTURE LANE CONFIGURATION AND TRAFFIC CONTROL

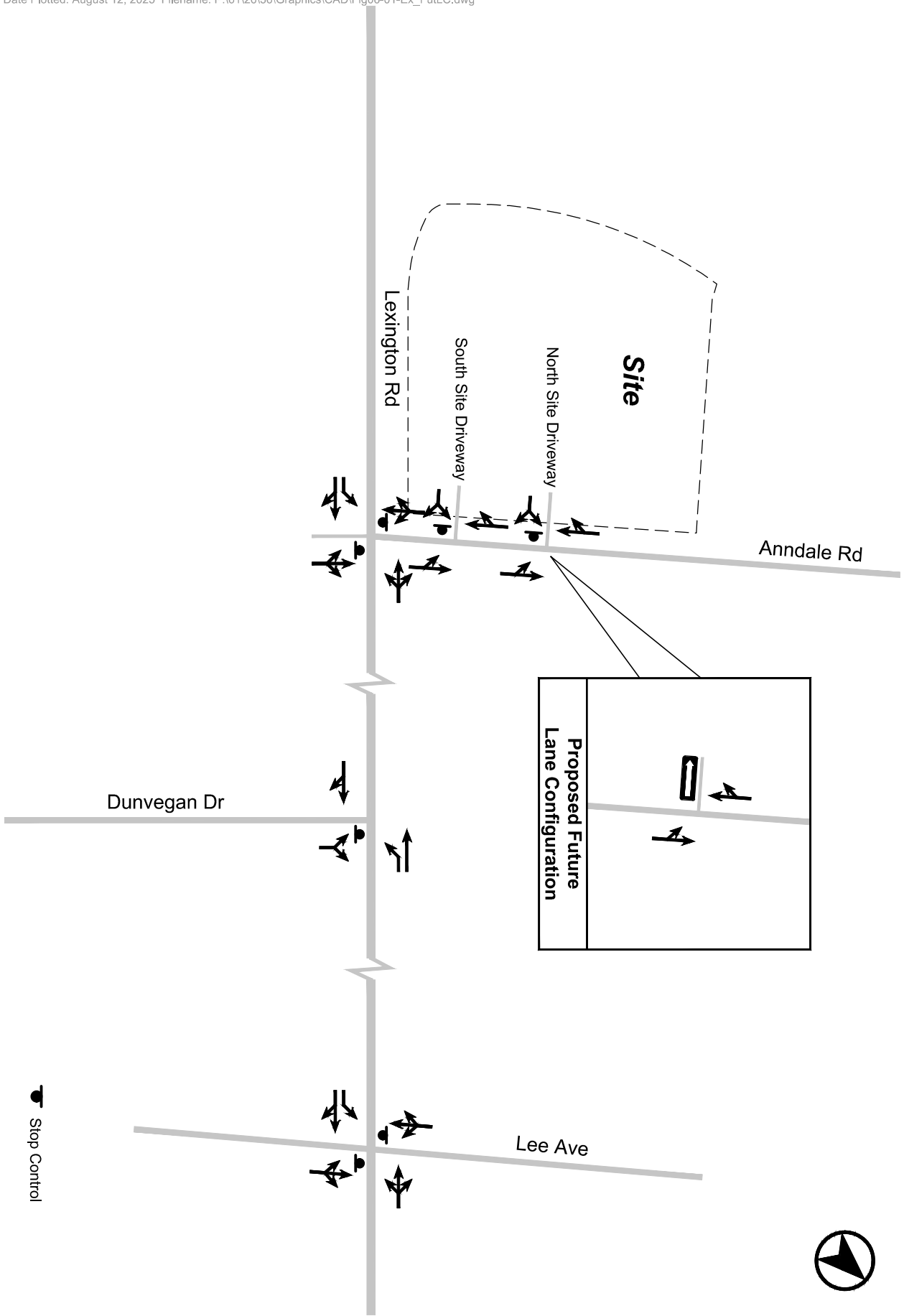
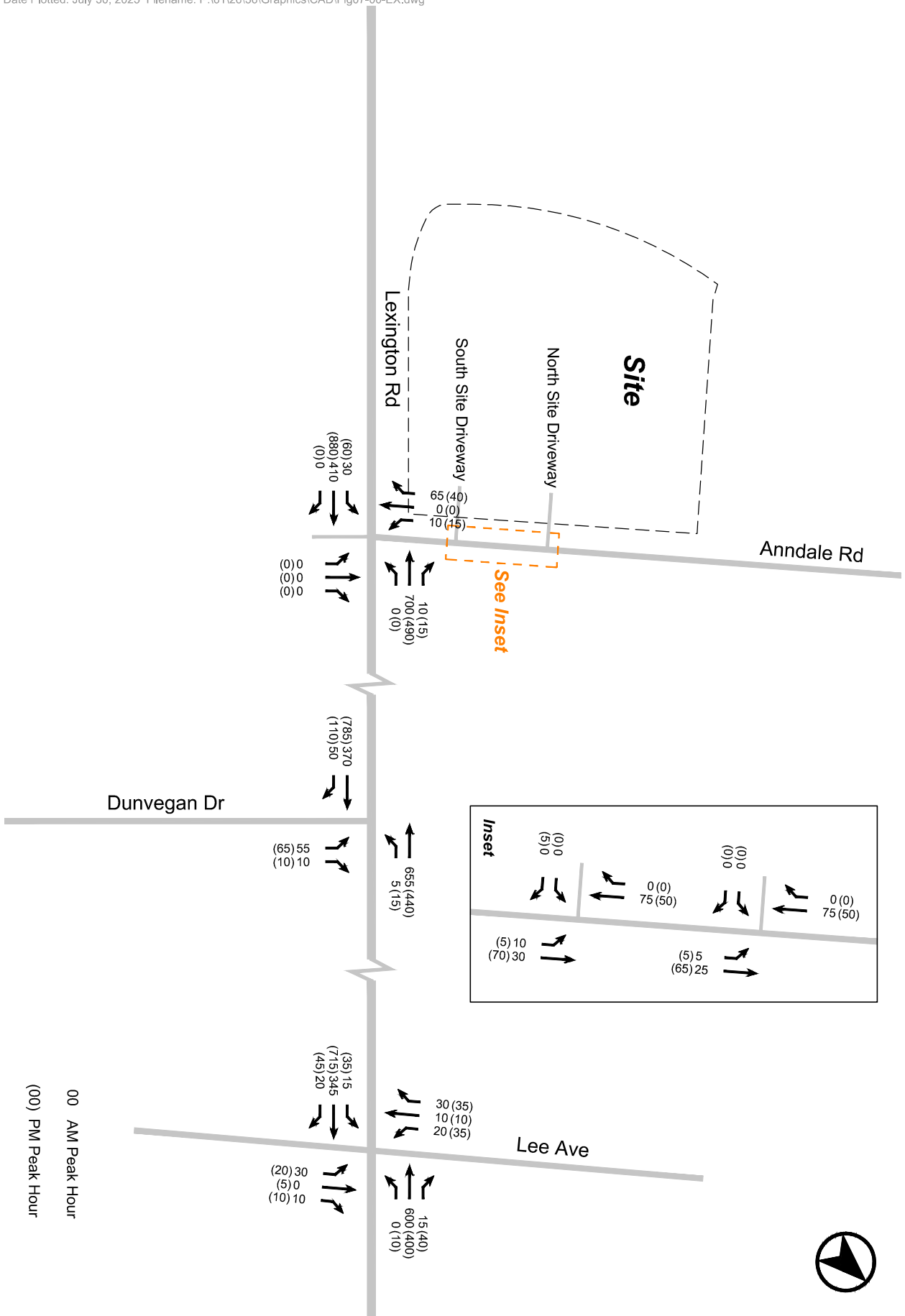


FIGURE 7 EXISTING TRAFFIC VOLUMES



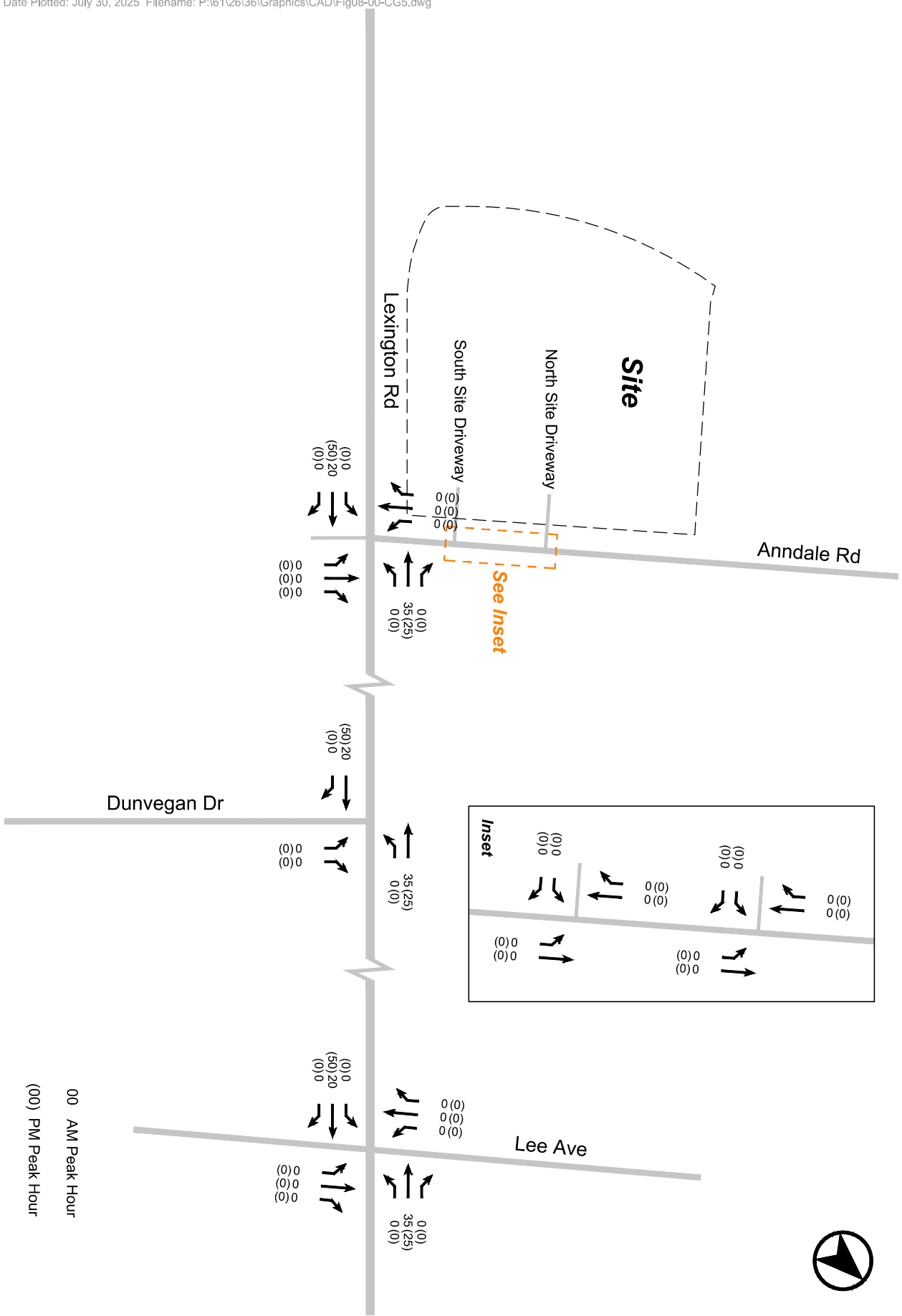


FIGURE 8 CORRIDOR GROWTH TRAFFIC VOLUMES
(5-YEAR HORIZON)
445 ANNDALE ROAD

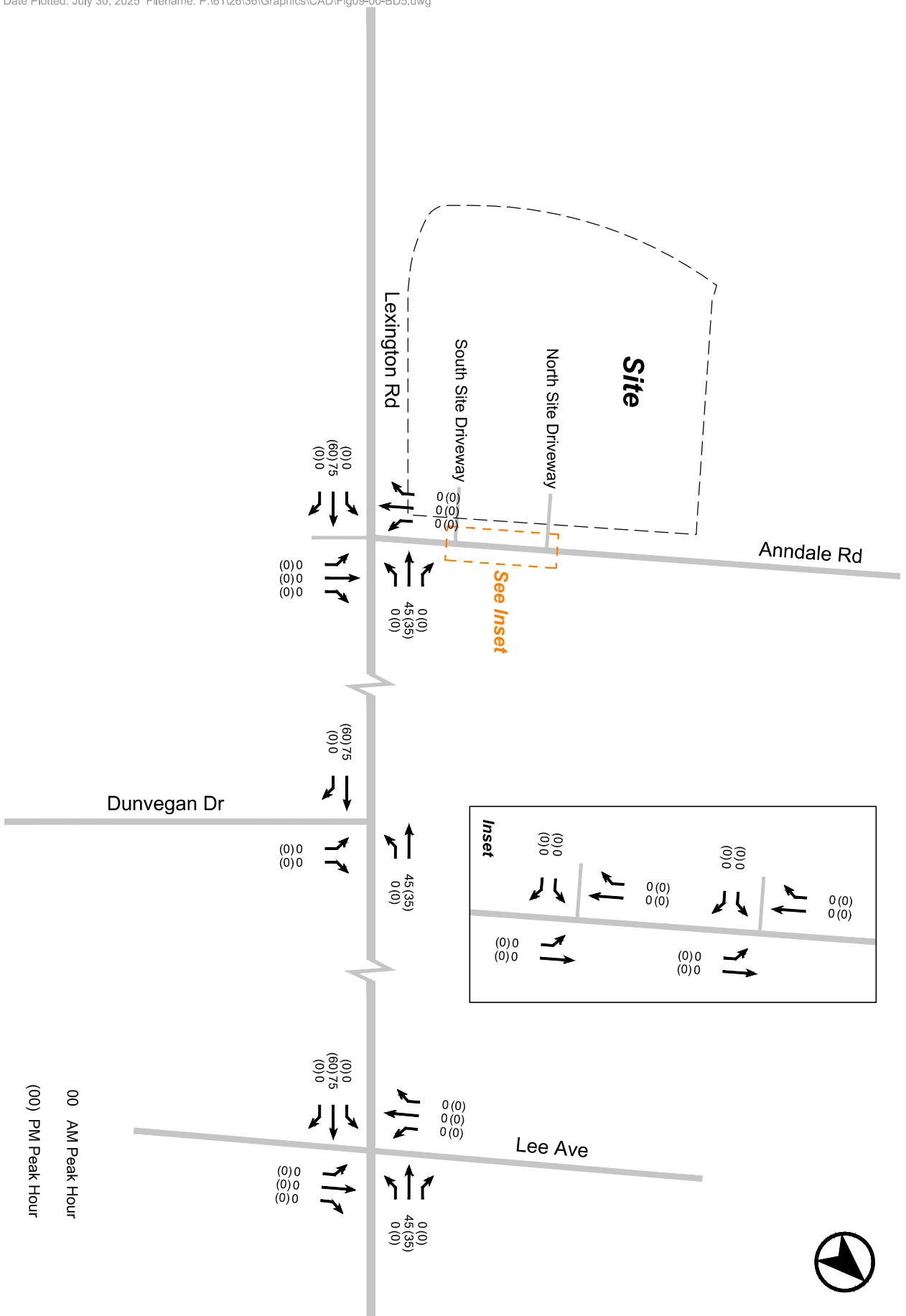


FIGURE 10 FUTURE BACKGROUND TRAFFIC VOLUMES
(5-YEAR HORIZON)
445 ANNDALE ROAD

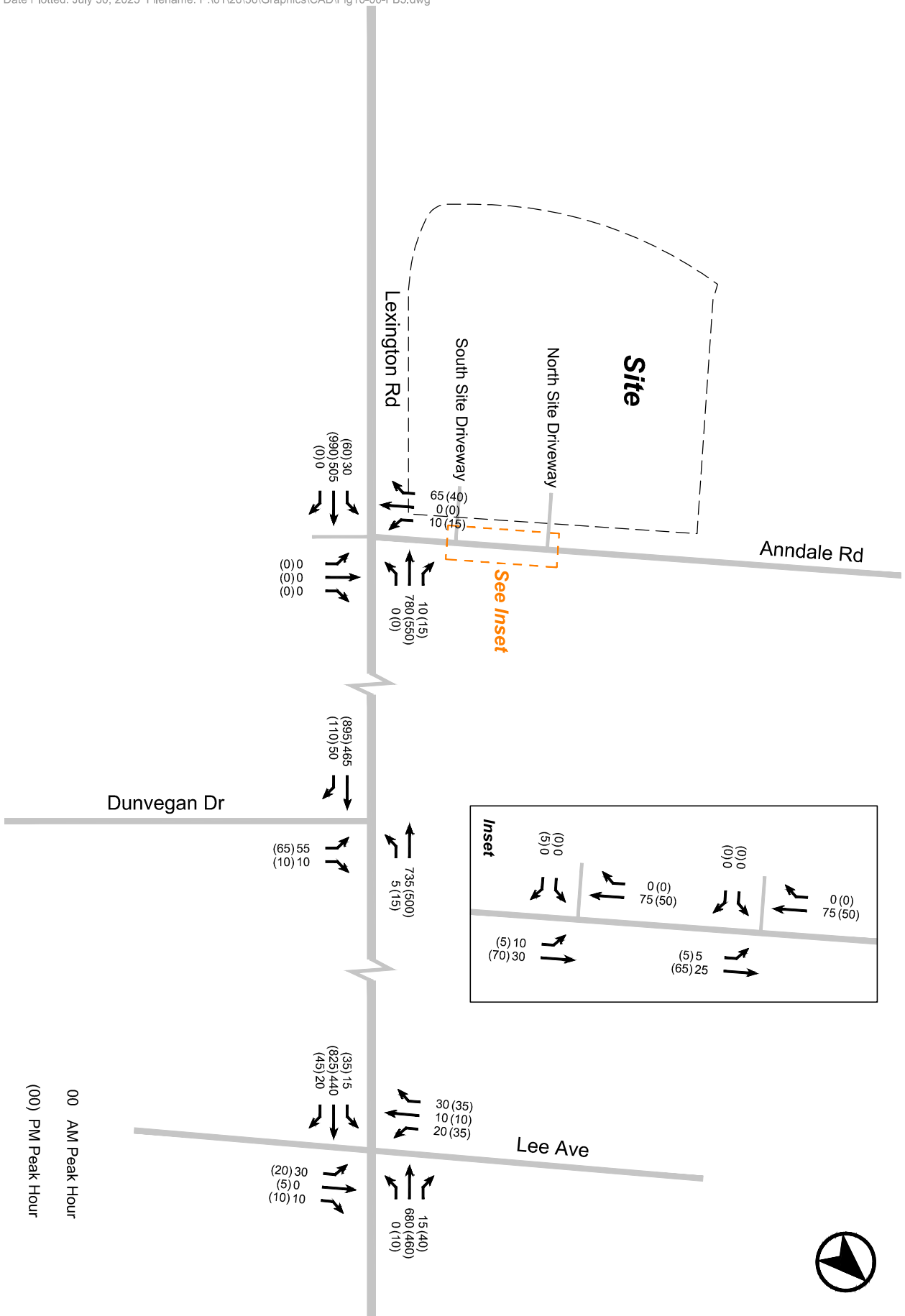


**FIGURE 11 NET NEW SITE TRAFFIC VOLUMES
(5-YEAR HORIZON)**
445 ANNDALE ROAD

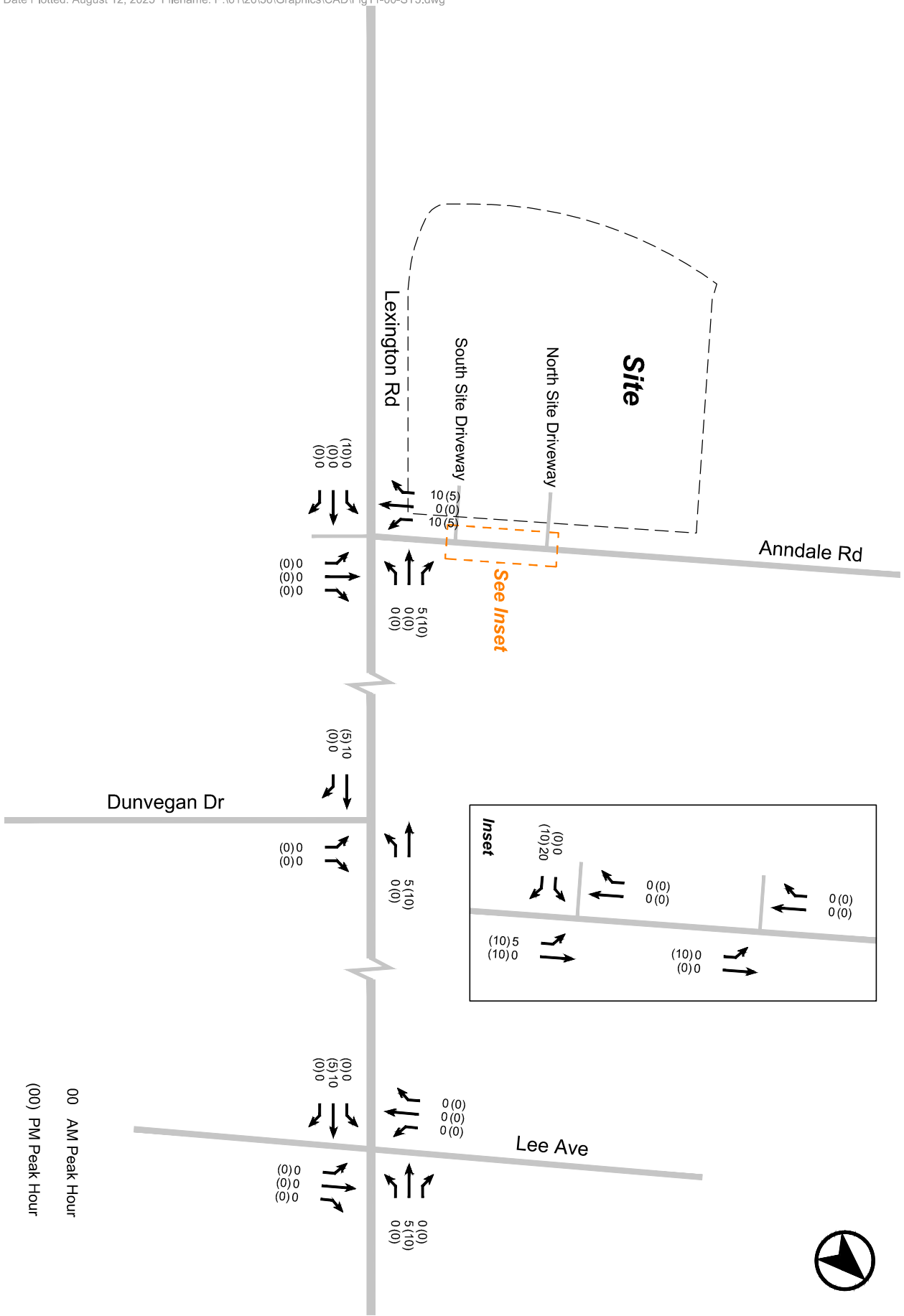
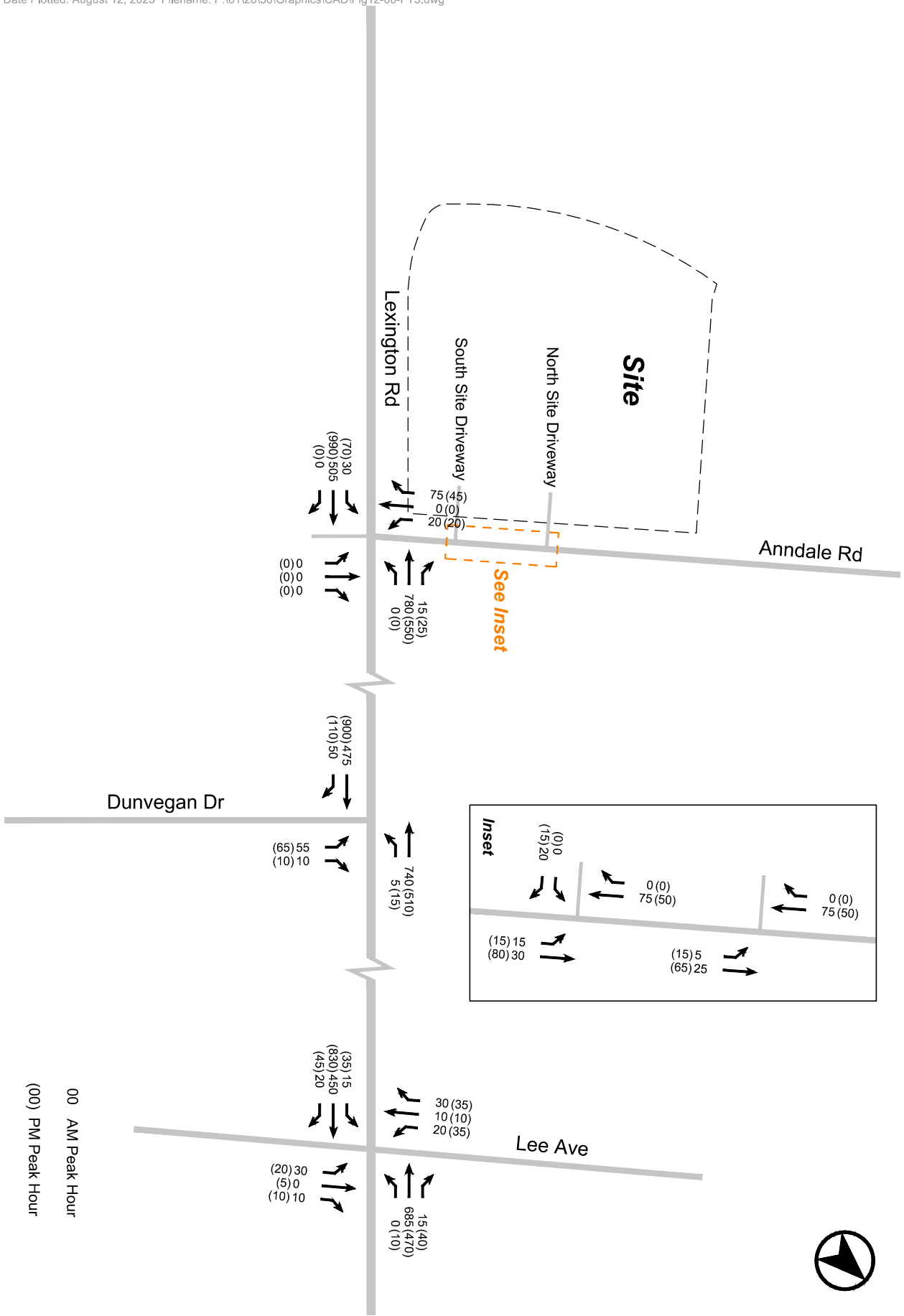


**FIGURE 12 FUTURE TOTAL TRAFFIC VOLUMES
(5-YEAR HORIZON)**
445 ANNDALE ROAD



6.2.6 Traffic Operations Analysis

6.2.6.1 Analysis Methodology

Signalized Intersections

There are no signalized intersections in the study area.

Unsignalized Intersections

Unsignalized intersection analyses have been carried out using standard capacity procedures for intersections operating under “Two-way” and “All-Way” stop control and in accordance with the methodologies outlined in HCM 2000.

The primary product of the unsignalized intersection evaluation is an LOS designation, ranging from LOS A to LOS F, providing a relative indication of the level of delay experienced by motorists completing a turning manoeuvre at an unsignalized intersection. LOS A represents conditions under which motorists would experience little delay and LOS F reflects conditions where more extended delays can be expected. HCM LOS criteria for unsignalized intersections are as follows:

- LOS A: Control Delay ≤ 10 s
- LOS B: $10\text{s} < \text{Control Delay} \leq 15$ s
- LOS C: $15\text{s} < \text{Control Delay} \leq 25$ s
- LOS D: $25\text{s} < \text{Control Delay} \leq 35$ s
- LOS E: $35\text{s} < \text{Control Delay} \leq 50$ s
- LOS F: Control Delay > 50 s

6.2.6.2 Analysis Assumptions and Parameters

Heavy Vehicles

Heavy vehicle percentages incorporated into the analysis were based upon information within the intersection turning movement counts.

Peak Hour Factor

Peak hour factors incorporated into the analysis were based upon information within the intersection turning movement counts.



6.2.6.3 Calibrations

Calibrations were undertaken at some intersections as required. The calibrations undertaken are summarized in **Table 16**, whilst calibration studies are attached in **Appendix E**. The target control delay represents the sum of the observed stop delay, which is collected from field observations and 5 seconds per vehicle. The additional 5 seconds per vehicle accommodates the additional delay experienced during deceleration to and acceleration from a stop. Therefore, the Synchro model is calibrated to the target control delay.

Table 16 Summary of Model Calibrations – PM Peak

Lane Group	Observed Stop Delay	Target Control Delay ⁽¹⁾	Synchro Parameters				
			Control Delay	Movement	Values	Critical Gap	Follow-Up Time
Lexington Rd / Anndale Rd							
SBLR	17 seconds	22 seconds	Synchro Default: 30 seconds	SBL	Synchro Default	7.2	3.6
					Calibrated	6.5	3.3
			Calibrated: 22 seconds	SBR	Synchro Default	6.2	3.3
					Calibrated	5.9	3.2
Lexington Rd / Dunvegan Dr							
NBLR	37 seconds	42 seconds	Synchro Default: 48.2 seconds	NBL	Synchro Default	6.4	3.5
					Calibrated	6.3	3.3
			Calibrated: 42 seconds	NBR	Synchro Default	6.3	3.4
					Calibrated	5.9	3.1
Lexington Rd / Lee Ave							
NBLTR	29 seconds	34 seconds	Synchro Default: 38.3 seconds Calibrated: 34 seconds	NBL	Synchro Default	7.1	3.5
					Calibrated	6.8	3.4
				NBT	Synchro Default	6.5	4.0
					Calibrated	6.4	3.9
				NBR	Synchro Default	6.4	3.5
					Calibrated	6.3	3.4
Table Continued on Next Page							



Lane Group	Observed Stop Delay	Target Control Delay ⁽¹⁾	Synchro Parameters				
			Control Delay	Movement	Values	Critical Gap	Follow-Up Time
SBLTR	20 seconds	25 seconds	Synchro Default: 34.6 seconds Calibrated: 25 seconds	SBL	Synchro Default	7.1	3.5
					Calibrated	6.2	3.1
				SBT	Synchro Default	6.6	4.1
					Calibrated	6.5	4.0
				SBR	Synchro Default	6.2	3.3
					Calibrated	6.2	3.3

Notes:

1. Control delay = Observed Stop Delay + 5 seconds/vehicle. The additional 5 seconds per vehicle accommodates the additional delay experienced during deceleration to and acceleration from a stop.
2. Control delay calibrations made via critical and follow up gap adjustments, based on delay studies attached in **Appendix E**.

6.2.6.4 Analysis Results

Unsignalized Intersections

Operations analysis results and queue analysis results for unsignalized intersections are provided in **Table 17** and **Table 18** respectively. Synchro outputs are attached in **Appendix F**.

Dunvegan Drive / Lexington Road – Shared Northbound Left-Turn and Right-Turn Lane

Under existing traffic conditions, the shared northbound right-turn and left-turn lane at Dunvegan Drive / Lexington Road currently operates with an LOS E during the weekday afternoon. The average delay a northbound motorist experiences is approximately 42 seconds during the peak hour.

Under future background traffic conditions, the shared northbound right-turn and left-turn lane at Dunvegan Drive / Lexington Road is projected to operate with an LOS F during the weekday afternoon peak hour. The average delay a northbound vehicle experiences is approximately 64 seconds during the peak hour. The increase in delay, which is approximately 22 seconds per vehicle compared to existing traffic conditions, is a result of the traffic allowances made as part of the area background traffic growth (i.e. area background development traffic allowances and general corridor growth). It should be noted that this condition will occur regardless of any redevelopment on the site.

The background traffic growth – specifically the general corridor growth, reflects a more conservative approach in projecting traffic growth along a collector road such as Lexington Road, which serves a neighbourhood that is already built-out. Notwithstanding the increased delay, northbound movement operates well under capacity with a v/c ratio of 0.59. Furthermore, there are multiple alternatives for vehicles to exit this neighbourhood should it be required, including a signal at Dansbury Drive / Bridge Street West.

Under future total traffic conditions, the shared northbound right-turn and left-turn lane at Dunvegan Drive / Lexington Road is projected to operate with an LOS F during the weekday afternoon peak hour. The average



delay a northbound motorist experiences is approximately 67 seconds during the peak hour. The increase in delay, (approximately 3 seconds per vehicle compared to the future background traffic conditions) reflects a minor impact to the intersection. Similarly to the future background traffic conditions, the northbound movement is projected to operate well under capacity with a v/c ratio of 0.61.

Given the above, it's concluded that the traffic associated with the development will have minor impact on this intersection and can be accommodated

Other Movements

All other movements at all unsignalized intersections within the study area are projected to operate with an LOS E or better under all analysis scenarios for both weekday morning and afternoon peak hours. Additionally, all projected queue lengths are accommodated within the available storage.

Overall, it is projected that the traffic associated with the development will have minor impact on the operation of unsignalized intersections within the study area and can therefore be accommodated.



Table 17 Operations Analysis Results – Unsignalized Intersections

Lane Group	Baseline Existing			Future Background (5-Year Horizon)			Future Total (5-Year Horizon)		
	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Lexington Rd / Annedale Rd									
EBL	0.04 (0.06)	A (A)	9.3 (8.7)	0.04 (0.07)	A (A)	9.7 (8.9)	0.04 (0.08)	A (A)	9.7 (9.0)
EBTR	0.25 (0.55)	A (A)	0.0 (0.0)	0.31 (0.62)	A (A)	0.0 (0.0)	0.31 (0.62)	A (A)	0.0 (0.0)
WBLTR	0.00 (0.00)	A (A)	0.0 (0.0)	0.00 (0.00)	A (A)	0.0 (0.0)	0.00 (0.00)	A (A)	0.0 (0.0)
NBLTR	0.00 (0.00)	A (A)	0.0 (0.0)	0.00 (0.00)	A (A)	0.0 (0.0)	0.00 (0.00)	A (A)	0.0 (0.0)
SBLTR	0.23 (0.22)	C (C)	19.1 (22.0)	0.28 (0.27)	C (D)	22.7 (27.4)	0.41 (0.35)	D (D)	30.3 (32.8)
Lexington Rd / Dunvegan Dr									
EBTR	0.27 (0.57)	A (A)	0.0 (0.0)	0.33 (0.64)	A (A)	0.0 (0.0)	0.34 (0.64)	A (A)	0.0 (0.0)
WBL	0.00 (0.02)	A (B)	8.3 (10.1)	0.00 (0.02)	A (B)	8.6 (10.6)	0.00 (0.02)	A (B)	8.6 (10.7)
WBT	0.42 (0.28)	A (A)	0.0 (0.0)	0.48 (0.32)	A (A)	0.0 (0.0)	0.48 (0.32)	A (A)	0.0 (0.0)
NBLR	0.30 (0.46)	D (E)	26.7 (42.0)	0.39 (0.59)	E (F)	37.0 (64.1)	0.40 (0.61)	E (F)	38.1 (66.8)
Lexington Rd / Lee Ave									
EBL	0.02 (0.03)	A (A)	9.3 (8.4)	0.02 (0.03)	A (A)	9.7 (8.6)	0.02 (0.03)	A (A)	9.7 (8.6)
EBTR	0.23 (0.47)	A (A)	0.0 (0.0)	0.29 (0.53)	A (A)	0.0 (0.0)	0.30 (0.54)	A (A)	0.0 (0.0)
WBLTR	0.00 (0.01)	A (A)	0.0 (0.4)	0.00 (0.01)	A (A)	0.0 (0.4)	0.00 (0.01)	A (A)	0.0 (0.4)
NBLTR	0.22 (0.23)	D (D)	28.0 (34.0)	0.30 (0.30)	E (E)	40.0 (46.4)	0.31 (0.30)	E (E)	41.5 (47.9)
SBLTR	0.24 (0.31)	C (C)	22.3 (25.0)	0.31 (0.39)	D (D)	29.3 (33.0)	0.31 (0.40)	D (D)	30.1 (34.1)
Annedale Rd / North Site Driveway									
NBLT	0.00 (0.00)	A (A)	1.2 (0.5)	0.00 (0.00)	A (A)	1.2 (0.5)	0.00 (0.01)	A (A)	1.2 (1.4)
SBTR	0.05 (0.03)	A (A)	0.0 (0.0)	0.05 (0.03)	A (A)	0.0 (0.0)	0.05 (0.03)	A (A)	0.0 (0.0)



Lane Group	Baseline Existing			Future Background (5-Year Horizon)			Future Total (5-Year Horizon)		
	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)
Anndale Rd / South Site Driveway									
EBLR	0.00 (0.01)	A (A)	0.0 (8.6)	0.00 (0.01)	A (A)	0.0 (8.6)	0.03 (0.02)	A (A)	8.9 (8.6)
NBLT	0.01 (0.00)	A (A)	1.9 (0.6)	0.01 (0.00)	A (A)	1.9 (0.6)	0.01 (0.01)	A (A)	2.6 (1.2)
SBTR	0.06 (0.03)	A (A)	0.0 (0.0)	0.06 (0.03)	A (A)	0.0 (0.0)	0.06 (0.03)	A (A)	0.0 (0.0)

Notes:

1. XX (XX) – AM Peak (PM Peak)



Table 18 Queue Analysis Results – Unsignalized Intersections

Lane Group	Approximate Queue Storage (m) ⁽¹⁾	Baseline Existing	Future Background (5-Year Horizon)	Future Total (5-Year Horizon)
		95%ile Queue (m)	95%ile Queue (m)	95%ile Queue (m)
Lexington Rd / Anndale Rd				
EBL	15	0.8 (1.5)	0.9 (1.6)	0.9 (1.9)
SBLTR	600	6.7 (6.2)	8.3 (8.0)	14.4 (11.3)
Lexington Rd / Dunvegan Dr				
WBL	20	0.1 (0.5)	0.1 (0.6)	0.1 (0.6)
NBLR	900	9.3 (16.5)	13.0 (23.2)	13.4 (23.8)
Lexington Rd / Lee Ave				
EBL	35	0.4 (0.8)	0.5 (0.8)	0.5 (0.8)
WBLTR	250	0.0 (0.3)	0.0 (0.3)	0.0 (0.3)
NBLTR	450	6.0 (6.3)	8.8 (8.6)	9.1 (8.9)
SBLTR	850	6.9 (9.9)	9.4 (13.3)	9.7 (13.7)
Anndale Rd / North Site Driveway				
NBLT	75	0.1 (0.1)	0.1 (0.1)	0.1 (0.2)
Anndale Rd / South Site Driveway				
EBLR	10	0.0 (0.1)	0.0 (0.1)	0.7 (0.4)
NBLT	40	0.2 (0.1)	0.2 (0.1)	0.3 (0.3)

Notes:

1. Existing turn lane storage length is measured from the stop bar to a point along the lane where the lane width becomes approximately 2.5 metres.
2. XX (XX) – AM Peak (PM Peak)



7.0 TRANSPORTATION DEMAND MANAGEMENT

7.1 Mobility Choice Travel Plan

The location of the site and its surrounding uses greatly influences the success of a Mobility Choice Travel Plan. The purpose of the Mobility Choice Travel Plan is to guide the provision of viable alternative personal transportation options beyond the single-occupant, private automobile. This plan intends to support the proposed development by outlining proposed TDM measures to promote the use of more active and sustainable transportation modes; respond to the mobility needs of residents and visitors of the site; and to reduce the overall dependence on the private automobile.

The site context provides for public transit services and good active transportation connectivity. While opportunities exist in the area infrastructure to accommodate sustainable transportation practices, the ability to fully leverage these opportunities is granted by the success of the implementation of the Mobility Choice Travel Plan.

Four specific objectives define the policy framework for the Mobility Choice Travel Plan:

- Encourage the use of alternate travel modes (transit, cycling, walking);
- Increase vehicle occupancy;
- Shift travel to off-peak periods; and
- Reduce vehicle kilometres travelled.

7.2 Organizational Framework

The four broader objectives can be organized within the following categories:

- Encourage Transit Use;
- Encourage and Facilitate Bicycle Use;
- Enhance Pedestrian Access and Walkability;
- Facilitation of Reduced Car Ownership and Usage;
- Vehicular Parking Supply and Management;
- Land Use and Building Infrastructure; and
- Coordination, Communication, and Promotion.

Measures from the Mobility Choice Travel Plan will be incorporated into the proposed development to minimize the need to own a personal vehicle or use an automobile when travelling to and from the site. It is important to encourage and facilitate the use of non-automobile travel modes on a daily basis.

The proposed TDM strategies along with their overall intent are set out in **Table 19**.



Table 19: Proposed TDM Measures

TRANSIT USE		Intent: Encourage Transit Use Support for and the promotion of the use of area transit services for both short and long-distance travel by residents and visitors will reduce the overall use of a vehicle and the need to own one.	Mobility Strategies: At first occupancy, provide 1 transit information package per unit which details available services in the area.
BICYCLE FACILITIES		Intent: Encourage Bicycle Use Provide cycling infrastructure within new development that supports and promotes cycling as a convenient and viable travel alternative to the personal automobile.	Mobility Strategies: - Provide bicycle parking as outlined in Section 4.0. - At first occupancy, provide 1 cycling information package per unit which details available routes in the area.
PEDESTRIAN CONNECTIVITY		Intent: Encourage Pedestrian Use A high-quality, safe, connection between the site and transit stations / stops, cycling network, and public street system encourages residents and visitors to travel around the site area without a vehicle.	Mobility Strategies: Provide on-site pedestrian connections between the residential units and the church, and to existing sidewalks on Anndale Road and Davenport Road.
PARKING MANAGEMENT		Intent: Reduce reliance on privately owned vehicle Reduced parking provisions encourages residents and visitors to re-consider the use or ownership of a vehicle.	Mobility Strategies: Provide on-site parking at a rate below the Zoning by-law requirement, as outlined in Section 3.0.



8.0 DESIGN CONSIDERATIONS

8.1 Desktop Sight Distance Assessment

A desktop assessment of the horizontal sight distances was undertaken for the proposed site driveways in accordance with the TAC Geometric Design Guide for Canadian Roads ("TAC"), and is attached in **Appendix G**.

The relevant sight distances for consideration in this case are stopping sight distance ("SSD") and intersection sight distance ("ISD") case B1 (stop control on the minor road, left turn from the minor road), case B2 (stop control on the minor road, right turn from the minor road), and case F (left turns from the major road). It's noted that of the relevant ISD cases, case B1 (stop control on the minor road, left turn from the minor road) has the highest sight distance requirement. The ISD assessment for the south site driveway has therefore been undertaken against case B1. As the north site driveway operates as outbound only, the ISD assessment for this intersection has been undertaken against case F.

The following sight distance properties were considered:

- Anndale Road posted speed: 40 km/h
- Anndale Road design speed: 50 km/h
- Design vehicle: Passenger car
- Average road grade: 0%
- Driver's eye height: -3% to +3% (i.e. no adjustment)
- Setback distance of driver's eye: 4.4 metres (TAC Section 9.9.2.3)

A summary of the desktop sight distance assessment is provided in **Table 20**. Overall, the sight distance at both driveways is appropriate.

Table 20 Desktop Sight Distance Assessment

Intersection	TAC Requirement ¹	Desktop Assessment
Anndale Rd / North Site Driveway	SSD: 65 m ISD Case F: 80 m	To the north: Sight distance satisfies SSD and ISD TAC requirements To the south: N/A
Anndale Rd / South Site Driveway	SSD: 65 m ISD Case B1: 105 m	To the north: Sight distance satisfies SSD and ISD TAC requirements To the south: Sight distance is available to the end of the street at Lexington Road, which is equal to approximately 65 metres. While this is less than the required ISD of 105 metres, it's not possible to increase the sight distance as it's the end of the street. Vehicles will be turning in from Lexington Road at slow speeds. This arrangement is generally consistent with existing conditions and is appropriate.

Notes:

1. Transportation Association of Canada Manual, Case B1; Table 9.9.4



8.2 Internal Traffic Control

As discussed in **Section 1.3**, a private road is proposed to loop around the site and will provide access to the car parking and loading spaces. The private road is proposed to operate one-way counterclockwise, with a width of 4.6 metres. An adjacent 1.5 metre sidewalk is proposed flush with the private road, which increases the driveable width to 6.1 metres. This proposed arrangement accommodates circulation by emergency and waste collection vehicles, provides sufficient drive aisle width for access to the car parking spaces, and satisfies fire route requirements.

Vehicles exiting the site will be subject to Stop control at Anndale Road. Details pertaining to pavement marking and signage will be addressed as part of the Site Plan Application stage.

8.3 Heavy Vehicle Access and Circulation

As discussed in **Section 5.0**, vehicle manoeuvring diagrams demonstrating access into and out of the Type A loading space, and circulation by a waste collection vehicle are attached in **Appendix C**.

The proposed private road has been designed to accommodate fire route requirements, as detailed on the architectural plans (not to scale) attached in **Appendix C**.



9.0 SUMMARY AND CONCLUSIONS

Proposal Overview

1. A Zoning By-law Amendment (“ZBA”) application is being made to the City for the proposed residential development at 445 Anndale Road in the City of Waterloo.
2. The development proposal contemplates the construction of 5 townhouse blocks comprising a total of 57 rental units, including 42 stacked townhouses and 15 linear townhouses. In addition to the proposed townhouse blocks, the existing church is proposed to be retained.
3. Site access is proposed via two new driveways to Anndale Road. The north driveway is proposed to operate one-way inbound only, and the south driveway is proposed to operate two-way.
4. A total of 92 car parking spaces are proposed at grade, including 57 resident spaces and 35 spaces for shared use between residential visitors and the church on a non-exclusive basis. The proposed car parking supply comprises a total of 4 accessible spaces (2 Type A and 2 Type B) and includes 4 electric vehicle (“EV”) charging stations.
5. A total of 46 bicycle parking spaces are proposed across the site, including 18 Type A spaces within combined bin and bicycle enclosures, and 28 Type B spaces at grade.
6. A Type A loading space is proposed and will be available for move in/out activities and deliveries.
7. Residential waste collection is proposed to be undertaken by a private contractor via curbside collection. A staging area is provided for Block 1 where there is limited space available for curbside collection. Church waste will continue to be collected by municipal services from Anndale Road, consistent with existing conditions.
8. A private road is proposed to loop around the site and will provide access to the car parking and loading spaces. The private road is proposed to operate one-way counterclockwise. A shared vehicle and pedestrian space is proposed to extend west from the private road along the north side of the church in order to provide pick up/drop off at the primary church entrance and to satisfy fire route requirements. A bulb within the shared space allows for pick up/drop off vehicles to turn around.
9. A severance is proposed to create:
 - 1 block comprising the existing church, the southeast part of the private road, part of the shared vehicle and pedestrian space, and 44 car parking spaces; and
 - 1 block comprising the townhouse blocks, the balance of the private road, the balance of the shared vehicle and pedestrian space, 48 car parking spaces, and the Type A loading space. This block is proposed to be rezoned to Residential Eight Zone (“R8”).
10. Appropriate easements and parking agreements will be implemented to allow use of the private road and parking spaces by the residential units and church as required.

Car Parking

11. Under the City of Waterloo Zoning By-law 2018-050, the proposed development has a requirement to provide a total of 125 car parking spaces, including 57 resident spaces, 10 residential visitor spaces and 58 church spaces.



12. The proposed resident car parking supply satisfies the resident car parking requirements. However the proposed 35 spaces for shared use between residential visitors and the church represents a shortfall of 33 spaces from the Zoning requirement.
13. The proposed accessible car parking supply satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.
14. The proposed electric vehicle car parking supply satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.
15. It's proposed for the non-residential spaces to be shared between residential visitors and the church on a non-exclusive basis. A combined residential visitor and church peak parking demand of 30 spaces and 25 spaces is estimated during Sunday service and outside of Sunday service respectively. The proposed non-residential car parking supply of 35 spaces satisfies these demands and is acceptable.

Bicycle Parking

16. The proposed development has a requirement to provide a total of 40 bicycle parking spaces, including 36 residential spaces (18 Type A and 18 Type B) and 4 church spaces (4 Type B).
17. The proposed bicycle parking supply satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.

Loading

18. The proposed development has a requirement to provide 1 Type A loading space.
19. The proposed loading supply satisfies the requirements of the City of Waterloo Zoning By-law 2018-050.
20. Residential waste collection is proposed to be undertaken by a private contractor via curbside collection. A staging area is provided for Block 1 where there is limited space available for curbside collection. Church waste will continue to be collected by municipal services from Anndale Road, consistent with existing conditions.

Multimodal Analysis

21. The proposed development is projected to generate in the order of 25 and 30 net new two-way vehicle trips during the AM and PM peak hours respectively.
22. The proposed development is projected to generate in the order of 40 and 45 net new two-way person trips during the AM and PM peak hours respectively.
23. Capacity analysis has been completed for the following scenarios during the AM and PM peak hour:
 - Existing Conditions
 - Future Background Conditions (5-Year Horizon)
 - Future Total Conditions (5-Year Horizon)
24. Capacity analysis was undertaken for the following intersections:
 - Lexington Road / Anndale Road
 - Lexington Road / Dunvegan Drive
 - Lexington Road / Lee Avenue
 - Anndale Road / North Site Driveway



- Anndale Road / South Site Driveway

25. It's projected that traffic associated with the proposed development can be accommodated at all intersections within the study area.

Transportation Demand Management

26. Proposed Transportation Demand Management measures include:

- Provide transit information packages at first occupancy
- Bicycle parking
- Provide bicycle information packages at first occupancy
- On-site pedestrian connections
- On-site parking below the Zoning by-law requirement

Design Considerations

27. A desktop assessment of the horizontal sight distances was undertaken for the proposed site driveways in accordance with the TAC Geometric Design Guide for Canadian Roads. Overall, the sight distance at both driveways is appropriate.
28. A private road is proposed to loop around the site and will provide access to the car parking and loading spaces. The private road is proposed to operate one-way counterclockwise, with a width of 4.6 metres. An adjacent 1.5 metre sidewalk is proposed flush with the private road, which increases the driveable width to 6.1 metres. This proposed arrangement accommodates circulation by emergency and waste collection vehicles, provides sufficient drive aisle width for access to the car parking spaces, and satisfies fire route requirements.
29. Vehicles exiting the site will be subject to Stop control at Anndale Road. Details pertaining to pavement marking and signage will be addressed as part of the Site Plan Application ("SPA") stage.
30. Vehicle manoeuvring has been reviewed for access into and out of the Type A loading space, and circulation by a waste collection vehicle. The proposed private road has been designed to accommodate fire route requirements.

