



**1521 Sunningdale Road and  
2631 Hyde Park Road,  
London  
Transportation Impact  
Assessment**

Paradigm Transportation Solutions Limited

April 2021  
210088





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**Client**

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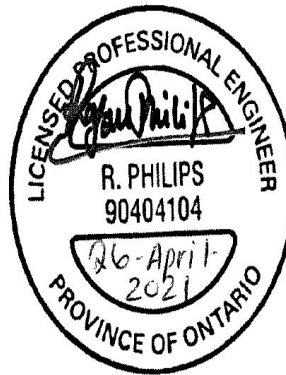
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## 1521 Sunningdale Road and 2631 Hyde Park Road, London Transportation Impact Assessment



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# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained by Auburn Developments Inc. to conduct this Transportation Impact Assessment (TIA) for the proposed Mount Pleasant residential subdivision at 1521 Sunningdale Road and 2631 Hyde Park Road in the northwest area of the City of London.

This Transportation Impact Assessment (TIA) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts and analysis for 2026 and 2031 horizon years, and any recommendations to address potential transportation impacts of the development.

The TIA also includes an assessment of the cumulative impacts of the potential future development of the surrounding lands on the study area road system within the ten year (2031) time frame.

## Mount Pleasant Subdivision

The proposed Mount Pleasant Subdivision is located in the northeast corner of Sunningdale Road and Hyde Park Road, within the City's Urban Growth Boundary. Official Plan and Zoning By-law applications have been submitted for the development of the subject lands.

The proposed subdivision consists of 153 single-family units, 221 townhouse units and 298 apartment units. One of the subdivision blocks (Block 14) is anticipated to include either an elementary school with 800 students or 137 townhouse units. For the purpose of this report, 137 townhouse units have been conservatively assumed for traffic impact assessment.

Vehicular access is proposed via two full-moves access points, one each on Sunningdale Road and on Hyde Park Road. The development is anticipated to be completed by 2026.

## Northwest Area

The proposed Mount Pleasant subdivision lands are surrounded by agricultural lands to the north and east in the City's northwest area, bounded by Sunningdale Road to the south, City limits (Medway Road) to the north, Hyde Park Road to the west and Wonderland Road to the east. The agricultural lands are currently outside the City's Urban Growth Boundary.



However, in anticipation of the potential future development of these lands, the TIA includes a cumulative impact assessment on the study area road system within a ten year (2031) timeframe. The cumulative impact assessment is based on a conceptual development plan for the northwest area, including five properties to the north and east of the subject subdivision.

The development plan provides for a potential yield of 2,531 dwelling units and 3.902 hectares of commercial development. These projections are used to estimate trip generation for the entire northwest area to assess the overall impacts on the surrounding roads and intersections.

For the purposes of this assessment the full development of the northwest area lands is assumed to be completed by 2031.

## TIS Scope

The scope of the Transportation Impact Assessment undertaken this study includes:

- ▶ **Analysis Periods:** Weekday AM and PM peak hours.
- ▶ **Traffic Conditions:**
  - 2021 - Existing Traffic Conditions;
  - 2026 – Background Traffic Conditions and Total Traffic Conditions including the full development of the Mount Pleasant Subdivision;
  - 2031 (a) – Total Traffic Conditions five years after the full development of the Mount Pleasant Subdivision; and
  - 2031 (b) – Total Traffic Conditions including the full development of the Mount Pleasant Subdivision and the potential of full development of the Northwest Area lands.
- ▶ **Study Area intersections:**
  - Sunningdale Road and Hyde Park Road;
  - Sunningdale Road and Wonderland Road;
  - Sunningdale Road and Development Access (Street A); and
  - Hyde Park Road and Development Access (Street A).

## Conclusions

Based on the investigations carried out, it is concluded that:



- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service. The westbound shared movement at Sunningdale Road and Hyde Park Road is operating with poor levels of service during the PM peak hour.
- ▶ **Development Trip Generation:** The development is forecast to generate 314 and 399 trips during the AM and PM peak hours, respectively.
- ▶ **2026 Background Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service. As under existing traffic conditions, the westbound shared movement at Sunningdale Road and Hyde Park Road is forecast to operate with poor levels of service during the PM peak hour.
- ▶ **2026 Total Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service. The westbound shared movement at Sunningdale Road and Hyde Park Road is forecast to operate with poor levels of service during the PM peak hour, as under existing and 2026 background traffic conditions.
- ▶ **2031 Intersection Improvements:** The following intersection improvements are identified over the ten-year (2031) timeframe:
  - Hyde Park Road and Sunningdale Road: A new one-lane roundabout similar to the existing roundabout at Wonderland Road and Sunningdale Road.
  - Wonderland Road and Sunningdale Road: Expansion of the existing roundabout at Wonderland Road and Sunningdale Road to a two-lane roundabout with pavement marking changes and the widening of the north leg.
- ▶ **2031 Total Traffic Conditions including Mount Pleasant Subdivision:** With the above intersection improvements in place, the study area intersections are forecast to operate within acceptable levels of service.
- ▶ **2031 Total Traffic Conditions including all Northwest Area Lands:** The study area intersections are forecast to operate generally within acceptable levels of service. The westbound, northbound, and southbound approaches at the intersection of Sunningdale Road and Wonderland Road are forecast to operate with poor levels of service during the PM peak hour.

The southbound shared movement at Street A and Sunningdale Road is forecast to operate with poor levels of service during the PM peak hour.



- ▶ **Street A - Access Points:** Left-turn lanes with 25 metres of storage are forecast to be warranted at the Street A connections to Sunningdale Road and Hyde Park Road under 2031 total traffic volumes.
- ▶ **TDM Measures:** The development can accommodate a number of pedestrian, cycling and transit measures to minimize the use of auto modes in the development.
- ▶ **Road System Capacity:** The existing and future study area road system capacity to accommodate development is identified as follows:
  - The existing road system and intersections can accommodate the proposed Mount Pleasant Subdivision. Auxiliary left-turn lanes will be required at the proposed access points.
  - A new two-lane roundabout at Hyde Park Road and Sunningdale Road, and the expansion of the existing roundabout at Wonderland Road and Sunningdale Road, will be required to accommodate the development of all Northwest Area lands.
  - Road widening is not identified as required for Hyde Park Road, Sunningdale Road and Wonderland Road (north of Sunningdale Road) within the study area limits in the ten-year (2031) timeframe.

## Recommendations

Based on the findings and conclusions of this study, it is recommended that the development of the proposed Mount Pleasant Subdivision be considered for approval with the following auxiliary-lanes:

- ▶ A southbound left-turn lane with 25 metres of storage on Hyde Park Road at Street A; and
- ▶ An eastbound left-turn lane with 25 metres of storage on Sunningdale Road at Street A.





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# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained by Auburn Developments Inc. to conduct this Transportation Impact Assessment (TIA) for a proposed residential subdivision at 1521 Sunningdale Road and 2631 Hyde Park Road in the City of London. **Figure 1.1** details the subject development location.

The subject lands (Mount Pleasant Subdivision) are located in the northeast corner of Sunningdale Road and Hyde Park Road, within the City's Urban Growth Boundary. The proposed subdivision plan consists of 153 single-family units, 221 townhouse units and 298 apartment units.

One of the subdivision blocks (Block 14) is anticipated to include either an elementary school with 800 students or 137 townhouse units. For the purpose of this report, 137 townhouse units have been conservatively assumed for the traffic impact assessment. The development is anticipated to be completed by 2026.

Vehicular access is proposed via two full-moves access points, one each on Sunningdale Road and on Hyde Park Road.

The proposed Mount Pleasant subdivision lands are surrounded by agricultural lands to the north and east in the City's northwest area, bounded by Sunningdale Road to the south, City limits (Medway Road) to the north, Hyde Park Road to the west and Wonderland Road to the east. In anticipation of the potential future development of these lands, the TIA includes a cumulative impact assessment on the study area road system within a ten-year (2031) timeframe.

## 1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development.

The scope of the study, includes:

- ▶ Assessment of the current traffic and site conditions within the study area;
- ▶ Estimates of background traffic growth for a five-year (2026) and ten-year (2031) horizon;
- ▶ Estimates of additional traffic generated by the subject site;



- ▶ Estimates of traffic generated by the five future properties within the Northwest Planning Area and assignment to the road network;
- ▶ Full analyses of the impact of the future traffic on the surrounding road network, including the following study area intersections:
  - Sunningdale Road and Hyde Park Road;
  - Sunningdale Road and Wonderland Road;
  - Sunningdale Road and Development Access (Street A); and
  - Hyde Park Road and Development Access (Street A).
- ▶ Recommendations necessary to mitigate the development traffic impacts.

**Appendix A** contains the pre-study consultation material provided to the City of London.

This study has been prepared in accordance with the requirements detailed by the City of London Transportation Impact Assessment Guidelines<sup>1</sup>.

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<sup>1</sup> Transportation Impact Assessment Guidelines, City of London, April 2012.





## Location of Subject Lands and Northwest Planning Area

Figure 1.1

## 2 Existing Conditions

### 2.1 Existing Roadways

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- ▶ **Sunningdale Road** is an east-west civic boulevard under the City's Official Plan (OP)<sup>2</sup>. The roadway has a two-lane cross section and a posted speed limit of 80 km/h west of Denview Avenue and 60 km/h to the east. Bike lanes are provided for approximately 230 metres east of Wonderland Road and for 180 metres west of Wonderland Road.
- ▶ **Hyde Park Road** is a north-south civic boulevard/rural thoroughfare with a two-lane cross section and a posted speed limit of 90 km/h within the study area.
- ▶ **Wonderland Road** is a north-south urban thoroughfare with a two-lane cross section. This roadway has a posted speed limit of 60 km/h. Bike lanes are provided on both sides of this roadway.

The intersection of Sunningdale Road and Hyde Park Road currently operates under stop control on the Sunningdale Road approaches, and the intersection of Wonderland Road and Sunningdale Road currently operates as a roundabout.

**Figure 2.1** displays the traffic control and lane configuration at the study area intersections.

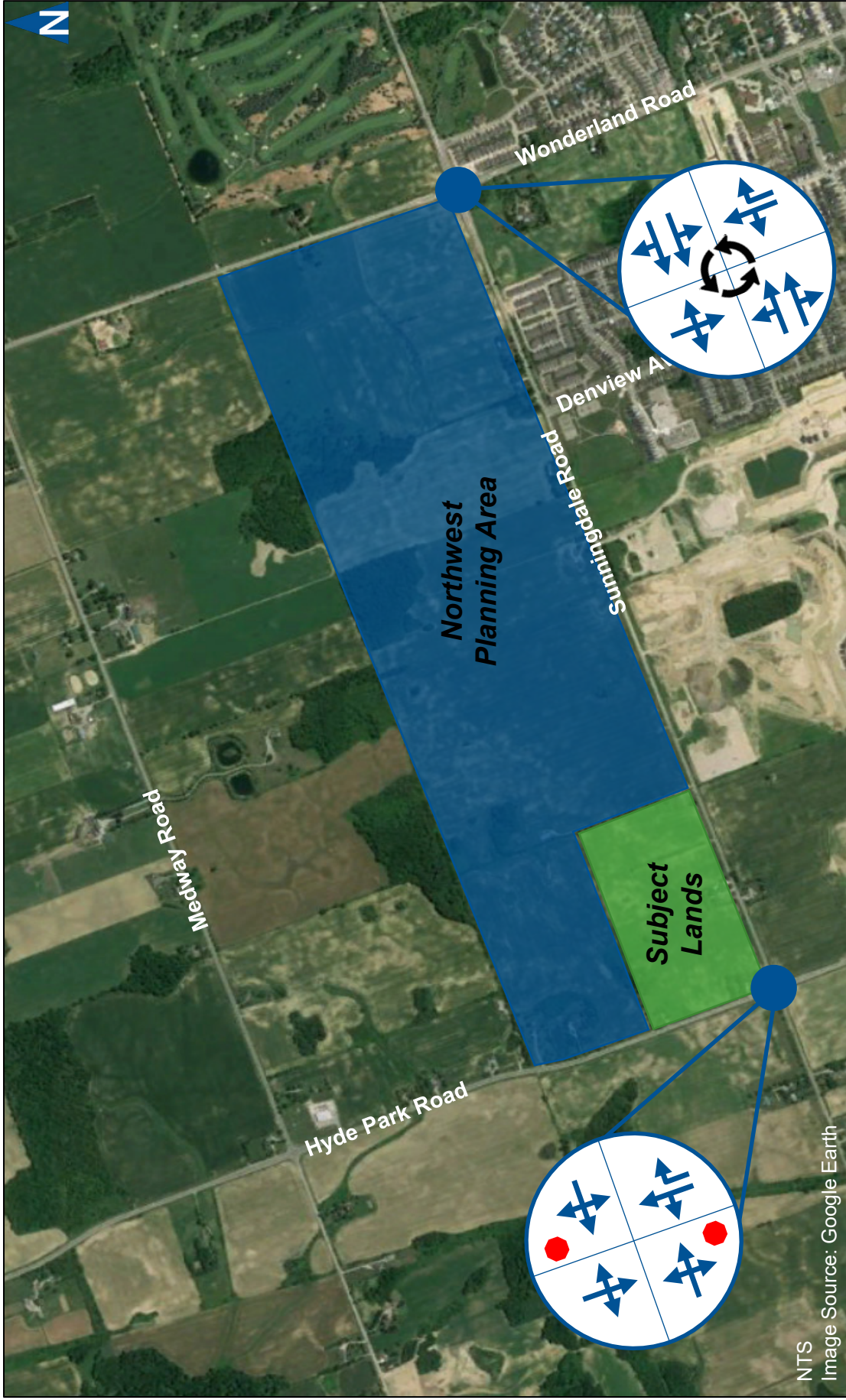
A roundabout is anticipated to be constructed at the intersection of Sunningdale Road and Hyde Park Road before 2031.

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<sup>2</sup> The London Plan. Prepared by







# Existing Lane Configuration and Traffic Control

Figure 2.1

## 2.2 Transit Service

There is currently no transit service in the surrounding area. Nearby transit routes (between 2 and 4 kilometres from the subject site) include Route 9, 19 and 31 which operate along Fanshawe Park Road West, south of the subject site, and Route 34 which operates along Sunningdale Road at Richmond Street, east of the subject site.

It is expected that existing transit routes will be extended on the study area roads to service the northwest area developments in the future.

## 2.3 Traffic Volumes

The following turning movement count (TMC) data have been used to determine 2021 traffic volumes:

- ▶ Sunningdale Road and Hyde Park Road – data collected by Paradigm on 9 August 2018; and
- ▶ Sunningdale Road and Wonderland Road - data provided by the City from counts on 28 September 2015.

**Table 2.1** summarizes the count date and peak hour start times for the two study area intersections.

**TABLE 2.1: TURNING MOVEMENT COUNT SUMMARY**

Intersection	Count Date	AM Peak Hour	PM Peak Hour
Sunningdale Road and Wonderland Road	September 28, 2015	7:30 AM	4:30 PM
Sunningdale Road and Hyde Park Road	August 9, 2018	9:30 AM	4:30 PM

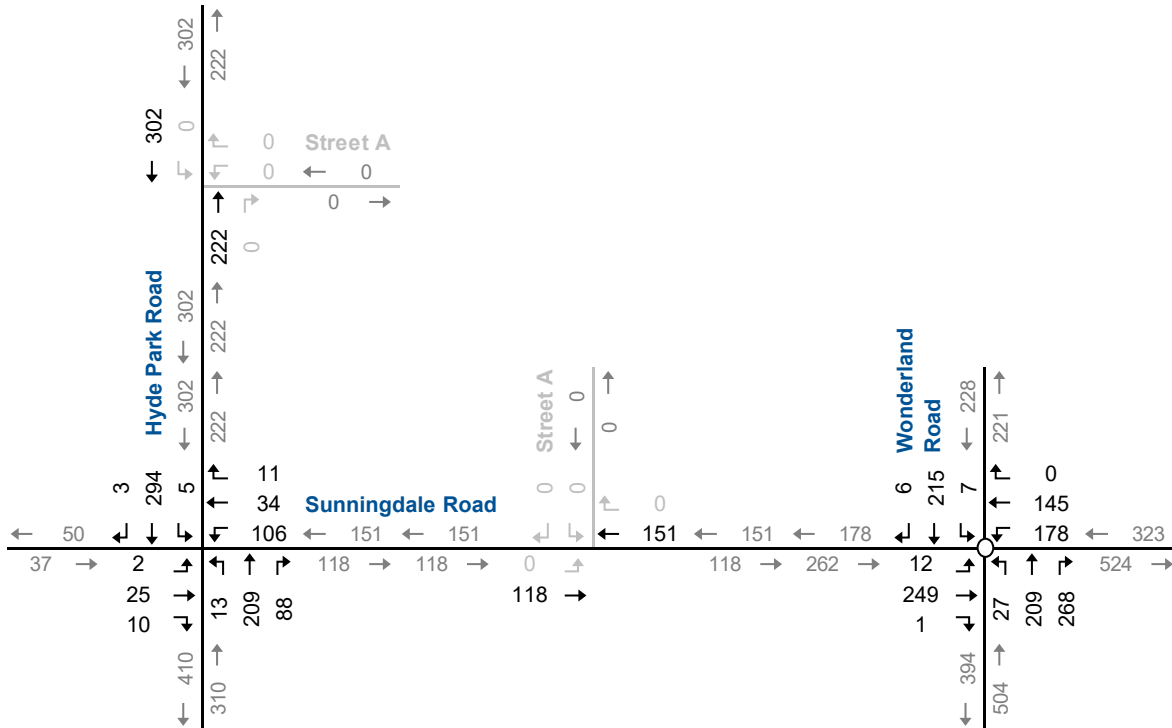
To obtain 2021 traffic volumes, a growth rate of 2.0% was applied to the 2015 and 2018 traffic volumes.

**Figure 2.2** displays the existing (2021) AM and PM peak hour turning movement traffic volumes.

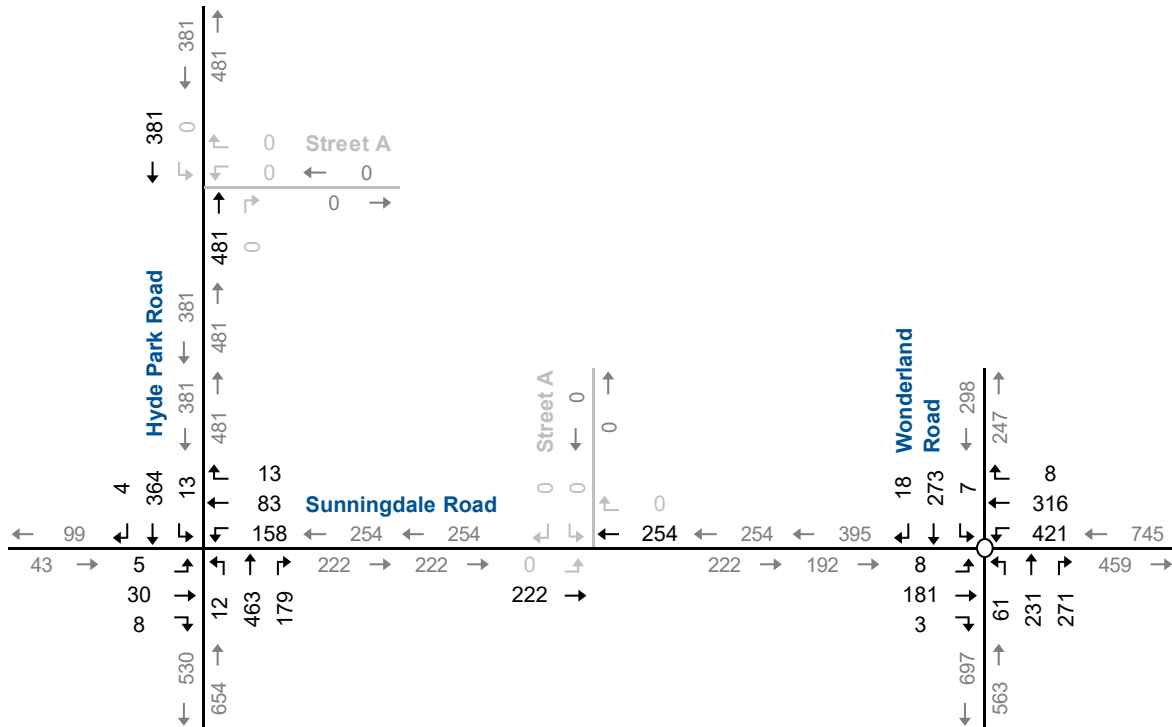
**Appendix B** contains the detailed traffic counts for the study area intersections.



**AM Peak Hour**



**PM Peak Hour**



**Existing (2021) Traffic Volumes**

## 2.4 Traffic Operations

The level of service conditions at the study area intersections have been assessed using Synchro 10 and Arcady. Movements are considered critical under the following conditions:

- ▶ Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above and Level of Service 'E' or worse;
- ▶ V/C ratios for dedicated turning movements increased to 0.90 or above and Level of Service 'E' or worse;
- ▶ 95th percentile queue lengths for individual movements exceeds available lane storage.

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

**Table 2.2** summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced.

The results indicate that the study area intersections are operating with acceptable levels of service, and with no problem movements.

The following critical movements are noted at the Sunningdale Road and Hyde Park Road intersection under existing traffic conditions:

- ▶ The westbound approach is operating with LOS F and v/c ratio greater than 1.00 during the PM peak hour.

**Appendix C** contains the detailed Synchro 10 and Arcady reports.



**TABLE 2.2: EXISTING (2021) TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Sunningdale Road & Hyde Park Road	TWSC	LOS Delay V/C 95th	< B > < 15 > < 0.10 > < 0 >	> B 15 > > > > > > >	< C > < 20 > < 0.41 > < 2 >	> C 20 > > > > > > >	< A > < 8 > < 0.01 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > > > > > >	< A > < 8 > < 0.00 > < 0 >	> A > > > > > > >	< A > < 8 > < 0.00 > < 0 >	> A > > > > > > >	< A > < 8 > < 0.00 > < 0 >	> A > > > > > > >			
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.17 > < 1 >	> A 3 > > > > > > >	< A > < 3 > < 0.19 > < 1 >	> A > > > > > > >	< A > < 5 > < 0.24 > < 1 >	> A > > > > > > >	< A > < 4 > < 0.22 > < 1 >	> A > > > > > > >	< A > < 4 > < 0.22 > < 1 >	> A > > > > > > >	< A > < 4 > < 0.22 > < 1 >	> A > > > > > > >	< A > < 4 > < 0.22 > < 1 >	> A > > > > > > >	A 4		
PM Peak Hour	Sunningdale Road & Hyde Park Road	TWSC	LOS Delay V/C 95th	< D > < 28 > < 0.23 > < 1 >	> D 28 > > > > > > >	< F > < 203 > < 1.28 > < 15 >	> F 203 > > > > > > >	< A > < 8 > < 0.01 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 9 > < 0.02 > < 0 >	> A > > > > > > >	< A > < 9 > < 0.02 > < 0 >	> A > > > > > > >	< A > < 9 > < 0.02 > < 0 >	> A > > > > > > >	< A > < 9 > < 0.02 > < 0 >	> A > > > > > > >	A 0		
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.14 > < 1 >	> A 3 > > > > > > >	< A > < 4 > < 0.46 > < 1 >	> A > > > > > > >	< A > < 5 > < 0.29 > < 1 >	> A > > > > > > >	< A > < 7 > < 0.37 > < 1 >	> A > > > > > > >	< A > < 7 > < 0.37 > < 1 >	> A > > > > > > >	< A > < 7 > < 0.37 > < 1 >	> A > > > > > > >	< A > < 7 > < 0.37 > < 1 >	> A > > > > > > >	A 4		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

95th - 95th Percentile Queue Length

RBT - Roundabout

TWSC - Two-Way Stop Control

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



## 3 Development Concept

### 3.1 Development Description

The subject lands (Mount Pleasant Subdivision) are located in the northeast corner of Sunningdale Road and Hyde Park Road. The proposed subdivision plan consists of 153 single-family units, 221 townhouse units and 298 apartment units.

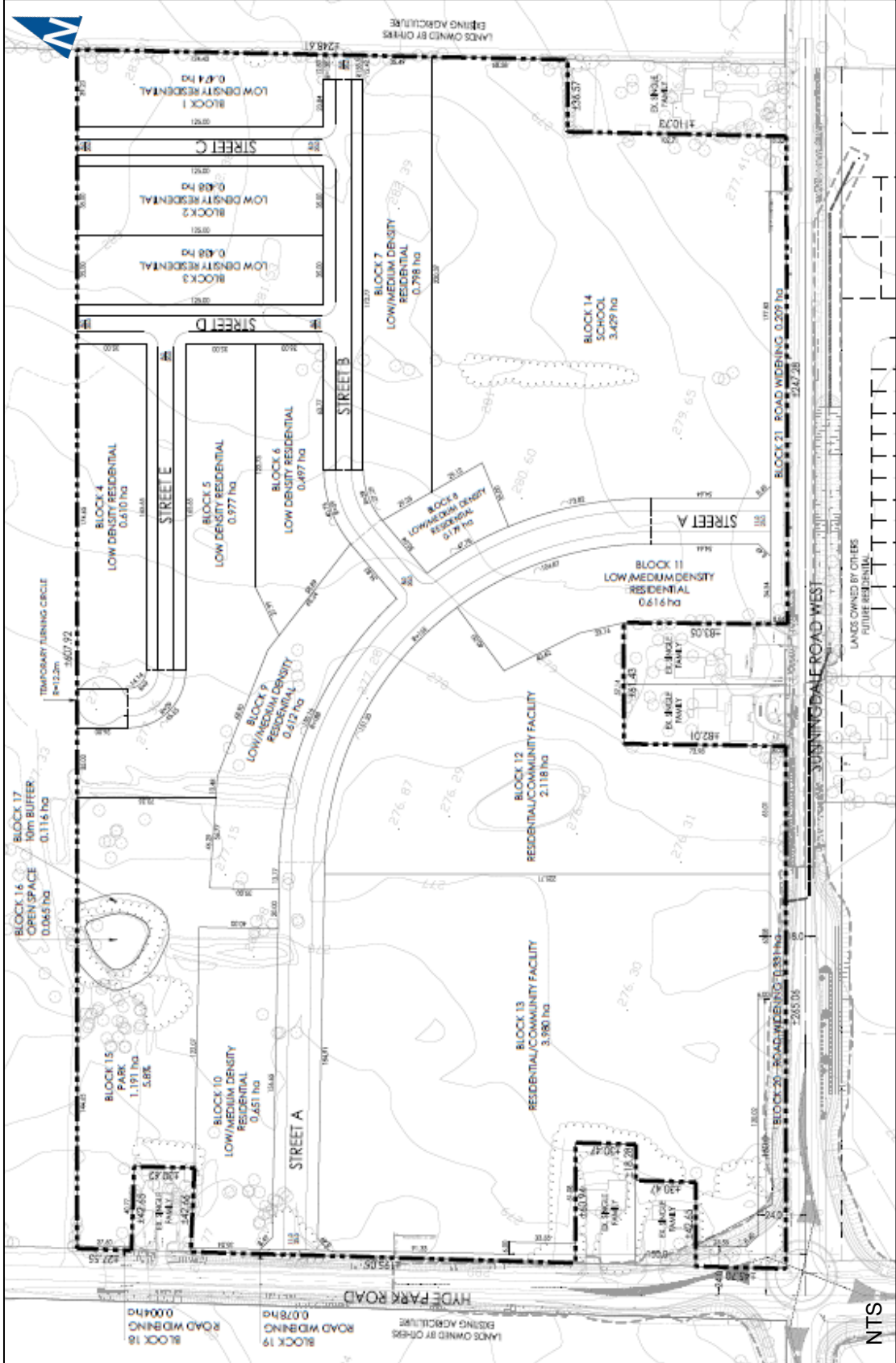
One of the subdivision blocks (Block 14) is anticipated to include either an elementary school with 800 students or 137 townhouse units. For the purpose of this report, 137 townhouse units have been conservatively assumed for traffic impact assessment.

The development is anticipated to be completed by 2026.

Vehicular access is proposed via two full-moves access points, one each on Sunningdale Road and on Hyde Park Road.

**Figure 3.1** illustrates the draft plan of subdivision.





# Draft Plan of Subdivision

Figure 3.1

### 3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual<sup>3</sup> provides rates and equations used to estimate the peak hour traffic volumes generated by the Land Use Codes (LUC) of this development:

- ▶ LUC 210 (Single-Family Detached Housing);
- ▶ LUC 220 (Multifamily Housing, Low Rise); and
- ▶ LUC 221 (Multifamily Housing, Mid Rise).

**Table 3.1** summarizes the forecast number of net new trips generated by the proposed development.

**TABLE 3.1: TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	153	Eq	28	85	113	Eq	96	57	153
LUC 220 - Multifamily Housing (Low-Rise)	221	Eq	23	78	101	Eq	75	45	120
LUC 221 - Multifamily Housing (Mid-Rise)	298	Eq	26	74	100	Eq	77	49	126
<b>Total Trip Generation</b>			<b>77</b>	<b>237</b>	<b>314</b>		<b>248</b>	<b>151</b>	<b>399</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$

LUC 220 - AM:  $\text{Ln}(T) = 0.95\text{Ln}(X) - 0.51$  | PM:  $\text{Ln}(T) = 0.89\text{Ln}(X) - 0.02$

LUC 221 - AM:  $\text{Ln}(T) = 0.98\text{Ln}(X) - 0.98$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) - 0.63$

### 3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing travel patterns along Sunningdale Road and within the study area. **Table 3.2** displays the breakdown of trip distributions used in this study.

**TABLE 3.2: ESTIMATED TRIP DISTRIBUTION**

Origin/Destination	Percentage
North via Hyde Park Rd	5%
North via Wonderland Rd	5%
South via Hyde Park Rd	35%
South via Wonderland Rd	20%
East via Sunningdale Rd	30%
West via Sunningdale Rd	5%
<b>Total</b>	<b>100%</b>

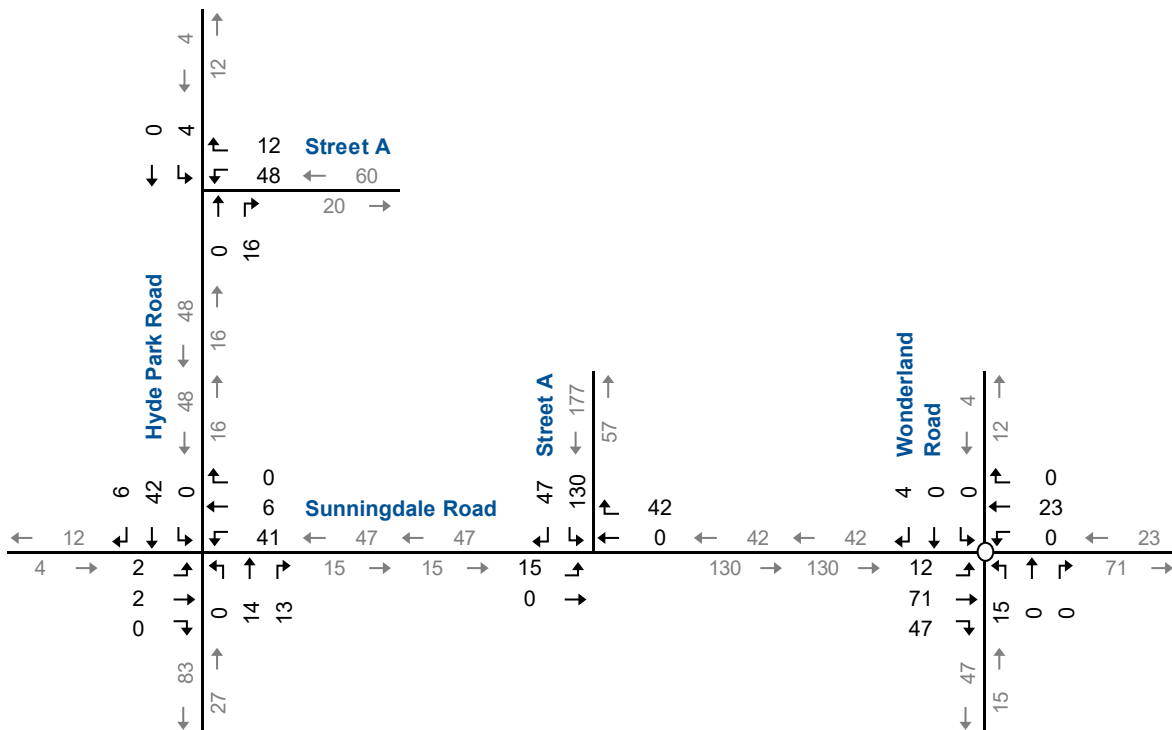
**Figure 3.2** illustrates the site-generated traffic volumes for the AM and PM peak hours.

<sup>3</sup> Institute of Transportation Engineers Trip Generation Manual 10<sup>th</sup> Edition, 2017.

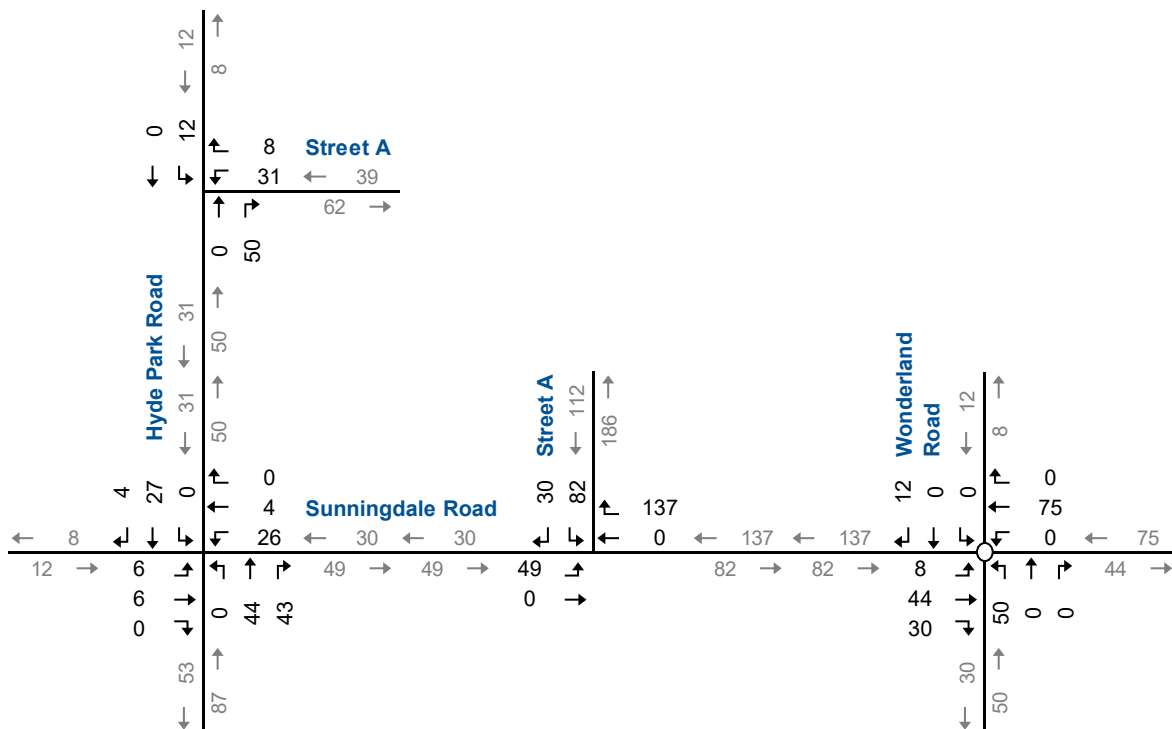




**AM Peak Hour**



**PM Peak Hour**



NTS



**Site Generated Traffic Volumes**

## 4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes, and the analyses for the 2026 and 2031 horizons, as noted below:

- ▶ 2026 – Background Traffic Conditions and Total Traffic Conditions including the full development of the Mount Pleasant Subdivision;
- ▶ 2031 (a) – Total Traffic Conditions five years after the full development of the Mount Pleasant Subdivision; and
- ▶ 2031 (b) – Total Traffic Conditions including the full development of the Mount Pleasant Subdivision and the potential of full development of the Northwest Area lands.

Background road traffic volumes for the 2026 and 2031 horizon years have been projected based on a growth rate of 2% applied to the existing roadway traffic volumes.

### 4.1 Network Improvements

The existing posted speed limits on Sunningdale Road and Hyde Park Road are 80 km/h and 90 km/h respectively. It is expected that with the introduction of the subject lands and Northwest Planning Area, the speed limit on Sunningdale Road just west of Wonderland Road (60 km/h) will be extended west and the speed limit on Hyde Park Road just south of Sunningdale Road (70 km/h) will be extended north. The reduction in speed limits have been assumed for both 2026 and 2031 background and total traffic conditions.

It is also anticipated that a two-lane roundabout will be constructed at the intersection of Hyde Park Road and Sunningdale Road prior to 2031. The same lane configuration as the existing roundabout at Wonderland Road and Sunningdale Road has been assumed.

The future roundabout Hyde Park Road and Sunningdale Road has been assumed for analysis under 2031 traffic conditions.

### 4.2 Mount Pleasant Subdivision

As noted, the impact assessment for the Mount Pleasant subdivision was undertaken for the 2026 (build-out) and 2031 (five-years post build-out) horizon years.



The analysis of the 2026 traffic conditions is also based on the existing study area road system, and the analysis for the 2031 traffic conditions includes the above-noted network improvements.

#### **4.2.1 2026 Background Traffic Conditions**

**Figure 4.1** illustrates the 2026 background traffic volumes, including road traffic. The trips generated by the Northwest Planning Area are not included in the 2026 background traffic volumes.

**Table 4.1** summarizes the results of the 2026 background traffic operations.

The results indicate that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours. The westbound approach at the intersection of Sunningdale Road and Hyde Park Road is forecast to operate with LOS F and v/c ratio greater than 1.00 during the PM peak hour.

**Appendix D** contains the supporting detailed Synchro 10 and Arcady reports.





**TABLE 4.1: 2026 BACKGROUND TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL	
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Sunningdale Road & Hyde Park Road	TWSC	LOS Delay V/C 95th	< < < <	C 16 0.12 0	> > > >	C 16	< < < <	D 25 0.51 3	> > > >	D 25	< < < <	A 8 0.01 0	A 0 0.00 0	> > > >	A 0	< < < <	A 8 0.01 0	> > > >	A 0	
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< < < <	A 3 0.19 1	> > > >	A 3	< < < <	A 3 0.22 1	> > > >	A 3	< < < <	A 5 0.27 1	A 5 > >	> > > >	A 5	< < < <	A 5 0.25 1	> > > >	A 5	A 4
PM Peak Hour	Sunningdale Road & Hyde Park Road	TWSC	LOS Delay V/C 95th	< < < <	E 37 0.32 1	> > > >	E 37	< < < <	F 392 1.72 21	> > > >	F 392	< < < <	A 9 0.01 0	A 0 0.00 0	> > > >	A 0	< < < <	A 9 0.02 0	> > > >	A 0	
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< < < <	A 3 0.16 1	> > > >	A 3	< < < <	A 4 0.51 1	> > > >	A 4	< < < <	A 5 0.32 1	A 5 > >	> > > >	A 5	< < < <	A 8 0.44 1	> > > >	A 8	A 5

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

95th - 95th Percentile Queue Length

RBT - Roundabout

TWSC - Two-Way Stop Control

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



#### 4.2.2 2026 Total Traffic Operations

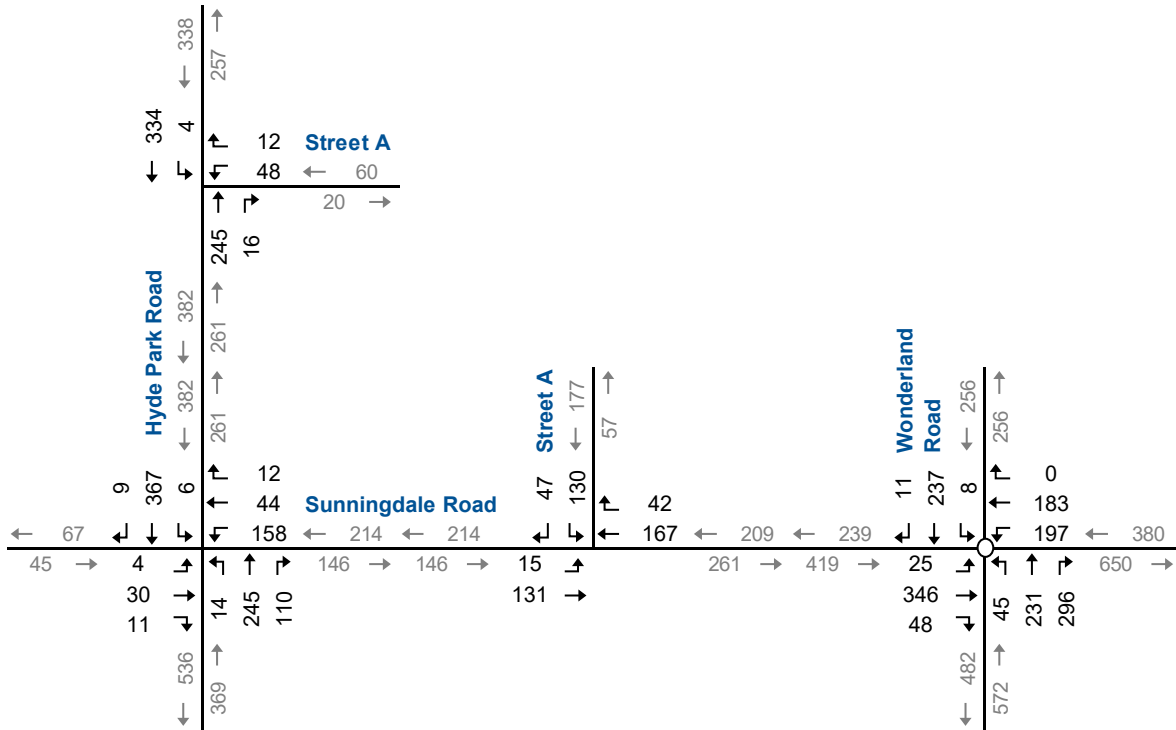
**Figure 4.2** illustrates the 2026 total traffic volumes, including development traffic from the subject subdivision.

**Table 4.2** summarizes the results of the 2026 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours. The westbound approach at the intersection of Sunningdale Road and Hyde Park Road is forecast to operate with LOS F and v/c ratio greater than 1.00 during the PM peak hour.

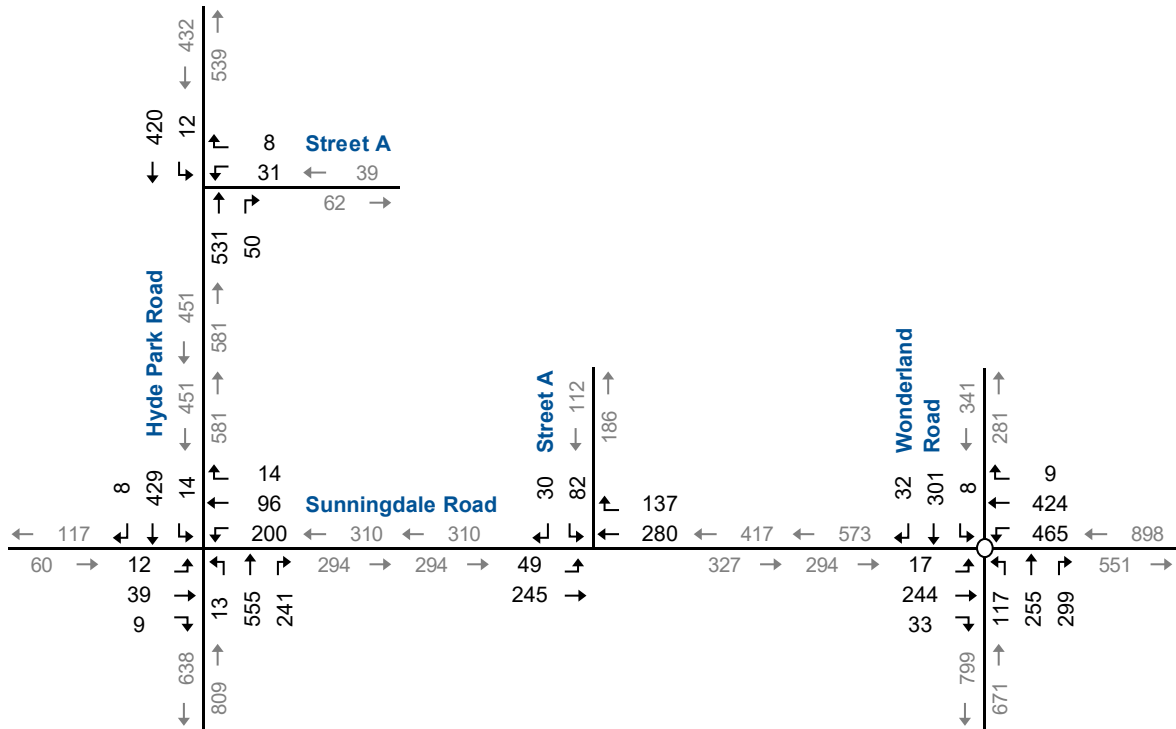
**Appendix E** contains the supporting detailed Synchro 10 and Arcady reports.



**AM Peak Hour**



**PM Peak Hour**



NTS



**2026 Total Traffic Volumes**





### 4.2.3 2031 Total Traffic Conditions

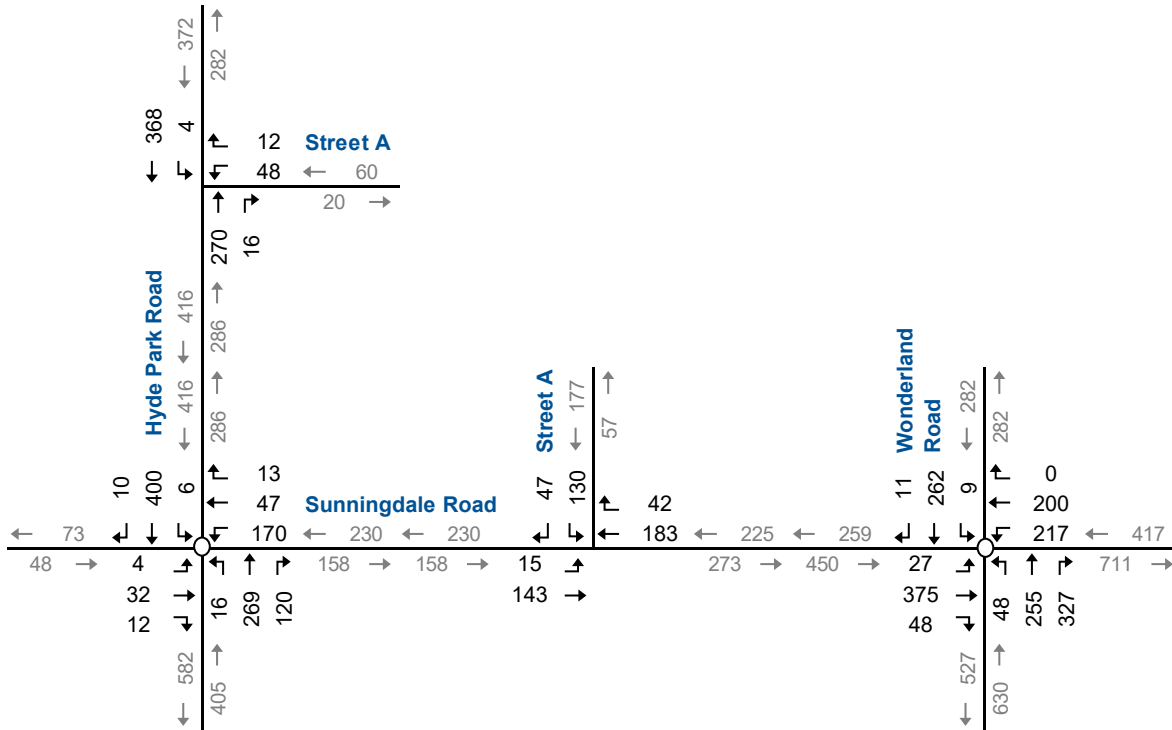
**Figure 4.3** illustrates the 2031 total traffic volumes, including development traffic from the subject subdivision.

**Table 4.3** summarizes the results of the 2031 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours.

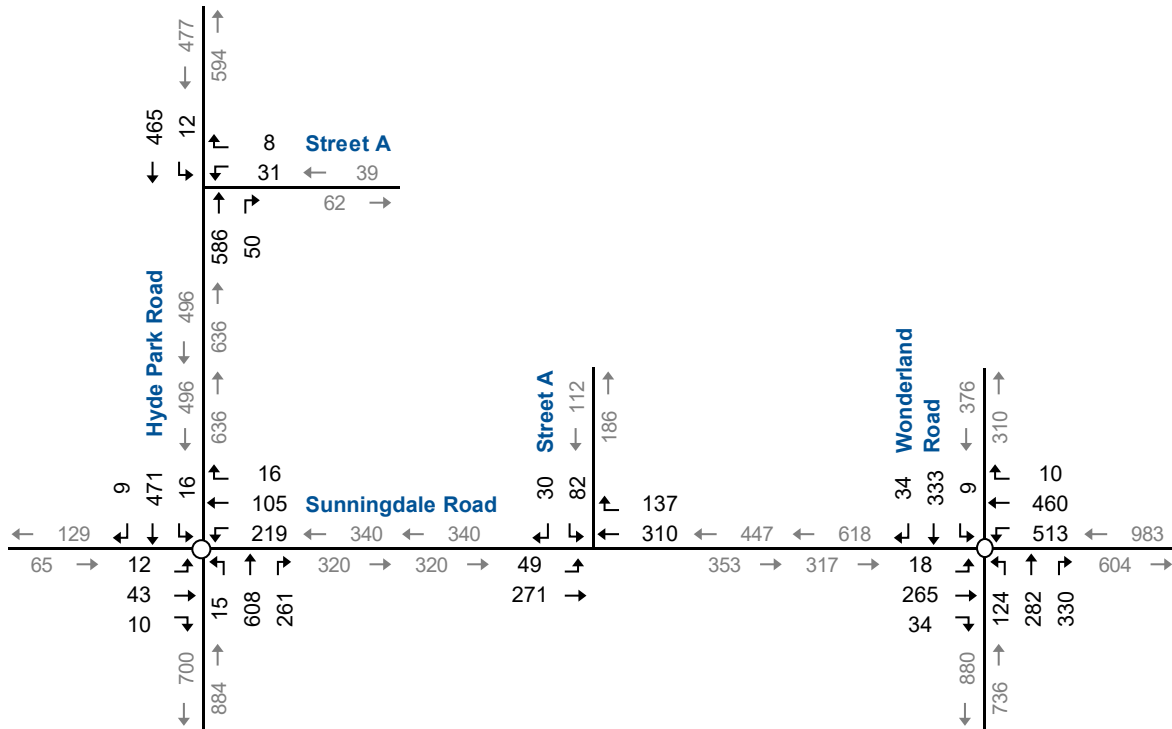
**Appendix F** contains the supporting detailed Synchro 10 and Arcady reports.



**AM Peak Hour**



**PM Peak Hour**



NTS



**2031 Total Traffic Volumes**

**TABLE 4.3: 2031 TOTAL TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Sunningdale Road & Hyde Park Road	RBT	LOS Delay V/C 95th	< A > < 2 > < 0.03 > < 0 >	> A > > 2 > > 0.14 > > 0 >	< A > < 2 > < 0 >	> A > > 2 > > 0 >	< A > < 2 > < 0 >	> A > > 2 > > 0 >	< A > < 5 > < 0.26 > < 0 >	> A > > 5 > > 0 >	< A > < 5 > < 0.38 > < 1 >	> A > > 5 > > 0 >	< A > < 5 > < 0.38 > < 1 >	> A > > 5 > > 0 >	< A > < 5 > < 0.38 > < 1 >	> A > > 5 > > 0 >	A 4		
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.30 > < 1 >	> A > > 3 > > 0.26 > > 1 >	< A > < 3 > < 0.26 > < 1 >	> A > > 3 > > 0.26 > > 1 >	< A > < 3 > < 0.26 > < 1 >	> A > > 3 > > 0.26 > > 1 >	< A > < 6 > < 0.34 > < 1 >	> A > > 6 > > 0.34 > > 1 >	< A > < 5 > < 0.29 > < 1 >	> A > > 5 > > 0.29 > > 1 >	< A > < 5 > < 0.29 > < 1 >	> A > > 5 > > 0.29 > > 1 >	< A > < 5 > < 0.29 > < 1 >	> A > > 5 > > 0.29 > > 1 >	A 4		
	Sunningdale Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 8 > < 0.01 > < 0 >	> A > > 8 > > 0.01 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.30 > < 1 >	> A > > 0 > > 0.30 > > 1 >	< A > < 0 > < 0.30 > < 1 >	> A > > 0 > > 0.30 > > 1 >	< A > < 0 > < 0.30 > < 1 >	> A > > 0 > > 0.30 > > 1 >	< A > < 0 > < 0.30 > < 1 >	> A > > 0 > > 0.30 > > 1 >	B 13		
	Hyde Park Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 15 > < 0.15 > < 1 >	> A > > 15 > > 0.15 > > 1 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	A 0		
PM Peak Hour	Sunningdale Road & Hyde Park Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.05 > < 0 >	> A > > 3 > > 0.24 > > 0 >	< A > < 3 > < 0.24 > < 0 >	> A > > 3 > > 0.24 > > 0 >	< A > < 3 > < 0.24 > < 0 >	> A > > 3 > > 0.24 > > 0 >	< A > < 7 > < 0.58 > < 1 >	> A > > 7 > > 0.58 > > 1 >	< A > < 6 > < 0.47 > < 1 >	> A > > 6 > > 0.47 > > 1 >	< A > < 6 > < 0.47 > < 1 >	> A > > 6 > > 0.47 > > 1 >	< A > < 6 > < 0.47 > < 1 >	> A > > 6 > > 0.47 > > 1 >	A 6		
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< A > < 4 > < 0.25 > < 1 >	> A > > 4 > > 0.64 > > 2 >	< A > < 6 > < 0.64 > < 2 >	> A > > 6 > > 0.64 > > 2 >	< A > < 6 > < 0.64 > < 2 >	> A > > 6 > > 0.64 > > 2 >	< A > < 6 > < 0.42 > < 1 >	> A > > 6 > > 0.42 > > 1 >	< A > < 13 > < 0.60 > < 2 >	> A > > 13 > > 0.60 > > 2 >	< A > < 13 > < 0.60 > < 2 >	> A > > 13 > > 0.60 > > 2 >	< A > < 13 > < 0.60 > < 2 >	> A > > 13 > > 0.60 > > 2 >	B 13		
	Sunningdale Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 9 > < 0.05 > < 0 >	> A > > 9 > > 0.05 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.32 > < 1 >	> A > > 0 > > 0.32 > > 1 >	< A > < 0 > < 0.32 > < 1 >	> A > > 0 > > 0.32 > > 1 >	< A > < 0 > < 0.32 > < 1 >	> A > > 0 > > 0.32 > > 1 >	< A > < 0 > < 0.32 > < 1 >	> A > > 0 > > 0.32 > > 1 >	C 19		
	Hyde Park Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 24 > < 0.18 > < 1 >	> A > > 24 > > 0.18 > > 1 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 9 > < 0.01 > < 0 >	> A > > 9 > > 0.01 > > 0 >	< A > < 9 > < 0.01 > < 0 >	> A > > 9 > > 0.01 > > 0 >	< A > < 9 > < 0.01 > < 0 >	> A > > 9 > > 0.01 > > 0 >	A 0		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

95th - 95th Percentile Queue Length

RBT - Roundabout

TWSC - Two-Way Stop Control

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



## 4.3 Northwest Area

The transportation impact assessment of the potential future development of the Northwest Area lands has been undertaken based on development projections as outlined below.

### 4.3.1 Development Projections

Development projections based on a conceptual development plan for the northwest area indicate a potential yield of 2,531 dwelling units and 3.902 hectares of commercial development. These projections were used to estimate trip generation to assess the overall impacts on the surrounding roads and intersections. Full development of the lands is assumed for 2031.

**Figure 4.4** shows the Northwest Area development plan including the subject lands (Mount Pleasant Subdivision) and the five additional properties.

**Table 4.4** summarizes the development statistics for each of the five properties (west to east).

**TABLE 4.4: NORTHWEST PLANNING AREA DEVELOPMENT STATISTICS**

Subdivision	Units
Property 1	181 single-family units 96 townhouse units 143 apartment units
Property 2	679 single-family units
Property 3	260 single-family units 65 townhouse units
Property 4	243 single-family units 47 townhouse units
Property 5	458 single-family units 359 apartment units 3.902 ha commercial





### 4.3.2 Trip Generation

The trip generation for the Northwest Area properties was estimated using the same methodology as in **Section 3.2**.

**Table 4.5** summarizes the forecast number of net new trips generated by Property 1.

**TABLE 4.5: PROPERTY 1 TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	181	Eq	33	100	133	Eq	113	67	180
LUC 220 - Multifamily Housing (Low-Rise)	96	Eq	11	35	46	Eq	35	22	57
LUC 221 - Multifamily Housing (Mid-Rise)	143	Eq	13	36	49	Eq	38	24	62
<b>Total Trip Generation</b>			<b>57</b>	<b>171</b>	<b>228</b>		<b>186</b>	<b>113</b>	<b>299</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$

LUC 220 - AM:  $\text{Ln}(T) = 0.95\text{Ln}(X) - 0.51$  | PM:  $\text{Ln}(T) = 0.89\text{Ln}(X) - 0.02$

LUC 221 - AM:  $\text{Ln}(T) = 0.98\text{Ln}(X) - 0.98$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) - 0.63$

**Table 4.6** summarizes the forecast number of net new trips generated by Property 2.

**TABLE 4.6: PROPERTY 2 TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	679	Eq	122	365	487	Eq	403	236	639
<b>Total Trip Generation</b>			<b>122</b>	<b>365</b>	<b>487</b>		<b>403</b>	<b>236</b>	<b>639</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$

**Table 4.7** summarizes the forecast number of net new trips generated by Property 3.

**TABLE 4.7: PROPERTY 3 TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	260	Eq	47	142	189	Eq	160	94	254
LUC 220 - Multifamily Housing (Low-Rise)	65	Eq	7	25	32	Eq	24	16	40
<b>Total Trip Generation</b>			<b>54</b>	<b>167</b>	<b>221</b>		<b>184</b>	<b>110</b>	<b>294</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$

LUC 220 - AM:  $\text{Ln}(T) = 0.95\text{Ln}(X) - 0.51$  | PM:  $\text{Ln}(T) = 0.89\text{Ln}(X) - 0.02$

**Table 4.8** summarizes the forecast number of net new trips generated by Property 4.



**TABLE 4.8: PROPERTY 4 TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	243	Eq	44	133	177	Eq	150	88	238
LUC 220 - Multifamily Housing (Low-Rise)	47	Eq	5	18	23	Eq	18	12	30
<b>Total Trip Generation</b>			<b>49</b>	<b>151</b>	<b>200</b>		<b>168</b>	<b>100</b>	<b>268</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$ LUC 220 - AM:  $\text{Ln}(T) = 0.95\text{Ln}(X) - 0.51$  | PM:  $\text{Ln}(T) = 0.89\text{Ln}(X) - 0.02$ 

**Table 4.9** summarizes the forecast number of net new trips generated by Property 5.

**TABLE 4.9: PROPERTY 5 TRIP GENERATION**

Land Use	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
LUC 210 - Single-Family Detached Housing	458	Eq	83	247	330	Eq	276	162	438
LUC 221 - Multifamily Housing (Mid-Rise)	359	Eq	31	89	120	Eq	92	59	151
LUC 820 - Shopping Centre	126	0.94	73	45	118	3.81	230	250	480
<b>Total Trip Generation</b>			<b>187</b>	<b>381</b>	<b>568</b>		<b>598</b>	<b>471</b>	<b>1069</b>
<i>LUC 820 Pass-by</i>		0%	0	0	0	34%	82	82	164
<b>Net Trip Generation</b>			<b>187</b>	<b>381</b>	<b>568</b>		<b>516</b>	<b>389</b>	<b>905</b>

LUC 210 - AM:  $T = 0.71(X) + 4.8$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) + 0.20$ LUC 221 - AM:  $\text{Ln}(T) = 0.98\text{Ln}(X) - 0.98$  | PM:  $\text{Ln}(T) = 0.96\text{Ln}(X) - 0.63$ 

### 4.3.3 Trip Distribution and Assignment

The distribution for the three properties on the west side of the Northwest Planning Area follows the same distribution as the subject lands as outlined in **Section 3.3**. It is expected that the majority of trips generated by the properties to the west will use Hyde Park Road to travel south.

**Table 4.10** summarizes the breakdown of trip distributions for the westerly properties.

**TABLE 4.10: TRIP DISTRIBUTION - WESTERLY LANDS**

Origin/Destination	Percentage
North via Hyde Park Rd	5%
North via Wonderland Rd	5%
South via Hyde Park Rd	35%
South via Wonderland Rd	20%
East via Sunningdale Rd	30%
West via Sunningdale Rd	5%
<b>Total</b>	<b>100%</b>

The distribution for the two properties on the east side of the Northwest Planning Area is similar to the distribution in **Table 4.7**. It is expected that the majority of trips generated by the properties to the east will use Wonderland to travel south.



**Table 4.11** summarizes the breakdown of trip distributions for the westerly properties.

**TABLE 4.11: TRIP DISTRIBUTION - EASTERLY LANDS**

Origin/Destination	Percentage
North via Hyde Park Rd	5%
North via Wonderland Rd	5%
South via Hyde Park Rd	20%
South via Wonderland Rd	35%
East via Sunningdale Rd	30%
West via Sunningdale Rd	5%
<b>Total</b>	<b>100%</b>

**Figure 4.5a** and **Figure 4.5b** illustrate the development traffic volumes for Property 1.

**Figure 4.6a** and **Figure 4.6b** illustrate the development traffic volumes for Property 2.

**Figure 4.7a** and **Figure 4.7b** illustrate the development traffic volumes for Property 3.

**Figure 4.8a** and **Figure 4.8b** illustrate the development traffic volumes for Property 4.

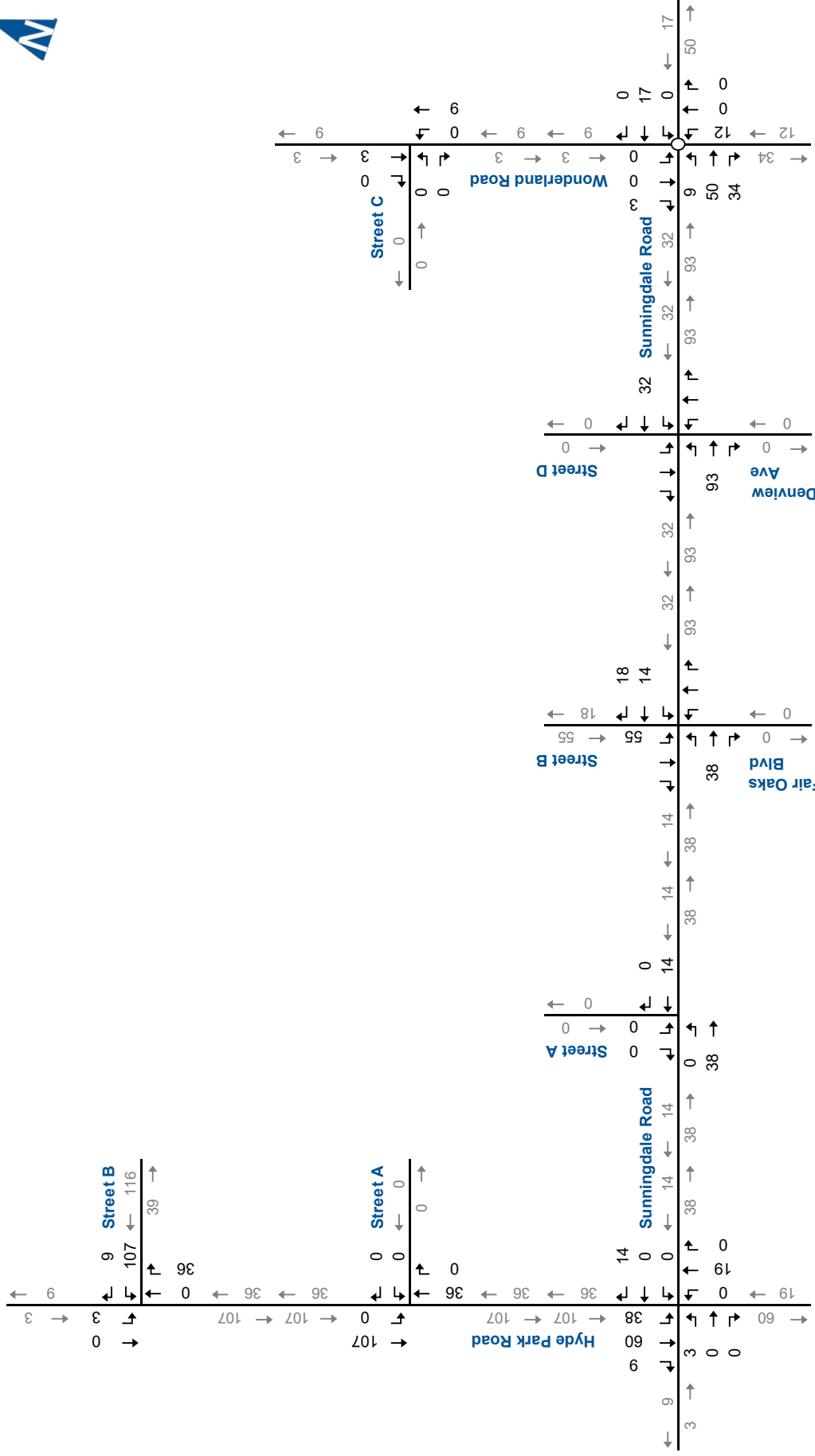
**Figure 4.9a** and **Figure 4.9b** illustrate the development traffic volumes for Property 5.

It is noted that northwest area development traffic volumes are assigned to the main road network and intersections (i.e., Sunningdale Road, Hyde Park Road and Wonderland Road, and the Sunningdale Road/Hyde Park Road and Sunningdale Road/Wonderland Road intersections), through access points identified in **Figure 4.4**, as Street B, Street C, and Street D.

The Sunningdale Road/Hyde Park Road and Sunningdale Road/Wonderland Road intersections are analysed in **Section 4.3.4**, under 2031 total traffic conditions corresponding to the full development of all northwest area lands.





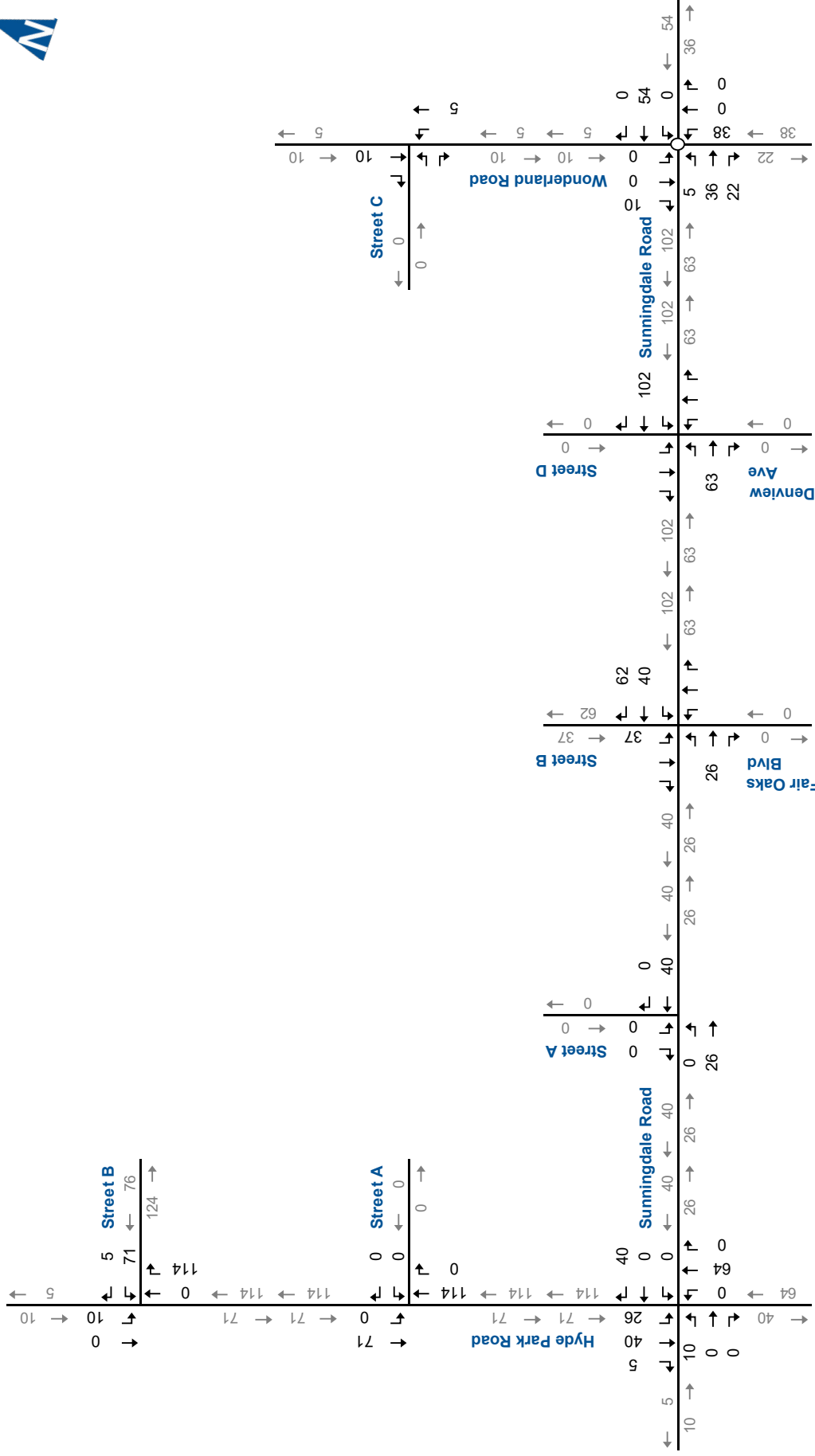


NTS



# Development Traffic Volumes - Property 1 AM Peak Hour

Figure 4.5a

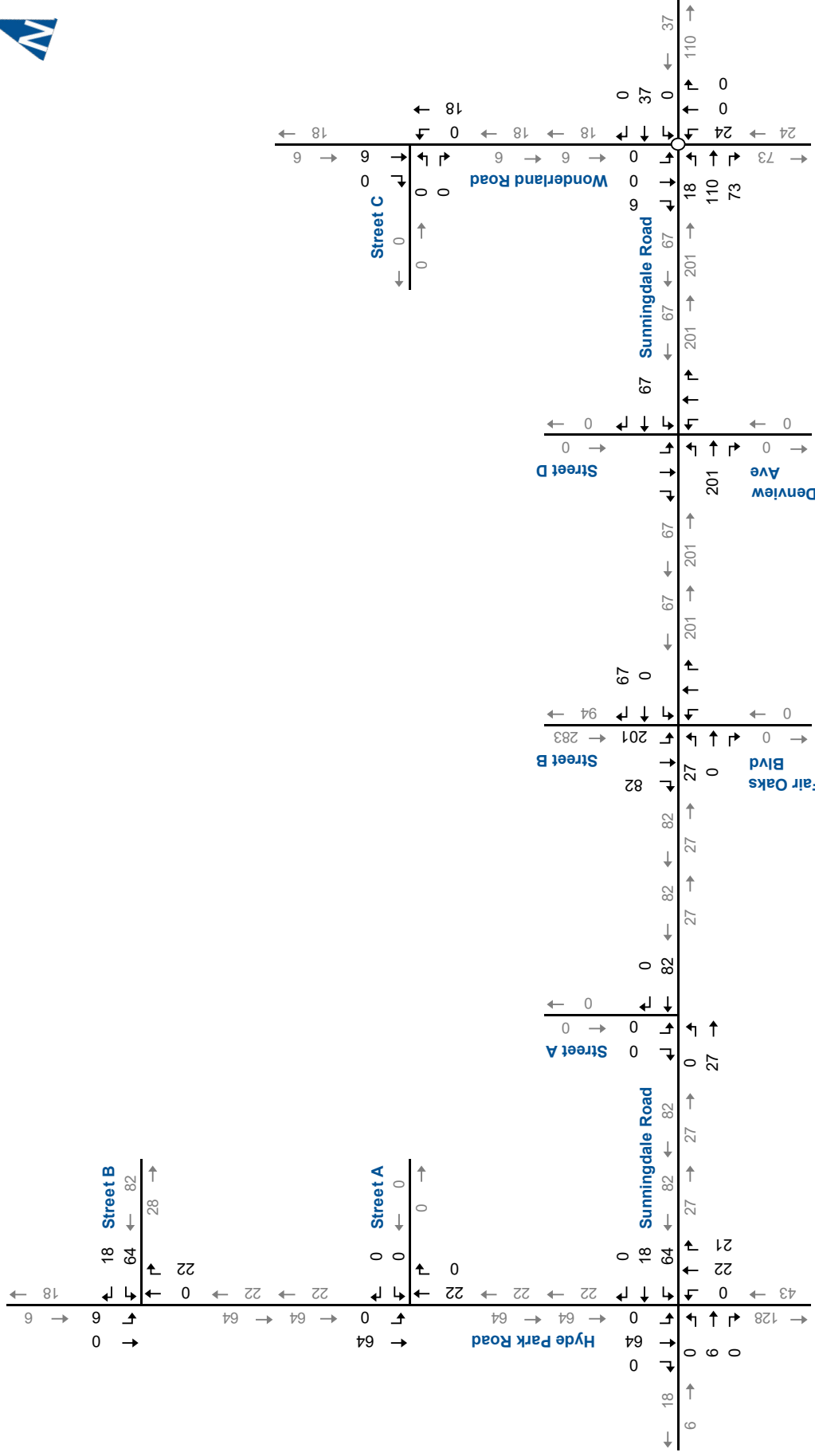


NTS



# Development Traffic Volumes - Property 1 PM Peak Hour

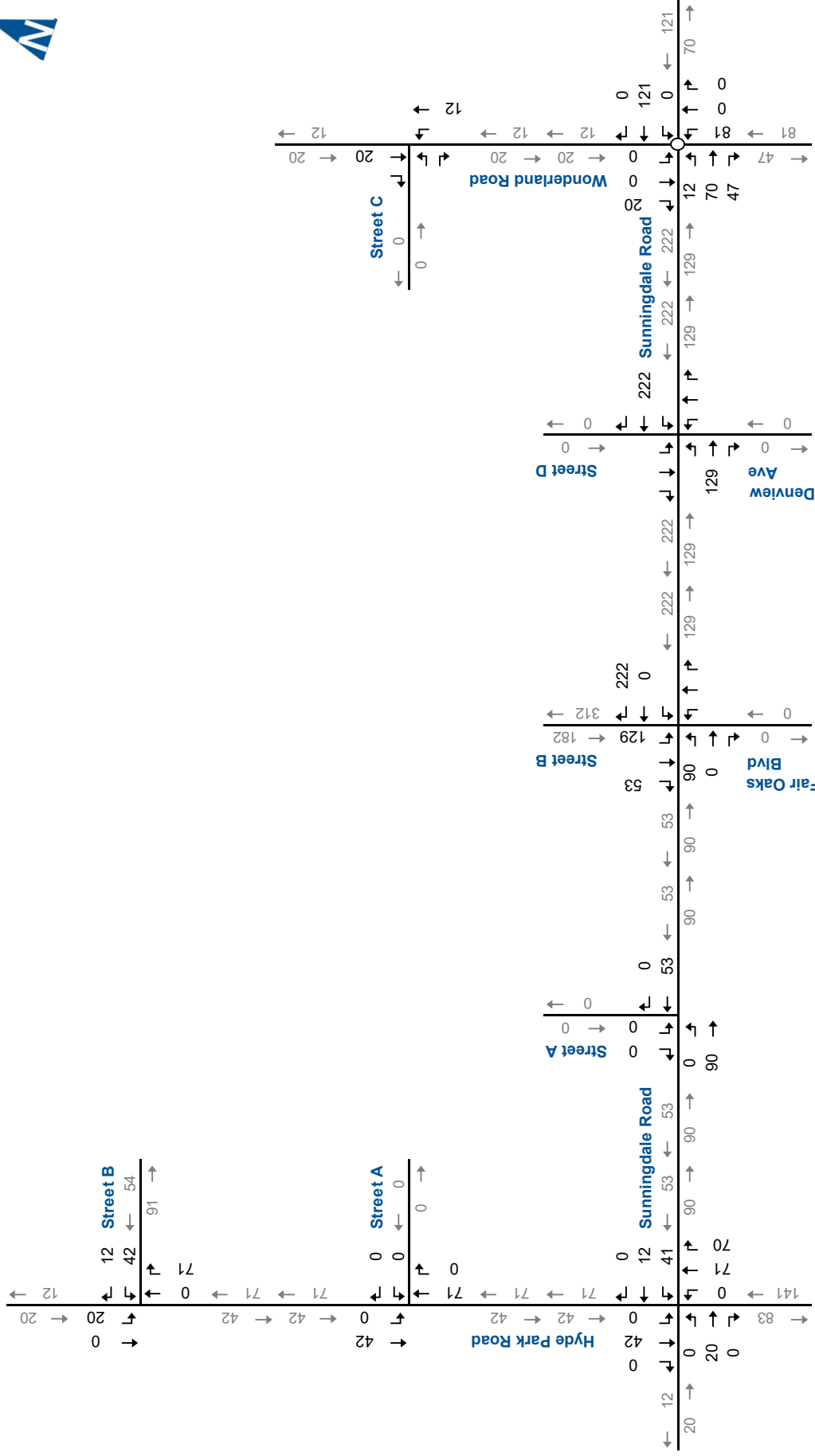
Figure 4.5b



# Development Traffic Volumes - Property 2 AM Peak Hour



Figure 4.6a

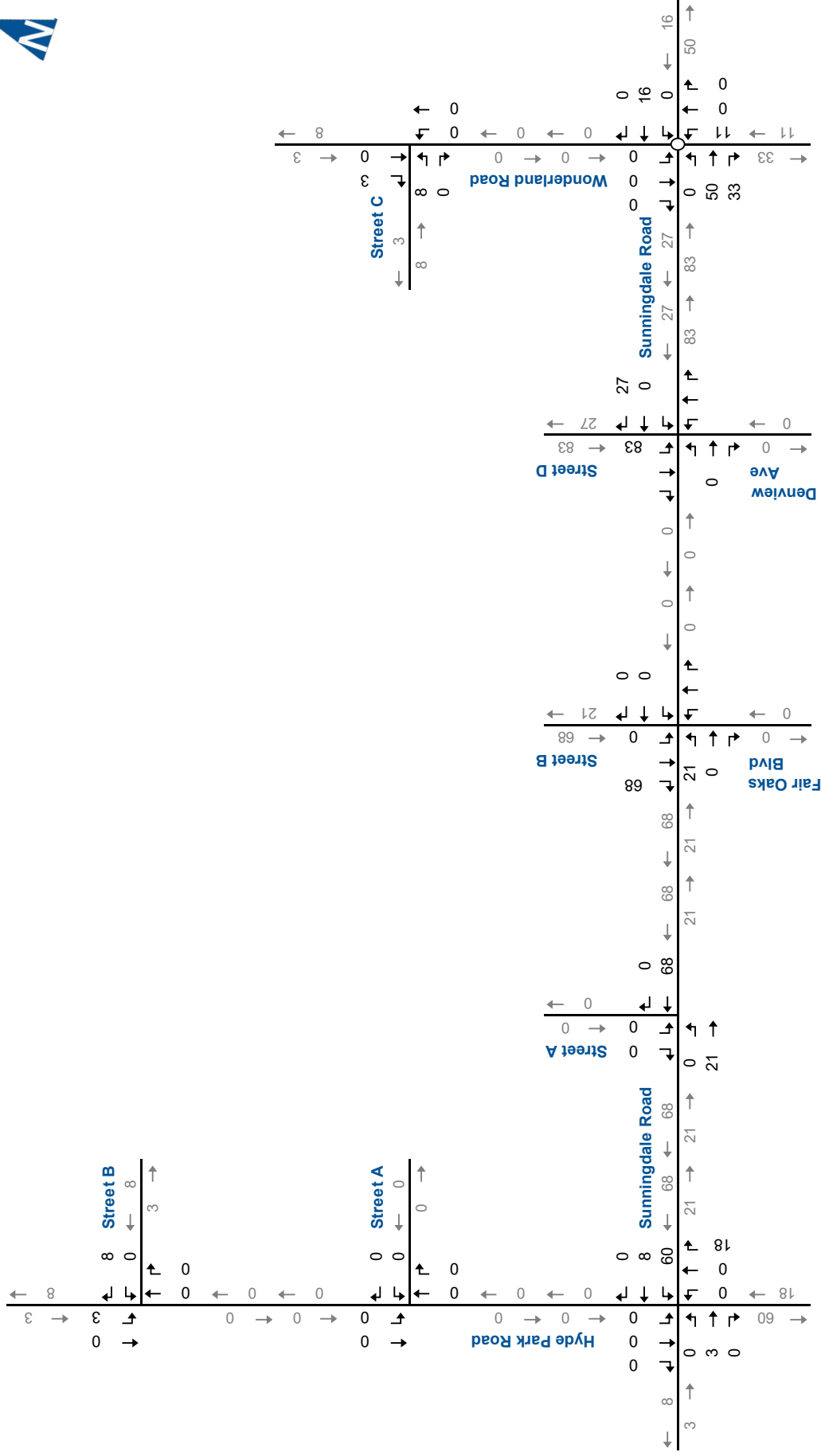


NTS



# Development Traffic Volumes - Property 2 PM Peak Hour

Figure 4.6b

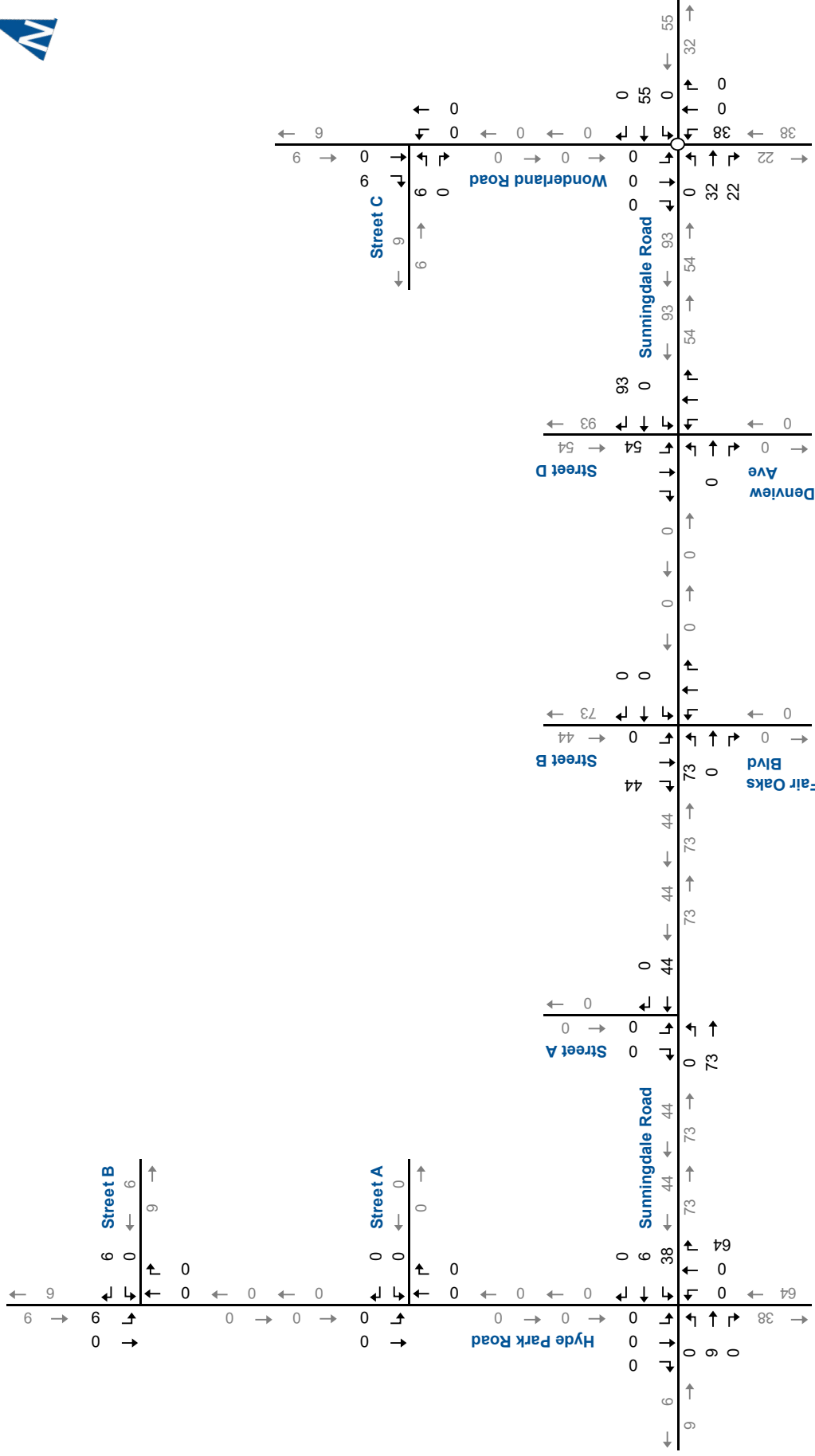


NTS



# Development Traffic Volumes – Property 3 AM Peak Hour

Figure 4.7a

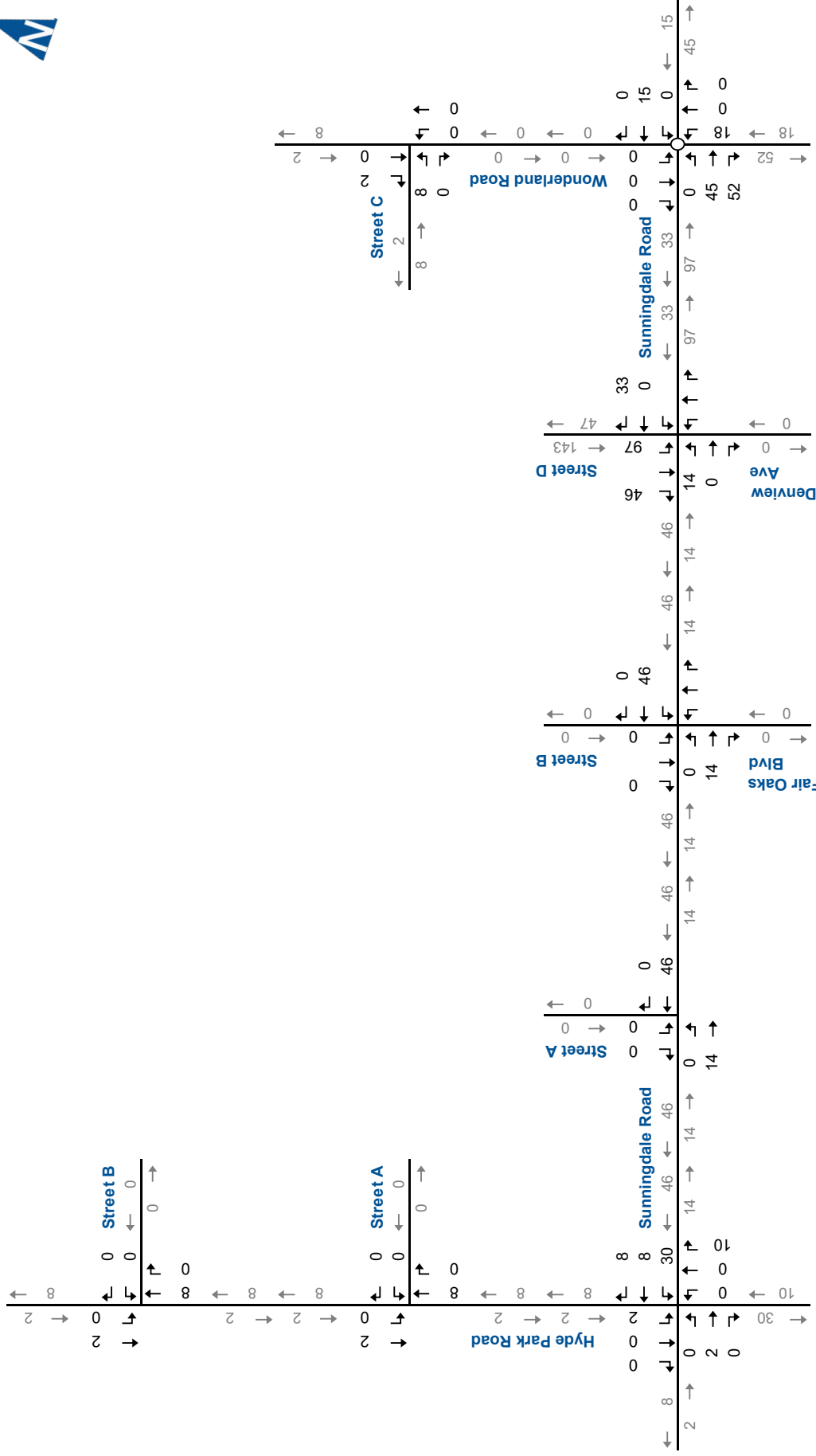


NTS



# Development Traffic Volumes – Property 3 PM Peak Hour

Figure 4.7b

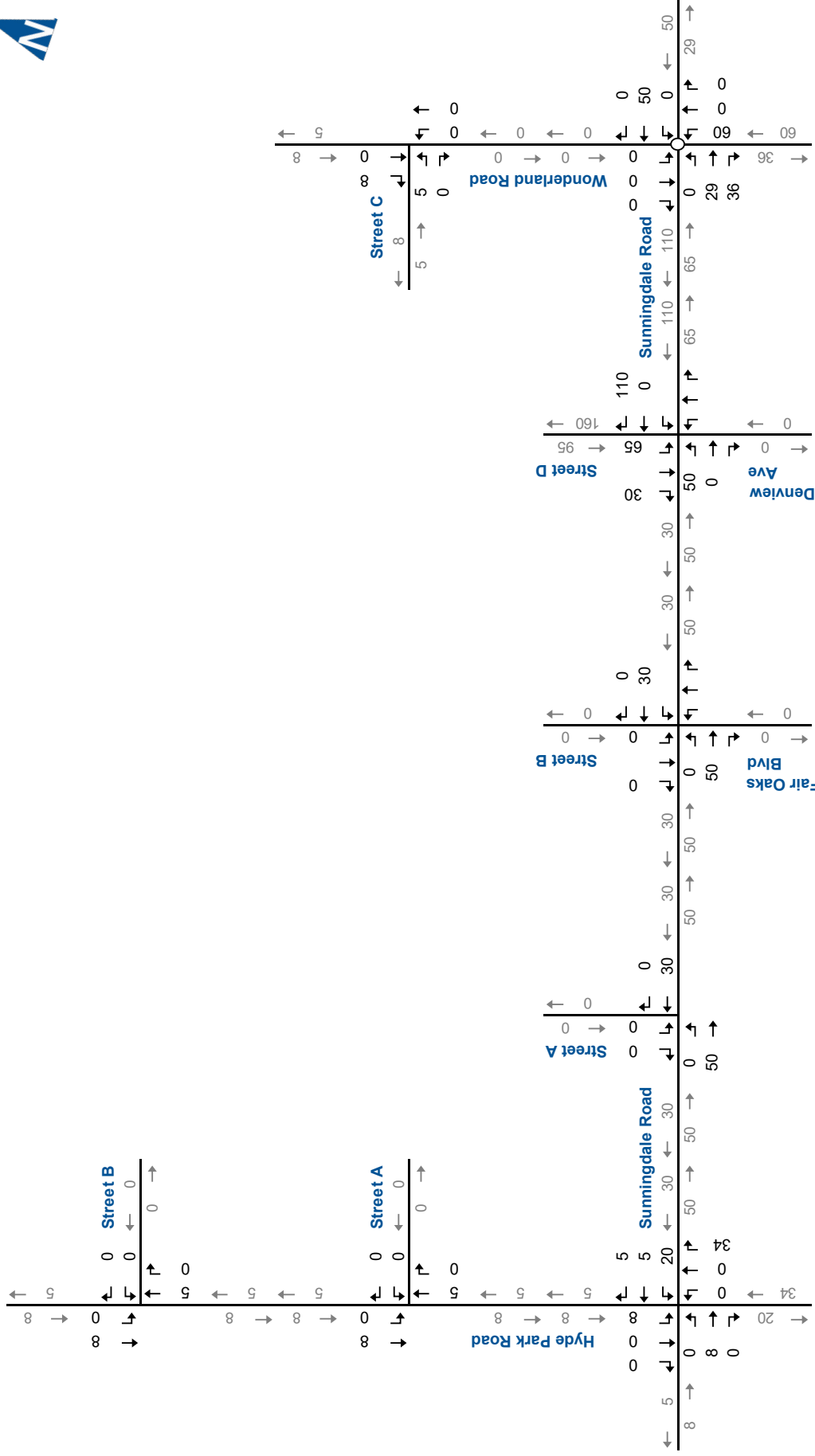


NTS



# Development Traffic Volumes - Property 4 AM Peak Hour

Figure 4.8a



NTS

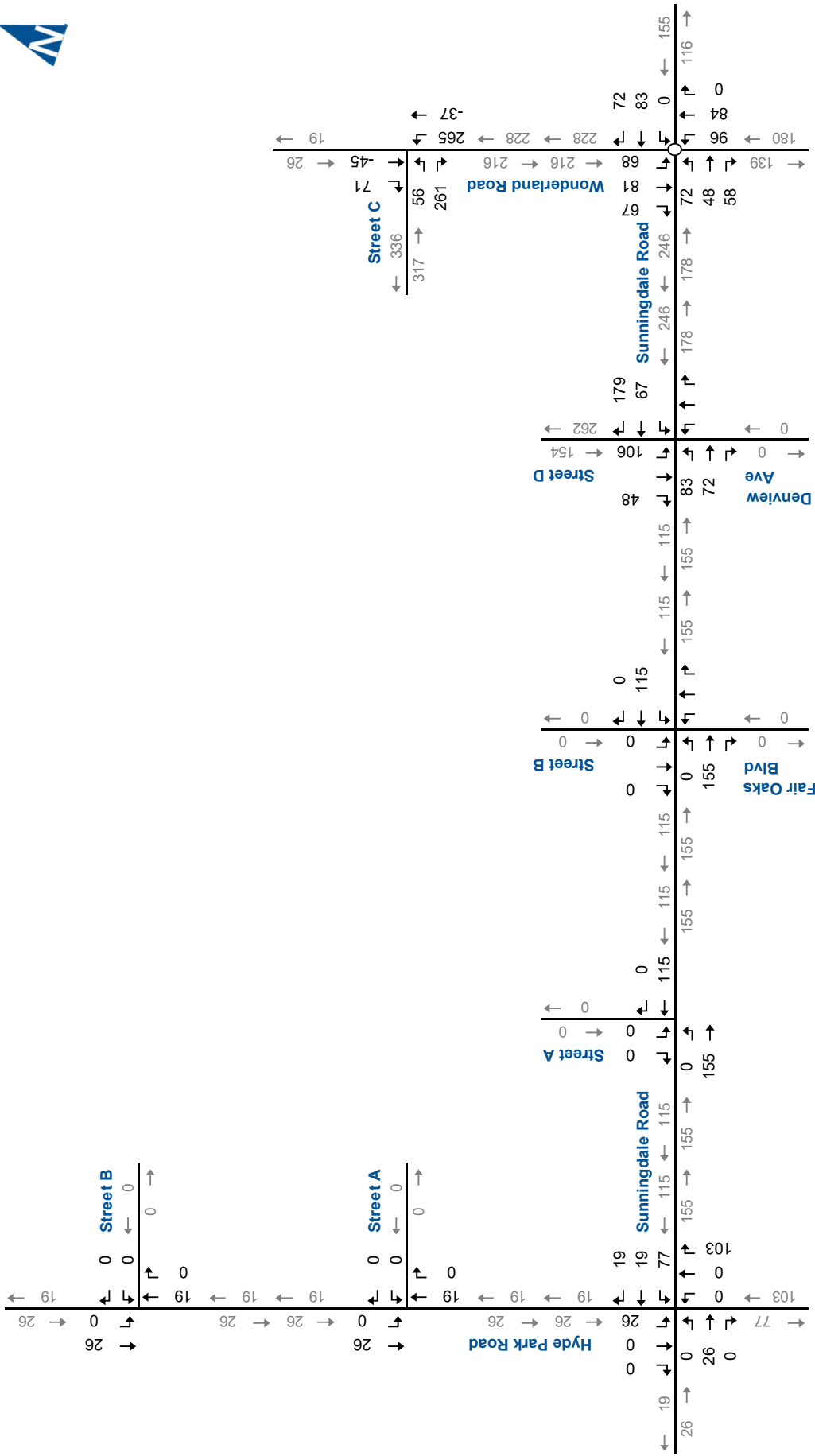


# Development Traffic Volumes - Property 4 PM Peak Hour

Figure 4.8b







NTS



# Development Traffic Volumes – Property 5 PM Peak Hour

Figure 4.9b

#### 4.3.4 2031 Northwest Area Cumulative Impacts

**Figure 4.10** illustrates the 2031 total traffic volumes, which includes:

- ▶ 2031 Background Road Traffic Volumes;
- ▶ Development Traffic from the Subject Subdivision; and
- ▶ Development Traffic from the potential additional five properties in the Northwest Area.

The following roadway improvements were assumed to be in place in 2031:

- ▶ Two-lane Roundabout at Sunningdale Road and Hyde Park Road; and
- ▶ Reduced speed limits on Sunningdale Road and Hyde Park Road.

**Table 4.12** summarizes the results of the 2031 total traffic operations, indicating that the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours.

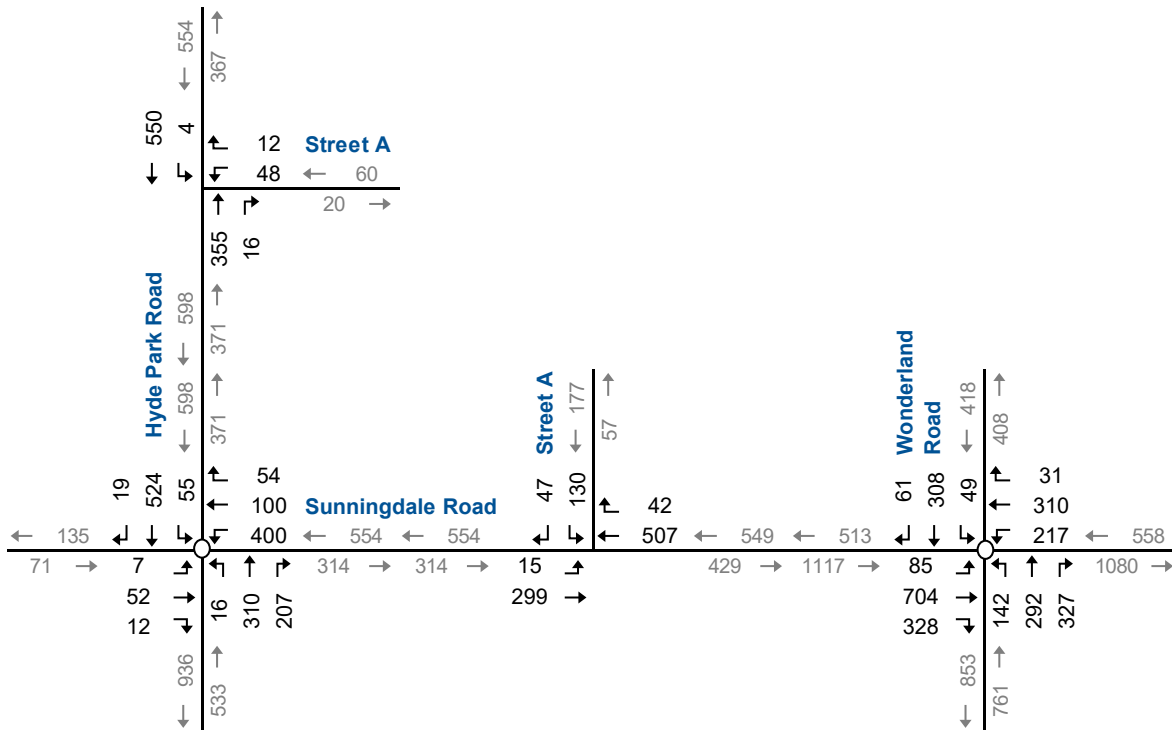
The westbound, northbound and southbound approaches at the intersection of Sunningdale Road and Wonderland Road are forecast to operate with LOS E-F and v/c ratio greater than 0.90 during the PM peak hour.

The southbound shared movement at Street A and Sunningdale Road is forecast to operate with LOS F during the PM peak hour.

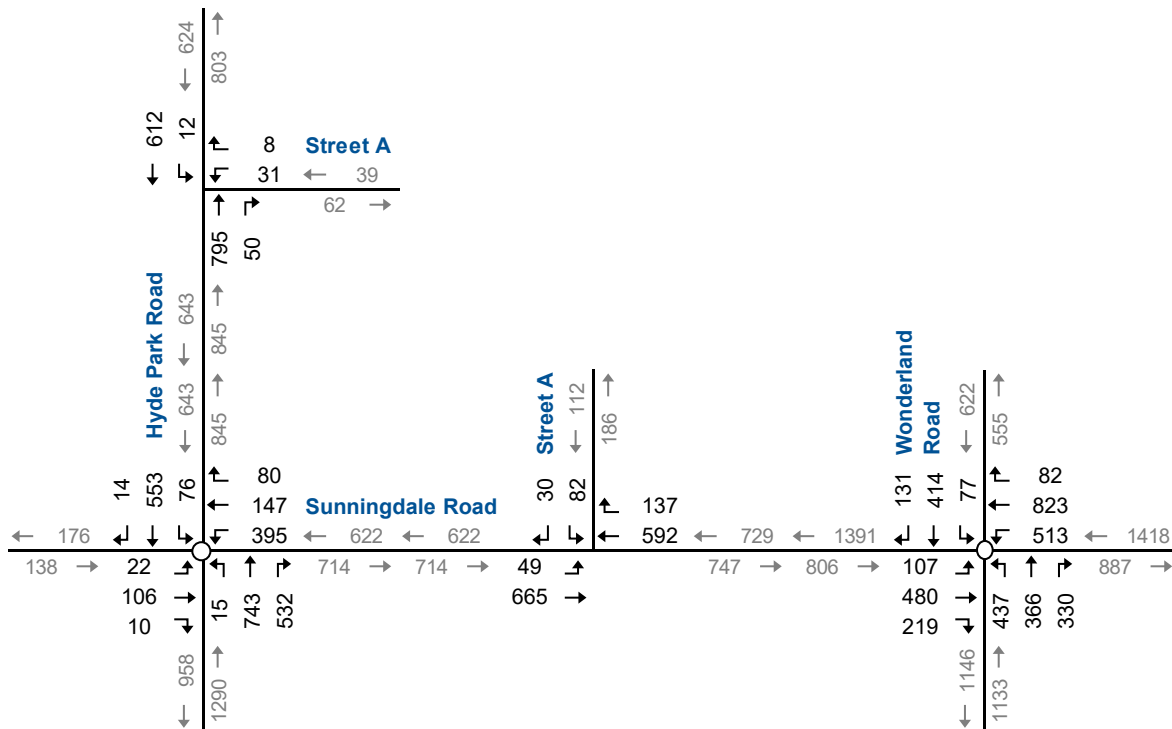
**Appendix G** contains the supporting detailed Synchro 10 and Arcady reports.



**AM Peak Hour**



**PM Peak Hour**



NTS



**2031 Northwest Area Cumulative Traffic Volumes**

**Figure 4.10**

**TABLE 4.12: 2031 TOTAL TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Sunningdale Road & Hyde Park Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.06 > < 1 >	> A > > 3 > > 0.34 > > 1 >	< A > < 3 > < 0.34 > < 1 >	> A > > 3 > > 0.34 > > 1 >	< A > < 5 > < 0.31 > < 1 >	> A > > 5 > > 0.31 > > 1 >	< B > < 10 > < 0.63 > < 1 >	> B > > 10 > > 0.63 > > 1 >	< B > < 10 > < 0.63 > < 1 >	> B > > 10 > > 0.63 > > 1 >	< B > < 10 > < 0.63 > < 1 >	> B > > 10 > > 0.63 > > 1 >	< B > < 10 > < 0.63 > < 1 >	> B > > 10 > > 0.63 > > 1 >	A 6		
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< B > < 10 > < 0.77 > < 8 >	> B > > 10 > > 0.77 > > 8 >	< A > < 4 > < 0.38 > < 1 >	> A > > 4 > > 0.38 > > 1 >	< B > < 14 > < 0.64 > < 3 >	> B > > 14 > > 0.64 > > 3 >	< A > < 8 > < 0.48 > < 1 >	> A > > 8 > > 0.48 > > 1 >	< A > < 8 > < 0.48 > < 1 >	> A > > 8 > > 0.48 > > 1 >	< A > < 8 > < 0.48 > < 1 >	> A > > 8 > > 0.48 > > 1 >	< A > < 8 > < 0.48 > < 1 >	> A > > 8 > > 0.48 > > 1 >	A 10		
	Sunningdale Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 9 > < 0.02 > < 0 >	> A > > 9 > > 0.02 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< D > < 30 > < 0.58 > < 4 >	> D > > 30 > > 0.58 > > 4 >	< D > < 30 > < 0.58 > < 4 >	> D > > 30 > > 0.58 > > 4 >	< D > < 30 > < 0.58 > < 4 >	> D > > 30 > > 0.58 > > 4 >	< D > < 30 > < 0.58 > < 4 >	> D > > 30 > > 0.58 > > 4 >	< D > < 30 > < 0.58 > < 4 >	> D > > 30 > > 0.58 > > 4 >	D 30		
	Hyde Park Road & Street A	TWSC	LOS Delay V/C 95th	< C > < 20 > < 0.21 > < 1 >	> C > > 20 > > 0.21 > > 1 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	< A > < 8 > < 0.00 > < 0 >	> A > > 8 > > 0.00 > > 0 >	A 0		
PM Peak Hour	Sunningdale Road & Hyde Park Road	RBT	LOS Delay V/C 95th	< A > < 3 > < 0.12 > < 1 >	> A > > 3 > > 0.12 > > 1 >	< A > < 5 > < 0.48 > < 1 >	> A > > 5 > > 0.48 > > 1 >	< B > < 14 > < 0.75 > < 8 >	> B > > 14 > > 0.75 > > 8 >	< B > < 12 > < 0.69 > < 4 >	> B > > 12 > > 0.69 > > 4 >	< B > < 12 > < 0.69 > < 4 >	> B > > 12 > > 0.69 > > 4 >	< B > < 12 > < 0.69 > < 4 >	> B > > 12 > > 0.69 > > 4 >	< B > < 12 > < 0.69 > < 4 >	> B > > 12 > > 0.69 > > 4 >	B 11		
	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< A > < 6 > < 0.60 > < 1 >	> A > > 6 > > 0.60 > > 1 >	< F > < 230 > < 1.14 > < 170 >	> F > > 230 > > 1.14 > > 170 >	< F > < 109 > < 1.03 > < 78 >	> F > > 109 > > 1.03 > > 78 >	< F > < 1572 > < 1.72 > < 200 >	> F > > 1572 > > 1.72 > > 200 >	< F > < 1572 > < 1.72 > < 200 >	> F > > 1572 > > 1.72 > > 200 >	< F > < 1572 > < 1.72 > < 200 >	> F > > 1572 > > 1.72 > > 200 >	< F > < 1572 > < 1.72 > < 200 >	> F > > 1572 > > 1.72 > > 200 >	F 360		
	Sunningdale Road & Street A	TWSC	LOS Delay V/C 95th	< A > < 10 > < 0.06 > < 0 >	> A > > 10 > > 0.06 > > 0 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< F > < 102 > < 0.86 > < 6 >	> F > > 102 > > 0.86 > > 6 >	< F > < 102 > < 0.86 > < 6 >	> F > > 102 > > 0.86 > > 6 >	< F > < 102 > < 0.86 > < 6 >	> F > > 102 > > 0.86 > > 6 >	< F > < 102 > < 0.86 > < 6 >	> F > > 102 > > 0.86 > > 6 >	< F > < 102 > < 0.86 > < 6 >	> F > > 102 > > 0.86 > > 6 >	F 102		
	Hyde Park Road & Street A	TWSC	LOS Delay V/C 95th	< E > < 43 > < 0.31 > < 1 >	> E > > 43 > > 0.31 > > 1 >	< A > < 0 > < 0.00 > < 0 >	> A > > 0 > > 0.00 > > 0 >	< A > < 10 > < 0.02 > < 0 >	> A > > 10 > > 0.02 > > 0 >	< A > < 10 > < 0.02 > < 0 >	> A > > 10 > > 0.02 > > 0 >	< A > < 10 > < 0.02 > < 0 >	> A > > 10 > > 0.02 > > 0 >	< A > < 10 > < 0.02 > < 0 >	> A > > 10 > > 0.02 > > 0 >	< A > < 10 > < 0.02 > < 0 >	> A > > 10 > > 0.02 > > 0 >	A 0		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

95th - 95th Percentile Queue Length

RBT - Roundabout

TWSC - Two-Way Stop Control

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane



## 5 Remedial Measures

### 5.1 Left-Turn Lanes

The Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads<sup>4</sup> provides guidance on the assessment and/or need for auxiliary left-turn lanes.

Warrants have been calculated for eastbound left-turns at Sunningdale Road and Street A and southbound left-turns at Hyde Park Road and Street A. The warrant was calculated using the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 70 km/h on Sunningdale Road and 80 km/h on Hyde Park Road (10 kilometres per hour over the posted speed limit). **Table 5.1** summarizes the left-turn lanes warranted.

**TABLE 5.1: LEFT-TURN LANE WARRANT SUMMARY**

Intersection	Analysis Period	Storage	
		2026 & 2031 Mount Pleasant Subdivision	2031 Northwest Area
Sunningdale Road and Street A	AM	-	-
	PM	15m	25m
Hyde Park Road and Street A	AM	-	15m
	PM	15m	25m

**Appendix H** contains the warrant nomographs.

### 5.2 Wonderland Road and Sunningdale Road Improvements

As outlined in **Section 4**, the westbound, northbound and southbound shared movements at the intersection of Wonderland Road and Sunningdale Road are forecast to operate with poor levels of service during the PM peak hour under 2031 background and total traffic conditions.

The existing roundabout at Wonderland Road and Sunningdale Road has the flexibility to be converted to a two-lane roundabout with pavement marking changes and the widening of the north leg.

**Table 5.2** summarizes the results of the 2031 total traffic operations with the updated roundabout configuration. The westbound shared

<sup>4</sup> MTO Design Supplement to the TAC Geometric Design Guide for Canadian Roads, 2017.



movement is forecast to operate with poor levels of service during the PM peak hour. As this movement is considered critical under background traffic conditions, it is recommended that further improvements be considered in the future Secondary Plan for the northwest area.

**Appendix I** contains the supporting detailed Arcady reports.



**TABLE 5.2: 2031 TOTAL TRAFFIC OPERATIONS - IMPROVEMENTS**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< < < <	B 10 0.77 8	> > > >	B 10	< < < <	A 4 0.38 1	> > > >	A 4	< < < <	A 7 0.60 1	> > > >	A 7	< < < <	A 4 0.30 1	> > > >	A 4 A 7	
PM Peak Hour	Sunningdale Road & Wonderland Road	RBT	LOS Delay V/C 95th	< < < <	A 8 0.67 2	> > > >	A 8	< < < <	F 245 1.16 183	> > > >	F 245	< < < <	B 13 0.82 13	> > > >	B 13	< < < <	C 22 0.81 13	> > > >	C 22 F 96	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

95th - 95th Percentile Queue Length

RBT - Roundabout

TWSC - Two-Way Stop Control

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane





## 6 Transportation Demand Management

Transportation Demand Management (TDM) refers to ways of making the capacity of roads more efficient by reducing vehicle demands. TDM approaches consider how people's choices of travel mode are affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience, and availability of alternative modes of travel. Various TDM strategies are used to influence those factors so that the alternatives are more competitive with driving alone and potentially reduce reliance on motor vehicles.

TDM strategies at a development can be divided into two basic categories.

- ▶ **Pre-occupancy:** measures that need to be implemented while a development is being designed and built, and
- ▶ **Post-occupancy:** measures that can be implemented once the development is occupied.

The pre-occupancy actions are critical because they are most likely to determine how attractive, convenient, and safe alternative travel will be once the site is occupied. Before a site is occupied, or during a remodel, it can be designed to be convenient and safe for pedestrians and cyclists, and vehicle parking can be provided to meet but not exceed demand.

After the development is built, incentives can be offered, but those incentives will not work as well if the site and its surroundings are oriented to cars.

### 6.1 Walking

The pedestrian accessibility of a development is essential in helping to ensure that those that can walk, have access to accessible pedestrian connections. Proper pedestrian connections from the surrounding community to the site should be available to ensure safety and to enhance the experience of those that choose to walk. The subdivision plan indicates that sidewalks are proposed on both sides of all internal roadways.

### 6.2 Cycling

The City's Zoning By-law<sup>5</sup> requires 0.75 long-term bicycle parking spaces per residential unit. It is expected that each single-family and

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<sup>5</sup> City of London Zoning By-Law Z.-1



townhouse dwelling unit will be able to accommodate the bicycle parking. Apartment buildings are expected to provide the required bicycle parking in a secured location within the building.

As mentioned in **Section 2.1**, bike lanes are provided on Wonderland Road surrounding the Wonderland Road and Sunningdale Road roundabout and south of Sunningdale Road connecting to the bike lanes along Fanshawe Park Road West.

### 6.3 Transit

There is currently no transit service in the surrounding area. Nearby transit routes (between 2 and 4 kilometres from the subject site) include Route 9, 19 and 31 which operate along Fanshawe Park Road West, south of the subject site, and Route 34 operates along Sunningdale Road at Richmond Street, east of the subject site.

It is expected that existing transit routes will be extended to service future developments in the northwest area.



## 7 Conclusions and Recommendations

### 7.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service. The westbound shared movement at Sunningdale Road and Hyde Park Road is operating with poor levels of service during the PM peak hour.
- ▶ **Development Trip Generation:** The development is forecast to generate 314 and 399 trips during the AM and PM peak hours, respectively.
- ▶ **2026 Background Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service. As under existing traffic conditions, the westbound shared movement at Sunningdale Road and Hyde Park Road is forecast to operate with poor levels of service during the PM peak hour.
- ▶ **2026 Total Traffic Conditions:** The study area intersections are forecast to operate within acceptable levels of service. The westbound shared movement at Sunningdale Road and Hyde Park Road is forecast to operate with poor levels of service during the PM peak hour, as under existing and 2026 background traffic conditions.
- ▶ **2031 Intersection Improvements:** The following intersection improvements are identified over the ten-year (2031) timeframe:
  - Hyde Park Road and Sunningdale Road: A new one-lane roundabout similar to the existing roundabout at Wonderland Road and Sunningdale Road.
  - Wonderland Road and Sunningdale Road: Expansion of the existing roundabout at Wonderland Road and Sunningdale Road to a two-lane roundabout with pavement marking changes and the widening of the north leg.
- ▶ **2031 Total Traffic Conditions including Mount Pleasant Subdivision:** With the above intersection improvements in place, the study area intersections are forecast to operate within acceptable levels of service.
- ▶ **2031 Total Traffic Conditions including all Northwest Area Lands:** The study area intersections are forecast to operate generally within acceptable levels of service. The westbound,



northbound, and southbound approaches at the intersection of Sunningdale Road and Wonderland Road are forecast to operate with poor levels of service during the PM peak hour.

The southbound shared movement at Street A and Sunningdale Road is forecast to operate with poor levels of service during the PM peak hour.

- ▶ **Street A - Access Points:** Left-turn lanes with 25 metres of storage are forecast to be warranted at the Street A connections to Sunningdale Road and Hyde Park Road under 2031 total traffic volumes.
- ▶ **TDM Measures:** The development can accommodate a number of pedestrian, cycling and transit measures to minimize the use of auto modes in the development.
- ▶ **Road System Capacity:** The existing and future study area road system capacity to accommodate development is identified as follows:
  - The existing road system and intersections can accommodate the proposed Mount Pleasant Subdivision. Auxiliary left-turn lanes will be required at the proposed access points.
  - A new two-lane roundabout at Hyde Park Road and Sunningdale Road, and the expansion of the existing roundabout at Wonderland Road and Sunningdale Road, will be required to accommodate the development of all Northwest Area lands.

Road widening is not identified as required for Hyde Park Road, Sunningdale Road and Wonderland Road (north of Sunningdale Road) within the study area limits in the ten-year (2031) timeframe.

## 7.2 Recommendations

Based on the findings and conclusions of this study, it is recommended that the development of the proposed Mount Pleasant Subdivision be considered for approval with the following auxiliary-lanes:

- ▶ A southbound left-turn lane with 25 metres of storage on Hyde Park Road at Street A; and
- ▶ An eastbound left-turn lane with 25 metres of storage on Sunningdale Road at Street A.



# Appendix A

## Pre-Study Consultation





## Maddison Murch

---

**From:** Rajan Philips  
**Sent:** March 1, 2021 8:57 AM  
**To:** Gardiner, Joshua  
**Cc:** Blackwell, Brian; Maddison Murch; Rajan Philips  
**Subject:** FW: (210088) 1521 Sunningdale Rd, London Pre-Study Consultation  
**Attachments:** dwg\_161413708\_20210205\_draft\_plan.pdf; dwg\_161413708\_20210201\_area\_plan.pdf

Hi Josh,

We have been retained by Auden Developments Inc., to complete a Transportation Impact Assessment (TIA) for a residential subdivision at 1521 Sunningdale Road and 2631 Hyde Park Road in London.

- The development is currently proposed to include a mix of 163 single detached and 208 low/medium density housing, mixed-use residential block, and a school.
- Two access points are identified via Street A - on Hyde Park Road and on Sunningdale Road.
- **A preliminary draft plan is attached.**

The subject lands are part of the City's northwest area at the City north limits (Medway Road – County Road 28) and bounded by Hyde Park Road to the west, Wonderland Road to the east, and Sunningdale Road to the south.

The proposed TIA will analyse the traffic impacts of the subject subdivision at 1521 Sunningdale as part of the long-term development of the above-described northwest area.

**A conceptual development plan prepared for the area is attached**, and it is appropriate for a comprehensive transportation impact analysis.

The attached area plan divides the Northwest Area into six development areas, including the subject development. Land uses are proposed for each of the six development areas, including the subject subdivision. The plan includes the following transportation network components:

- An interconnected system of local roads
- Four internal collector roads (Street A, Street B, Street C and Street D) with proposed intersections on the surrounding arterial roads as follows:
  - o Two intersections on Hyde Park Road - at Street A (RIRO) and Street B (Full)
  - o Two intersections on Wonderland Road – RIRO and Street C (Full)
  - o Four intersections on Sunningdale Road – two RIRO (one at Street A), one Full at Street B/Fair Oaks Blvd, and one Full at Street D

We outline below the main parameters and scope of work for the TIA, for the City's review and approval:

- Analysis Periods: Weekday AM and PM peak hours.
- Existing Traffic Conditions: Please let us know if the City has traffic counts available at Sunningdale Road and Wonderland Road and/or Sunningdale Road and Hyde Park Road. These volumes will be increased to 2021 using a growth rate of 2%, **please confirm.**
- Future Traffic Conditions:
  - o One five-year horizon (2026) will be analyzed for the completion of the subject development. This will involve 2026 background traffic and subject development traffic.
  - o A ten year horizon (2031) for the full development of the entire Northwest Plan Area. This will involve 2031 background traffic and the entire northwest area development traffic
  - o Background road growth rate of 2%, **please confirm.**
  - o Other Area development – potentially from south of Sunningdale. **Please confirm.**

- Trip Generation & Distribution: ITE Trip Generation Manual 10<sup>th</sup> Edition and distribution will be based on existing traffic patterns.

- Study Area Intersections:

Northwest Plan Area development projections and road network, including the following future intersections for trip generation & assignment only:

- Street B & Hyde Park Road (Full)
- Street B/Fair Oaks Blvd & Sunningdale Road (Full)
- Street C & Wonderland Road (Full)
- RIRO at Wonderland
- RIRO at Sunningdale
- Street D & Sunningdale Road (Full)

Subject Development Intersections for full analysis:

- Sunningdale Road & Hyde Park Road
- Street A – RIRO on Sunningdale Road
- Street A – RIRO on Hyde Park Road
- Sunningdale Road & Wonderland Road

- Specific to the subject development, the TIA will address:

- A sightline analysis to ensure the proposed access locations can provide desirable decision sight distances as per City standards;
- Internal access from the subdivision to be provided to the remnant parcels to provide for future access;
- Auxiliary left/right turn lanes at the proposed access points on Hyde Park Road and Sunningdale Road; and
- A TDM Plan - appropriate for the development will be prepared in consultation with the owner/client per City's TIA guidelines.

- Background Roadway Improvements: **Please confirm and provide us with the build-out date and lane configuration/construction drawings.**

Please let us know if you have any comments or questions.

Regards,

**Maddison Murch, EIT**

*Transportation Consultant*



**Paradigm Transportation Solutions Limited**

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 519.896.3163 x205

e: [mmurch@ptsl.com](mailto:mmurch@ptsl.com)

w: [www.ptsl.com](http://www.ptsl.com)



# Appendix B

## Existing Traffic Counts







Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 mmurch@ptsl.com

Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 1

### Turning Movement Data

Start Time	Sunningdale Road Eastbound						Sunningdale Road Westbound						Hyde Park Road Northbound						Hyde Park Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	15	0	0	0	15	13	6	1	0	0	20	1	61	9	0	0	71	1	62	1	0	0	64	170
7:45 AM	1	9	3	0	0	13	18	10	2	0	0	30	0	42	17	0	0	59	1	66	1	0	0	68	170
Hourly Total	1	24	3	0	0	28	31	16	3	0	0	50	1	103	26	0	0	130	2	128	2	0	0	132	340
8:00 AM	0	7	2	0	0	9	21	10	0	0	0	31	0	51	16	0	0	67	2	55	1	0	0	58	165
8:15 AM	0	3	2	0	0	5	35	14	2	0	0	51	1	54	18	0	0	73	3	64	1	0	0	68	197
8:30 AM	1	7	1	0	0	9	25	8	2	0	0	35	1	45	30	0	0	76	4	69	1	0	0	74	194
8:45 AM	1	3	2	0	0	6	27	7	0	0	0	34	3	64	27	0	0	94	0	55	1	0	0	56	190
Hourly Total	2	20	7	0	0	29	108	39	4	0	0	151	5	214	91	0	0	310	9	243	4	0	0	256	746
9:00 AM	0	7	1	0	0	8	22	5	0	0	0	27	2	41	27	0	0	70	1	62	0	0	0	63	168
9:15 AM	2	8	3	0	0	13	21	9	1	0	0	31	3	52	18	0	0	73	1	48	1	0	0	50	167
9:30 AM	0	9	4	0	0	13	29	11	3	0	0	43	3	47	16	0	0	66	3	77	0	0	0	80	202
9:45 AM	0	4	3	0	0	7	25	5	1	0	0	31	3	50	12	0	0	65	1	67	1	0	0	69	172
Hourly Total	2	28	11	0	0	41	97	30	5	0	0	132	11	190	73	0	0	274	6	254	2	0	0	262	709
10:00 AM	2	4	1	0	0	7	17	8	0	0	0	25	2	58	29	0	0	89	1	58	1	0	0	60	181
10:15 AM	0	7	1	0	0	8	29	8	6	0	0	43	4	42	26	0	0	72	0	75	1	0	0	76	199
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	11	2	0	0	15	46	16	6	0	0	68	6	100	55	0	0	161	1	133	2	0	0	136	380
12:00 PM	0	4	1	0	0	5	27	10	0	0	0	37	3	59	30	0	0	92	3	54	0	0	0	57	191
12:15 PM	2	2	3	0	0	7	30	8	3	0	0	41	5	74	31	0	0	110	1	64	0	0	0	65	223
12:30 PM	1	6	4	0	0	11	20	9	1	0	0	30	1	66	25	0	0	92	1	60	0	0	0	61	194
12:45 PM	0	4	1	17	0	22	39	10	3	0	1	52	2	69	29	0	0	100	1	58	1	0	0	60	234
Hourly Total	3	16	9	17	0	45	116	37	7	0	1	160	11	268	115	0	0	394	6	236	1	0	0	243	842
1:00 PM	0	2	3	0	0	5	30	4	8	0	0	42	4	68	34	0	0	106	1	65	3	0	0	69	222
1:15 PM	1	3	3	0	0	7	22	6	0	0	0	28	3	72	29	0	0	104	2	41	0	0	0	43	182
1:30 PM	2	6	2	0	0	10	27	10	1	0	0	38	3	66	29	0	0	98	2	62	0	0	0	64	210
1:45 PM	0	7	3	0	0	10	30	12	2	0	0	44	1	57	34	0	0	92	3	59	0	0	0	62	208
Hourly Total	3	18	11	0	0	32	109	32	11	0	0	152	11	263	126	0	0	400	8	227	3	0	0	238	822
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	4	0	0	0	4	27	7	1	0	0	35	1	69	29	0	0	99	3	47	1	0	0	51	189
3:15 PM	2	5	2	0	0	9	31	13	2	0	0	46	0	67	44	0	0	111	1	66	4	0	0	71	237
3:30 PM	0	5	3	0	0	8	31	19	1	0	0	51	6	86	28	0	0	120	4	60	2	0	0	66	245
3:45 PM	1	7	2	0	0	10	41	7	1	0	0	49	5	89	28	0	0	122	0	71	1	0	0	72	253
Hourly Total	3	21	7	0	0	31	130	46	5	0	0	181	12	311	129	0	0	452	8	244	8	0	0	260	924
4:00 PM	1	7	2	0	0	10	28	9	2	0	0	39	3	91	31	0	0	125	2	84	0	0	0	86	260
4:15 PM	0	12	2	0	0	14	42	20	1	0	0	63	5	88	39	0	0	132	3	80	0	0	0	83	292

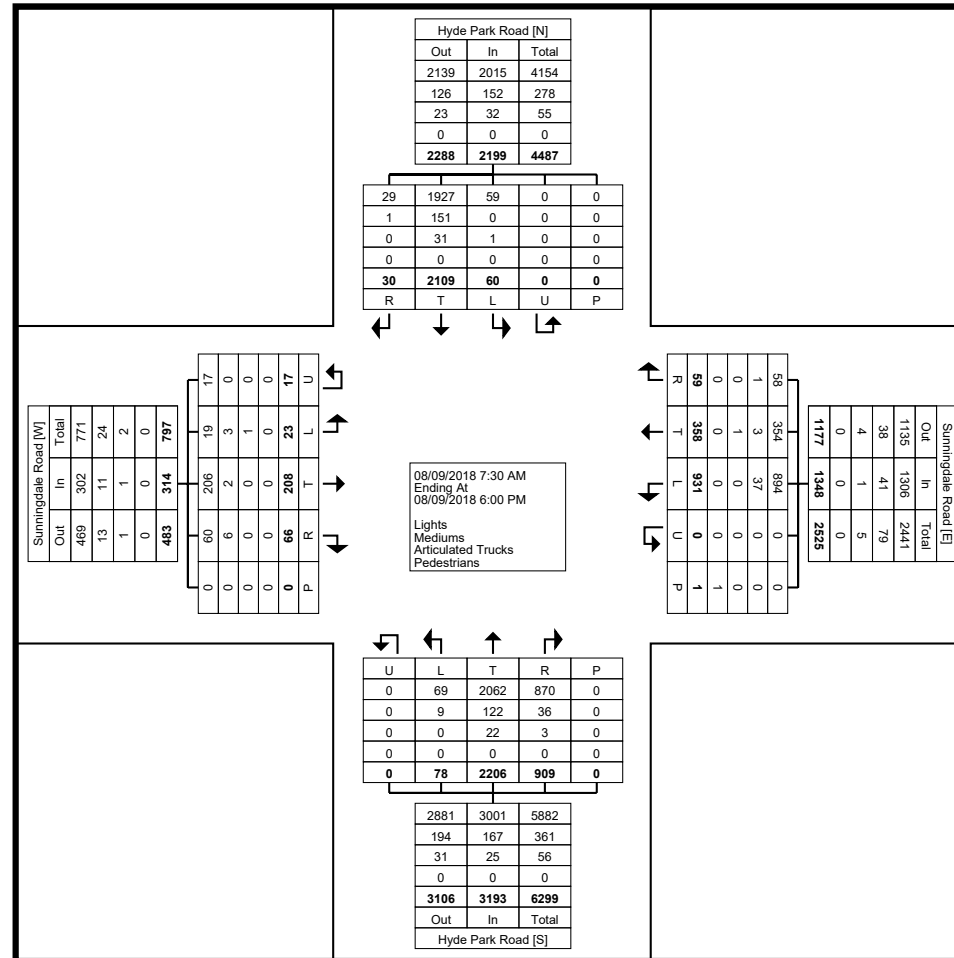




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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519-896-3163 mmurch@pts.com

Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
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Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 4

### Turning Movement Peak Hour Data (9:30 AM)

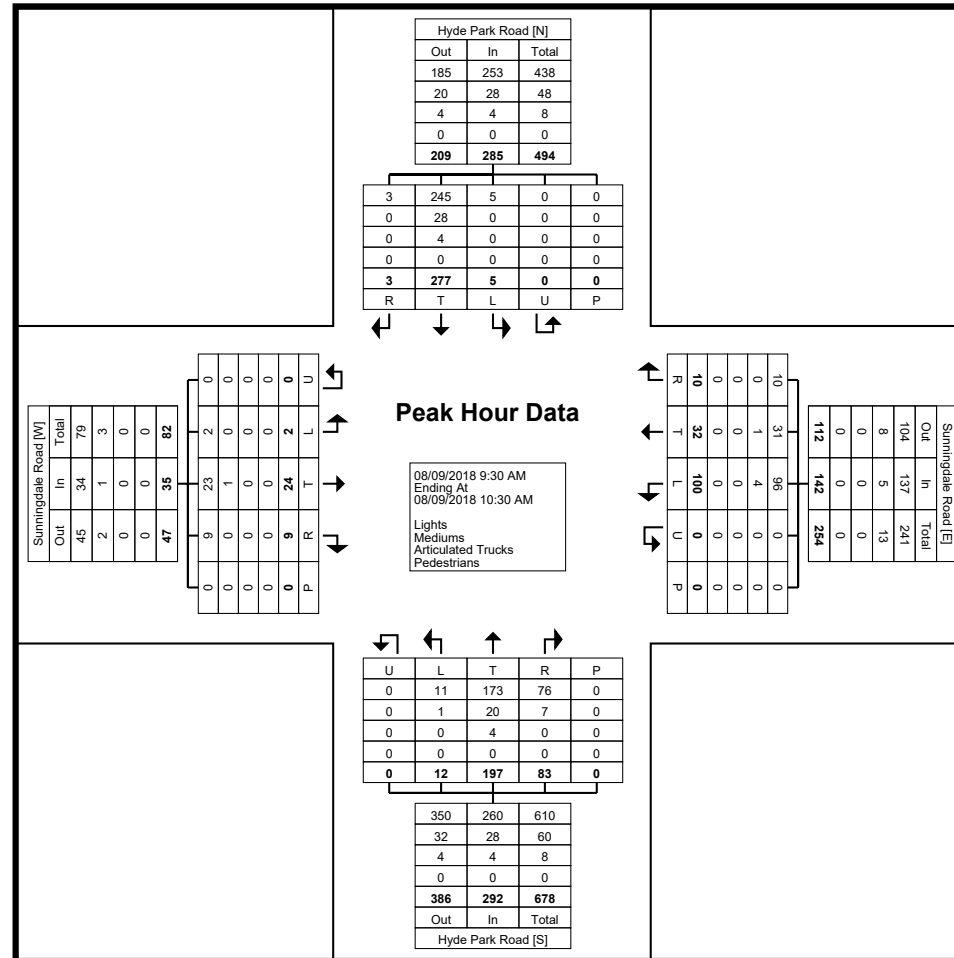
Start Time	Sunningdale Road Eastbound						Sunningdale Road Westbound						Hyde Park Road Northbound						Hyde Park Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:30 AM	0	9	4	0	0	13	29	11	3	0	0	43	3	47	16	0	0	66	3	77	0	0	0	80	202
9:45 AM	0	4	3	0	0	7	25	5	1	0	0	31	3	50	12	0	0	65	1	67	1	0	0	69	172
10:00 AM	2	4	1	0	0	7	17	8	0	0	0	25	2	58	29	0	0	89	1	58	1	0	0	60	181
10:15 AM	0	7	1	0	0	8	29	8	6	0	0	43	4	42	26	0	0	72	0	75	1	0	0	76	199
Total	2	24	9	0	0	35	100	32	10	0	0	142	12	197	83	0	0	292	5	277	3	0	0	285	754
Approach %	5.7	68.6	25.7	0.0	-	-	70.4	22.5	7.0	0.0	-	-	4.1	67.5	28.4	0.0	-	-	1.8	97.2	1.1	0.0	-	-	-
Total %	0.3	3.2	1.2	0.0	-	4.6	13.3	4.2	1.3	0.0	-	18.8	1.6	26.1	11.0	0.0	-	38.7	0.7	36.7	0.4	0.0	-	37.8	-
PHF	0.250	0.667	0.563	0.000	-	0.673	0.862	0.727	0.417	0.000	-	0.826	0.750	0.849	0.716	0.000	-	0.820	0.417	0.899	0.750	0.000	-	0.891	0.933
Lights	2	23	9	0	-	34	96	31	10	0	-	137	11	173	76	0	-	260	5	245	3	0	-	253	684
% Lights	100.0	95.8	100.0	-	-	97.1	96.0	96.9	100.0	-	-	96.5	91.7	87.8	91.6	-	-	89.0	100.0	88.4	100.0	-	-	88.8	90.7
Mediums	0	1	0	0	-	1	4	1	0	0	-	5	1	20	7	0	-	28	0	28	0	0	-	28	62
% Mediums	0.0	4.2	0.0	-	-	2.9	4.0	3.1	0.0	-	-	3.5	8.3	10.2	8.4	-	-	9.6	0.0	10.1	0.0	-	-	9.8	8.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	0	4	0	0	-	4	8
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.0	0.0	-	-	1.4	0.0	1.4	0.0	-	-	1.4	1.1
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited  
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Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 5



Turning Movement Peak Hour Data Plot (9:30 AM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
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Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 6

### Turning Movement Peak Hour Data (12:15 PM)

Start Time	Sunningdale Road Eastbound						Sunningdale Road Westbound						Hyde Park Road Northbound						Hyde Park Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	2	2	3	0	0	7	30	8	3	0	0	41	5	74	31	0	0	110	1	64	0	0	0	65	223
12:30 PM	1	6	4	0	0	11	20	9	1	0	0	30	1	66	25	0	0	92	1	60	0	0	0	61	194
12:45 PM	0	4	1	17	0	22	39	10	3	0	1	52	2	69	29	0	0	100	1	58	1	0	0	60	234
1:00 PM	0	2	3	0	0	5	30	4	8	0	0	42	4	68	34	0	0	106	1	65	3	0	0	69	222
<b>Total</b>	<b>3</b>	<b>14</b>	<b>11</b>	<b>17</b>	<b>0</b>	<b>45</b>	<b>119</b>	<b>31</b>	<b>15</b>	<b>0</b>	<b>1</b>	<b>165</b>	<b>12</b>	<b>277</b>	<b>119</b>	<b>0</b>	<b>0</b>	<b>408</b>	<b>4</b>	<b>247</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>255</b>	<b>873</b>
Approach %	6.7	31.1	24.4	37.8	-	-	72.1	18.8	9.1	0.0	-	-	2.9	67.9	29.2	0.0	-	-	1.6	96.9	1.6	0.0	-	-	-
Total %	0.3	1.6	1.3	1.9	-	5.2	13.6	3.6	1.7	0.0	-	18.9	1.4	31.7	13.6	0.0	-	46.7	0.5	28.3	0.5	0.0	-	29.2	-
PHF	0.375	0.583	0.688	0.250	-	0.511	0.763	0.775	0.469	0.000	-	0.793	0.600	0.936	0.875	0.000	-	0.927	1.000	0.950	0.333	0.000	-	0.924	0.933
Lights	3	13	10	17	-	43	109	30	15	0	-	154	9	258	112	0	-	379	4	217	4	0	-	225	801
% Lights	100.0	92.9	90.9	100.0	-	95.6	91.6	96.8	100.0	-	-	93.3	75.0	93.1	94.1	-	-	92.9	100.0	87.9	100.0	-	-	88.2	91.8
Mediums	0	1	1	0	-	2	10	1	0	0	-	11	3	18	7	0	-	28	0	26	0	0	-	26	67
% Mediums	0.0	7.1	9.1	0.0	-	4.4	8.4	3.2	0.0	-	-	6.7	25.0	6.5	5.9	-	-	6.9	0.0	10.5	0.0	-	-	10.2	7.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	4	0	0	-	4	5
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.2	0.0	1.6	0.0	-	-	1.6	0.6
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

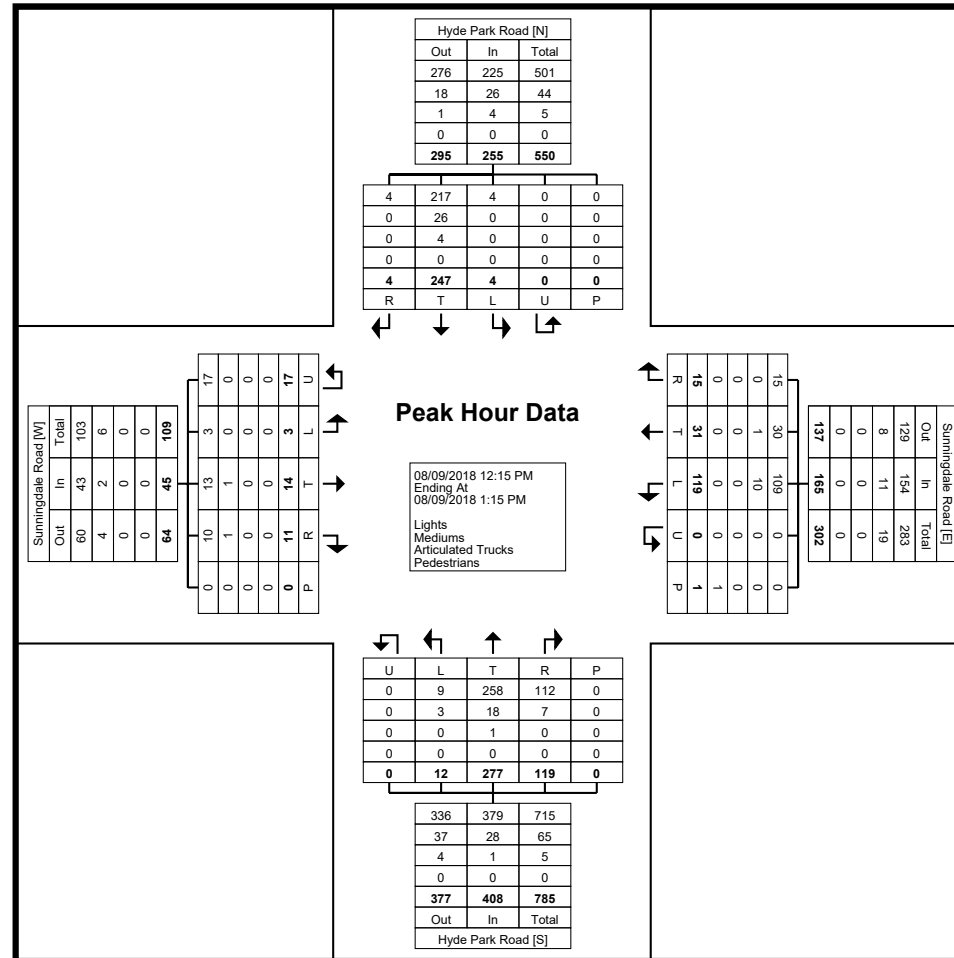




Paradigm Transportation Solutions Limited  
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Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 mmurch@ptsl.com

Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 8

### Turning Movement Peak Hour Data (4:30 PM)

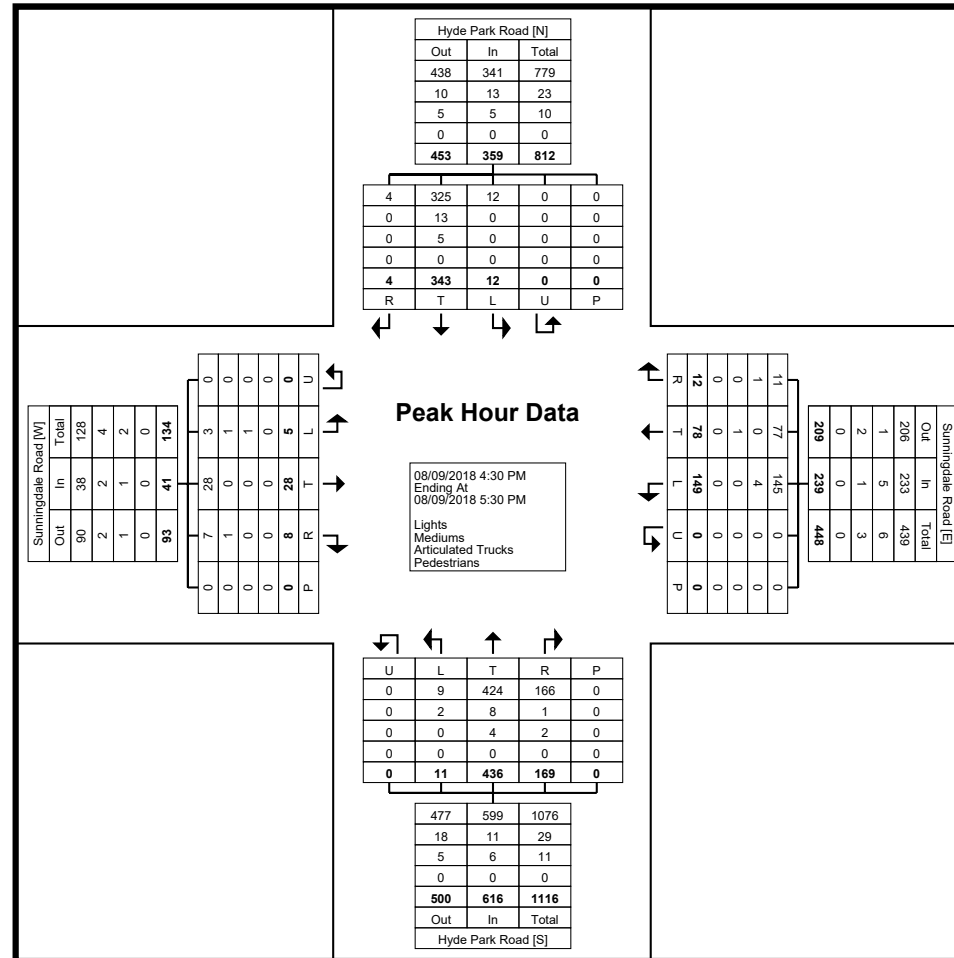
Start Time	Sunningdale Road Eastbound						Sunningdale Road Westbound						Hyde Park Road Northbound						Hyde Park Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	0	5	2	0	0	7	35	15	3	0	0	53	5	110	39	0	0	154	0	78	0	0	0	78	292
4:45 PM	2	8	3	0	0	13	37	17	2	0	0	56	4	115	44	0	0	163	3	88	2	0	0	93	325
5:00 PM	3	6	2	0	0	11	42	21	2	0	0	65	2	106	43	0	0	151	6	94	1	0	0	101	328
5:15 PM	0	9	1	0	0	10	35	25	5	0	0	65	0	105	43	0	0	148	3	83	1	0	0	87	310
<b>Total</b>	<b>5</b>	<b>28</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>41</b>	<b>149</b>	<b>78</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>239</b>	<b>11</b>	<b>436</b>	<b>169</b>	<b>0</b>	<b>0</b>	<b>616</b>	<b>12</b>	<b>343</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>359</b>	<b>1255</b>
Approach %	12.2	68.3	19.5	0.0	-	-	62.3	32.6	5.0	0.0	-	-	1.8	70.8	27.4	0.0	-	-	3.3	95.5	1.1	0.0	-	-	-
Total %	0.4	2.2	0.6	0.0	-	3.3	11.9	6.2	1.0	0.0	-	19.0	0.9	34.7	13.5	0.0	-	49.1	1.0	27.3	0.3	0.0	-	28.6	-
PHF	0.417	0.778	0.667	0.000	-	0.788	0.887	0.780	0.600	0.000	-	0.919	0.550	0.948	0.960	0.000	-	0.945	0.500	0.912	0.500	0.000	-	0.889	0.957
Lights	3	28	7	0	-	38	145	77	11	0	-	233	9	424	166	0	-	599	12	325	4	0	-	341	1211
% Lights	60.0	100.0	87.5	-	-	92.7	97.3	98.7	91.7	-	-	97.5	81.8	97.2	98.2	-	-	97.2	100.0	94.8	100.0	-	-	95.0	96.5
Mediums	1	0	1	0	-	2	4	0	1	0	-	5	2	8	1	0	-	11	0	13	0	0	-	13	31
% Mediums	20.0	0.0	12.5	-	-	4.9	2.7	0.0	8.3	-	-	2.1	18.2	1.8	0.6	-	-	1.8	0.0	3.8	0.0	-	-	3.6	2.5
Articulated Trucks	1	0	0	0	-	1	0	1	0	0	-	1	0	4	2	0	-	6	0	5	0	0	-	5	13
% Articulated Trucks	20.0	0.0	0.0	-	-	2.4	0.0	1.3	0.0	-	-	0.4	0.0	0.9	1.2	-	-	1.0	0.0	1.5	0.0	-	-	1.4	1.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited  
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Cambridge, Ontario, Canada N1R 8J8  
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Count Name: Hyde Park Road & Sunningdale Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 mmurch@ptsl.com

Count Name: Hyde Park Road & Sunningdale  
Road  
Site Code:  
Start Date: 08/09/2018  
Page No: 10



# Turning Movements Report - AM Period

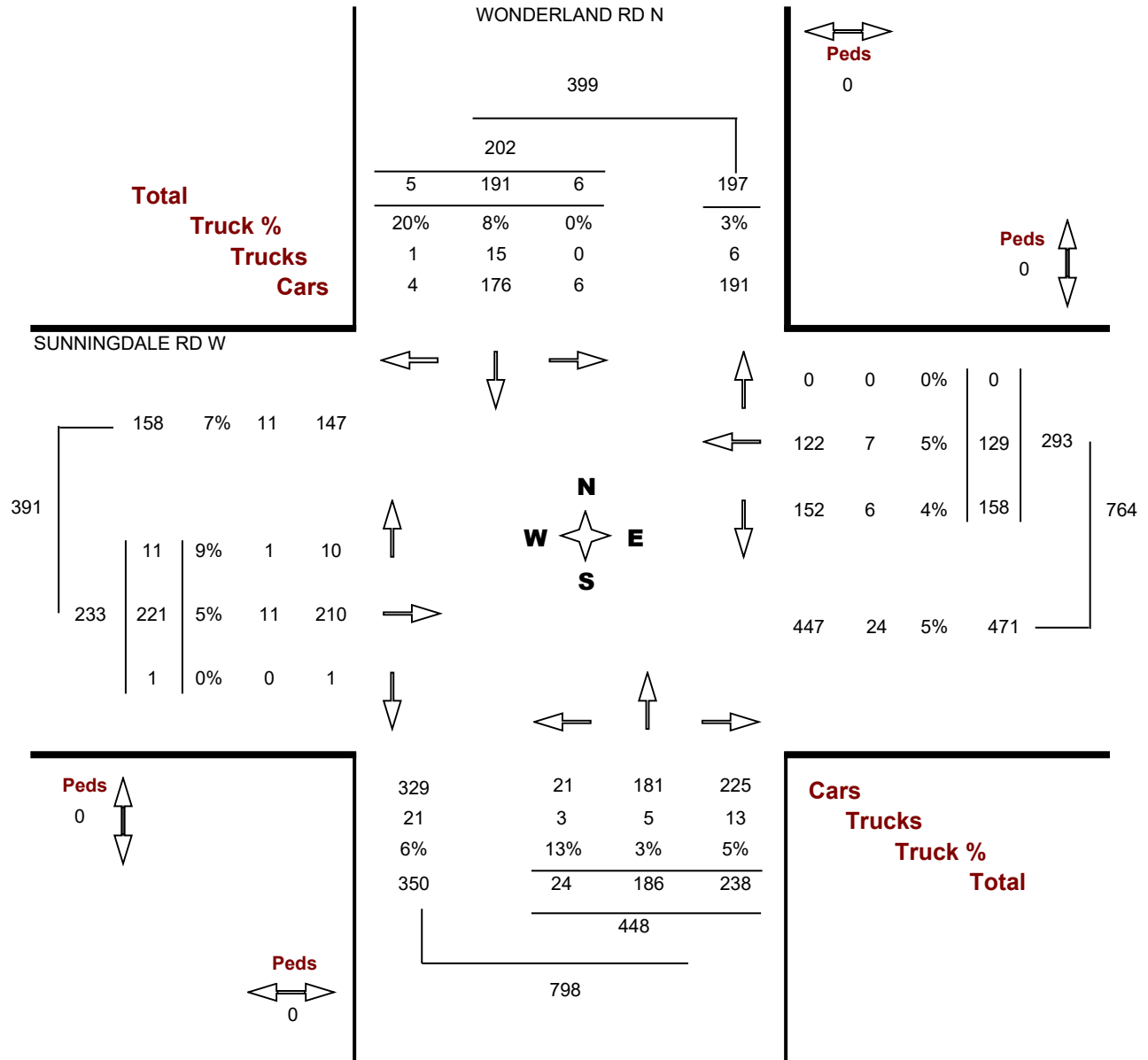
**Location.....** SUNNINGDALE RD W @ WONDERLAND RD N

**Municipality.....** LONDON

**GeoID.....** INT484

**Count Date.....** Monday, 28 September, 2015

**Peak Hour.....** 07:30 AM — 08:30 AM





# Turning Movements Report - MD Period

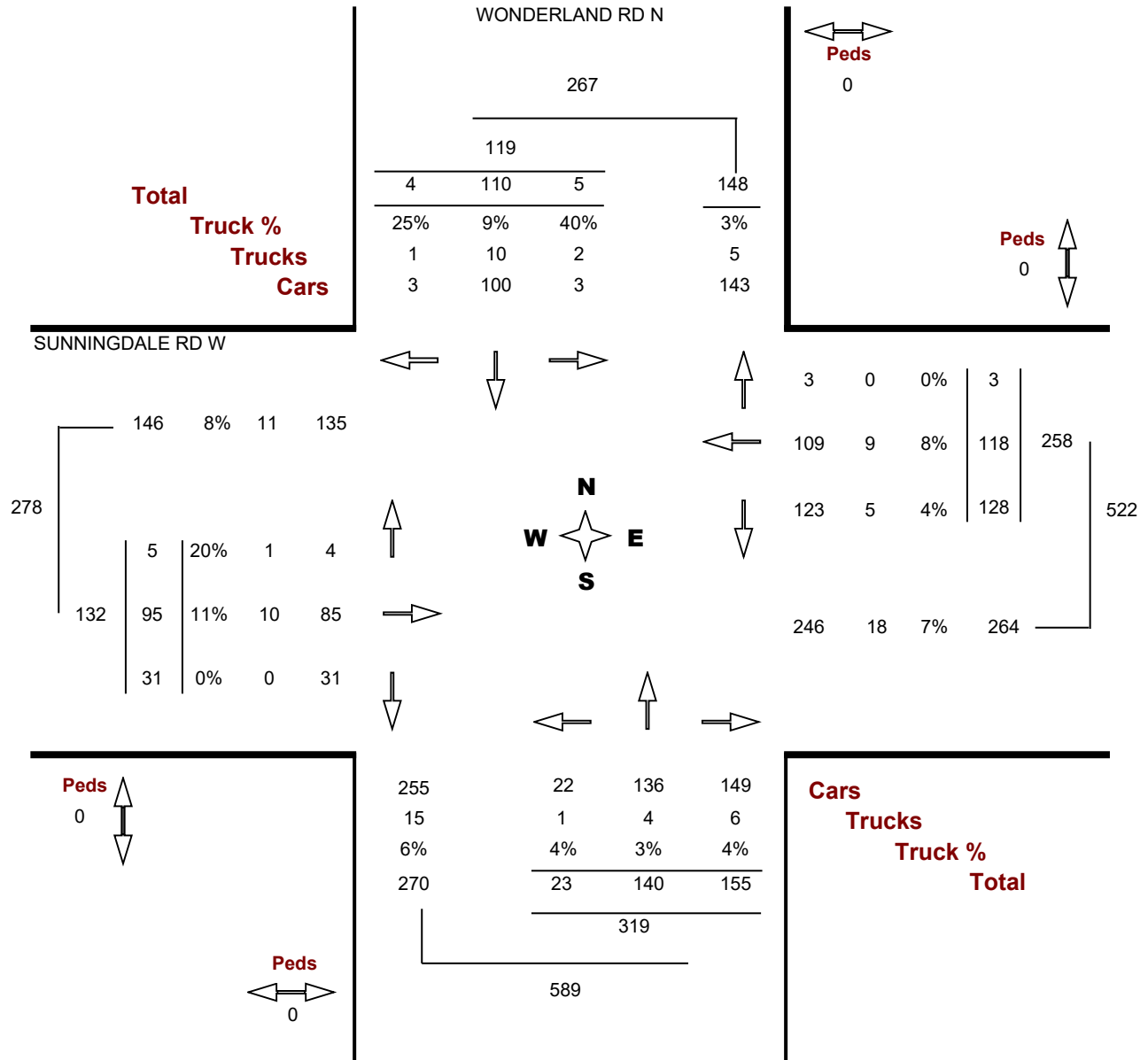
**Location.....** SUNNINGDALE RD W @ WONDERLAND RD N

**Municipality.....** LONDON

**GeoID.....** INT484

**Count Date.....** Monday, 28 September, 2015

**Peak Hour.....** 01:00 PM — 02:00 PM





# Turning Movements Report - PM Period

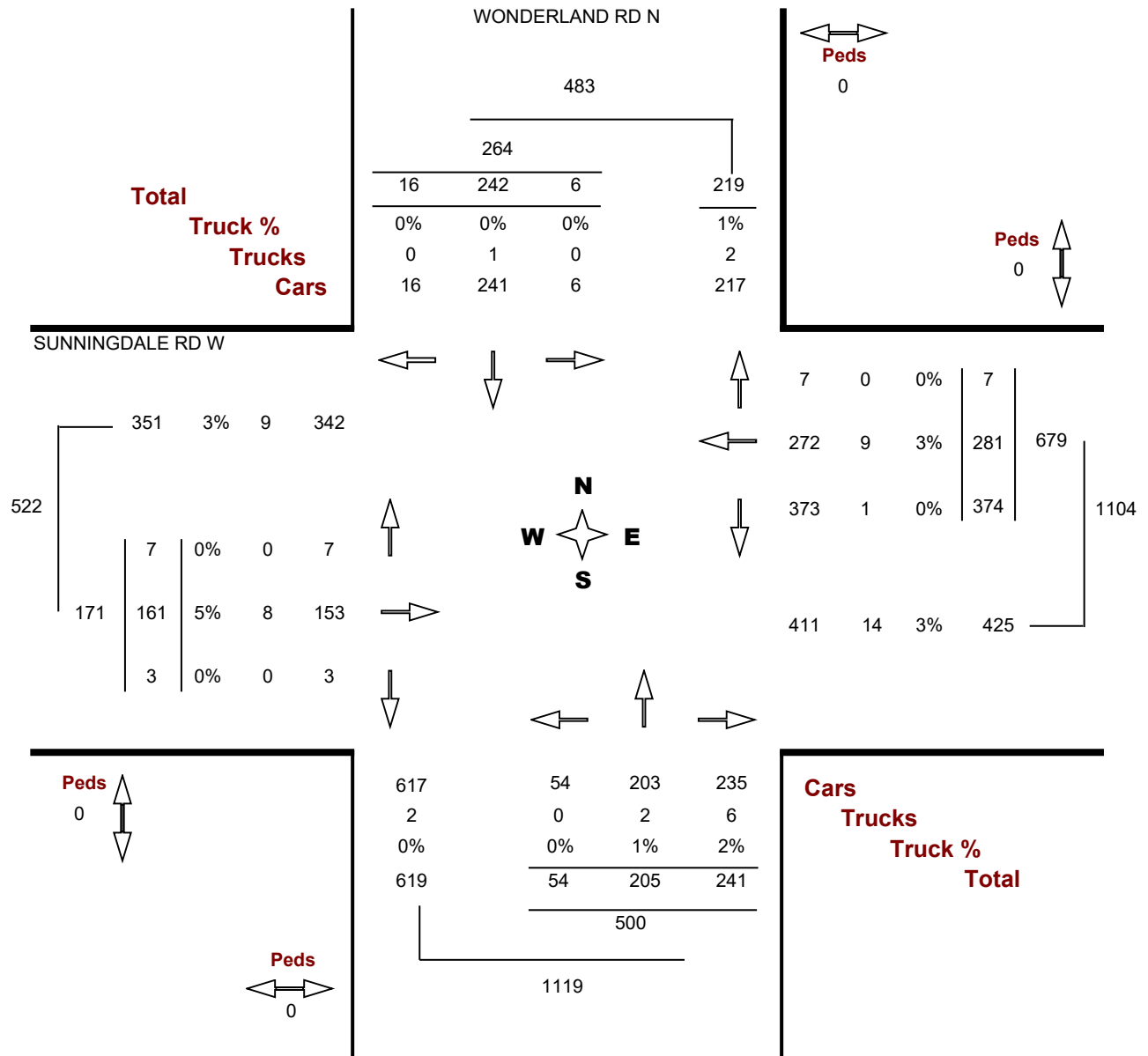
**Location.....** SUNNINGDALE RD W @ WONDERLAND RD N

**Municipality.....** LONDON

**GeoID.....** INT484

**Count Date.....** Monday, 28 September, 2015

**Peak Hour.....** 04:30 PM — 05:30 PM







# Appendix C

## Existing Traffic Operations Reports





Existing AM  
1521 Sunningdale Road, London

HCM 6th TWSC

1: Hyde Park Road & Sunningdale Road

Intersection	4.7											
Int Delay, s/veh	EBL	EBT	EBL	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	2	25	10	106	34	11	13	209	88	5	294	3
Traffic Vol, veh/h	2	25	10	106	34	11	13	209	88	5	294	3
Future Vol, veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds, #/hr	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
Sign Control	-	-	-	-	-	-	-	-	-	-	-	-
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	0	4	3	0	8	12	8	0	12	0
Mvmt Flow	2	27	11	115	37	12	14	227	96	5	320	3

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	660	683	322	606	588	227	323	0	0	323	0	0
Stage 1	332	332	-	255	255	-	-	-	-	-	-	-
Stage 2	328	351	-	351	333	-	-	-	-	-	-	-
Critical Hwy	7.1	6.54	6.2	7.14	6.53	6.2	4.18	-	-	4.1	-	-
Critical Hwy Stg 1	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-
Critical Hwy Stg 2	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-
Follow-up Hwy	3.5	4.036	3.3	3.536	4.027	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	379	369	724	406	420	817	1204	-	-	1248	-	-
Stage 1	686	641	-	745	695	-	-	-	-	-	-	-
Stage 2	689	629	-	661	642	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	343	362	724	371	412	817	1204	-	-	1248	-	-
Mov Cap-2 Maneuver	343	362	-	371	412	-	-	-	-	-	-	-
Stage 1	676	638	-	735	685	-	-	-	-	-	-	-
Stage 2	633	620	-	620	639	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	20.4	0.3	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1204	-	-	417	396	1248	-	-
HCM Lane V/C Ratio	0.012	-	-	0.036	0.414	0.004	-	-
HCM Control Delay (s)	8	0	-	14.6	20.4	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %ile Q(veh)	0	-	-	0.3	2	0	-	-

**Junctions 8**

**ARCADY 8 - Roundabout Module**

Version: 8.0.6.541 (1951.28/11/2015)  
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: (210088) 1521 Sunningdale Road - Sunningdale and Wonderland Road.arcb  
 Path: C:\Users\AdamMorrison\Para\junc\Projects - (210088) 1521 Sunningdale2 Analysis\Arcady  
 Report generation date: 2021-03-26 2:55:07 PM

**Summary of intersection performance**

	AM				
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS
	A1 - Existing				
Leg North	0.30	~1	4.34	0.22	A
Leg West	0.21	~1	2.64	0.17	A
Leg South	0.33	~1	4.62	0.24	A
Leg East	0.25	~1	2.55	0.19	A

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- D1 - Existing, AM - model duration: 8:00 AM - 9:30 AM
- D2 - Existing, PM - model duration: 4:00 PM - 5:30 PM
- D3 - Existing, AM - model duration: 8:00 AM - 9:30 AM
- D4 - Background 2026, PM - model duration: 4:00 PM - 5:30 PM
- D5 - Background 2031, AM - model duration: 8:00 AM - 9:30 AM
- D6 - Background 2031, PM - model duration: 4:00 PM - 5:30 PM
- D7 - Total 2026, AM - model duration: 8:00 AM - 9:30 AM
- D8 - Total 2026, PM - model duration: 4:00 PM - 5:30 PM
- D9 - Total 2031, AM - model duration: 8:00 AM - 9:30 PM
- D10 - Total 2031, PM - model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 2:55:06 PM

**File summary**

Title	(untitled)
Location	
Site Number	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

**Analysis Options**

Vehicle Length (m)	7.50	Do Queue Variations	X	Calculate Residual Capacity		Residual Capacity Criteria	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	30.00	Queue Threshold (PCE)	20.00
--------------------	------	---------------------	---	-----------------------------	--	----------------------------	-----	---------------------	------	-----------------------------	-------	-----------------------	-------

**Units**

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per/hour	s	s	per/hour
						min	per/hour

**(Default Analysis Set) - Existing, AM**

**Data Errors and Warnings**  
No errors or warnings

**Analysis Set Details**

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		X				100.000	100.000	

**Demand Set Details**

Name	Scenario Name	Time Period	Description	Traffic Profile Type	Model Time (HH:mm)	Model Period Length (min)	Model Time Period Length (min)	Results For Central Segment Only	Single Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing - AM	Existing	AM		ONE HOUR	08:00	09:30	90	15			X		

# Intersection Network

**Intersections**

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	St Luke's Summingdale	Roundabout	North,West,South,East				3.67	A

**Intersection Network Options**

Driving Side	Lighting
Right	Normal/unknown

# Legs

**Legs**

Leg	Leg Name	Description
North	North	Wonderland Road N
West	West	Summingdale Road W
South	South	Wonderland Road S
East	East	Summingdale Road E

**Capacity Options**

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

**Roundabout Geometry**

Leg	V - Approach road half-width (m)	E - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	Phi - Corridor (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00
West	3.50	8.00	30.00	20.00	50.00	25.00
South	3.50	4.00	30.00	20.00	50.00	25.00
East	3.50	8.00	30.00	20.00	50.00	25.00

**Bypass**

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	X	100
South		
East		

**Slope / Intercept / Capacity**

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr) (calculated)	Final Slope (calculated)	Final Intercept (PCE/hr) (calculated)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

# Traffic Flows

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Turns Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	X	X	X	2.00			X	X

# Entry Flows

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	X	228.00	100.000
West	ONE HOUR	X	262.00	100.000
South	ONE HOUR	X	504.00	100.000
East	ONE HOUR	X	323.00	100.000

# Turning Proportions

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.000	6.000	215.000
West	12.000	0.000	1.000
South	209.000	277.000	0.000
East	0.000	145.000	178.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.00	0.03	0.54
West	0.05	0.00	0.00
South	0.41	0.05	0.00
East	0.00	0.45	0.55

# Vehicle Mix

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	1.000	1.200	1.080
West	1.000	1.000	1.000
South	1.030	1.130	1.000
East	1.000	1.050	1.040

Truck Percentages - Intersection 1 (for whole period)

Table with columns: From, To, North, West, South, East. Rows: North, West, South, East.

Results

Results Summary for whole modelled period

Table with columns: Leg, Max Daily Demand, Max Queue, Max LOS, Average Demand, Average LOS, Total Arrivals, Total Delay, Average Queuing Delay, Sat. of Queuing Delay, Inclusive Total Queuing Delay, Inclusive Total Delay.

Main Results for each time segment

Main results: (08:00-08:15)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Main results: (08:15-08:30)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Main results: (08:30-08:45)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Main results: (08:45-09:00)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Main results: (08:00-09:15)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Main results: (09:15-09:30)

Table with columns: Leg, Total Demand, Intersection Demand, Bypass Demand, Entry Flow, Exit Flow, Circulating Flow, Pedestrian Demand, Capacity, Saturation, V/C Ratio, Start Queue, End Queue, Delay, LOS.

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

Queueing Delay results: (08:15-08:30)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

Queueing Delay results: (08:30-08:45)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

Queueing Delay results: (08:45-09:00)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

Queueing Delay results: (09:00-09:15)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

Queueing Delay results: (09:15-09:30)

Table with columns: Leg, Queuing Total Delay, Queuing Rate of Delay, Average Delay Per Arriving Vehicle, Signalized Level Of Service.

East	2.34	0.16	2.284	A	A	N/A	N/A
------	------	------	-------	---	---	-----	-----

East	0.15	-1	-1	-1	-1	Per centiles could not be calculated. This may be because the mean queue is very small or very big.
------	------	----	----	----	----	---

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.20	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.25	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.33	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.33	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.23	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.25	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.20	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Existing PM  
1521 Sunningdale Road, London

HCM 6th TWSC  
1: Hyde Park Road & Sunningdale Road

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	39.8											
Movement	5	30	8	158	83	13	12	463	179	13	364	4
Lane Configurations												
Traffic Vol, veh/h	5	30	8	158	83	13	12	463	179	13	364	4
Future Vol, veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	40	0	13	3	1	8	18	3	2	0	5	0
Mvmt Flow	5	33	9	172	90	14	13	503	195	14	396	4

**Junctions 8**

**ARCADY 8 - Roundabout Module**

Version: 8.0.6.541 (1982128/11/2015)  
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Filename: (C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale2 Analysis\Arcady Report\generation date: 2021-03-26 2:55:42 PM)

**Summary of intersection performance**

	PM				
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	Intersection LOS
Leg North	0.60	1.00	6.58	0.37	A
Leg West	0.17	~1	2.93	0.14	A
Leg South	0.41	~1	4.59	0.29	A
Leg East	0.85	1.01	3.74	0.46	A

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

D1 - Existing, AM mode duration: 8:00 AM - 9:30 AM  
 D2 - Existing, PM mode duration: 4:00 PM - 5:30 PM  
 D3 - Existing, AM mode duration: 8:00 AM - 9:30 AM  
 D4 - Background 2026, PM mode duration: 4:00 PM - 5:30 PM  
 D5 - Background 2031, AM mode duration: 8:00 AM - 9:30 AM  
 D6 - Background 2031, PM mode duration: 4:00 PM - 5:30 PM  
 D7 - Total 2026, AM mode duration: 8:00 AM - 9:30 AM  
 D8 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM  
 D9 - Total 2031, AM mode duration: 8:00 AM - 9:30 PM  
 D10 - Total 2031, PM mode duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 2:55:40 PM

**File summary**

Title	Location	Site Number	Version	Status	Identifier	Client	Jobnumber	Analyst	Description
(untitled)		2021-03-25			(new file)			AdamMorrison	

**Analysis Options**

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold (PCE)	Queue Threshold (PCE)
7.50	x		N/A	0.85	20.00

**Units**

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per/hour	s	s	per/hour
						min	per/hour

**(Default Analysis Set) - Existing, PM**

**Data Errors and Warnings**  
No errors or warnings

**Analysis Set Details**

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		x				100.000	100.000	

**Demand Set Details**

Name	Scenario Name	Time Period	Traffic Profile Type	Model Time (HH:mm)	Model Time Period (HH:mm)	Model Time Start Length (min)	Model Time Central Segment Length (min)	Results For Central Segment Only	Single Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing - PM	Existing	PM	ONE HOUR	16:00	17:30	90	15				x		

# Intersection Network

**Intersections**

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	St Luke's Summingdale	Roundabout	North,West,South,East				4.39	A

**Intersection Network Options**

Driving Side	Lighting
Right	Normal/unknown

# Legs

**Legs**

Leg	Leg Name	Description
North	North	Wondelind Road N
West	West	Summingdale Road W
South	South	Wondelind Road S
East	East	Summingdale Road E

**Capacity Options**

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

**Roundabout Geometry**

Leg	V - Approach road half-width (m)	E - Entry width (m)	I - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	Phi - Corridor (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	Only
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

**Bypass**

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

**Slope / Intercept / Capacity**

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr)	Final Slope (calculated)	Final Intercept (PCE/hr)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

# Traffic Flows

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Turns Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	2.00			x	x

# Entry Flows

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	298.00	100.000
West	ONE HOUR	x	192.00	100.000
South	ONE HOUR	x	963.00	100.000
East	ONE HOUR	x	745.00	100.000

# Turning Proportions

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To		
	North	West	East
North	0.000	18.000	273.000
West	8.000	0.000	3.000
South	231.000	61.000	0.000
East	8.000	316.000	421.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To		
	North	West	East
North	0.00	0.06	0.92
West	0.04	0.00	0.02
South	0.41	0.11	0.00
East	0.01	0.42	0.57

# Vehicle Mix

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To		
	North	West	East
North	1.000	1.000	1.000
West	1.000	1.000	1.000
South	1.010	1.000	1.000
East	1.000	1.030	1.000



Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.0	0.0	0.0
West	0.0	0.0	0.0
South	1.0	0.0	5.0
East	0.0	3.0	0.0

## Results

### Results Summary for whole modelled period

Leg	Max Daily Demand (PCE/hr)	Max 95th Queue (PCE)	Average Demand (PCE/hr)	Average LOS	Total Intersection Arrivals (PCE/hr)	Total Queuing Delay (PCE-min)	Average Queuing Delay (s)	Rate of Queuing Delay (PCE-min/min)	Inclusive Total Delay (PCE-min)
North	0.37	0.58	0.60	1.00	273.45	410.18	37.47	0.42	37.47
West	0.14	2.93	0.17	-1	176.18	264.27	11.95	2.71	11.95
South	0.29	4.59	0.41	-1	516.62	401.92	28.37	0.32	28.37
East	0.46	3.74	0.85	1.01	683.63	1023.44	55.69	0.62	55.69

### Main Results for each time segment

#### Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	224.35	224.35	0.00	0.00	223.24	185.17	598.85	0.00	1028.86	0.38	0.28	0.00	0.28	4.463
West	144.55	144.55	0.00	0.00	144.15	296.38	525.73	0.00	162.16	1.45	0.087	0.10	0.10	2.483
South	423.86	54.96	204.02	0.00	218.88	522.74	147.14	0.00	1148.17	0.29	0.191	0.00	0.24	3.900
East	560.88	560.88	0.00	204.02	559.14	141.14	224.89	0.00	1864.74	0.30	0.301	0.00	0.43	2.788

#### Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	267.00	267.00	0.00	0.00	267.08	221.93	716.76	0.00	984.18	0.38	0.28	0.38	0.38	5.193
West	172.60	172.60	0.00	0.00	172.49	354.77	629.46	0.00	1692.31	1.45	0.108	0.10	0.13	2.654
South	508.93	262.50	243.62	0.00	262.24	625.87	176.08	0.00	1133.02	0.23	0.24	0.36	0.36	4.466
East	689.74	689.74	0.00	243.62	689.16	168.89	269.43	0.00	1824.74	0.36	0.43	0.36	0.36	3.123

#### Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	211.40	211.40	0.00	0.00	211.22	434.31	770.42	0.00	1497.40	1.45	0.141	0.13	0.17	2.930
West	619.87	321.50	298.38	0.00	321.08	766.03	215.60	0.00	1112.32	0.29	0.289	0.30	0.41	4.984
South	820.26	205.07	0.00	298.38	819.19	208.80	328.88	0.00	1794.04	0.457	0.58	0.85	0.85	3.736

#### Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	328.10	328.10	0.00	0.00	328.09	271.95	878.60	0.00	876.00	0.37	0.38	0.59	0.60	6.577
West	211.40	211.40	0.00	0.00	211.39	434.90	771.79	0.00	1496.47	1.45	0.141	0.17	0.17	2.932
South	619.87	321.50	298.38	0.00	321.49	767.39	215.80	0.00	1112.22	0.29	0.289	0.41	0.41	4.988
East	820.26	205.07	0.00	298.38	820.25	208.99	330.30	0.00	1793.76	0.457	0.58	0.85	0.85	3.743

#### Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	267.00	267.00	0.00	0.00	268.73	222.39	718.52	0.00	983.21	0.38	0.28	0.39	0.39	5.191
West	172.60	172.60	0.00	0.00	172.28	355.68	631.56	0.00	1590.00	1.45	0.108	0.17	0.13	2.659
South	508.93	262.50	243.62	0.00	262.01	627.95	176.39	0.00	1132.86	0.232	0.242	0.41	0.31	4.174
East	689.74	689.74	0.00	243.62	670.80	169.19	270.11	0.00	1834.29	0.365	0.365	0.59	0.59	3.137

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	267.00	267.00	0.00	0.00	268.73	222.39	718.52	0.00	983.21	0.38	0.28	0.39	0.39	5.191
West	172.60	172.60	0.00	0.00	172.28	355.68	631.56	0.00	1590.00	1.45	0.108	0.17	0.13	2.659
South	508.93	262.50	243.62	0.00	262.01	627.95	176.39	0.00	1132.86	0.232	0.242	0.41	0.31	4.174
East	689.74	689.74	0.00	243.62	670.80	169.19	270.11	0.00	1834.29	0.365	0.365	0.59	0.59	3.137

#### Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	224.35	224.35	0.00	0.00	224.78	186.17	528.49	0.00	1027.46	0.38	0.28	0.39	0.39	4.487
West	144.55	144.55	0.00	0.00	144.66	297.71	528.49	0.00	1660.31	1.45	0.10	0.10	0.10	2.488
South	423.86	219.83	54.96	204.02	220.10	525.47	147.68	0.00	1147.89	0.29	0.192	0.31	0.24	3.911
East	560.88	560.88	0.00	204.02	561.47	141.65	224.12	0.00	1863.91	0.301	0.301	0.44	0.44	2.801

### Queueing Delay Results for each time segment

#### Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	4.05	0.27	4.463	A
West	1.47	0.10	2.483	A
South	3.48	0.23	3.900	A
East	6.38	0.43	2.788	A

#### Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.01	0.37	5.193	A
West	1.86	0.13	2.654	A
South	4.46	0.30	4.166	A
East	8.55	0.57	3.125	A

#### Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	8.62	0.57	6.551	A
West	2.54	0.17	2.830	A
South	5.99	0.40	4.584	A
East	12.43	0.83	3.736	A

#### Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	8.92	0.58	6.577	A
West	2.58	0.17	2.832	A
South	6.12	0.41	4.588	A
East	12.73	0.85	3.743	A

#### Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.97	0.40	5.191	A
West	1.94	0.13	2.659	A
South	4.67	0.31	4.174	A
East	8.95	0.60	3.137	A

#### Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	4.30	0.29	4.487	A
West	1.52	0.10	2.488	A
South	3.66	0.24	3.911	A

East	6.66	0.44	2.801	A	A
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**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.24	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.43	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:15-16:30)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.38	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.30	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:30-16:45)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.59	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.41	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:45-17:00)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.60	0.00	0.00	0.00	1.00	1.00	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.41	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	0.00	0.00	0.00	1.00	1.00	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:00-17:15)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.39	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.31	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:15-17:30)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.24	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

# Appendix D

## 2026 Background Traffic Operations Reports





2026 Background AM  
1521 Sunningdale Road, London

HCM 6th TWSC  
1: Hyde Park Road & Sunningdale Road

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	5.7											
Lane Configurations	4 2 2 0 0 0 0 0 0 0 0 0 0											
Traffic Vol, veh/h	2	28	11	117	38	12	14	231	97	6	325	3
Future Vol, veh/h	2	28	11	117	38	12	14	231	97	6	325	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	0	4	3	0	8	12	8	0	12	0
Mvmt Flow	2	30	12	127	41	13	15	251	105	7	353	3
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2	Major2	Major2	Major2	Major2	Major2	Major2
Conflicting Flow All	730	755	355	671	651	251	356	0	0	356	0	0
Stage 1	369	369	-	281	281	-	-	-	-	-	-	-
Stage 2	361	396	-	390	370	-	-	-	-	-	-	-
Critical Hwy	7.1	6.54	6.2	7.14	6.53	6.2	4.18	-	-	4.1	-	-
Critical Hwy Stg 1	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-
Critical Hwy Stg 2	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-
Follow-up Hwy	3.5	4.036	3.3	3.536	4.027	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	340	35	693	367	386	793	1170	-	-	1214	-	-
Stage 1	655	617	-	721	617	-	-	-	-	-	-	-
Stage 2	662	607	-	630	618	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	301	327	693	329	377	793	1170	-	-	1214	-	-
Mov Cap-2 Maneuver	301	327	-	329	377	-	-	-	-	-	-	-
Stage 1	645	613	-	709	666	-	-	-	-	-	-	-
Stage 2	601	597	-	584	614	-	-	-	-	-	-	-
Approach	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	15.8	25.4	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
HCM LOS	C	D	D	D	D	D	D	D	D	D	D	D
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR	SBL	SBT	SBR	SBR
Capacity (veh/h)	1170	-	-	379	354	1214	-	-	-	-	-	-
HCM Lane V/C Ratio	0.013	-	-	0.118	0.513	0.005	-	-	-	-	-	-
HCM Control Delay (s)	8.1	0	-	15.8	25.4	8	0	0	0	0	0	0
HCM Lane LOS	A	A	-	C	D	A	A	A	A	A	A	A
HCM 95th %ile Q(veh)	0	-	-	0.4	2.8	0	-	-	-	-	-	-

### Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1951.28/11/23/15)  
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Filename: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale 2 Analysis\Arcady  
Report generation date: 2021-03-26 3:00:03 PM

### Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
Leg North	0.35	~1	4.57	0.25	A		
Leg West	0.24	~1	2.76	0.19	A		
Leg South	0.39	~1	4.88	0.27	A	3.86	A
Leg East	0.29	~1	2.65	0.22	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- D1 - Existing, AM model duration: 8:00 AM - 9:30 AM
- D2 - Existing, PM model duration: 4:00 PM - 5:30 PM
- D3 - Existing, PM model duration: 8:00 AM - 9:30 AM
- D4 - Background 2026, PM model duration: 4:00 PM - 5:30 PM
- D5 - Background 2031, AM model duration: 8:00 AM - 9:30 AM
- D6 - Background 2031, PM model duration: 4:00 PM - 5:30 PM
- D7 - Total 2026, AM model duration: 8:00 AM - 9:30 AM
- D8 - Total 2026, PM model duration: 4:00 PM - 5:30 PM
- D9 - Total 2031, AM model duration: 8:00 AM - 9:30 AM
- D10 - Total 2031, PM model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:00:03 PM

### File summary

Title	(untitled)
Location	
Site Number	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	x	Do Queue Variations		Calculate Residual Capacity		Residual Capacity Criteria		V/C Ratio Threshold	0.85	Average Delay Threshold (s)	30.00	Queue Threshold (PCE)	20.00
--------------------	---	---------------------	--	-----------------------------	--	----------------------------	--	---------------------	------	-----------------------------	-------	-----------------------	-------

### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per hour	s	s	per Min
						4 Min	

## (Default Analysis Set) - Background 2026, AM

**Data Errors and Warnings**  
No errors or warnings

**Analysis Set Details**

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		x				100.000	100.000	

**Demand Set Details**

Name	Scenario Name	Time Period Name	Traffic Profile Type	Model Time (hh:mm)	Model Time (hh:mm)	Model Time Period Length (min)	Results For Central Segment Only	Single Segment Only	Run Automatically	Relationship	Use Relationship
Background 2:05s_AM 2026	AM	ONE HOUR	ONE HOUR	08:00	09:30	90	15		x		

# Intersection Network

**Intersections**

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lanes Surringsdale	Roundabout	North,West,South,East				3.86	A

**Intersection Network Options**

Driving Side	Lighting
Right	Normal/unknown

# Legs

**Legs**

Leg	Leg Name	Description
North	North	Wondelore Road N
West	West	Surringsdale Road W
South	South	Wondelore Road N
East	East	Surringsdale Road W

**Capacity Options**

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

**Roundabout Geometry**

Leg	V - Approach road half-width (m)	E - Entry width (m)	r - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	Phi - Corridor (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	Only
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

**Bypass**

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

**Slope / Intercept / Capacity**

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr) (calculated)	Final Slope (calculated)	Final Intercept (PCE/hr) (calculated)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

# Traffic Flows

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Turns	Vehicle Mix Turns Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	x	2.00			x	x

# Entry Flows

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	262.00	100.000
West	ONE HOUR	x	289.00	100.000
South	ONE HOUR	x	357.00	100.000
East	ONE HOUR	x	357.00	100.000

# Turning Proportions

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.000	7.000	237.000
West	13.000	0.000	1.000
South	231.000	30.000	0.000
East	0.000	160.000	197.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.00	0.03	0.94
West	0.04	0.00	0.96
South	0.41	0.05	0.00
East	0.00	0.45	0.55

# Vehicle Mix

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	1.000	1.020	1.080
West	1.090	1.000	1.050
South	1.030	1.130	1.000
East	1.000	1.050	1.040

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.0	2.0	8.0
West	9.0	0.0	5.0
South	3.0	13.0	0.0
East	0.0	5.0	4.0

# Results

## Results Summary for whole modelled period

Leg	Max Demand (PCE/hr)	Max Delay (s)	Max Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Average Delay (s)	Total Delay (min)	Total In-Vehicle Arrivals (PCE)	Average Queuing Delay (PCE-min)	Average Delay (s)	Rate of Queuing Delay (PCE-min/min)	Inclusive Total Delay (PCE-min)	Average Queuing Delay (s)
North	0.25	4.57	0.35	-1	A	251.24	346.86	24.26	4.20	0.27	24.26	4.20	
West	0.19	2.76	0.24	-1	A	263.19	397.79	17.12	2.38	0.19	17.12	2.38	
South	0.27	4.88	0.39	-1	A	511.11	359.25	26.83	4.48	0.30	26.83	4.48	
East	0.22	2.65	0.29	-1	A	327.59	491.38	20.40	2.49	0.23	20.40	2.49	

## Main Results for each time segment

### Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	189.72	189.72	0.00	189.51	182.88	0.00	1198.02	461.79	0.198	0.00	0.20	3.832	A	
West	217.57	217.57	0.00	217.00	147.88	331.59	0.00	1792.89	1134.03	0.121	0.14	2.402	A	
South	419.34	196.49	49.12	195.00	326.35	222.24	0.00	1108.95	625.77	0.177	0.00	2.22	4.099	A
East	268.77	268.77	0.00	222.84	268.07	212.48	205.36	0.00	1877.88	1560.45	0.143	0.17	2.334	A

### Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	236.54	236.54	0.00	236.32	219.12	347.70	0.00	1198.02	461.79	0.20	0.26	4.116	A	
West	259.81	259.81	0.00	259.05	176.08	307.03	0.00	1748.92	1134.03	0.146	0.14	1.9	2.411	A
South	500.73	234.83	56.66	234.58	390.75	265.94	0.00	1085.97	625.77	0.216	0.22	2.388	A	
East	320.94	320.94	0.00	268.10	320.76	254.26	246.05	0.00	1830.46	1560.45	0.173	0.17	2.457	A

### Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	277.46	277.46	0.00	277.09	268.28	425.77	0.00	1123.83	461.79	0.247	0.26	4.570	A	
West	318.19	318.19	0.00	317.95	216.72	486.14	0.00	1688.92	1134.03	0.188	0.18	2.781	A	
South	613.27	287.37	71.84	325.90	479.44	325.65	0.00	1054.70	625.77	0.272	0.29	4.877	A	
East	393.06	393.06	0.00	325.90	392.79	311.35	301.26	0.00	1813.31	1560.45	0.217	0.22	2.646	A

### Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	277.46	277.46	0.00	277.45	268.64	426.09	0.00	1123.86	461.79	0.247	0.35	4.575	A	
West	318.19	318.19	0.00	318.19	216.90	486.65	0.00	1688.48	1134.03	0.188	0.24	2.792	A	
South	613.27	287.37	71.84	325.90	479.44	325.90	0.00	1054.57	625.77	0.273	0.39	4.882	A	
East	393.06	393.06	0.00	325.90	393.06	311.59	301.67	0.00	1813.03	1560.45	0.217	0.29	2.647	A

### Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	277.46	277.46	0.00	277.45	268.64	426.09	0.00	1123.86	461.79	0.247	0.35	4.575	A	
West	318.19	318.19	0.00	318.19	216.90	486.65	0.00	1688.48	1134.03	0.188	0.24	2.792	A	
South	613.27	287.37	71.84	325.90	479.44	325.90	0.00	1054.57	625.77	0.273	0.39	4.882	A	
East	393.06	393.06	0.00	325.90	393.06	311.59	301.67	0.00	1813.03	1560.45	0.217	0.29	2.647	A

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	236.54	236.54	0.00	236.91	219.71	345.23	0.00	1168.38	461.79	0.194	0.35	4.122	A	
West	259.81	259.81	0.00	250.04	177.28	397.85	0.00	1748.27	1134.03	0.149	0.34	1.9	2.543	A
South	500.73	234.83	56.66	235.03	391.55	265.35	0.00	1085.75	625.77	0.216	0.39	2.39	4.408	A
East	320.94	320.94	0.00	268.10	321.21	254.65	245.73	0.00	1830.03	1560.45	0.173	0.29	2.459	A

### Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Circulating Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	189.72	189.72	0.00	189.51	183.93	291.56	0.00	1197.47	461.79	0.158	0.26	3.843	A	
West	217.57	217.57	0.00	217.73	148.43	333.08	0.00	1791.88	1134.03	0.121	0.18	2.406	A	
South	419.34	196.49	49.12	196.75	327.81	223.00	0.00	1168.45	625.77	0.177	0.29	2.23	4.109	A
East	268.77	268.77	0.00	222.84	268.95	213.21	205.54	0.00	1877.09	1560.45	0.143	0.22	2.339	A

## Queueing Delay Results for each time segment

### Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	2.95	0.20	3.832	A
West	2.14	0.14	2.402	A
South	3.27	0.22	4.099	A
East	2.57	0.17	2.334	A

### Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.91	0.25	4.116	A
West	2.71	0.18	2.941	A
South	4.21	0.28	4.398	A
East	3.24	0.22	2.457	A

### Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.16	0.34	4.570	A
West	3.80	0.24	2.761	A
South	5.89	0.38	4.877	A
East	4.27	0.28	2.646	A

### Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.26	0.35	4.575	A
West	3.65	0.24	2.762	A
South	5.82	0.39	4.882	A
East	4.33	0.29	2.647	A

### Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.98	0.27	4.122	A
West	2.80	0.19	2.543	A
South	4.41	0.29	4.406	A
East	3.34	0.22	2.459	A

### Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.10	0.21	3.843	A
West	2.21	0.15	2.408	A
South	3.44	0.23	4.109	A

East	2.65	0.18	2.339	A	A	N/A	N/A
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Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.22	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.26	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.29	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.29	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.29	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.26	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.29	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Lag	Mean (PCE)	Q5 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.23	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.18	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
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2026 Background PM  
1521 Sunningdale Road, London

HCM 6th TWSC  
1: Hyde Park Road & Sunningdale Road

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	76.1											
Movement	6	33	9	174	92	14	13	511	138	14	402	4
Lane Configurations	Traffic Vol, veh/h: 6 33 9 174 92 14 13 511 138 14 402 4 Future Vol, veh/h: 6 33 9 174 92 14 13 511 138 14 402 4 Conflicting Peds, #/hr: 0 0 0 0 0 0 0 0 0 0 0 0 0 Sign Control: Stop Stop Stop Stop Stop Stop Free Free Free Free Free Free RT Channelized: - - None - - None - - None - - None - - None - - None Storage Length: - - - - - - - - - - - - - - - Veh in Median Storage, #: - 0 - - - 0 - - - 0 - - - 0 - - - Grade, %: - 0 - - - 0 - - - 0 - - - 0 - - - Peak Hour Factor: 92 92 92 92 92 92 92 92 92 92 92 92 92 Heavy Vehicles, %: 40 0 13 3 1 8 18 3 2 0 5 0 Mvmt Flow: 7 36 10 189 100 15 14 555 215 15 437 4											
Major/Minor	Minor2	Minor1	Minor1	Minor1	Major1	Major2	Major2	Major2	Major2	Major2	Major2	Major2
Conflicting Flow All	1217	1267	439	1075	1054	555	441	0	0	770	0	0
Stage 1	469	469	-	583	583	-	-	-	-	-	-	-
Stage 2	748	798	-	492	471	-	-	-	-	-	-	-
Critical Hwy	7.5	6.5	6.33	7.13	6.51	6.28	4.28	-	-	4.1	-	-
Critical Hwy Stg 1	6.5	5.5	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hwy Stg 2	6.5	5.5	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hwy	3.86	4	3.417	3.527	4.009	3.372	2.362	-	-	2.2	-	-
Pot Cap-1 Maneuver	132	170	595	196	227	520	1039	-	-	854	-	-
Stage 1	509	564	-	496	500	-	-	-	-	-	-	-
Stage 2	351	401	-	557	561	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	79	162	595	~154	216	520	1039	-	-	854	-	-
Mov Cap-2 Maneuver	79	162	~	154	216	-	-	-	-	-	-	-
Stage 1	496	551	-	484	488	-	-	-	-	-	-	-
Stage 2	264	391	-	500	548	-	-	-	-	-	-	-
Approach	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	37.2	\$ 392	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
HCM LOS	E	F	F	F	F	F	F	F	F	F	F	F
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR	SBL	SBT	SBR	SBR
Capacity (veh/h)	1039	-	-	163	177	854	-	-	-	-	-	-
HCM Lane V/C Ratio	0.014	-	-	0.32	1.719	0.018	-	-	-	-	-	-
HCM Control Delay (s)	8.5	0	-	37.2	\$ 392	9.3	0	-	-	-	-	-
HCM Lane LOS	A	A	-	E	F	A	A	-	-	-	-	-
HCM 95th %ile Q(veh)	0	-	-	1.3	21.3	0.1	-	-	-	-	-	-

Notes  
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined \*: All major volume in platoon

**Junctions 8**

**ARCADY 8 - Roundabout Module**

Version: 8.0.6.541 (1951.28/11/2015)  
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Filename: (C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale2 Analysis\Arcady  
 Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale2  
 Report generation date: 2021-03-26 3:15:41 PM

**Summary of intersection performance**

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Background 2026						
Leg North	0.78	1.00	7.77	0.44	A		
Leg West	0.20	~1	3.12	0.16	A	4.89	A
Leg South	0.48	1.01	4.87	0.32	A		
Leg East	1.06	?	4.21	0.51	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- D1 - Existing, AM mode duration: 8:00 AM - 9:30 AM
- D2 - Existing, PM mode duration: 4:00 PM - 5:30 PM
- D3 - Existing, PM mode duration: 4:00 PM - 5:30 PM
- D4 - Background 2026, PM mode duration: 4:00 PM - 5:30 PM
- D5 - Background 2026, PM mode duration: 4:00 PM - 5:30 PM
- D6 - Background 2026, AM mode duration: 8:00 AM - 9:30 AM
- D7 - Total 2026, AM mode duration: 8:00 AM - 9:30 AM
- D8 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM
- D9 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM
- D10 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:15:34 PM

**File summary**

Title	(untitled)
Location	
Site Number	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

**Analysis Options**

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity	N/A	Residual Capacity Criteria Type	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (PCE)	36.00	Queue Threshold (PCE)	20.00
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**Units**

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per-hour	s	s	per-Min
						4-Min	

**(Default Analysis Set) - Background 2026, PM**

**Data Errors and Warnings**  
No errors or warnings

**Analysis Set Details**

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		x				100.000	100.000	

**Demand Set Details**

Name	Scenario Name	Time Period Name	Traffic Profile Type	Model Time (HH:MM)	Model Time Period (min)	Model Time Start Length (min)	Results For Central Segment Only	Single Segment Only	Run Automatically	Use Relationship	Relationship
Background 2:05_P.M. 2026	PM	ONE HOUR	ONE HOUR	16:00	90	15			x		

# Intersection Network

**Intersections**

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lanes Surringsdale	Roundabout	North,West,South,East				4.89	A

**Intersection Network Options**

Driving Side	Lighting
Right	Normal/unknown

# Legs

**Legs**

Leg	Leg Name	Description
North	North	Wondelind Road N
West	West	Surringsdale Road W
South	South	Wondelind Road N
East	East	Surringsdale Road W

**Capacity Options**

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

**Roundabout Geometry**

Leg	V - Approach road half-width (m)	E - Entry width (m)	r - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	Phi - Corridor (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	Only
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

**Bypass**

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

**Slope / Intercept / Capacity**

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr) (calculated)	Final Slope (PCE/hr) (calculated)	Final Intercept (PCE/hr) (calculated)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

# Traffic Flows

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Turns Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	2.00			x	x

# Entry Flows

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	320.00	100.000
West	ONE HOUR	x	212.00	100.000
South	ONE HOUR	x	621.00	100.000
East	ONE HOUR	x	623.00	100.000

# Turning Proportions

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.000	20.000	301.000
West	9.000	0.000	3.000
South	255.000	67.000	0.000
East	9.000	349.000	465.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.00	0.06	0.91
West	0.04	0.00	0.01
South	0.41	0.11	0.00
East	0.01	0.42	0.57

# Vehicle Mix

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	1.000	1.000	1.000
West	1.000	1.000	1.000
South	1.010	1.000	1.000
East	1.000	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.0	0.0	0.0
West	0.0	0.0	0.0
South	1.0	0.0	0.0
East	0.0	0.0	0.0

## Results

Results Summary for whole modelled period

Leg	Max Demand (PCE/hr)	Max Delay (s)	Max Queue (PCE)	Average Demand (PCE/hr)	Average Delay (s)	Average Queue (PCE)	Total In-Veh Arrivals (PCE/hr)	Total Queuing Delay (PCE-min)	Inclusive Total Queuing Delay (s)
North	0.44	7.77	0.76	301.90	46.86	6.21	452.84	0.52	46.87
West	0.16	3.12	0.20	194.53	29.80	2.84	291.80	13.83	13.83
South	0.32	4.87	0.48	360.84	443.21	4.44	327.79	4.44	327.79
East	0.51	4.21	1.06	755.20	1132.80	3.57	677.36	67.36	677.36

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	247.69	247.69	0.00	0.00	247.69	204.63	0.00	994.75	439.00	0.249	0.00	0.33	4.803	A
West	159.60	159.60	0.00	0.00	159.60	327.08	0.00	1625.40	1144.96	0.098	0.00	0.11	2.571	A
South	467.52	242.42	60.60	225.10	241.34	576.58	162.89	1136.03	628.56	0.213	0.00	0.27	4.033	A
East	619.60	619.60	0.00	225.10	617.57	156.13	248.09	1848.11	1560.19	0.335	0.00	0.51	2.954	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	205.76	205.76	0.00	0.00	205.76	205.16	701.21	0.00	923.32	0.220	0.33	0.47	5.726	A	
West	100.58	100.58	0.00	0.00	100.58	301.55	604.88	0.00	1548.27	1144.96	0.123	0.11	1.5	2.775	A
South	553.27	289.47	72.37	288.79	288.16	680.39	194.94	0.00	1123.15	628.56	0.236	0.27	3.56	4.389	A
East	739.86	739.86	0.00	288.79	738.12	186.85	239.23	0.00	1816.01	1560.19	0.407	0.51	1.68	3.383	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	362.24	362.24	0.00	0.00	361.03	300.15	968.47	0.00	826.06	0.439	0.47	0.77	7.721	A	
West	233.42	233.42	0.00	0.00	233.20	479.26	850.24	0.00	1443.65	1144.96	0.162	0.15	0.20	3.113	A
South	653.73	354.53	88.63	329.21	354.02	844.76	238.68	0.00	1100.24	628.56	0.322	0.35	0.48	4.869	A
East	906.14	906.14	0.00	329.21	904.70	228.78	353.92	0.00	1771.12	1560.19	0.512	0.69	1.05	4.200	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	362.24	362.24	0.00	0.00	362.21	300.57	969.98	0.00	826.24	0.439	0.49	0.77	7.773	A	
West	233.42	233.42	0.00	0.00	233.41	480.03	852.15	0.00	1442.36	1144.96	0.162	0.20	0.20	3.117	A
South	653.73	354.53	88.63	329.21	354.52	846.65	238.92	0.00	1100.11	628.56	0.322	0.48	0.48	4.866	A
East	906.14	906.14	0.00	329.21	906.12	228.01	364.43	0.00	1770.78	1560.19	0.512	1.05	1.06	4.215	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	247.69	247.69	0.00	0.00	247.69	205.79	664.07	0.00	993.08	0.249	0.249	0.48	0.33	4.838
West	159.60	159.60	0.00	0.00	159.74	328.86	163.51	0.00	1139.60	628.56	0.213	0.35	0.27	4.048
South	467.52	242.42	60.60	225.10	242.73	578.89	163.51	0.00	1122.94	628.56	0.258	0.48	0.35	4.360
East	619.60	619.60	0.00	225.10	620.35	155.73	249.51	0.00	1848.16	1560.19	0.408	1.06	0.70	3.339

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	205.76	205.76	0.00	0.00	206.96	245.84	793.51	0.00	922.06	0.220	0.321	0.78	0.48	5.769
West	100.58	100.58	0.00	0.00	100.80	302.23	607.24	0.00	1548.34	1144.96	0.123	0.20	0.15	2.782
South	553.27	289.47	72.37	288.79	289.97	693.22	195.32	0.00	1122.94	628.56	0.258	0.48	0.35	4.360
East	739.86	739.86	0.00	288.79	741.28	187.22	298.07	0.00	1815.46	1560.19	0.408	1.06	0.70	3.339

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	By-pass Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Pedestrian Demand (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	247.69	247.69	0.00	0.00	248.26	205.79	664.07	0.00	993.08	0.249	0.249	0.48	0.33	4.838
West	159.60	159.60	0.00	0.00	159.74	328.86	163.51	0.00	1139.60	628.56	0.213	0.35	0.27	4.048
South	467.52	242.42	60.60	225.10	242.73	578.89	163.51	0.00	1122.94	628.56	0.258	0.48	0.35	4.360
East	619.60	619.60	0.00	225.10	620.35	155.73	249.51	0.00	1848.16	1560.19	0.335	0.70	0.51	2.972

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	4.80	0.32	4.803	A
West	1.68	0.11	2.571	A
South	3.97	0.26	4.033	A
East	7.46	0.50	2.954	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	6.84	0.46	5.726	A
West	2.17	0.14	2.775	A
South	5.13	0.34	4.350	A
East	10.19	0.68	3.383	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	11.13	0.74	7.721	A
West	2.98	0.20	3.113	A
South	6.98	0.47	4.859	A
East	15.36	1.02	4.200	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	11.69	0.74	7.773	A
West	3.02	0.20	3.117	A
South	7.15	0.48	4.866	A
East	15.81	1.03	4.215	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	7.36	0.49	5.769	A
West	2.24	0.15	2.782	A
South	5.39	0.36	4.360	A
East	10.74	0.72	3.389	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.13	0.34	4.838	A
West	1.74	0.12	2.575	A
South	4.18	0.28	4.048	A

East	7.62	0.52	2.972	A	A
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**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.33	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.27	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.51	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:15-16:30)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.47	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.35	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.69	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:30-16:45)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.77	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.48	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.05	?	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:45-17:00)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.78	0.00	0.00	0.00	1.00	1.00	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.48	0.00	0.00	0.00	1.01	1.01	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.06	?	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:00-17:15)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.35	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.70	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:15-17:30)**

Lag	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q20 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.33	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.27	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.51	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

# Appendix E

## 2026 Total Traffic Operations Reports





HCM 6th TWSC  
 1.: Hyde Park Road & Sunningdale Road

2026 Total AM  
 1521 Sunningdale Road, London

Intersection														
Int Delay, s/veh														
10.1														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Vol, veh/h	4	30	11	158	44	12	14	245	110	6	367	9		
Future Vol, veh/h	4	30	11	158	44	12	14	245	110	6	367	9		
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0		
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free		
RT Channelized	-	-	None	-	None	-	-	None	-	None	-	None		
Storage Length	-	-	-	-	-	-	-	-	700	-	-	-		
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-		
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-		
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92		
Heavy Vehicles, %	0	4	0	4	3	0	8	12	8	0	12	0		
Mvmt Flow	4	33	12	172	48	13	15	266	120	7	399	10		
Major/Minor	Minor2	Minor1	Major1	Major2										
Conflicting Flow All	805	834	404	737	719	266	409	0	0	386	0	0		
Stage 1	418	418	-	296	296	-	-	-	-	-	-	-		
Stage 2	387	416	-	441	423	-	-	-	-	-	-	-		
Critical Hwy	7.1	6.54	6.2	7.14	6.53	6.2	4.18	-	-	4.1	-	-		
Critical Hwy Stg 1	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-		
Critical Hwy Stg 2	6.1	5.54	-	6.14	5.53	-	-	-	-	-	-	-		
Follow-up Hwy	3.5	4.036	3.3	3.536	4.027	3.3	2.272	-	-	2.2	-	-		
Pot Cap-1 Maneuver	303	302	651	332	353	778	1118	-	-	1184	-	-		
Stage 1	616	587	-	708	666	-	-	-	-	-	-	-		
Stage 2	641	588	-	591	586	-	-	-	-	-	-	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	261	294	651	293	344	778	1118	-	-	1184	-	-		
Mov Cap-2 Maneuver	261	294	-	293	344	-	-	-	-	-	-	-		
Stage 1	606	582	-	696	655	-	-	-	-	-	-	-		
Stage 2	574	578	-	543	581	-	-	-	-	-	-	-		
Approach	EB	WB	NB	WB	NB	SB								
HCM Control Delay, s	17.6	43.1	0.3	0.3	0.1	0.1								
HCM LOS	C	E	E	E	C	B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR						
Capacity (veh/h)	1118	-	-	335	314	1184	-	-						
HCM Lane V/C Ratio	0.014	-	-	0.146	0.741	0.006	-	-						
HCM Control Delay (s)	8.3	0	-	17.6	43.1	8.1	0	-						
HCM Lane LOS	A	A	-	C	E	A	A	-						
HCM 95th %ile Q(veh)	0	-	-	0.5	5.5	0	-	-						

HCM 6th TWSC  
 3.: Sunningdale Road & Street A

2026 Total AM  
 1521 Sunningdale Road, London

Intersection													
Int Delay, s/veh													
4.4													
Movement	EBL	EBT	EBR	WBT	WBR	SBL	SBR						
Lane Configurations													
Traffic Vol, veh/h	15	131	167	42	130	47							
Future Vol, veh/h	15	131	167	42	130	47							
Conflicting Peds, #/hr	0	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	None	-						
Storage Length	-	-	-	-	-	0	-						
Veh in Median Storage, #	-	0	0	0	0	0	-						
Grade, %	-	0	0	0	0	0	-						
Peak Hour Factor	92	92	92	92	92	92	92						
Heavy Vehicles, %	0	7	4	0	0	0	0						
Mvmt Flow	16	142	182	46	141	51							
Major/Minor	Major1	Major2	Minor2										
Conflicting Flow All	228	0	-	0	379	205							
Stage 1	-	-	-	-	205	-							
Stage 2	-	-	-	-	174	-							
Critical Hwy	4.1	-	-	-	6.4	6.2							
Critical Hwy Stg 1	-	-	-	-	5.4	-							
Critical Hwy Stg 2	-	-	-	-	5.4	-							
Follow-up Hwy	2.2	-	-	-	3.5	3.3							
Pot Cap-1 Maneuver	1352	-	-	-	627	841							
Stage 1	-	-	-	-	834	-							
Stage 2	-	-	-	-	861	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	1352	-	-	-	619	841							
Mov Cap-2 Maneuver	-	-	-	-	619	-							
Stage 1	-	-	-	-	823	-							
Stage 2	-	-	-	-	861	-							
Approach	EB	WB	SB										
HCM Control Delay, s	0.8	0	12.6										
HCM LOS	B	B	B										
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1								
Capacity (veh/h)	1352	-	-	-	666								
HCM Lane V/C Ratio	0.012	-	-	-	0.289								
HCM Control Delay (s)	7.7	0	-	-	12.6								
HCM Lane LOS	A	A	-	-	B								
HCM 95th %ile Q(veh)	0	-	-	-	1.2								

Intersection	Int Delay, s/veh										1.3
Movement	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	W	R	L	L	L	L					
Traffic Vol, veh/h	48	12	245	16	4	334					
Future Vol, veh/h	48	12	245	16	4	334					
Conflicting Peds, #/hr	0	0	0	0	0	0					
Sign Control	Stop	Stop	Free	Free	Free	Free					
RT Channelized	-	None	-	None	-	None					
Storage Length	0	-	-	-	-	-					
Veh in Median Storage, #	0	-	0	-	-	0					
Grade, %	0	-	0	-	-	0					
Peak Hour Factor	92	92	92	92	92	92					
Heavy Vehicles, %	0	0	12	0	0	11					
Mvmt Flow	52	13	266	17	4	363					
Major/Minor	Minor1	Minor1	Major1	Major2							
Conflicting Flow All	646	275	0	0	283	0					
Stage 1	275	-	-	-	-	-					
Stage 2	371	-	-	-	-	-					
Critical Hwy	6.4	6.2	-	-	-	4.1					
Critical Hwy Stg 1	5.4	-	-	-	-	-					
Critical Hwy Stg 2	5.4	-	-	-	-	-					
Follow-up Hwy	3.5	3.3	-	-	-	2.2					
Pot Cap-1 Maneuver	439	769	-	-	-	1291					
Stage 1	776	-	-	-	-	-					
Stage 2	702	-	-	-	-	-					
Platoon blocked, %	-	-	-	-	-	-					
Mov Cap-1 Maneuver	437	769	-	-	-	1291					
Mov Cap-2 Maneuver	437	-	-	-	-	-					
Stage 1	776	-	-	-	-	-					
Stage 2	699	-	-	-	-	-					
Approach	WB	NB	SB								
HCM Control Delay, s	13.7	0	0.1								
HCM LOS	B										
Minor Lane/Major Mvmt	NBT	NBR	WBL	N	SBL	SBT					
Capacity (veh/h)	-	-	478	1291	-	-					
HCM Lane V/C Ratio	-	-	0.136	0.003	-	-					
HCM Control Delay (s)	-	-	13.7	7.8	0	-					
HCM Lane LOS	-	-	B	A	A	-					
HCM 95th %ile Q(veh)	-	-	0.5	0	-	-					

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1951.28/1/22/15)  
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Filename: (210088) 1521 Sunningdale Road - Sunningdale and Wonderland Road.arcb  
Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale2 Analysis\Arcady  
Report generation date: 2021-03-26 3:18:32 PM

### Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Total 2026							
Leg North	0.37	~1	4.72	0.26	A		
Leg West	0.39	~1	3.07	0.27	A		
Leg South	0.45	1.05	5.35	0.30	A	4.05	A
Leg East	0.32	~1	2.74	0.23	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- D1 - Existing, AM model duration: 8:00 AM - 9:30 AM
- D2 - Existing, PM model duration: 4:00 PM - 5:30 PM
- D3 - Existing, AM model duration: 8:00 AM - 9:30 AM
- D4 - Background 2026, PM model duration: 4:00 PM - 5:30 PM
- D5 - Background 2031, AM model duration: 8:00 AM - 9:30 AM
- D6 - Background 2031, PM model duration: 4:00 PM - 5:30 PM
- D7 - Total 2026, AM model duration: 8:00 AM - 9:30 AM
- D8 - Total 2026, PM model duration: 4:00 PM - 5:30 PM
- D9 - Total 2031, AM model duration: 8:00 AM - 9:30 AM
- D10 - Total 2031, PM model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:18:31 PM

### File summary

Title	(Untitled)
Location	
Site Number	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity		Residual Capacity Criteria Type	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	36.00	Queue Threshold (PCE)	20.00
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### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per/hour	s	s	per/h
						min	per/h

## (Default Analysis Set) - Total 2026, AM



### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period Name	Model Profile Name	Model Profile Time (HH:mm)	Model Profile Time (HH:mm)	Model Period Length (min)	Time Period Length (min)	Results For Central Segment Only	Single Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total AM	2028	AM	ONE HOUR	08:00	09:30	90	15				x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Circle Separated	Laps Roundabout	Do Geometric Delay	Intersections Delay (s)	Intersection LOS
1	2 Lane Summingdale	Roundabout	North,West,South,East				4.05	A

### Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

## Legs

Leg	Leg Name	Description
North	Wendland Road N	
West	Summingdale Road W	
South	Wendland Road S	
East	Summingdale Road E	

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I* - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	6.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	6.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr) (calculated)	Final Slope (calculated)	Final Intercept (PCE/hr) (calculated)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

## Traffic Flows

### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Values Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	2.00			x	x

## Entry Flows

### General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	256.00	100.000
West	ONE HOUR	x	419.00	100.000
South	ONE HOUR	x	572.00	100.000
East	ONE HOUR	x	360.00	100.000

## Turning Proportions

### Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.000	11.000	237.000
From West	26.000	0.000	48.000
From South	231.000	45.000	0.000
From East	0.000	183.000	197.000

### Turning Proportions (PCE) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.00	0.04	0.93
From West	0.06	0.00	0.11
From South	0.40	0.08	0.00
From East	0.00	0.46	0.52

## Vehicle Mix

### Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	South
From North	1.000	1.020	1.060
From West	1.000	1.000	1.000
From South	1.030	1.130	1.000
From East	1.000	1.050	1.040

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	East
North	0.0	2.0	8.0
West	9.0	0.0	5.0
South	3.0	13.0	0.0
East	0.0	5.0	4.0

## Results

Results Summary for whole modelled period

Leg	Max Daily Demand (PCE/h)	Max 95th Queue (PCE)	Average Demand (PCE/h)	Average LOS	Total Intersection Arrivals (PCE)	Total Queuing Delay (PCE-min)	Average Queuing Delay (s)	Rate of Queuing Delay (PCE-min/min)	Inclusive Total Queuing Delay (s)
North	0.26	4.72	0.37	-1	234.91	352.37	4.30	0.28	25.28
West	0.27	3.07	0.39	-1	364.48	576.72	2.81	0.30	26.98
South	0.30	5.35	0.45	1.05	524.88	379.89	4.82	0.34	30.55
East	0.23	2.74	0.32	-1	348.69	523.04	2.56	0.25	22.30

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.73	192.73	0.00	191.50	191.84	319.04	0.00	1162.39	464.25	0.163	0.00	0.21	3.902	A
West	315.45	315.45	0.00	314.55	179.37	331.57	0.00	1792.50	1198.71	0.176	0.00	0.22	2.546	A
South	430.63	207.79	51.95	222.84	206.79	361.61	294.52	1076.24	687.40	0.193	0.00	0.25	4.323	A
East	286.09	286.08	71.52	0.00	222.84	285.33	265.75	1864.28	1519.09	0.153	0.00	0.19	2.380	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	230.14	230.14	0.00	229.00	229.88	381.82	0.00	1147.95	464.25	0.200	0.31	0.37	4.213	A
West	376.67	376.67	0.00	376.67	214.70	307.02	0.00	1748.83	1198.71	0.215	0.23	0.29	2.714	A
South	514.22	248.32	62.03	268.00	247.22	432.86	346.48	1046.93	687.40	0.237	0.25	0.32	4.797	A
East	341.61	341.61	85.40	0.00	268.10	341.41	318.02	1834.17	1519.09	0.196	0.19	0.24	2.519	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	281.86	281.86	0.00	281.86	281.42	467.54	0.00	1100.92	464.25	0.256	0.27	0.37	4.719	A
West	461.33	461.33	0.00	460.91	262.69	486.11	0.00	1688.94	1198.71	0.273	0.29	0.39	3.087	A
South	620.78	303.88	75.97	325.90	303.38	530.11	416.90	1008.91	687.40	0.302	0.32	0.45	5.344	A
East	418.39	418.39	104.60	0.00	325.90	418.07	330.88	1793.37	1519.09	0.233	0.24	0.32	2.734	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	281.86	281.86	0.00	281.86	281.85	467.93	0.00	1100.70	464.25	0.256	0.37	0.37	4.724	A
West	461.33	461.33	0.00	461.32	263.14	486.64	0.00	1688.48	1198.71	0.273	0.39	0.39	3.088	A
South	620.78	303.88	75.97	325.90	303.87	530.69	417.28	1006.71	687.40	0.302	0.45	0.45	5.342	A
East	418.39	418.39	104.60	0.00	325.90	418.39	380.76	1793.02	1519.09	0.233	0.32	0.32	2.735	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	230.14	230.14	0.00	230.53	230.98	362.46	0.00	1147.60	464.25	0.201	0.37	0.37	4.221	A
West	376.67	376.67	0.00	377.00	215.10	307.88	0.00	1748.25	1198.71	0.215	0.39	0.29	2.747	A
South	514.22	248.32	62.03	268.10	248.61	433.88	341.09	1046.61	687.40	0.237	0.45	0.33	4.718	A
East	341.61	341.61	85.40	0.00	268.10	341.92	318.59	1833.61	1519.09	0.188	0.32	0.24	2.523	A

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	230.14	230.14	0.00	230.53	230.98	362.46	0.00	1147.60	464.25	0.201	0.37	0.37	4.221	A
West	376.67	376.67	0.00	377.00	215.10	307.88	0.00	1748.25	1198.71	0.215	0.39	0.29	2.747	A
South	514.22	248.32	62.03	268.10	248.61	433.88	341.09	1046.61	687.40	0.237	0.45	0.33	4.718	A
East	341.61	341.61	85.40	0.00	268.10	341.92	318.59	1833.61	1519.09	0.188	0.32	0.24	2.523	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	Entry Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (Ped/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.73	192.73	0.00	192.97	193.00	320.21	0.00	1181.75	464.25	0.163	0.27	0.21	3.914	A
West	315.45	315.45	0.00	315.70	180.09	333.10	0.00	1791.87	1198.71	0.176	0.29	0.22	2.553	A
South	430.63	207.79	51.95	222.84	208.09	363.23	285.57	1076.69	687.40	0.193	0.33	0.25	4.339	A
East	286.09	286.08	71.52	0.00	222.84	286.28	265.73	1863.37	1519.09	0.154	0.24	0.19	2.384	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.05	0.20	3.902	A
West	3.29	0.22	2.546	A
South	3.64	0.24	4.323	A
East	2.79	0.19	2.380	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.95	0.26	4.213	A
West	4.24	0.28	2.744	A
South	4.75	0.32	4.707	A
East	3.54	0.24	2.519	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.40	0.36	4.719	A
West	5.79	0.39	3.087	A
South	6.57	0.44	5.344	A
East	4.69	0.31	2.734	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	5.82	0.39	4.724	A
West	6.24	0.45	3.082	A
South	7.19	0.52	5.352	A
East	4.76	0.32	2.735	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	4.14	0.28	4.221	A
West	4.39	0.29	2.747	A
South	5.01	0.33	4.718	A
East	3.64	0.24	2.523	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalised Level Of Service
North	3.21	0.21	3.914	A
West	3.40	0.23	2.553	A
South	3.84	0.26	4.339	A



HCM 6th TWSC  
 1: Hyde Park Road & Sunningdale Road

2026 Total PM  
 1521 Sunningdale Road, London

Intersection	130.8											
Int Delay, s/veh	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	4	4	4	4	4	4	4	4	4	4	4	4
Lane Configurations												
Traffic Vol, veh/h	12	39	9	200	96	14	13	555	241	14	429	8
Future Vol, veh/h	12	39	9	200	96	14	13	555	241	14	429	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	40	0	13	3	1	8	18	3	2	0	5	0
Mvmt Flow	13	42	10	217	104	15	14	603	262	15	466	9

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1323	1394	471	1158
Stage 1	501	501	-	631
Stage 2	822	893	-	527
Critical Hwy	7.5	6.5	6.33	7.13
Critical Hwy Stg 1	6.5	5.5	-	6.13
Critical Hwy Stg 2	6.5	5.5	-	6.13
Follow-up Hwy	3.86	4	3.417	3.527
Pot Cap-1 Maneuver	111	143	571	-172
Stage 1	488	546	-	467
Stage 2	318	363	-	533
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	59	135	571	-123
Mov Cap-2 Maneuver	59	135	-	-123
Stage 1	474	532	-	454
Stage 2	232	353	-	470

Approach	EB	WB	NB	SB
HCM Control Delay, s	68	\$ 673.9	0.1	0.3
HCM LOS	F	F	F	F

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1009	-	-	118	144	787	-	-
HCM Lane V/C Ratio	0.014	-	-	0.563	2.34	0.019	-	-
HCM Control Delay (s)	8.6	0	-	688	673.9	9.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %ile Q(veh)	0	-	-	2.6	28.5	0.1	-	-

Notes  
 ~: Volume exceeds capacity \$: Delay exceeds 300s +-: Computation Not Defined \*: All major volume in platoon

HCM 6th TWSC  
 3: Sunningdale Road & Street A

2026 Total PM  
 1521 Sunningdale Road, London

Intersection	2.9											
Int Delay, s/veh	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	4	4	4	4	4	4	4	4	4	4	4	4
Lane Configurations												
Traffic Vol, veh/h	49	245	280	137	82	30	-	-	-	-	-	-
Future Vol, veh/h	49	245	280	137	82	30	-	-	-	-	-	-
Conflicting Peds, #/hr	0	0	0	0	0	0	-	-	-	-	-	-
Sign Control	Free	Free	Free	Free	Free	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	0	0	0	-	-	-	0	-	-
Grade, %	-	0	0	0	0	0	-	-	-	0	-	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	2	0	0	0	-	-	-	0	-	-
Mvmt Flow	53	266	304	149	89	33	-	-	-	89	33	-

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	453	0	-	0
Stage 1	-	-	-	379
Stage 2	-	-	-	372
Critical Hwy	4.1	-	-	6.4
Critical Hwy Stg 1	-	-	-	5.4
Critical Hwy Stg 2	-	-	-	5.4
Follow-up Hwy	2.2	-	-	3.5
Pot Cap-1 Maneuver	1118	-	-	381
Stage 1	-	-	-	696
Stage 2	-	-	-	702
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1118	-	-	360
Mov Cap-2 Maneuver	-	-	-	360
Stage 1	-	-	-	657
Stage 2	-	-	-	702

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	17.4
HCM LOS	C	C	C

Minor Lane/Major Mvmt	EBL	EBT	WBL	WBT	WBR	SBLn1	SBTn1
Capacity (veh/h)	1118	-	-	-	-	-	411
HCM Lane V/C Ratio	0.048	-	-	-	-	-	0.296
HCM Control Delay (s)	8.4	0	-	-	-	-	17.4
HCM Lane LOS	A	A	-	-	-	-	C
HCM 95th %ile Q(veh)	0.1	-	-	-	-	-	1.2

Intersection	0.9			
In/Delay, s/veh				
Movement	WBL	WBR	NBT	SBL
Lane Configurations	W	R	F	4
Traffic Vol, veh/h	31	8	531	50
Future Vol, veh/h	31	8	531	50
Conflicting Peds, #/hr	0	0	0	0
Sign Control	Stop	Stop	Free	Free
RT Channelized	-	None	-	None
Storage Length	0	-	-	-
Veh in Median Storage, #	0	-	0	-
Grade, %	0	-	0	-
Peak Hour Factor	92	92	92	92
Heavy Vehicles, %	0	0	3	0
Mvmt Flow	34	9	577	54
Major/Minor	Minor1	Major1	Major2	
Conflicting Flow All	1087	604	0	631
Stage 1	604	-	-	-
Stage 2	483	-	-	-
Critical Hwy	6.4	6.2	-	4.1
Critical Hwy Stg 1	5.4	-	-	-
Critical Hwy Stg 2	5.4	-	-	-
Follow-up Hwy	3.5	3.3	-	2.2
Pot Cap-1 Maneuver	241	502	-	961
Stage 1	550	-	-	-
Stage 2	625	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	237	502	-	961
Mov Cap-2 Maneuver	237	-	-	-
Stage 1	550	-	-	-
Stage 2	614	-	-	-
Approach	WB	NB	SB	
HCM Control Delay, s	21.1	0	0.2	
HCM LOS	C			
Minor Lane/Major Mvmt	NBT	NBR	WBL	SBL
Capacity (veh/h)	-	-	266	961
HCM Lane V/C Ratio	-	-	0.159	0.014
HCM Control Delay (s)	-	-	21.1	8.8
HCM Lane LOS	-	-	C	A
HCM 95th %ile Q(veh)	-	-	0.6	0

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1951.28/11/22/15)  
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Filename: (210088) 1521 Sunningdale Road - Sunningdale and Wonderland Road.arcb  
 Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Sunningdale2 Analysis\Arcady  
 Report generation date: 2021-03-26 3:18:53 PM

### Summary of intersection performance

	PM				
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS
Leg North	0.99	2.00	9.61	0.50	A
Leg West	0.30	~1	3.35	0.22	A
Leg South	0.62	1.01	5.49	0.38	A
Leg East	1.35	1.01	4.94	0.57	A

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- D1 - Existing, AM model duration: 8:00 AM - 9:30 AM
- D2 - Existing, PM model duration: 4:00 PM - 5:30 PM
- D3 - Background 2026, AM model duration: 8:00 AM - 9:30 AM
- D4 - Background 2026, PM model duration: 4:00 PM - 5:30 PM
- D5 - Background 2031, AM model duration: 8:00 AM - 9:30 AM
- D6 - Background 2031, PM model duration: 4:00 PM - 5:30 PM
- D7 - Total 2026, AM model duration: 8:00 AM - 9:30 PM
- D8 - Total 2026, PM model duration: 4:00 PM - 5:30 PM
- D9 - Total 2031, AM model duration: 8:00 AM - 9:30 PM
- D10 - Total 2031, PM model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:18:52 PM

### File summary

Title	(untitled)
Location	
Site Number	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity		Residual Capacity Criteria Type	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	36.00	Queue Threshold (PCE)	20.00
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### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	per/hour	s	s	per/h
						min	per/h

## (Default Analysis Set) - Total 2026, PM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Period Time (HH:mm)	Model Period Length (min)	Model Period Start Time (HH:mm)	Time For Central Segment Only	Results For Central Segment Only	Single Segment Only	Run Automatically	Use Relationship	Relationship
Total 2028, PM	2028	PM	ONE HOUR	ONE HOUR	16:00	17:30	90	15			x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Circle Separated	Legs Roundabout	Do Geometric Delay	Intersections Delay (s)	Intersection LOS
1	2 Lane Sunningdale	Roundabout	North,West,South,East				5.62	A

### Intersection Network Options

Driving Side	Right
Lighting	Normal/unknown

## Legs

Leg	Leg Name	Description
North	Wondelands Road N	
West	Sunningdale Road W	
South	Wondelands Road S	
East	Sunningdale Road E	

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I* - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	6.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	6.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope (calculated)	Entered Intercept (PCE/hr) (calculated)	Final Slope (calculated)	Final Intercept (PCE/hr) (calculated)
North				0.549	1357.445
West				0.673	2016.168
South				0.524	1225.224
East				0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

## Traffic Flows

### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Values Over Turn	Vehicle Mix Turns Over Entry	Vehicle Mix Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	2.00			x	x

## Entry Flows

### General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	341.00	100.000
West	ONE HOUR	x	294.00	100.000
South	ONE HOUR	x	671.00	100.000
East	ONE HOUR	x	698.00	100.000

## Turning Proportions

### Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.00	32.00	301.00
From West	17.00	0.00	33.00
From South	255.00	117.00	0.00
From East	9.00	424.00	465.00

### Turning Proportions (PCE) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.00	0.09	0.88
From West	0.06	0.00	0.11
From South	0.38	0.17	0.00
From East	0.01	0.47	0.52

## Vehicle Mix

### Average PCE Per Vehicle - Intersection 1 (for whole period)

	To		
	North	West	South
From North	1.000	1.000	1.000
From West	1.000	1.000	1.000
From South	1.010	1.000	1.000
From East	1.000	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.0	0.0	0.0
From West	1.0	0.0	0.0
From South	0.0	0.0	2.0
From East	0.0	3.0	0.0

# Results

## Results Summary for whole modelled period

Leg	Max Demand (PCE/h)	Max Delay (s)	Max Queue (PCE)	Max LOS	Average Demand (PCE/h)	Average Delay (s)	Average Queue (PCE)	Average LOS	Inclusive Total Delay (PCEmin)	Inclusive Average Delay (s)
North	0.50	9.61	0.99	2.00	312.91	469.36	56.70	0.63	56.71	7.25
West	0.22	3.35	0.30	-1	263.78	404.67	20.28	3.01	20.28	3.01
South	0.38	5.49	0.62	1.01	615.72	512.03	41.64	0.46	41.64	4.88
East	0.57	4.94	1.35	1.01	624.02	1236.03	82.86	4.02	82.86	4.02

## Main Results for each time segment

### Main results: (16:00-16:15)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	256.72	256.72	0.00	0.00	255.24	270.57	754.59	0.00	943.42	0.272	0.00	0.37	5.221	A	
West	221.34	221.34	0.00	0.00	220.68	429.70	595.13	0.00	1625.53	0.136	0.16	2.666	3.01	A	
South	505.16	280.06	70.02	225.10	0.00	278.73	596.91	201.90	0.00	1119.50	648.46	0.250	0.30	4.304	A
East	676.06	676.06	0.00	0.00	673.68	189.14	291.49	0.00	1819.99	0.371	0.00	0.60	3.177	A	

### Main results: (16:15-16:30)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	306.55	306.55	0.00	0.00	305.85	262.31	602.30	0.00	861.82	0.356	0.37	0.55	6.467	A	
West	264.30	264.30	0.00	0.00	264.10	514.47	694.68	0.00	1548.40	0.171	0.16	0.21	2.918	A	
South	632.22	334.42	83.61	268.79	0.00	334.01	717.15	244.63	0.00	1096.89	648.46	0.304	0.33	4.738	A
East	807.28	807.28	0.00	0.00	806.53	226.36	346.28	0.00	1726.36	0.463	0.60	0.63	3.741	A	

### Main results: (16:30-16:45)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	375.45	375.45	0.00	0.00	373.71	308.85	1105.40	0.00	750.93	0.500	0.55	0.96	9.499	A	
West	323.70	323.70	0.00	0.00	323.36	629.54	849.57	0.00	1444.10	0.224	0.21	0.30	3.344	A	
South	736.76	409.58	102.39	329.21	0.00	408.86	877.10	295.83	0.00	1070.31	648.46	0.363	0.44	6.474	A
East	966.72	966.72	0.00	0.00	966.70	277.13	427.55	0.00	1726.27	0.572	0.63	1.34	4.911	A	

### Main results: (16:45-17:00)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	375.45	375.45	0.00	0.00	375.40	309.38	1107.59	0.00	749.73	0.501	0.98	0.96	9.614	A	
West	323.70	323.70	0.00	0.00	323.70	630.86	852.13	0.00	1442.38	0.224	0.30	0.30	3.349	A	
South	736.76	409.58	102.39	329.21	0.00	409.57	879.65	296.17	0.00	1070.14	648.46	0.363	0.62	6.486	A
East	966.72	966.72	0.00	0.00	966.68	277.45	428.28	0.00	1727.78	0.572	1.34	1.35	4.938	A	

### Main results: (17:00-17:15)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	375.45	375.45	0.00	0.00	375.40	309.38	1107.59	0.00	749.73	0.501	0.98	0.96	9.614	A	
West	323.70	323.70	0.00	0.00	323.70	630.86	852.13	0.00	1442.38	0.224	0.30	0.30	3.349	A	
South	736.76	409.58	102.39	329.21	0.00	409.57	879.65	296.17	0.00	1070.14	648.46	0.363	0.62	6.486	A
East	966.72	966.72	0.00	0.00	966.68	277.45	428.28	0.00	1727.78	0.572	1.34	1.35	4.938	A	

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	306.55	306.55	0.00	0.00	306.28	253.14	906.58	0.00	860.02	0.356	0.39	0.55	6.546	A	
West	264.30	264.30	0.00	0.00	264.44	516.44	694.41	0.00	1546.99	0.171	0.30	0.22	2.925	A	
South	632.22	334.42	83.61	268.79	0.00	335.03	720.88	245.17	0.00	1098.41	648.46	0.304	0.44	4.754	A
East	807.28	807.28	0.00	0.00	809.28	226.67	350.43	0.00	1759.20	0.463	0.65	0.65	3.786	A	

### Main results: (17:15-17:30)

Leg	Total Demand (PCE/h)	Intersection Arrivals (PCE)	Bypass Demand (PCE/h)	By-pass Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Demand (PCE/h)	Pedestrian Demand (Peds/h)	Capacity (PCE/h)	Saturation (PCE/h)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	256.72	256.72	0.00	0.00	257.45	211.86	754.47	0.00	941.29	0.273	0.56	0.38	5.271	A	
West	221.34	221.34	0.00	0.00	221.54	432.05	593.87	0.00	1623.01	0.136	0.22	0.16	2.674	A	
South	505.16	280.06	70.02	225.10	0.00	280.46	602.70	202.71	0.00	1119.07	648.46	0.250	0.44	4.324	A
East	676.06	676.06	0.00	0.00	677.04	189.90	293.29	0.00	1818.67	0.372	0.65	0.60	3.199	A	

## Queueing Delay Results for each time segment

### Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	5.40	0.36	5.221	A
West	2.41	0.16	2.666	A
South	4.88	0.33	4.304	A
East	8.74	0.58	3.177	A

### Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	7.97	0.53	6.467	A
West	3.16	0.21	2.918	A
South	6.43	0.43	4.738	A
East	12.26	0.82	3.741	A

### Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	14.02	0.93	9.499	A
West	4.42	0.29	3.344	A
South	9.04	0.60	5.474	A
East	19.45	1.30	4.911	A

### Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	14.81	0.99	9.614	A
West	4.50	0.30	3.349	A
South	9.30	0.62	5.486	A
East	20.16	1.34	4.938	A

### Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	8.70	0.58	6.546	A
West	3.28	0.22	2.925	A
South	6.81	0.45	4.754	A
East	13.03	0.87	3.766	A

### Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCEmin)	Queueing Rate Of Delay (PCEmin/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	8.81	0.59	6.571	A
West	2.50	0.17	2.674	A
South	5.17	0.34	4.324	A

East	9.22	0.61	3.199	A	A
------	------	------	-------	---	---

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.37	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.33	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.44	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.83	0.00	0.00	1.01			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.88	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.30	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.62	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.34	?	?	?			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.99	0.00	0.00	2.00			N/A	N/A
West	0.30	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.62	0.00	0.00	1.01			N/A	N/A
East	1.35	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.22	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.44	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.38	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.34	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A



# Appendix F

## 2031 Total Traffic Operations Reports





## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541.11953.2611223.151  
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Filename: (210088) 1521 Sunningdale Road - Sunningdale and Hyde Park.arcd8  
 Path: C:\Users\AdamMorrison\Programs\Projects - (210088) 1521 Sunningdale02 Analysis\Arcady  
 Report generation date: 2021-04-21 14:42:37 PM

### Summary of intersection performance

	AM			
	Queue (PCE)	Delay (s)	V/C Ratio	LOS
	A1 - Total 2031 no BG Dev			
Leg North	0.67	5.29	0.38	A
Leg West	0.04	2.40	0.03	A
Leg South	0.39	4.53	0.26	A
Leg East	0.17	2.41	0.14	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- \*D1 - Background 2031, AM, model duration: 6:00 AM - 9:30 AM
- \*D2 - Background 2031, PM, model duration: 4:00 PM - 5:30 PM
- \*D3 - Total 2031, AM, model duration: 6:00 AM - 9:30 AM
- \*D4 - Total 2031, PM, model duration: 4:00 PM - 5:30 PM
- \*D5 - Total 2031 no BG Dev, AM, model duration: 6:00 AM - 9:30 AM
- \*D6 - Total 2031 no BG Dev, PM, model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-04-21 14:42:36 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(never file)
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity	N/A	Residual Capacity Criteria	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	30.00	Queue Threshold (CBS)	20.00
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### Units

Distance Units	m	Speed Units	km/h	Traffic Units Input	PCE	Traffic Units Results	PCE	Average Delay Units	s	Total Delay Units	veh	Rate Of Delay Units	veh/min
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## (Default Analysis Set) - Total 2031 no BG Dev, AM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default AnalysisSet)	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason for Scaling Factors
ARCADY			x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Flow Type	Model Start Time (hh:mm)	Model Finish Time (hh:mm)	Model Time Segment Length (min)	Results For Cycle Length (min)	Time Segment Length (min)	Single Segment Hour Only	Run Automatically	Use Relationship	Relationship
Total 2031 no BG Dev, AM	Total 2031 no BG Dev, AM	AM		ONE HOUR	06:00	09:30	90	15			x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	A1 Lane Sunningdale	Roundabout	North,West,South,East				4.28	A

### Intersection Network Options

Driving Side	Right
Lighting	Normal/unknown

## Legs

### Legs

Leg	Leg Name	Description
North	North	Hyde Park Road
West	West	Sunningdale Road W
South	South	Hyde Park Road
East	East	Sunningdale Road W

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	999996.00		0.00
West	0.00	999996.00		0.00
South	0.00	999996.00		0.00
East	0.00	999996.00		0.00

### Roundabout Geometry

Leg	V - Approach road half width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope (PCE/hr)	Entered intercept (PCE/hr)	Final Slope (calculated)	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.549	1357.445
West		(calculated)	(calculated)	0.673	2016.188
South		(calculated)	(calculated)	0.524	1225.224
East		(calculated)	(calculated)	0.673	2016.188

The slope and intercept shown above include any corrections and adjustments.

### Traffic Flows

#### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Varies Over Truck Percentages	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
					2.00					

### Entry Flows

#### General Flows Data

Leg	Profile Type	Use	Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x		416.00	100.000
West	ONE HOUR	x		46.00	100.000
South	ONE HOUR	x		406.00	100.000
East	ONE HOUR	x		230.00	100.000

### Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	10.00	400.00	6.00
	West	4.00	0.00	12.00	32.00
	South	269.00	16.00	0.00	120.00
	East	13.00	47.00	170.00	0.00

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.96	0.01
	West	0.08	0.00	0.25	0.97
	South	0.66	0.04	0.00	0.30
	East	0.06	0.20	0.74	0.00

### Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.120	1.000
	West	1.000	1.000	1.000	1.000
	South	1.200	1.080	1.000	1.080
	East	1.000	1.030	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	12.0	0.0
	West	0.0	0.0	0.0	4.0
	South	12.0	8.0	0.0	8.0
	East	0.0	3.0	4.0	0.0

## Results

Results Summary for whole modelled period

Leg	Max Ratio	Max Delay (s)	Max Queue (PCE)	Max LOS	Average LOS (PCE/hr)	Average Delay (PCE/hr)	Total Delay (PCE)	Total Delay (min)	Average Delay (s)	Rate of Queuing Delay (PCE-min)	Rate of Queuing Delay (s)	Indicative Total Average Delay (s)
North	0.38	5.29	0.67	1.11	A	361.73	572.59	462.4	4.74	0.50	0.50	46.24
West	0.03	2.40	0.04	-1	A	44.05	66.07	2.53	2.30	0.03	0.03	2.53
South	0.26	4.53	0.39	-1	A	371.64	362.28	27.96	4.26	0.31	0.31	27.96
East	0.14	2.41	0.17	-1	A	211.05	316.58	12.14	2.30	0.13	0.13	12.14

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	313.19	313.19	78.30	0.00	0.00	311.72	214.38	174.96	0.00	1261.45	613.23	0.248	0.00	0.00	0.37	4.220
West	361.4	361.4	9.03	0.00	0.00	360.65	54.76	43.90	0.00	1725.34	923.07	0.021	0.00	0.00	0.02	2.196
South	304.91	274.56	53.64	90.34	0.00	213.00	456.42	315.3	0.00	1208.71	858.07	0.176	0.00	0.00	0.24	4.040
East	173.16	173.16	43.29	0.00	90.34	172.73	268.53	216.61	0.00	1870.31	1386.58	0.093	0.00	0.00	0.11	2.196

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	371.98	371.98	93.49	0.00	0.00	373.53	266.87	205.35	0.00	1242.58	613.23	0.301	0.37	0.48	4.616	
West	431.15	431.15	10.79	0.00	0.00	431.13	615.58	617.31	0.00	1657.83	933.07	0.026	0.03	0.03	2.273	
South	364.09	266.21	64.65	107.88	0.00	255.87	522.79	377.3	0.00	1268.46	858.07	0.213	0.24	0.30	4.236	
East	206.77	206.77	51.69	0.00	107.88	206.06	34.14	259.36	0.00	1841.39	1386.58	0.112	0.11	0.13	2.260	

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	458.02	458.02	114.51	0.00	0.00	457.26	314.53	256.37	0.00	1216.78	613.23	0.376	0.48	0.67	5.278	
West	52.85	52.85	13.21	0.00	0.00	52.82	80.30	633.33	0.00	1589.14	923.07	0.033	0.03	0.04	2.403	
South	445.91	313.79	78.45	132.12	0.00	313.42	639.94	462.1	0.00	1201.03	858.07	0.261	0.30	0.39	4.531	
East	253.23	253.23	63.31	0.00	132.12	253.08	41.81	317.62	0.00	1802.16	1386.58	0.141	0.13	0.17	2.406	

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	458.02	458.02	114.51	0.00	0.00	458.01	314.89	256.54	0.00	1216.69	613.23	0.376	0.67	0.67	5.289	
West	52.85	52.85	13.21	0.00	0.00	52.85	80.37	634.17	0.00	1589.14	923.07	0.034	0.04	0.04	2.404	
South	445.91	313.79	78.45	132.12	0.00	313.79	640.78	462.4	0.00	1201.01	858.07	0.261	0.39	0.39	4.534	
East	253.23	253.23	63.31	0.00	132.12	253.23	41.84	318.19	0.00	1801.91	1386.58	0.141	0.17	0.17	2.406	

Main results: (09:00-09:15)



because the mean queue is very small or very big.

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1951.28/11/23/15)  
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Filename: (210088) 1521 Summingdale Road - Summingdale and Wonderland Road.arcb  
 Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Summingdale\ Analysis\Arcady  
 Report generation date: 2021-04-21 3:24:32 PM

### Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031 no BG Dev						
Leg North	0.43	~1	5.05	0.29	A		
Leg West	0.45	~1	3.25	0.30	A	4.33	A
Leg South	0.53	1.04	5.74	0.34	A		
Leg East	0.36	~1	2.86	0.26	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of a average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- \*D1 - Existing, AM model duration: 8:00 AM - 9:30 AM
- \*D2 - Existing, PM model duration: 4:00 PM - 5:30 PM
- \*D3 - Background 2026, AM model duration: 8:00 AM - 9:30 AM
- \*D4 - Background 2026, PM model duration: 4:00 PM - 5:30 PM
- \*D5 - Background 2031, AM model duration: 8:00 AM - 9:30 AM
- \*D6 - Background 2031, PM model duration: 4:00 PM - 5:30 PM
- \*D7 - Total 2026, AM model duration: 8:00 AM - 9:30 PM
- \*D8 - Total 2026, PM model duration: 4:00 PM - 5:30 PM
- \*D9 - Total 2031, AM model duration: 8:00 AM - 9:30 PM
- \*D10 - Total 2031, PM model duration: 4:00 PM - 5:30 PM
- \*D11 - Total 2031 no BG Dev, AM model duration: 8:00 AM - 9:30 AM
- \*D12 - Total 2031 no BG Dev, PM model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-04-21 3:24:31 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	AdamMorrison
Analyst	
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity		Residual Capacity Criteria Type	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	35.00	Queue Threshold (PCE)	20.00
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### Units

Distance Units	m	Speed Units	km/h	Traffic Units Input	PCE	Traffic Units Results	PCE	Flow Units	per hour	Average Delay Units	s	Total Delay Units	km	Rate Of Delay Units	per km
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# (Default Analysis Set) - Total 2031 no BG Dev, AM

## Data Errors and Warnings

No errors or warnings

## Analysis Set Details

Name (Default Analysis Set)	Roundabout Capacity Model	Description	Includes in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Phase For Scaling Factors
ARCADY			x				100.000	100.000	

## Demand Set Details

Scenario Name	Time Period	Description	Traffic Profile	Model Start (HH:MM)	Model Finish (HH:MM)	Model Length (min)	Time Segment Length (min)	Results Central Hour Only	Single Time Period Start Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031 no BG Dev, AM	AM		ONE HOUR	08:30	09:30	90	15				x		

# Intersection Network

## Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lane Sunningdale	Roundabout	North,West,South,East				4.33	A

## Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

# Legs

## Legs

Leg	Leg Name	Description
North	North	Wondriane Road N
West	West	Sunningdale Road W
South	South	Wondriane Road S
East	East	Sunningdale Road E

## Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99995.00		0.00
West	0.00	99995.00		0.00
South	0.00	99995.00		0.00
East	0.00	99995.00		0.00

## Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.00	30.00	20.00	50.00	25.00	
West	3.50	4.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	4.00	30.00	20.00	50.00	25.00	

## Bypass

Leg	Lag/Min Bypass	Bypass Utilization (%)
North		
West	x	100
South		
East		

## Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.549	1357.445
West		(calculated)	(calculated)	0.673	2016.168
South		(calculated)	(calculated)	0.524	1225.224
East		(calculated)	(calculated)	0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

# Traffic Flows

## Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Varies Over Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	x	2.00			x	x

# Entry Flows

## General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	282.00	100.000
West	ONE HOUR	x	450.00	100.000
South	ONE HOUR	x	630.00	100.000
East	ONE HOUR	x	417.00	100.000

# Turning Proportions

## Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.000	11.000	282.000
From West	27.000	0.000	48.000
From South	255.000	48.000	0.000
From East	0.000	200.000	217.000

## Turning Proportions (PCE) - Intersection 1 (for whole period)

	To		
	North	West	South
From North	0.00	0.04	0.93
From West	0.06	0.00	0.11
From South	0.40	0.08	0.00
From East	0.00	0.48	0.52

# Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

From	To		
	North	West	South
North	1.000	1.020	1.090
West	1.090	1.000	1.000
South	1.030	1.130	1.000
East	1.000	1.050	1.040

Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.0	2.0	8.0
West	9.0	0.0	0.0
South	3.0	13.0	0.0
East	0.0	5.0	4.0

## Results

Results Summary for whole modelled period

Leg	Max V/Ratio	Max Delay (s)	Max Queue (PCE)	Max LOS	Average Delay (s)	Average Queue (PCE)	Total Queuing Delay (PCE-min)	Inclusive Total Delay (s)	Inclusive Total Delay (PCE-min)	Rate Of Queuing Delay (PCE-min)	Average Delay (s)	Inclusive Total Delay (s)
North	0.29	5.05	0.43	-1	2.53	388.15	29.37	29.37	4.54	0.33	4.54	2.66
West	0.30	3.25	0.45	-1	4.12	619.39	30.34	30.34	0.34	0.34	30.34	2.94
South	0.34	5.74	0.53	1.04	5.74	417.08	35.44	35.44	0.39	0.39	35.45	5.10
East	0.28	2.88	0.36	-1	3.62	573.97	25.40	25.41	0.28	0.28	25.41	2.66

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	212.30	212.30	0.00	0.00	211.35	211.29	349.05	1185.03	465.15	0.182	0.00	0.24	4.019	A
West	338.78	338.78	0.00	0.00	337.60	194.56	266.03	1759.69	1182.20	0.191	0.00	0.25	2.630	A
South	474.30	228.11	57.03	246.18	0.00	226.68	395.52	1063.67	684.42	0.214	0.00	0.26	4.489	A
East	313.94	313.94	0.00	246.18	313.09	288.24	247.23	1846.68	1521.01	0.170	0.00	0.21	2.446	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	253.51	253.51	0.00	0.00	253.23	253.20	417.74	1126.24	465.15	0.225	0.24	0.31	5.042	A
West	404.54	404.54	0.00	0.00	404.25	232.66	438.31	1721.03	1182.20	0.235	0.25	0.32	2.861	A
South	560.96	272.39	88.10	293.97	0.00	272.04	473.34	1031.89	684.42	0.294	0.28	0.37	4.947	A
East	374.87	374.87	0.00	293.97	374.64	344.95	296.29	1816.66	1521.01	0.206	0.21	0.27	2.608	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	310.49	310.49	0.00	0.00	310.00	309.64	511.50	1076.79	465.15	0.288	0.31	0.43	5.042	A
West	495.46	495.46	0.00	0.00	494.86	284.67	536.63	1654.82	1182.20	0.299	0.32	0.45	3.246	A
South	693.64	333.61	83.40	360.03	0.00	332.89	579.54	988.50	684.42	0.337	0.37	0.53	5.732	A
East	459.13	459.13	0.00	360.03	458.75	422.36	362.69	1771.95	1521.01	0.259	0.27	0.36	2.864	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	310.49	310.49	0.00	0.00	310.00	309.64	511.50	1076.79	465.15	0.288	0.31	0.43	5.042	A
West	495.46	495.46	0.00	0.00	494.86	284.67	536.63	1654.82	1182.20	0.299	0.32	0.45	3.246	A
South	693.64	333.61	83.40	360.03	0.00	332.89	579.54	988.50	684.42	0.337	0.37	0.53	5.732	A
East	459.13	459.13	0.00	360.03	458.75	422.36	362.69	1771.95	1521.01	0.259	0.27	0.36	2.864	A

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	310.49	310.49	310.49	0.00	0.00	310.48	310.48	511.97	1076.54	465.15	0.288	0.43	0.43	5.050	A
West	495.46	495.46	123.86	0.00	0.00	495.45	285.16	537.29	1654.38	1182.20	0.299	0.45	0.45	3.250	A
South	693.64	333.61	83.40	360.03	0.00	333.00	580.23	452.51	988.26	684.42	0.338	0.53	0.53	5.743	A
East	459.13	459.13	114.78	0.00	360.03	459.12	422.79	363.33	1771.52	1521.01	0.259	0.36	0.36	2.865	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	253.51	253.51	63.38	0.00	0.00	253.09	254.05	418.49	1127.83	465.15	0.225	0.43	0.31	4.431	A
West	404.54	404.54	101.14	0.00	0.00	403.03	233.13	459.36	1729.32	1182.20	0.235	0.45	0.32	2.865	A
South	560.96	272.39	88.10	293.97	0.00	273.00	474.45	369.94	1031.51	684.42	0.264	0.38	0.38	4.981	A
East	374.87	374.87	374.87	0.00	293.97	375.24	345.63	291.30	1815.98	1521.01	0.206	0.36	0.27	2.610	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	212.30	212.30	53.08	0.00	0.00	212.60	212.63	350.37	1166.21	465.15	0.182	0.31	0.24	4.082	A
West	338.78	338.78	84.70	0.00	0.00	339.08	195.17	367.79	1768.51	1182.20	0.192	0.32	0.25	2.638	A
South	474.30	228.11	57.03	246.18	0.00	228.46	397.18	309.70	1063.05	684.42	0.215	0.38	0.29	4.507	A
East	313.94	313.94	78.48	0.00	246.18	314.17	289.35	248.82	1848.62	1521.01	0.170	0.27	0.21	2.432	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	3.49	0.23	4.049	A
West	3.64	0.24	2.630	A
South	4.14	0.28	4.489	A
East	3.14	0.21	2.446	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	4.56	0.30	4.421	A
West	4.74	0.32	2.861	A
South	5.47	0.36	4.947	A
East	4.01	0.27	2.608	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	6.35	0.42	5.042	A
West	6.57	0.44	3.246	A
South	7.72	0.51	5.732	A
East	5.38	0.36	2.864	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	6.50	0.43	5.050	A
West	6.69	0.45	3.250	A
South	7.93	0.53	5.743	A
East	5.47	0.36	2.865	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	4.80	0.32	4.431	A
West	4.92	0.33	2.865	A



Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	5.79	4.14	0.39	0.28	2.10	4.81				A	A
South	5.79	4.14	0.39	0.28	2.10	4.81				A	A

**Queueing Delay Results: (09:15-09:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.67	0.24	0.24	0.25	2.68	4.62				A	A
West	3.78	0.25	0.25	0.29	4.97					A	A
South	4.39	0.29	0.29	0.29	4.97					A	A
East	3.25	0.22	0.22	0.22	2.62					A	A

**Queue Variation Results for each time segment**

**Queue Variation results: (05:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.25	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.26	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.21	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:15-08:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.31	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.32	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.37	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.27	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:30-08:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.43	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.45	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.53	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.36	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:45-09:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.43	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.45	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.53	0.00	0.00	0.00	1.04				Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.36	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (09:00-09:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.31	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.32	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.38	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.27	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (09:15-09:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.25	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.29	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.21	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A



**Junctions 8**  
**ARCADY 8 - Roundabout Module**  
 Version: 8.0.6.541.11983.2811223151  
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Filename: (210088) 1521 Sunningdale Road - Sunningdale and Hyde Park.arc8  
 Path: C:\Users\AdamMorrison\Personal\Projects - (210088) 1521 Sunningdale02 Analysis\Arcady  
 Report generation date: 2021-04-21 14:30:54 PM

**Summary of intersection performance**

	PM			
	Queue (PCE)	Delay (s)	V/C Ratio	LOS
	A1 - Total 2031 no BG Dev			
Leg North	0.94	6.22	0.47	A
Leg West	0.05	2.72	0.05	A
Leg South	1.41	7.46	0.58	A
Leg East	0.33	3.15	0.24	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- \*D1 - Background 2031, AM model duration: 6:00 AM - 9:30 AM
- \*D2 - Background 2031, PM model duration: 4:00 PM - 5:30 PM
- \*D3 - Total 2031, AM model duration: 6:00 AM - 9:30 AM
- \*D4 - Total 2031, PM model duration: 4:00 PM - 5:30 PM
- \*D5 - Total 2031 no BG Dev, AM model duration: 6:00 AM - 9:30 AM
- \*D6 - Total 2031 no BG Dev, PM model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-04-21 14:30:54 PM

**File summary**

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(refer file)
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

**Analysis Options**

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity	N/A	Residual Capacity Criteria	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	30.00	Queue Threshold (PCE)	20.00
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**Units**

Distance Units	m	Speed Units	km/h	Traffic Units Input	PCE	Traffic Units Results	PCE	Average Delay Units	s	Total Delay Units	perhour	Rate Of Delay Units	permin
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**(Default Analysis Set) - Total 2031 no BG Dev, PM**

**Data Errors and Warnings**

No errors or warnings

**Analysis Set Details**

Name (Default AnalysisSet)	ARCADY	Include in Report	x	Use Specific Demand Set(s)		Specific Demand Set(s)		Locked		Network Flow Scaling Factor (%)	100.000	Network Capacity Scaling Factor (%)	100.000	Reason for Scaling Factors	
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**Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Flow Type	Model Start Time (hh:mm)	Model Finish Time (hh:mm)	Model Time Segment Length (min)	Results For Cycle Length (min)	Time Segment Length (min)	Hour Only	Single Segment Only <th>Locked <th>Run Automatically <th>Use Relationship <th>Relationship </th></th></th></th>	Locked <th>Run Automatically <th>Use Relationship <th>Relationship </th></th></th>	Run Automatically <th>Use Relationship <th>Relationship </th></th>	Use Relationship <th>Relationship </th>	Relationship
Total 2031 no BG Dev, PM	Total 2031 no BG Dev, PM	PM		ONE HOUR	16:00	17:30	90	15					x		

**Intersection Network**

**Intersections**

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	A1 Lane Sunningdale	Roundabout	North,West,South,East				6.12	A

**Intersection Network Options**

Driving Side	Right
Lighting	Normal/unknown

**Legs**

**Legs**

Leg	Leg Name	Description
North	North	Hyde Park Road
West	West	Sunningdale Road W
South	South	Hyde Park Road
East	East	Sunningdale Road W

**Capacity Options**

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	999996.00		0.00
West	0.00	999996.00		0.00
South	0.00	999996.00		0.00
East	0.00	999996.00		0.00

**Roundabout Geometry**

Leg	V - Approach road half width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

**Bypass**

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered Intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North	(calculated)	(calculated)	0.549	1357.445
West	(calculated)	(calculated)	0.673	2016.188
South	(calculated)	(calculated)	0.524	1225.224
East	(calculated)	(calculated)	0.673	2016.188

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
				2.00					
	x	x	x				x		x

Entry Flows

General Flows Data

Leg	Profile Type	Use	Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	498.00	100.000	
West	ONE HOUR	x	65.00	100.000	
South	ONE HOUR	x	894.00	100.000	
East	ONE HOUR	x	340.00	100.000	

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

Leg	North	West	South	East
From	North 0.000	West 9.000	South 471.000	East 16.000
	West 12.000	0.000	10.000	43.000
	South 608.000	15.000	0.000	261.000
	East 16.000	105.000	219.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

Leg	North	West	South	East
From	North 0.00	West 0.02	South 0.95	East 0.03
	West 0.18	0.00	0.15	0.96
	South 0.69	0.02	0.00	0.30
	East 0.05	0.31	0.64	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

Leg	North	West	South	East
From	North 1.000	West 1.000	South 1.050	East 1.000
	West 1.400	1.000	1.300	1.000
	South 1.000	1.180	1.000	1.020
	East 1.080	1.010	1.050	1.000

Truck Percentages - Intersection 1 (for whole period)

	To			
	North	West	South	East
From	North 0.0	West 0.0	South 5.0	East 0.0
	West 40.0	0.0	13.0	0.0
	South 3.0	18.0	0.0	2.0
	East 8.0	1.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max Delay Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th Queue (PCE)	Max LOS	Average Delay (PCE/hr)	Total Intersections Arrivals (PCE)	Total Delay (PCE-min)	Average Delay (s)	Rate Of Queuing Delay (PCE-min/min)	Rate Of Queuing Delay (PCE-min)	Inclusive Total Average Delay (s)	Inclusive Total Average Delay (h)
North	0.17	6.22	0.94	208.47	A	455.14	682.71	60.28	5.30	0.67	60.28	60.28	5.30
West	0.05	2.72	0.05	-1	A	59.65	89.47	3.62	2.56	0.04	3.62	3.62	2.56
South	0.38	7.46	1.41	1.03	A	811.17	857.51	88.62	6.20	0.98	88.63	88.63	6.20
East	0.24	3.15	0.33	-1	A	311.99	467.88	22.29	2.88	0.25	22.29	22.29	2.88

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	373.41	373.41	93.35	0.00	0.00	371.58	476.18	254.46	0.00	127.87	629.32	0.307	0.00	0.46	4.445	A
West	48.94	48.94	12.23	0.00	0.00	46.81	96.80	52.24	0.00	1659.80	1004.54	0.029	0.00	0.03	2.403	A
South	665.52	669.03	117.26	196.49	0.00	466.39	524.76	53.28	0.00	1197.32	769.50	0.382	0.00	0.66	5.070	A
East	235.97	259.97	63.99	0.00	196.49	255.24	44.27	475.40	0.00	1696.05	1373.14	0.151	0.00	0.18	2.582	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	445.89	445.89	111.47	0.00	0.00	445.25	570.77	304.53	0.00	1159.36	629.32	0.375	0.46	0.62	5.056	A
West	58.43	58.43	14.51	0.00	0.00	58.40	115.87	63.80	0.00	1569.22	1004.54	0.027	0.03	0.04	2.520	A
South	734.70	690.86	140.02	234.63	0.00	659.06	633.53	63.78	0.00	1159.83	769.50	0.470	0.66	0.91	3.988	A
East	302.63	305.85	76.41	0.00	234.63	305.44	53.00	369.86	0.00	1632.45	1373.14	0.187	0.18	0.24	2.123	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	546.11	546.11	138.53	0.00	0.00	544.67	698.31	372.85	0.00	1152.87	629.32	0.474	0.62	0.93	6.189	A
West	71.57	71.57	17.89	0.00	0.00	71.51	141.85	77.29	0.00	1483.73	1004.54	0.046	0.01	0.05	2.722	A
South	973.30	685.94	171.48	287.37	0.00	683.97	769.30	78.09	0.00	1194.33	769.50	0.579	0.91	1.40	7.403	A
East	374.35	374.35	93.59	0.00	287.37	373.96	64.89	697.18	0.00	1546.72	1373.14	0.242	0.24	0.33	3.149	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	546.11	546.11	138.53	0.00	0.00	546.06	700.20	373.24	0.00	1152.86	629.32	0.474	0.93	0.94	6.215	A
West	71.57	71.57	17.89	0.00	0.00	71.57	142.03	77.29	0.00	1482.77	1004.54	0.046	0.05	0.05	2.724	A
South	973.30	685.94	171.48	287.37	0.00	685.86	770.69	78.17	0.00	1194.29	769.50	0.579	1.40	1.41	7.459	A
East	374.35	374.35	93.59	0.00	287.37	374.34	64.86	691.10	0.00	1545.42	1373.14	0.242	0.33	0.33	3.153	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Classifying (PCE/hr)	Pedestrian (PCE/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	VC Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	445.89	111.47	0.00	447.11	573.66	305.14	0.00	1190.02	629.32	0.375	0.94	0.33	5.085	A	
West	58.43	14.61	0.00	58.40	116.15	636.10	0.00	1597.84	1004.54	0.037	0.05	0.04	2.531	A	
South	794.70	500.05	140.02	234.63	0.00	561.99	630.68	1191.76	789.50	0.470	1.41	0.33	5.923	A	
East	305.65	305.65	76.41	0.00	234.63	306.11	572.79	0.00	1630.46	1373.14	0.187	0.33	0.24	2.788	A

**Main results: (17:15-17:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating (PCE/hr)	Pedestrian Demand (PCE/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	VC Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	373.41	93.35	0.00	374.08	479.83	255.45	0.00	1217.29	629.32	0.307	0.63	0.47	4.476	A	
West	48.94	12.23	0.00	48.97	97.22	532.31	0.00	1627.73	1004.54	0.030	0.04	0.03	2.405	A	
South	665.52	469.03	117.26	198.40	0.00	470.05	527.77	53.50	1197.21	789.50	0.392	0.93	0.67	5.123	A
East	255.97	255.97	63.99	0.00	198.49	256.19	44.46	479.09	1633.57	1273.14	0.151	0.24	0.18	2.571	A

**Queueing Delay Results for each time segment**

**Queueing Delay results: (16:00-16:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	6.71	0.45	4.445	A	A
West	0.48	0.03	2.403	A	A
South	9.56	0.64	5.070	A	A
East	2.68	0.18	2.562	A	A

**Queueing Delay results: (16:15-16:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	9.12	0.61	5.056	A	A
West	0.61	0.04	2.529	A	A
South	13.20	0.88	5.888	A	A
East	3.49	0.23	2.783	A	A

**Queueing Delay results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	13.53	0.90	6.189	A	A
West	0.80	0.05	2.722	A	A
South	20.10	1.34	7.403	A	A
East	4.82	0.32	3.149	A	A

**Queueing Delay results: (16:45-17:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	14.02	0.93	6.215	A	A
West	0.81	0.05	2.724	A	A
South	21.05	1.40	7.459	A	A
East	4.80	0.33	3.153	A	A

**Queueing Delay results: (17:00-17:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	9.75	0.65	5.085	A	A
West	0.62	0.04	2.531	A	A
South	14.37	0.96	5.923	A	A
East	3.61	0.24	2.788	A	A

**Queueing Delay results: (17:15-17:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	7.15	0.48	4.476	A	A
West	0.50	0.03	2.406	A	A
South	10.33	0.69	5.123	A	A

East	27.78	0.19	2.571	A	A
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**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.46	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.03	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.86	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.18	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:15-16:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.62	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.04	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.91	0.00	0.00	1.03	1.03	1.03	1.03	1.03	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:30-16:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.93	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.40	?	?	?	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:45-17:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.94	0.00	0.00	0.00	1.05	1.05	1.05	1.05	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.41	?	?	?	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:00-17:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.63	0.00	0.00	0.00	0.999	0.999	0.999	0.999	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.04	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.93	0.00	0.00	1.03	1.03	1.03	1.03	1.03	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:15-17:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.47	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.03	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.67	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.18	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1983.261122) [S]  
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Filename: (210088) 1521 Summingdale Road - Summingdale and Wonderland Road.atc8  
 Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Summingdale02 Analysis\Arcady  
 Report generation date: 2021-04-21 13:20:35 PM

### Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
<b>Leg North</b>	1.45	2.00	12.80	0.60	B		
<b>Leg West</b>	0.35	~1	3.63	0.25	A	6.69	A
<b>Leg South</b>	0.73	1.01	5.94	0.42	A		
<b>Leg East</b>	1.76	2.03	5.89	0.64	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- \*D1 - Existing, AM mode duration: 8:00 AM - 9:30 AM
- \*D2 - Existing, PM mode duration: 4:00 PM - 5:30 PM, 9:30 AM
- \*D3 - Background 2026, AM mode duration: 8:00 AM - 9:30 AM
- \*D4 - Background 2026, PM mode duration: 4:00 PM - 5:30 PM
- \*D5 - Background 2031, AM mode duration: 8:00 AM - 9:30 AM
- \*D6 - Background 2031, PM mode duration: 4:00 PM - 5:30 PM
- \*D7 - Total 2026, AM mode duration: 8:00 AM - 9:30 AM
- \*D8 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM
- \*D9 - Total 2031, AM mode duration: 8:00 AM - 9:30 AM
- \*D10 - Total 2031, PM mode duration: 4:00 PM - 5:30 PM
- \*D11 - Total 2031 no BG Dev, AM mode duration: 8:00 AM - 9:30 AM
- \*D12 - Total 2031 no BG Dev, PM mode duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-04-21 13:20:54 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Residual Capacity	N/A	V/C Ratio Threshold	0.85	Queue Threshold (PCE)	20.00
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### Units

Distance Units	m	Speed Units	km/h	Traffic Units Input	PCE	Traffic Units Results	per hour	Average Delay Units	s	Total Delay Units	veh	Rate of Delay Units	veh/min
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## (Default Analysis Set) - Total 2031 no BG Dev, PM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default Analysis Set)	Roundabout Capacity Model	Description	Includes in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reserve For Scaling Factors
ARCADY			x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period	Description	Traffic Profile Type	Model Start (H:MM)	Model Finish (H:MM)	Model Length (min)	Time Segment Length (min)	Results Segment Central Hour Only	Single Time Segment Only	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Run Automatically	Use Relationship	Relationship
Total 2031 no BG Dev, PM	Total 2031 no BG Dev, PM	PM		ONE HOUR	16:00	17:30	90	15				100.000	100.000	x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lane Summingdale	Roundabout	North, West, South, East				6.69	A

### Intersection Network Options

Driving Side	Right	Lighting	Normal/unknown
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## Legs

### Legs

Leg	Leg Name	Description
North	North	Wonderland Road N
West	West	Summingdale Road W
South	South	Wonderland Road S
East	East	Summingdale Road E

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PH - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

**Bypass**

Leg	Leg Hrs Bypass	Bypass Utilization (%)
North		
West		
South	x	100
East		

**Slope / Intercept / Capacity**

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	0.549	(calculated)	1357.445
West		(calculated)	0.673	(calculated)	2016.188
South		(calculated)	0.524	(calculated)	1225.224
East		(calculated)	0.673	(calculated)	2016.188

The slope and intercept shown above include any corrections and adjustments.

**Traffic Flows**

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix for a Truck Entry	PCE Factor for a Truck Entry (PCE)	Drift/Turn Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	Percentages	2.00				x	x

**Entry Flows**

**General Flows Data**

Leg	Profile Type	Use	Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x		376.00	100.000
West	ONE HOUR	x		317.00	100.000
South	ONE HOUR	x		736.00	100.000
East	ONE HOUR	x		983.00	100.000

**Turning Proportions**

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.000	34.000	333.000	9.000
West	19.000	0.000	34.000	285.000
South	282.000	124.000	0.000	330.000
East	10.000	469.000	513.000	0.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.09	0.89	0.02
West	0.06	0.00	0.11	0.84
South	0.38	0.17	0.00	0.45
East	0.01	0.47	0.52	0.00

**Vehicle Mix**

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	1.000	1.000	1.000	1.000
West	1.000	1.000	1.000	1.050
South	1.010	1.000	1.000	1.020
East	1.000	1.030	1.000	1.000

**Truck Percentages - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.0	0.0	0.0	0.0
West	0.0	0.0	0.0	5.0
South	1.0	0.0	0.0	2.0
East	0.0	3.0	0.0	0.0

**Results**

**Results Summary for whole modelled period**

Leg	Max V/C Ratio	Max Delay (s)	Max 95th Queue (PCE)	Max LOS	Average Delay (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queuing Delay (PCE-hr)	Average Delay (s)	Rate Of Queuing Delay (PCE-min)	Inclusive Total Delay (PCE-min)	Inclusive Total Queuing Delay (s)	Inclusive Average Queuing Delay (s)
North	0.60	12.80	1.45	B	345.02	517.54	76.44	8.96	0.65	76.45	8.96	8.96
West	0.25	3.63	0.35	A	290.88	436.33	29.28	3.20	0.26	29.29	3.20	3.20
South	0.42	5.94	0.73	A	675.37	589.93	49.36	5.19	0.54	49.36	5.19	5.19
East	0.64	5.69	1.76	A	902.02	1353.03	103.23	4.58	1.15	103.24	4.58	4.58

**Main Results for each time segment**

**Main results: (16:00-16:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS	
North	383.02	338.02	84.50	0.00	0.00	281.27	232.28	822.64	0.00	906.08	416.34	0.312	0.00	0.45	0.70	4.746	A
West	238.65	238.65	59.66	0.00	0.00	237.62	463.32	645.69	0.00	1594.82	1232.56	0.151	0.00	0.18	2.782	A	
South	554.10	395.86	76.41	248.44	0.00	394.54	659.97	219.13	0.00	1110.46	648.48	0.275	0.00	0.38	4.487	A	
East	740.05	740.05	185.01	0.00	298.44	737.25	253.62	317.60	0.00	1892.28	1532.76	0.411	0.00	0.70	3.419	A	

**Main results: (16:15-16:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	338.02	338.02	84.50	0.00	0.00	337.03	278.31	864.79	0.00	817.11	416.34	0.414	0.45	0.70	7.483	A
West	284.98	284.98	71.24	0.00	0.00	284.74	554.75	767.08	0.00	1459.64	1222.55	0.190	0.18	0.24	3.085	A
South	661.63	384.99	91.25	298.66	0.00	364.49	789.96	262.27	0.00	1097.89	648.48	0.336	0.38	0.50	5.008	A
East	893.70	893.70	220.92	0.00	298.66	892.45	246.10	380.66	0.00	1759.85	1532.76	0.502	0.70	1.01	4.153	A

**Main results: (16:30-16:45)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	413.98	413.98	103.50	0.00	0.00	411.10	340.64	1204.67	0.00	866.47	416.34	0.594	0.70	1.42	12.489	B
West	349.02	349.02	87.26	0.00	0.00	348.80	678.54	937.23	0.00	1385.07	1222.55	0.252	0.24	0.35	3.615	A
South	810.35	447.01	111.75	363.34	0.00	446.11	964.78	321.05	0.00	1057.11	648.48	0.423	0.50	0.73	5.524	A
East	1062.30	1062.30	270.85	0.00	363.34	1079.40	301.26	465.91	0.00	1702.44	1532.76	0.636	1.01	1.74	5.831	A

**Main results: (16:45-17:00)**

Bypass																

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation V/C Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	413.98	413.98	103.50	0.00	0.00	413.97	341.30	100.77	0.00	694.78	416.34	0.966	1.42	1.45	12.802	B	
West	345.02	345.02	87.26	0.00	0.00	345.02	690.38	941.23	0.00	1382.38	1222.55	0.252	0.35	0.35	3.627	A	
South	810.35	810.35	447.01	111.75	363.34	0.00	447.00	989.76	321.49	0.00	1056.88	648.48	0.423	0.73	0.73	5.943	A
East	1082.30	1082.30	270.98	0.00	363.34	1082.24	301.67	466.82	0.00	1701.83	1532.76	0.636	1.74	1.76	5.688	A	

**Main results: (17:00-17:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation V/C Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	333.02	333.02	84.50	0.00	0.00	340.93	279.35	095.31	0.00	814.63	416.34	0.415	1.45	1.45	0.72	7.644	A
West	284.86	284.86	71.24	0.00	0.00	285.39	557.53	772.78	0.00	1485.91	1222.55	0.191	0.35	0.25	3.097	A	
South	671.66	671.66	344.99	91.25	280.66	0.00	365.97	759.23	262.94	0.00	1097.93	648.48	0.336	0.73	0.31	5.030	A
East	853.70	853.70	220.32	0.00	236.06	856.59	246.74	382.08	0.00	1738.09	1532.76	0.502	1.76	1.10	4.197	A	

**Main results: (17:15-17:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation V/C Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	283.07	283.07	70.77	0.00	0.00	284.11	233.77	827.31	0.00	903.52	416.34	0.313	0.72	0.46	5.823	A	
West	238.65	238.65	59.86	0.00	0.00	238.90	486.11	645.30	0.00	1581.65	1222.55	0.151	0.25	0.19	2.794	A	
South	554.10	554.10	305.66	76.41	248.44	0.00	306.17	684.12	220.07	0.00	1109.98	648.48	0.275	0.51	0.30	4.512	A
East	740.05	740.05	185.01	0.00	248.44	741.34	206.51	319.73	0.00	1800.87	1532.76	0.411	1.03	0.71	3.448	A	

**Queueing Delay Results for each time segment**

**Queueing Delay results: (16:00-16:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.53	0.44	5.746	A	A
West	2.71	0.18	2.782	A	A
South	5.54	0.37	4.887	A	A
East	10.26	0.68	3.419	A	A

**Queueing Delay results: (16:15-16:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.09	0.67	7.483	A	A
West	3.60	0.24	3.085	A	A
South	10.64	0.71	5.524	A	A
East	25.04	1.67	5.831	A	A

**Queueing Delay results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.91	1.33	12.489	B	B
West	5.15	0.34	3.615	A	A
South	10.64	0.71	5.524	A	A
East	25.04	1.67	5.831	A	A

**Queueing Delay results: (16:45-17:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.54	1.44	12.802	B	B
West	5.25	0.35	3.627	A	A
South	10.98	0.73	5.943	A	A
East	25.23	1.75	5.888	A	A

**Queueing Delay results: (17:00-17:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.27	0.75	7.644	A	A
West	3.75	0.25	3.097	A	A

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.88	0.53	5.030	A	A
West	15.96	1.06	4.197	A	A

**Queueing Delay results: (17:15-17:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.11	0.47	5.823	A	A
West	2.82	0.19	2.794	A	A
South	5.89	0.39	4.512	A	A
East	10.90	0.73	3.448	A	A

**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.45	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.38	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.70	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:15-16:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.70	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.50	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.01	0.00	0.00	1.01	2.03			N/A	N/A

**Queue Variation results: (16:30-16:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.42	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.73	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.74	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:45-17:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.45	0.00	0.00	0.00	2.00			N/A	N/A
West	0.35	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.73	0.00	0.00	0.00	1.01			N/A	N/A
East	1.76	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:00-17:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.72	0.00	0.00	0.00	1.00			N/A	N/A
West	0.25	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.51	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:15-17:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.72	0.00	0.00	0.00	1.00			N/A	N/A
West	0.25	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.51	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A



Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q15 (PCE)	Q20 (PCE)	Q25 (PCE)	Percentile Message	Marker Message	Probability of Reaching Or Exceeding Marker	Probability of Exactly Reaching Marker
North	0.46	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.71	0.00	0.00	0.00	1.01				N/A	N/A

HCM 6th TWSC  
 3: Sunningdale Road & Street A  
 2031 Total PM  
 1521 Sunningdale Road, London

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
In/Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4
Traffic Vol, veh/h	49	271	310	137	82	30
Future Vol, veh/h	49	271	310	137	82	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	2	0	0	0
Mvmt Flow	53	295	337	149	89	33
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	486	0	0	813	412	
Stage 1	-	-	-	412	-	
Stage 2	-	-	-	401	-	
Critical Hdwy	4.1	-	-	6.4	6.2	
Critical Hdwy Stg 1	-	-	-	5.4	-	
Critical Hdwy Stg 2	-	-	-	5.4	-	
Follow-up Hdwy	2.2	-	-	3.5	3.3	
Pot Cap-1 Maneuver	1087	-	-	351	644	
Stage 1	-	-	-	673	-	
Stage 2	-	-	-	681	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1087	-	-	331	644	
Mov Cap-2 Maneuver	-	-	-	331	-	
Stage 1	-	-	-	634	-	
Stage 2	-	-	-	681	-	
Approach	EB	WB	SB			
HCM Control Delay, s	1.3	0	18.8			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1087	-	-	-	381	
HCM Lane V/C Ratio	0.049	-	-	-	0.32	
HCM Control Delay (s)	8.5	0	-	-	18.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	1.4	

Intersection	Int Delay, s/veh			
	WBL	WBR	NBT	SBL
Int Delay, s/veh	0.9			
Movement	WBL	WBR	NBT	SBL
Lane Configurations	W	R	T	4
Traffic Vol, veh/h	31	8	586	50
Future Vol, veh/h	31	8	586	50
Conflicting Peds, #/hr	0	0	0	0
Sign Control	Stop	Stop	Free	Free
RT Channelized	-	None	-	None
Storage Length	0	-	-	-
Veh in Median Storage, #	0	-	0	-
Grade, %	0	-	0	-
Peak Hour Factor	92	92	92	92
Heavy Vehicles, %	0	0	3	0
Mvmt Flow	34	9	637	54
	13	505		
Major/Minor	Minor1	Major1	Major2	
Conflicting Flow All	1195	664	0	691
Stage 1	664	-	-	-
Stage 2	531	-	-	-
Critical Hdwy	6.4	6.2	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-
Follow-up Hdwy	3.5	3.3	-	2.2
Pot Cap-1 Maneuver	208	464	-	913
Stage 1	516	-	-	-
Stage 2	594	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	204	464	-	913
Mov Cap-2 Maneuver	204	-	-	-
Stage 1	516	-	-	-
Stage 2	582	-	-	-
Approach	WB	NB	SB	
HCM Control Delay, s	24.2	0	0.2	
HCM LOS	C			
Minor Lane/Major Mvmt	NBT	NBR	WBL	SBL
Capacity (veh/h)	-	-	230	913
HCM Lane V/C Ratio	-	-	0.184	0.014
HCM Control Delay (s)	-	-	24.2	9
HCM Lane LOS	-	-	C	A
HCM 95th %ile Q(veh)	-	-	0.7	0

# Appendix G

## 2031 Northwest Area Cumulative Traffic Operations Reports





## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (19831261122193)  
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Filename: (210088) 1521 Sunningdale Road - Sunningdale and Hyde Park.ar8  
 Path: C:\Users\AdamMorrison\Personal\Projects - (210088) 1521 Sunningdale\2 Analysis\Arcady  
 Report generation date: 2021-03-26 3:22:29 PM

### Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031						
Leg North	1.85	1.10	10.25	0.63	B		
Leg West	0.07	~1	3.05	0.06	A	6.15	A
Leg South	0.50	1.12	5.03	0.31	A		
Leg East	0.54	1.03	3.21	0.34	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

\*D1 - Background 2031, AM, model duration: 6:00 AM - 9:30 AM  
 \*D2 - Background 2031, PM, model duration: 4:00 PM - 5:30 PM  
 \*D3 - Background 2031, PM, model duration: 5:30 PM - 7:00 PM  
 \*D4 - Total 2031, PM, model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:22:28 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity	N/A	Residual Capacity Criteria	VIC Ratio Threshold	0.85	Average Delay Threshold (s)	36.00	Queue Threshold (PCE)	20.00
--------------------	------	---------------------	---	-----------------------------	-----	----------------------------	---------------------	------	-----------------------------	-------	-----------------------	-------

### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	veh/hour	s	-Min	veh/min

## (Default Analysis Set) - Total 2031, AM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default Analysis Set)	Roundabout Capacity Model	Description	Includes In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
	ARCADY		x				100.000	100.000	

### Demand Set Details

Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start (HH:MM)	Model Finish (HH:MM)	Model Period Length (min)	Time Segment Length (min)	Results Central Hour Only	Single Time Slot Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031 AM	AM		ONE HOUR	08:00	09:30	90	15				x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	4 Lanes Sunningdale	Roundabout	North,West,South,East				6.15	A

### Intersection Network Options

Driving Side	Right
Lighting	Normal/unknown

## Legs

### Legs

Leg	Leg Name	Description
North	North	Hyde Park Road
West	West	Sunningdale Road W
South	South	Hyde Park Road
East	East	Sunningdale Road W

### Capacity Options

Leg	Minimum Capacity (PCE/h)	Maximum Capacity (PCE/h)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V-Approach road half-width (m)	E-Entry width (m)	r-Effective flare length (m)	R-Entry radius (m)	D-Inscribed circle diameter (m)	PH-Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (PCE/hr)	Entered intercept (PCE/hr)	Final slope (calculated)	Final intercept (PCE/hr)
North		(calculated)	0.549	(calculated)	1357.445
West		(calculated)	0.673	(calculated)	2016.168
South		(calculated)	0.524	(calculated)	1225.224
East		(calculated)	0.673	(calculated)	2016.168

The slope and intercept shown above include any corrections and adjustments.

**Traffic Flows**

**Demand Set Data Options**

Leg	Vehicle Mix	Vehicle Mix Values Over Time	Vehicle Mix Values Over Turn	PCE Entry for a Truck	Default Turning proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary
North		x	x	2.00				x	x
West		x	x	2.00				x	x
South		x	x	2.00				x	x
East		x	x	2.00				x	x

**Entry Flows**

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	598.00	100.000
West	ONE HOUR	x	71.00	100.000
South	ONE HOUR	x	533.00	100.000
East	ONE HOUR	x	554.00	100.000

**Turning Proportions**

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.03	0.88	0.09
West	7.00	0.00	12.00	82.00
South	310.00	16.00	0.00	207.00
East	54.00	100.00	1400.00	0.00

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.03	0.88	0.09
West	0.10	0.00	0.17	0.73
South	0.58	0.03	0.00	0.39
East	0.10	0.18	0.72	0.00

**Vehicle Mix**

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	1.000	1.000	1.120	1.000
West	1.000	1.000	1.000	1.000
South	1.120	1.080	1.000	1.000
East	1.000	1.030	1.040	1.000

**Truck Percentages - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.03	0.88	0.09
West	0.10	0.00	0.17	0.73
South	0.58	0.03	0.00	0.39
East	0.10	0.18	0.72	0.00

	North	West	South	East
From	0.0	0.0	12.0	0.0
North	0.0	0.0	0.0	4.0
West	12.0	8.0	0.0	8.0
East	0.0	3.0	4.0	0.0

**Results**

**Results Summary for whole modelled period**

Leg	Max Delay (s)	Max 95th Queue (PCE)	Max LOS	Average Delay (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queuing Delay (PCE-min)	Average Delay (s)	Ratio Of Queuing Delay (PCE-min/min)	Inclusive Total Delay (s)	Inclusive Total Delay (PCE-min)	Indicative Average Queuing Delay (s)
North	0.03	0.25	1.85	1.10	B	545.74	823.10	106.52	7.76	1.18	108.43
West	0.06	3.05	0.07	-1	A	65.15	97.73	4.54	2.79	0.05	4.54
South	0.31	5.03	0.50	1.12	A	486.09	486.71	34.76	4.65	0.39	34.76
East	0.34	3.21	0.54	1.03	A	508.36	762.54	38.89	2.90	0.41	36.89

**Main Results for each time segment**

**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	450.21	450.21	112.95	0.00	0.00	447.37	278.07	397.33	0.00	1144.92	633.44	0.363	0.00	0.71	5.673	A
West	53.45	53.45	13.36	0.00	0.00	53.30	101.27	73.43	0.00	1522.30	913.44	0.035	0.00	0.04	2.521	A
South	401.27	295.43	61.36	159.84	0.00	244.26	701.30	85.44	0.00	1189.48	797.24	0.208	0.00	0.29	4.293	A
East	417.08	417.08	104.27	0.00	155.84	415.88	80.19	245.52	0.00	1848.15	1418.70	0.226	0.00	0.30	2.936	A

**Main results: (08:15-08:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	537.59	537.59	134.40	0.00	0.00	536.29	333.18	463.54	0.00	1103.11	633.44	0.497	0.71	1.03	6.904	A
West	63.83	63.83	15.96	0.00	0.00	63.78	121.24	87.58	0.00	1424.57	913.45	0.045	0.04	0.05	2.721	A
South	475.18	293.07	73.27	186.09	0.00	292.75	840.04	102.33	0.00	1174.64	797.23	0.290	0.29	0.37	4.578	A
East	486.03	486.03	124.51	0.00	186.09	497.68	96.04	295.04	0.00	1814.81	1418.70	0.274	0.30	0.39	2.828	A

**Main results: (08:30-08:45)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	658.41	658.41	164.60	0.00	0.00	655.26	407.93	587.55	0.00	1046.04	633.44	0.629	1.03	1.82	10.084	B
West	78.17	78.17	19.54	0.00	0.00	78.10	148.40	107.41	0.00	1202.70	913.44	0.060	0.05	0.07	3.055	A
South	586.84	358.93	89.73	227.91	0.00	358.43	1027.35	125.17	0.00	1159.68	797.24	0.310	0.37	0.50	5.019	A
East	609.97	609.97	152.49	0.00	227.91	609.96	117.47	366.13	0.00	1769.63	1418.70	0.345	0.39	0.54	3.207	A

**Main results: (08:45-09:00)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	658.41	658.41	164.60	0.00	0.00	658.30	408.47	588.12	0.00	1045.73	633.44	0.630	1.82	1.85	10.247	B
West	78.17	78.17	19.54	0.00	0.00	78.17	148.63	107.79	0.00	1290.43	913.44	0.061	0.07	0.07	3.055	A
South	586.84	358.93	89.73	227.91	0.00	358.92	1030.46	125.51	0.00	1159.50	797.24	0.310	0.50	0.50	5.026	A
East	609.97	609.97	152.49	0.00	227.91	609.96	117.80	366.63	0.00	1769.29	1418.70	0.345	0.54	0.54	3.210	A

**Main results: (09:00-09:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Ratio (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	658.41	658.41	164.60	0.00	0.00	658.30	408.47	588.12	0.00	1045.73	633.44	0.630	1.82	1.85	10.247	B
West	78.17	78.17	19.54	0.00	0.00	78.17	148.63	107.79	0.00	1290.43	913.44	0.061	0.07	0.07	3.055	A
South	586.84	358.93	89.73	227.91	0.00	358.92	1030.46	125.51	0.00	1159.50	797.24	0.310	0.50	0.50	5.026	A
East	609.97	609.97	152.49	0.00	227.91	609.96	117.80	366.63	0.00	1769.29	1418.70	0.345	0.54	0.54	3.210	A

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (PCE/hr)	Entered intercept (PCE/hr)	Final slope (calculated)	Final intercept (PCE/hr)
North		(calculated)	0.549	(calculated)	1357.445
West		(calculated)	0.673	(calculated)	2016.168
South		(calculated)	0.524	(calculated)	1225.224
East		(calculated)	0.673	(calculated)	2016.168

The slope and intercept shown above include any corrections and adjustments.

**Traffic Flows**

**Demand Set Data Options**

Leg	Vehicle Mix	Vehicle Mix Values Over Time	Vehicle Mix Values Over Turn	PCE Entry for a Truck	Default Turning proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary
North		x	x	2.00				x	x
West		x	x	2.00				x	x
South		x	x	2.00				x	x
East		x	x	2.00				x	x

**Entry Flows**

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	598.00	100.000
West	ONE HOUR	x	71.00	100.000
South	ONE HOUR	x	533.00	100.000
East	ONE HOUR	x	554.00	100.000

**Turning Proportions**

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.03	0.88	0.09
West	7.00	0.00	12.00	82.00
South	310.00	16.00	0.00	207.00
East	54.00	100.00	1400.00	0.00

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	0.00	0.03	0.88	0.09
West	0.10	0.00	0.17	0.73
South	0.58	0.03	0.00	0.39
East	0.10	0.18	0.72	0.00

**Vehicle Mix**

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To			
	North	West	South	East
North	1.000	1.000	1.120	1.000
West	1.000	1.000	1.000	1.000
South	1.120	1.080		

	(PCE/h)	(PCE)	(PCE/h)	Flow (PCE/h)	(PCE/h)	(PCE/h)	(PCE/h)	Ratio (PCE)	(e)	(PCE)	(e)					
North	537.59	537.59	134.40	0.00	540.72	334.06	464.44	0.00	1102.62	633.44	0.488	1.85	1.07	7.108	A	
West	63.83	63.83	15.96	0.00	63.80	121.59	863.56	0.00	1421.21	913.45	0.045	0.07	0.05	2.730	A	
South	479.16	203.07	73.27	186.09	0.00	293.66	844.63	102.83	0.00	1171.38	797.23	0.250	0.50	0.36	4.587	A
East	489.03	489.03	124.51	0.00	186.09	488.63	96.53	299.86	0.00	1814.25	1418.70	0.275	0.54	0.39	2.830	A

**Main results: (08:15-09:30)**

Leg	Total Demand (PCE/h)	Intersection Demand (PCE)	Bypass Demand (PCE/h)	Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (PCE/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	VC Ratio (PCE/h)	Start Queue (PCE)	End Queue (PCE)	LOS			
North	450.21	450.21	0.00	0.00	451.57	279.65	398.81	0.00	1144.11	633.44	0.394	1.07	0.72	5.749	A	
West	53.45	53.45	13.36	0.00	53.50	101.76	738.63	0.00	1518.80	913.44	0.035	0.05	0.04	2.527	A	
South	401.27	245.43	61.36	155.84	0.00	245.75	706.14	85.99	0.00	1190.20	797.24	0.208	0.38	0.30	4.308	A
East	417.08	417.08	104.27	0.00	155.84	417.44	80.71	251.03	0.00	1847.14	1418.70	0.226	0.39	0.30	2.604	A

**Queueing Delay Results for each time segment**

**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.24	0.68	5.673	A	A
West	0.55	0.04	2.821	A	A
South	4.27	0.28	4.293	A	A
East	4.43	0.30	2.596	A	A

**Queueing Delay results: (08:15-08:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.00	1.00	6.984	A	A
West	0.71	0.05	2.721	A	A
South	5.46	0.36	4.578	A	A
East	5.77	0.38	2.826	A	A

**Queueing Delay results: (08:30-08:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	25.79	1.72	10.084	B	B
West	0.86	0.07	3.049	A	A
South	7.30	0.49	5.019	A	A
East	7.86	0.53	3.207	A	A

**Queueing Delay results: (08:45-09:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	27.56	1.84	10.247	B	B
West	0.99	0.07	3.055	A	A
South	7.48	0.50	5.026	A	A
East	8.13	0.54	3.210	A	A

**Queueing Delay results: (09:00-09:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.66	1.11	7.038	A	A
West	0.74	0.05	2.739	A	A
South	5.74	0.38	4.897	A	A
East	5.36	0.40	2.830	A	A

**Queueing Delay results: (09:15-09:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.17	0.74	5.749	A	A
West	0.57	0.04	2.527	A	A
South	4.51	0.30	4.308	A	A
East	4.60	0.31	2.604	A	A

**Queue Variation Results for each time segment**

**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.71	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.04	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.29	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.30	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:15-08:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.03	0.00	0.00	1.10	1.10	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.05	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.37	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.39	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:30-08:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.82	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.07	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.50	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.54	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (08:45-09:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.85	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.07	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.50	0.00	0.00	0.00	1.12	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.54	0.00	0.00	0.00	1.03	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (09:00-09:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.07	0.00	0.00	1.10	1.10	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.05	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.38	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.39	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

**Queue Variation results: (09:15-09:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.72	0.00	0.00	1.10	1.10	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
West	0.04	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
South	0.30	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A
East	0.30	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.	N/A	N/A

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (1983.2611.123.15)  
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Filename: (210088) 1521 Summingdale Road - Summingdale and Wonderland Road.arc8  
Path: C:\Users\AdamMorrison\Personal\Projects - (210088) 1521 Summingdale2 Analysis\Arcady  
Report generation date: 2021-03-26 3:19:17 PM

### Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Total 2031							
Leg North	0.98	1.06	7.74	0.48	A		
Leg West	3.45	8.30	10.32	0.77	B		
Leg South	1.87	3.18	14.41	0.64	B	9.74	A
Leg East	0.63	1.04	3.69	0.38	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- \*D1 - Existing, AM mode duration: 8:00 AM - 9:30 AM
- \*D2 - Existing, PM mode duration: 4:00 PM - 5:30 PM
- \*D3 - Existing, AM mode duration: 8:00 AM - 9:30 AM
- \*D4 - Background 2026, PM mode duration: 4:00 PM - 5:30 PM
- \*D5 - Background 2031, AM mode duration: 8:00 AM - 9:30 AM
- \*D6 - Background 2031, PM mode duration: 4:00 PM - 5:30 PM
- \*D7 - Total 2026, AM mode duration: 8:00 AM - 9:30 PM
- \*D8 - Total 2026, PM mode duration: 4:00 PM - 5:30 PM
- \*D9 - Total 2031, AM mode duration: 8:00 AM - 9:30 PM
- \*D10 - Total 2031, PM mode duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:19:16 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Residual Capacity	N/A	Queue Threshold (PCE)	20.00
Average Delay Threshold (s)	36.00	Calculate Residual Capacity		V/C Ratio Threshold	0.85		

### Units

Distance Units	m	Speed Units	km/h	Traffic Units	PCE	Flow Units	veh/hour	Total Delay Units	s	Rate Of Delay Units	veh/km

## (Default Analysis Set) - Total 2031, AM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default)	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
	ARCADY		x				100.000	100.000	

### Demand Set Details

Name	Scenario	Time Period Name	Time Period (HH:mm)	Traffic Profile Type	Model Period Time (HH:mm)	Model Period Length (min)	Results For Central Segment Only	Single Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM		AM	09:30	ONE HOUR	09:30	90	15			x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Circle Separated	Lanes Roundabout	Do Geometric Delay	Intersections Delay (s)	Intersection LOS
1	2 Lane Summingdale	Roundabout	North,West,South,East				9.74	A

### Intersection Network Options

Driving Side	Right
Lighting	Normal/unknown

## Legs

### Legs

Leg	Leg Name	Description
North	North	Wonderland Road N
West	West	Summingdale Road W
South	South	Wonderland Road N
East	East	Summingdale Road W

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		



### Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope (PCE/hr)	Entered intercept (PCE/hr)	Final Slope (PCE/hr)	Final Intercept (PCE/hr)
North	(calculated)	0.549	(calculated)	0.549	1357.445
West	(calculated)	0.673	(calculated)	0.673	2016.188
South	(calculated)	0.524	(calculated)	0.524	1225.224
East	(calculated)	0.673	(calculated)	0.673	2016.188

The slope and intercept shown above include any corrections and adjustments.

### Traffic Flows

#### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/left counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
Mix	x	x	x	2.00			x	x	x

### Entry Flows

#### General Flows Data

Leg	Profile Type	Use	Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	418.00	117.00	100.000
West	ONE HOUR	x	761.00	212.00	100.000
South	ONE HOUR	x	598.00	169.00	100.000
East	ONE HOUR	x	598.00	169.00	100.000

### Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

Leg	To			
	North	West	South	East
From North	0.00	0.15	0.74	0.12
From West	0.08	0.00	0.29	0.63
From South	0.38	0.19	0.00	0.43
From East	0.06	0.56	0.39	0.00

Turning Proportions (PCE) - Intersection 1 (for whole period)

Leg	To			
	North	West	South	East
From North	0.00	0.15	0.74	0.12
From West	0.08	0.00	0.29	0.63
From South	0.38	0.19	0.00	0.43
From East	0.06	0.56	0.39	0.00

### Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

Leg	To			
	North	West	South	East
From North	1.000	1.020	1.090	1.000
From West	1.090	1.000	1.000	1.090
From South	1.000	1.130	1.000	1.090
From East	1.000	1.050	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To			
	North	West	South	East
From North	0.0	2.0	8.0	0.0
From West	0.0	0.0	0.0	5.0
From South	3.0	13.0	0.0	5.0
From East	0.0	5.0	4.0	0.0

## Results

Results Summary for whole modelled period

Leg	Max Ratio	Max Delay (s)	Max Queue (PCE)	Max LOS	Average LOS (s)	Average Delay (s)	Total Arrivals (PCE)	Total Delay (PCE-min)	Average Delay (s)	Rate of Queuing Delay (PCE-min/min)	Rate of Queuing Delay (PCE-hr)	Inclusive Total Delay (PCE-min)	Inclusive Total Delay (PCE-hr)
North	0.48	7.74	0.98	1.06	A	363.56	575.35	60.17	6.27	0.97	60.17	60.17	6.28
West	0.77	10.32	3.45	8.30	B	1024.98	1537.47	174.76	6.82	1.94	174.76	174.76	6.82
South	0.04	14.41	1.87	3.18	B	698.31	997.37	99.87	10.03	1.11	99.88	99.88	10.03
East	0.38	3.89	0.63	1.04	A	572.03	788.05	41.53	3.24	0.46	41.54	41.54	3.24

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	314.69	314.69	76.67	0.00	0.00	312.97	305.18	50.164	0.00	1062.21	466.26	0.291	0.00	0.43	4.954	A
West	840.94	840.94	210.23	0.00	0.00	837.03	384.45	430.15	0.00	1726.52	1360.58	0.467	0.00	0.98	4.181	A
South	572.92	326.74	81.88	246.18	0.00	324.33	639.26	627.53	0.00	896.41	693.35	0.365	0.00	0.60	6.647	A
East	420.09	420.09	105.02	0.00	246.18	418.78	564.23	385.03	0.00	1754.89	1479.58	0.239	0.00	0.33	2.808	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	375.77	375.77	93.94	0.00	0.00	375.08	365.73	600.80	0.00	1027.81	466.36	0.366	0.43	0.61	5.844	A
West	1004.16	1004.16	251.04	0.00	0.00	1001.89	460.43	545.26	0.00	1659.22	1360.58	0.802	0.68	1.54	6.570	A
South	684.12	390.16	97.84	293.97	0.00	388.88	785.49	751.86	0.00	831.62	693.35	0.469	0.69	0.92	9.809	A
East	501.63	501.63	123.41	0.00	283.97	501.20	673.42	463.12	0.00	1702.98	1479.58	0.295	0.33	0.43	3.123	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	460.23	460.23	115.06	0.00	0.00	458.76	446.20	734.68	0.00	954.34	486.26	0.482	0.61	0.97	7.684	A
West	1229.84	1229.84	307.46	0.00	0.00	1222.55	563.01	630.43	0.00	1591.66	1360.58	0.773	1.54	3.37	9.928	A
South	837.88	477.84	119.46	360.03	0.00	474.24	935.05	917.33	0.00	744.86	693.35	0.642	0.92	1.82	13.925	B
East	614.37	614.37	153.59	0.00	360.03	613.91	824.30	597.27	0.00	1634.19	1479.58	0.376	0.43	0.62	3.678	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE/hr)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	460.23	460.23	115.06	0.00	0.00	460.19	449.06	738.50	0.00	953.34	486.26	0.483	0.97	0.98	7.743	A
West	1229.84	1229.84	307.46	0.00	0.00	1229.51	564.75	631.95	0.00	1590.64	1360.58	0.773	3.37	3.45	10.318	B
South	837.88	477.84	119.46	360.03	0.00	477.64	939.04	922.42	0.00	742.20	693.35	0.644	1.82	1.87	14.407	B
East	614.37	614.37	153.59	0.00	360.03	614.36	828.85	671.20	0.00	1631.54	1479.58	0.377	0.62	0.63	3.691	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Demand (PCE/hr)	Circulating Arrivals (PCE/hr)	Unsignalized Level Of Service	VC Ratio (PCE/hr)	Saturation Capacity (PCE/hr)	Unsignalized Level Of Service	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	375.77	325.77	93.94	0.00	377.22	369.84	603.32	0.00	1028.42	466.26	0.366	A	0.98	1360.58	0.602	3.45	1.59	5.758	A
West	1004.16	1004.16	251.04	0.00	1011.58	483.00	517.55	0.00	1627.67	1360.58	0.602	A	0.471	1360.58	0.471	1.87	0.96	8.887	A
South	894.12	300.16	97.54	263.97	0.00	369.60	770.37	748.76	0.00	827.00	693.35	0.225	A	1479.58	0.225	0.63	0.44	3.141	A
East	501.63	501.63	125.41	0.00	233.97	502.38	681.76	470.77	0.00	1630.17	1479.58	0.225	A	1479.58	0.225	0.63	0.44	3.141	A

**Main results: (08:15-08:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Arrivals (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Demand (PCE/hr)	Circulating Arrivals (PCE/hr)	Unsignalized Level Of Service	VC Ratio (PCE/hr)	Saturation Capacity (PCE/hr)	Unsignalized Level Of Service	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	314.69	314.69	78.67	0.00	315.41	308.30	504.52	0.00	1020.03	466.26	0.291	A	0.62	1360.58	0.488	1.59	1.00	4.251	A
West	840.94	840.94	210.23	0.00	843.33	387.01	432.92	0.00	1724.66	1360.58	0.366	A	0.96	1360.58	0.366	0.62	0.62	6.766	A
South	572.92	326.74	81.68	246.18	0.00	328.11	643.68	632.66	0.00	893.93	693.35	0.240	A	1479.58	0.240	0.44	0.33	2.820	A
East	420.09	420.09	105.02	0.00	246.18	420.53	568.49	392.29	0.00	1732.02	1479.58	0.240	A	1479.58	0.240	0.44	0.33	2.820	A

**Queueing Delay Results for each time segment**

**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	6.28	0.42	4.554	A
West	14.18	0.95	4.181	A
South	8.67	0.58	6.647	A
East	4.82	0.32	2.508	A

**Queueing Delay results: (08:15-08:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	6.65	0.39	5.814	A
West	22.33	1.49	3.979	A
South	13.30	0.89	8.600	A
East	6.41	0.43	3.125	A

**Queueing Delay results: (08:30-08:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	14.05	0.94	7.684	A
West	46.51	3.10	9.628	A
South	25.37	1.69	13.625	B
East	9.19	0.61	3.678	A

**Queueing Delay results: (08:45-09:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	14.67	0.94	7.743	A
West	51.26	3.42	10.318	B
South	27.79	1.85	14.407	B
East	9.40	0.63	3.691	A

**Queueing Delay results: (09:00-09:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	9.57	0.64	5.888	A
West	25.11	1.67	5.758	A
South	15.16	1.01	8.887	A
East	6.70	0.45	3.141	A

**Queueing Delay results: (09:15-09:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Signalized Level Of Service
North	6.74	0.45	4.987	A
West	15.37	1.02	4.251	A
South	9.58	0.64	6.766	A

East	5.02	0.33	2.820	A	A
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**Queue Variation Results for each time segment**

**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.43	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.98	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.60	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:15-08:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.61	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.54	0.00	0.00	3.11	4.15				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.92	0.00	0.00	1.06	1.06				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.43	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:30-08:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.97	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.37	0.00	0.00	1.04	8.30				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.82	0.00	0.00	0.00	3.18				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.62	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:45-09:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.98	0.00	0.00	0.00	1.06				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.45	?	?	?	?				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.87	0.00	0.00	0.00	3.18				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.63	0.00	0.00	0.00	1.04				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (09:00-09:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.62	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.59	0.00	0.00	3.11	4.15				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.96	0.00	0.00	1.06	1.06				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (09:15-09:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.44	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.00	0.00	0.00	1.04	2.08				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.62	0.00	0.00	0.00	1.06				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A



## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541 (10/03/2021) (20/1/2021)  
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Filename: (210088) 1521 Summingdale Road - Summingdale and Hyde Park.ar8  
Path: C:\Users\AdamMorrison\Personal\Projects - (210088) 1521 Summingdale2 Analysis\Arcady  
Report generation date: 2021-03-26 3:25:04 PM

### Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031						
Leg North	2.31	4.17	11.97	0.69	B		
Leg West	0.14	~1	3.44	0.12	A	10.66	B
Leg South	3.06	8.26	13.55	0.75	B		
Leg East	0.93	1.03	4.93	0.48	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

\*D1 - Background 2031, AM, model duration: 6:00 AM - 9:30 AM  
\*D2 - Background 2031, PM, model duration: 4:00 PM - 5:30 PM  
\*D3 - Background 2031, PM, model duration: 4:00 PM - 5:30 PM  
\*D4 - Total 2031, PM, model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:25:03 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Calculate Residual Capacity		Residual Capacity Criteria	N/A	VIC Ratio Threshold	0.85	Average Delay Threshold (g)	36.00	Queue Threshold (PCE)	20.00
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### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	km/h	PCE	PCE	veh/hour	s	-Min	veh/min

## (Default Analysis Set) - Total 2031, PM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default Analysis Set)	Roundabout Capacity Model	Description	Includes In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
	ARCADY		x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start (HH:MM)	Model Finish (HH:MM)	Model Period Length (min)	Time Segment Length (min)	Results Central Hour Only	Single Time Slot Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031 PM	Total 2031 PM	PM		ONE HOUR	16:00	17:30	90	15				x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (g)	Intersection LOS
1	4 Lanes Summingdale	Roundabout	North,West,South,East				10.66	B

### Intersection Network Options

Driving Side	Right
Lighting	Normal/unknown

## Legs

### Legs

Leg	Leg Name	Description
North	North	Hyde Park Road
West	West	Summingdale Road W
South	South	Hyde Park Road
East	East	Summingdale Road W

### Capacity Options

Leg	Minimum Capacity (PCE/h)	Maximum Capacity (PCE/h)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V-Approach road half-width (m)	E-Entry width (m)	r-Effective flare length (m)	R-Entry radius (m)	D-Inscribed circle diameter (m)	PH-Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope (PCE/hr)	Entered intercept (PCE/hr)	Final slope (calculated)	Final intercept (PCE/hr)
North		(calculated)	(calculated)	0.549	1357.445
West		(calculated)	(calculated)	0.673	2016.168
South		(calculated)	(calculated)	0.524	1225.224
East		(calculated)	(calculated)	0.673	2016.168

The slope and intercept shown above include any corrections and adjustments.

**Traffic Flows**

**Demand Set Data Options**

Leg	Vehicle Mix	Vehicle Mix Values Over Time	Vehicle Mix Values Over Turn	PCE Entry for a Truck (PCE)	Default Turning proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary
North		x	x	2.00				x	x
West		x	x	2.00				x	x
South		x	x	2.00				x	x
East		x	x	2.00				x	x

**Entry Flows**

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	643.00	100.000
West	ONE HOUR	x	138.00	100.000
South	ONE HOUR	x	1200.00	100.000
East	ONE HOUR	x	622.00	100.000

**Turning Proportions**

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.000	14.000	535.000
West	22.000	0.000	10.000
South	745.000	15.000	0.000
East	80.000	147.000	395.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.00	0.02	0.86
West	0.16	0.00	0.07
South	0.58	0.01	0.00
East	0.13	0.24	0.64

**Vehicle Mix**

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	1.000	1.000	1.050
West	1.400	1.000	1.130
South	1.030	1.180	1.000
East	1.080	1.010	1.030

**Truck Percentages - Intersection 1 (for whole period)**

From	To		
	North	West	South
North	0.00	0.00	0.00
West	0.00	0.00	0.00
South	0.00	0.00	0.00
East	0.00	0.00	0.00

	North	West	South	East
From	0.0	0.0	5.0	0.0
North	40.0	0.0	13.0	0.0
West	3.0	18.0	0.0	2.0
East	8.0	1.0	3.0	0.0

**Results**

**Results Summary for whole modelled period**

Leg	Max Delay (s)	Max 95th Queue (PCE)	Max LOS	Average Delay (PCE/hr)	Total In-Veh Arrivals (PCE)	Total Queuing Delay (PCE-min)	Average Delay (s)	Rate Of Queuing Delay (PCE-min/min)	Inclusive Total Delay (s)	Inclusive Total Delay (PCE-min)	Indicative Average Queuing Delay (s)
North	0.09	1.97	2.31	4.17	B	560.03	885.04	125.44	8.50	1.39	125.46
West	0.12	3.44	0.14	-1	A	126.63	189.95	97.6	3.08	0.11	97.6
South	0.75	93.55	3.06	8.26	B	1183.73	1043.33	164.77	9.48	1.83	164.80
East	0.48	4.93	0.93	1.03	A	570.76	886.14	97.58	4.04	0.64	97.58

**Main Results for each time segment**

**Main results: (16:00-16:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	434.03	484.06	921.02	0.00	0.00	480.98	631.93	417.81	0.00	1128.20	665.47	0.429	0.00	0.77	5772	A
West	103.89	103.89	26.97	0.00	0.00	103.98	131.96	766.83	0.00	1458.91	965.87	0.669	0.00	0.08	2725	A
South	971.18	970.86	142.67	409.52	0.00	586.02	717.49	152.92	0.00	1145.15	714.91	0.498	0.00	1.01	5381	A
East	488.27	488.27	117.07	0.00	400.52	486.01	136.41	583.13	0.00	1623.51	1431.09	0.288	0.00	0.42	3205	A

**Main results: (16:15-16:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	570.04	570.04	144.51	0.00	0.00	576.45	757.48	900.11	0.00	1093.04	686.46	0.534	0.77	1.17	7385	A
West	124.06	124.06	31.01	0.00	0.00	123.98	157.90	916.59	0.00	1397.64	965.97	0.693	0.08	0.10	2487	A
South	1459.68	681.43	170.36	478.26	0.00	679.32	859.43	183.11	0.00	1128.34	714.91	0.603	1.01	1.64	8221	A
East	558.17	558.17	139.79	0.00	478.26	588.31	163.35	693.09	0.00	1548.43	1431.09	0.362	0.42	0.36	3700	A

**Main results: (16:30-16:45)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	707.96	707.96	176.99	0.00	0.00	703.61	924.49	611.96	0.00	1021.68	665.46	0.693	1.17	2.26	11642	B
West	151.94	151.94	37.99	0.00	0.00	151.77	193.25	1122.32	0.00	1260.44	965.87	0.763	0.10	0.14	3431	A
South	1420.32	834.57	208.64	586.74	0.00	828.79	1050.16	223.94	0.00	1107.96	714.91	0.643	1.54	2.98	13046	B
East	684.83	684.83	171.21	0.00	585.74	683.46	199.74	862.98	0.00	1441.80	1431.09	0.475	0.58	0.92	4827	A

**Main results: (16:45-17:00)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	707.96	707.96	176.99	0.00	0.00	707.76	930.04	613.23	0.00	1020.98	665.46	0.693	2.26	2.31	11985	B
West	151.94	151.94	37.99	0.00	0.00	151.94	193.76	1127.24	0.00	1257.13	965.87	0.763	0.14	0.14	3442	A
South	1420.32	834.57	208.64	586.74	0.00	834.25	1054.59	224.58	0.00	1107.62	714.91	0.753	2.98	3.06	13532	B
East	684.83	684.83	171.21	0.00	585.74	684.80	200.36	895.47	0.00	1438.11	1431.09	0.476	0.92	0.93	4928	A

**Main results: (17:00-17:15)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	707.96	707.96	176.99	0.00	0.00	707.76	930.04	613.23	0.00	1020.98	665.46	0.693	2.26	2.31	11985	B
West	151.94	151.94	37.99	0.00	0.00	151.94	193.76	1127.24	0.00	1257.13	965.87	0.763	0.14	0.14	3442	A
South	1420.32	834.57	208.64	586.74	0.00	834.25	1054.59	224.58	0.00	1107.62	714.91	0.753	2.98	3.06	13532	B
East	684.83	684.83	171.21	0.00	585.74	684.80	200.36	895.47	0.00	1438.11	1431.09	0.476	0.92	0.93	4928	A

	(PCE/h)	(PCE)	(PCE/h)	Flow (PCE/h)	(PCE/h)	(PCE/h)	(PCE/h)	(PCE/h)	Ratio (PCE)	(e)				
North	576.04	44.51	0.00	582.41	785.55	502.03	0.00	1061.99	665.46	0.534	2.31	1.22	2.579	A
West	124.06	31.01	0.00	124.22	138.75	925.69	0.00	1392.85	965.87	0.089	0.14	0.10	2.999	A
South	1159.68	681.43	170.36	478.26	865.65	184.06	0.00	1128.84	714.91	0.604	3.06	1.61	6.525	A
East	559.17	139.79	0.00	478.26	560.53	164.26	707.06	1540.06	1431.09	0.363	0.93	0.59	3.797	A

**Main results: (17:15-17:30)**

Leg	Total Demand (PCE/h)	Intersection Demand Arrivals (PCE/h)	Bypass Demand (PCE/h)	Flow (PCE/h)	Exit Flow (PCE/h)	Circulating Flow (PCE/h)	Pedestrian Demand (PCE/h)	Capacity (PCE/h)	Saturation Ratio (PCE/h)	VC Ratio	Start Queue (PCE)	End Queue (PCE)	LOS	
North	484.08	484.08	121.02	0.00	485.78	638.49	419.98	1127.01	665.47	0.430	1.22	0.79	5.970	A
West	103.89	103.89	25.97	0.00	103.99	132.74	775.01	1495.66	965.87	0.069	0.10	0.08	2.735	A
South	974.18	570.66	142.67	400.52	0.00	572.93	153.87	1144.65	714.91	0.499	1.61	1.04	6.529	A
East	463.27	468.27	117.07	0.00	400.52	488.95	569.51	1619.22	1431.09	0.289	0.59	0.42	3.228	A

**Queueing Delay Results for each time segment**

**Queueing Delay Results: (16:00-16:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.18	0.75	5.772	A	A
West	1.16	0.08	2.725	A	A
South	14.50	0.97	6.381	A	A
East	6.11	0.41	3.205	A	A

**Queueing Delay Results: (16:15-16:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.95	1.13	7.385	A	A
West	1.52	0.10	2.987	A	A
South	22.05	1.47	8.221	A	A
East	8.55	0.57	3.760	A	A

**Queueing Delay Results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	31.58	2.10	11.842	B	B
West	2.13	0.14	3.431	A	A
South	41.03	2.74	13.046	B	B
East	13.47	0.90	4.887	A	A

**Queueing Delay Results: (16:45-17:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	34.34	2.29	11.865	B	B
West	2.17	0.14	3.442	A	A
South	45.49	3.03	13.552	B	B
East	13.93	0.93	4.928	A	A

**Queueing Delay Results: (17:00-17:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.14	1.26	7.979	A	A
West	1.56	0.11	2.899	A	A
South	25.50	1.70	8.925	A	A
East	9.08	0.61	3.197	A	A

**Queueing Delay Results: (17:15-17:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (e)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.29	0.82	5.670	A	A
West	1.20	0.08	2.735	A	A
South	16.20	1.08	6.529	A	A
East	6.43	0.43	3.228	A	A

**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.77	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.01	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.42	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:15-16:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.17	0.00	0.00	2.09	2.09				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.54	0.00	0.00	3.10	4.13				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:30-16:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	2.26	0.00	0.00	4.17	4.17				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.98	0.00	0.00	1.03	6.26				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.92	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (16:45-17:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	2.31	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	3.06	0.00	0.00	0.00	4.13				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.95	0.00	0.00	0.00	1.03				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:00-17:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	1.22	0.00	0.00	2.09	3.13				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.61	0.00	0.00	3.10	4.13				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (17:15-17:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q10 (PCE)	Q25 (PCE)	Q50 (PCE)	Q75 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.79	0.00	0.00	1.04	2.09				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.04	0.00	0.00	1.03	3.10				Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.42	-1	-1	-1	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.0.6.541.1982126\1920153  
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Filename: (210088) 1521 Summingdale Road - Summingdale and Wonderland Road.ar08  
 Report generation date: 2021-03-26 3:19:42 PM  
 Report generation date: 2021-03-26 3:19:42 PM

### Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Total 2031							
Leg North	205.37	200.00	1572.31	1.72	F		
Leg West	1.55	1.03	6.34	0.60	A		
Leg South	27.50	78.33	106.61	1.03	F	360.05	F
Leg East	103.45	169.87	230.24	1.14	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

- "D1 - Existing AM" model duration: 8:00 AM - 9:30 AM
- "D2 - Existing PM" model duration: 4:00 PM - 5:30 PM
- "D3 - Background 2026 AM" model duration: 8:00 AM - 9:30 AM
- "D4 - Background 2026 PM" model duration: 4:00 PM - 5:30 PM
- "D5 - Background 2031 AM" model duration: 8:00 AM - 9:30 AM
- "D6 - Background 2031 PM" model duration: 4:00 PM - 5:30 PM
- "D7 - Total 2026 AM" model duration: 8:00 AM - 9:30 AM
- "D8 - Total 2026 PM" model duration: 4:00 PM - 5:30 PM
- "D9 - Total 2031 AM" model duration: 8:00 AM - 9:30 AM
- "D10 - Total 2031 PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 3:19:41 PM

### File summary

Title	(Untitled)
Location	
Site Number	
Date	2021-03-25
Version	(new file)
Status	
Identifier	
Client	
Job Number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Calculate Residual Capacity	Residual Capacity Criteria	N/A	V/C Ratio Threshold	0.85	Queue Threshold (PCE)	20.00
Do Queue Variations	x				Average Delay Threshold (s)	36.00		

### Units

Distances Units	m	Speed Units	km/h	Traffic Units Input	PCE	Traffic Units Result	PCE	Average Delay Units	s	Total Delay Units	veh/h	Rate Of Delay Units	per/hm
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## (Default Analysis Set) - Total 2031, PM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default Analysis Set)	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
	ARCADY		x				100.000	100.000	

### Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Flow Type	Model Start Time (HH:MM)	Model Finish Time (HH:MM)	Model Time Segment Length (min)	Results For Car Hour Only	Stops For Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031 PM		PM	ONE HOUR		16:00	17:30	90	15			x		

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lane Summingdale	Roundabout	North West South East				360.05	F

### Intersection Network Options

Driving Side	Lighting
Right	NormalInc.com

## Legs

### Legs

Leg	Leg Name	Description
North	North	Wonderland Road N
West	West	Summingdale Road W
South	South	Wonderland Road S
East	East	Summingdale Road E

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	F - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	Phi - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	4.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West	x	100
South		
East		

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North	(calculated)	(calculated)	(calculated)	0.549	1357.445
West	(calculated)	(calculated)	(calculated)	0.673	2016.166
South	(calculated)	(calculated)	(calculated)	0.524	1225.224
East	(calculated)	(calculated)	(calculated)	0.673	2016.166

The slope and intercept shown above include any corrections and adjustments.

## Traffic Flows

### Demand Set Data Options

Leg	Default Vehicle Mix	Vehicle Mix	Vehicle Mix	Vehicle Mix	PCE Factor	Default Turning	Estimate from	Turning	Turning	Turning
	Vehicle Mix	Vehicle Mix	Vehicle Mix	Vehicle Mix	for Truck	Proportions	Truck	Prop. Any	Prop. Any	Prop. Any
	Time	Time	Time	Time	Source		Percentages	Over Turn	Over Turn	Over Entry
North	x	x	x	x	2.00			x	x	x
West	x	x	x	x						
South	x	x	x	x						
East	x	x	x	x						

## Entry Flows

### General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	632.00	100.000
West	ONE HOUR	x	806.00	100.000
South	ONE HOUR	x	1133.00	100.000
East	ONE HOUR	x	1418.00	100.000

## Turning Proportions

### Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.00	0.21	0.67
West	107.000	0.00	219.000
South	396.000	437.000	0.00
East	82.000	823.000	513.000

### Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.00	0.21	0.67
West	0.13	0.00	0.27
South	0.32	0.39	0.00
East	0.06	0.58	0.36

## Vehicle Mix

### Average PCE Per Vehicle - Intersection 1 (for whole period)

From	To		
	North	West	South
North	1.000	1.000	1.000
West	1.000	1.000	1.000
South	1.010	1.000	1.000
East	1.000	1.030	1.000

### Truck Percentages - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.0	0.0	0.0
West	0.0	0.0	0.0
South	1.0	0.0	0.0
East	0.0	3.0	0.0

## Results

### Results Summary for whole modelled period

Leg	Max Ratio	Max Demand (PCE/hr)	Max Queue (PCE)	Max 30th Queue (PCE)	Average LOS (PCE/hr)	Average Inflow Arrivals (PCE)	Total Inflow Arrivals (PCE)	Total Queuing Delay (PCE-hr)	Average Queuing Delay (s)	Rate Of Queuing Delay (PCE-hr/mile)	Inclusive Total Delay (PCE-hr)	Inclusive Total Queue (PCE)	Inclusive Total Delay (s)
North	1.72	1072.31	205.37	200.00	F	570.76	856.14	8890.70	623.08	99.70	11551.72	809.57	809.57
West	0.60	6.34	1.55	1.03	A	759.60	1039.40	97.60	5.28	1.08	97.61	5.28	5.28
South	1.03	108.61	27.59	78.95	F	1039.66	1052.27	790.89	42.39	8.88	760.99	42.40	42.40
East	1.14	203.24	103.45	169.87	F	1331.16	1951.77	3475.62	106.84	38.62	3475.73	106.85	106.85

### Main Results for each time segment

#### Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Chasing Demand (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)
North	468.27	117.07	0.00	457.74	413.99	1323.14	0.00	631.47	413.94	0.742	0.00	2.63	19.691
West	606.80	151.70	0.00	604.07	1036.44	744.43	0.00	1514.90	1442.73	0.401	0.00	0.68	4.055
South	852.98	604.54	151.14	248.44	0.00	598.00	851.90	496.60	648.18	0.626	0.00	1.64	9.666
East	1067.54	266.89	0.00	248.44	1058.94	416.41	0.00	1559.50	1450.74	0.685	0.00	2.15	7.198

#### Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Chasing Demand (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)
North	556.17	59.17	0.00	476.04	484.69	1576.15	0.00	492.64	413.94	1.135	2.63	22.92	119.121
West	724.58	724.58	181.14	0.00	724.27	1321.00	833.20	0.00	1456.13	0.498	0.68	1.01	5.053
South	1016.54	721.88	180.47	296.66	0.00	714.83	970.54	585.93	918.40	0.786	1.64	3.40	17.162
East	1274.75	1274.75	318.69	0.00	296.66	1260.00	469.91	810.85	1470.17	0.867	2.15	5.84	16.379

#### Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Chasing Demand (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)
North	684.83	684.83	171.21	0.00	404.00	572.79	1739.96	0.00	404.41	413.94	1.093	22.62	93.12
West	897.42	897.42	221.96	0.00	895.28	1327.57	813.39	0.00	1468.46	1442.73	0.604	1.01	1.95
South	1247.46	894.12	221.03	363.34	0.00	825.43	1003.92	694.75	961.42	0.648	1.64	3.40	18.07
East	1561.25	1561.25	390.31	0.00	363.34	1396.79	577.23	942.95	1381.22	1.450	5.84	54.45	86.924

#### Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Chasing Demand (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)
North	684.83	684.83	171.21	0.00	404.00	572.79	1739.96	0.00	404.41	413.94	1.177	93.12	184.61
West	897.42	897.42	221.96	0.00	895.28	1327.57	813.39	0.00	1468.46	1442.73	0.603	1.55	1.45
South	1247.46	894.12	221.03	363.34	0.00	844.42	1000.52	695.66	860.94	0.648	1.64	3.40	18.07
East	1561.25	1561.25	390.31	0.00	363.34	1396.26	577.65	944.22	1396.90	1.142	54.45	103.45	214.707

#### Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Bypass Demand (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Chasing Demand (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)
North	684.83	684.83	171.21	0.00	404.00	572.79	1739.96	0.00	404.41	413.94	1.177	93.12	184.61
West	897.42	897.42	221.96	0.00	895.28	1327.57	813.39	0.00	1468.46	1442.73	0.603	1.55	1.45
South	1247.46	894.12	221.03	363.34	0.00	844.42	1000.52	695.66	860.94	0.648	1.64	3.40	18.07
East	1561.25	1561.25	390.31	0.00	363.34	1396.26	577.65	944.22	1396.90	1.142	54.45	103.45	214.707



Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection (PCE)	Bypass Demand (PCE/hr)	Bypass (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Queueing Ratio (PCE/hr)	V/C Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	559.17	559.17	130.79	0.00	0.00	398.15	548.43	1751.95	0.00	398.19	413.94	1.411	184.61	205.37	1565.189	F
West	724.98	724.98	181.14	0.00	0.00	728.73	1333.05	815.04	0.00	1487.35	1442.73	0.934	1.55	1.01	5.018	A
South	1018.54	721.88	180.47	265.66	0.00	815.42	953.46	578.31	0.00	922.39	645.18	0.783	27.50	4.11	49.242	E
East	1274.75	1274.75	318.89	0.00	248.66	1388.48	481.83	911.89	0.00	1402.14	1450.74	0.959	103.45	75.02	230.240	F

**Main results: (17:15-17:30)**

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE)	Intersection (PCE)	Bypass Demand (PCE/hr)	Bypass (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Queueing Ratio (PCE/hr)	V/C Ratio (PCE/hr)	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	463.27	463.27	117.07	0.00	0.00	471.23	439.08	1613.64	0.00	472.08	413.94	0.992	205.37	204.63	1572.308	F
West	606.80	606.80	151.70	0.00	0.00	607.82	1221.58	883.28	0.00	1434.87	1442.73	0.423	1.01	0.76	4.485	A
South	852.98	604.54	151.14	248.44	0.00	614.01	970.10	501.00	0.00	982.88	645.18	0.628	4.11	1.74	10.633	B
East	1067.54	1067.54	266.89	0.00	248.44	1358.02	420.31	694.70	0.00	1548.38	1450.74	0.689	75.02	2.40	56.032	F

**Queueing Delay Results for each time segment**

**Queueing Delay results: (16:00-16:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	34.33	2.29	19.891	C	B
West	9.95	0.66	4.055	A	A
South	22.81	1.52	9.686	A	A
East	30.21	2.01	7.198	A	A

**Queueing Delay results: (16:15-16:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	202.84	13.52	119.121	F	F
West	14.73	0.96	5.053	A	A
South	45.66	3.04	17.182	C	B
East	75.55	5.04	16.379	C	B

**Queueing Delay results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	970.03	58.04	535.033	F	F
West	22.31	1.49	6.331	A	A
South	178.21	11.88	61.153	F	E
East	463.51	31.03	88.924	F	F

**Queueing Delay results: (16:45-17:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1933.06	128.87	1161.161	F	F
West	23.24	1.55	6.342	A	A
South	344.04	22.94	108.612	F	F
East	1194.88	78.99	214.707	F	F

**Queueing Delay results: (17:00-17:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2774.88	184.99	1565.189	F	F
West	15.70	1.05	5.018	A	A
South	161.76	10.78	49.242	E	D
East	1338.52	89.23	230.240	F	F

**Queueing Delay results: (17:15-17:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3074.96	205.00	1572.308	F	F
West	11.67	0.76	4.485	A	A
South	284.1	1.89	10.633	B	B
East	380.95	25.40	56.032	F	E

**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.63	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.68	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.64	0.00	0.00	2.01	2.01			N/A	N/A
East	2.15	0.00	0.00	4.07	6.10			N/A	N/A

**Queue Variation results: (16:15-16:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	22.92	0.00	0.00	32.00	87.00			N/A	N/A
West	1.01	0.00	0.00	1.03	1.03			N/A	N/A
South	3.40	0.00	0.00	8.04	12.05			N/A	N/A
East	5.84	0.00	1.02	14.24	21.36			N/A	N/A

**Queue Variation results: (16:30-16:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	93.12	4.00	55.00	>189	>189			N/A	N/A
West	1.55	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	18.07	0.00	12.05	30.18	50.23			N/A	N/A
East	54.45	20.34	49.84	86.46	98.67			N/A	N/A

**Queue Variation results: (16:45-17:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	164.81	47.00	147.00	>189	>189			N/A	N/A
West	1.55	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	27.50	1.00	19.09	60.27	78.35			N/A	N/A
East	103.45	49.84	97.65	151.56	168.87			N/A	N/A

**Queue Variation results: (17:00-17:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	205.37	78.00	191.00	>189	>189			N/A	N/A
West	1.01	0.00	0.00	1.03	1.03			N/A	N/A
South	4.11	0.00	0.00	8.04	13.07			N/A	N/A
East	75.02	45.77	72.22	98.67	107.82			N/A	N/A

**Queue Variation results: (17:15-17:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	204.63	78.00	190.00	>189	>189			N/A	N/A
West	0.76	0.00	0.00	1.03	1.03			N/A	N/A
South	1.74	0.00	0.00	0.00	4.02			N/A	N/A
East	2.40	0.00	0.00	0.00	4.07			N/A	N/A

HCM 6th TWSC  
3: Sunningdale Road & Street A

2031 Total PM  
1521 Sunningdale Road, London

Intersection	Int Delay, s/veh											
Int Delay, s/veh	7.7											
Movement	EBL	EBT	WBT	WBR	SBL	SBR						
Lane Configurations	4 4 4 4 4 4											
Traffic Vol, veh/h	49	665	592	137	82	30						
Future Vol, veh/h	49	665	592	137	82	30						
Conflicting Peds, #/hr	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	None						
Storage Length	-	-	-	-	-	-						
Veh in Median Storage, #	-	0	0	-	0	-						
Grade, %	-	0	0	-	0	-						
Peak Hour Factor	92	92	92	92	92	92						
Heavy Vehicles, %	0	1	2	0	0	0						
Mvmt Flow	53	723	643	149	89	33						
Major/Minor	Major1	Major2	Minor2									
Conflicting Flow All	792	0	-	0	1547	718						
Stage 1	-	-	-	718	-	-						
Stage 2	-	-	-	829	-	-						
Critical Hwy	4.1	-	-	6.4	6.2	-						
Critical Hwy Stg 1	-	-	-	5.4	-	-						
Critical Hwy Stg 2	-	-	-	5.4	-	-						
Follow-up Hwy	2.2	-	-	3.5	3.3	-						
Pot Cap-1 Maneuver	838	-	-	127	432	-						
Stage 1	-	-	-	487	-	-						
Stage 2	-	-	-	432	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	838	-	-	114	432	-						
Mov Cap-2 Maneuver	-	-	-	114	-	-						
Stage 1	-	-	-	435	-	-						
Stage 2	-	-	-	432	-	-						
Approach	EB	WB	SB									
HCM Control Delay, s	0.7	0	102.2									
HCM LOS	F											
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1							
Capacity (veh/h)	838	-	-	-	142	-						
HCM Lane V/C Ratio	0.064	-	-	-	0.857	-						
HCM Control Delay (s)	9.6	0	-	-	102.2	-						
HCM Lane LOS	A	A	-	-	F	-						
HCM 95th %tile Q(veh)	0.2	-	-	-	5.6	-						

HCM 6th TWSC  
4: Hyde Park Road & Street A

2031 Total PM  
1521 Sunningdale Road, London

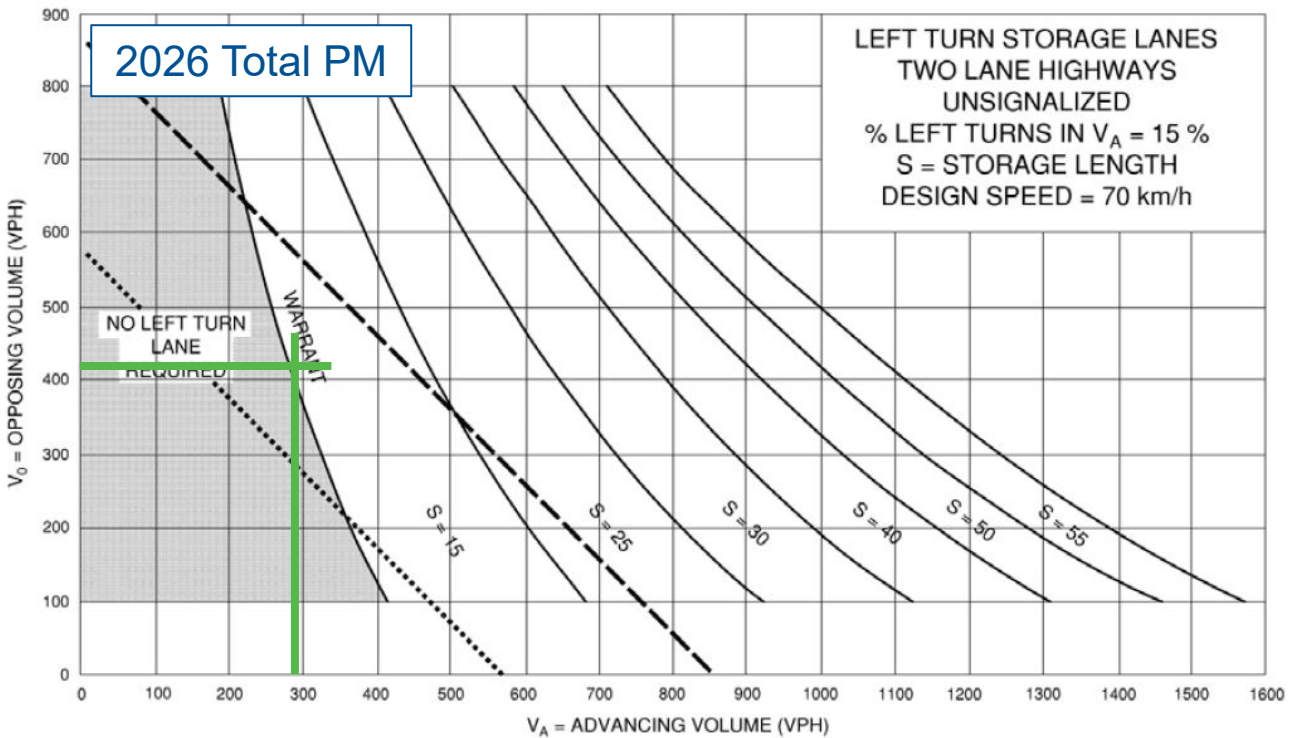
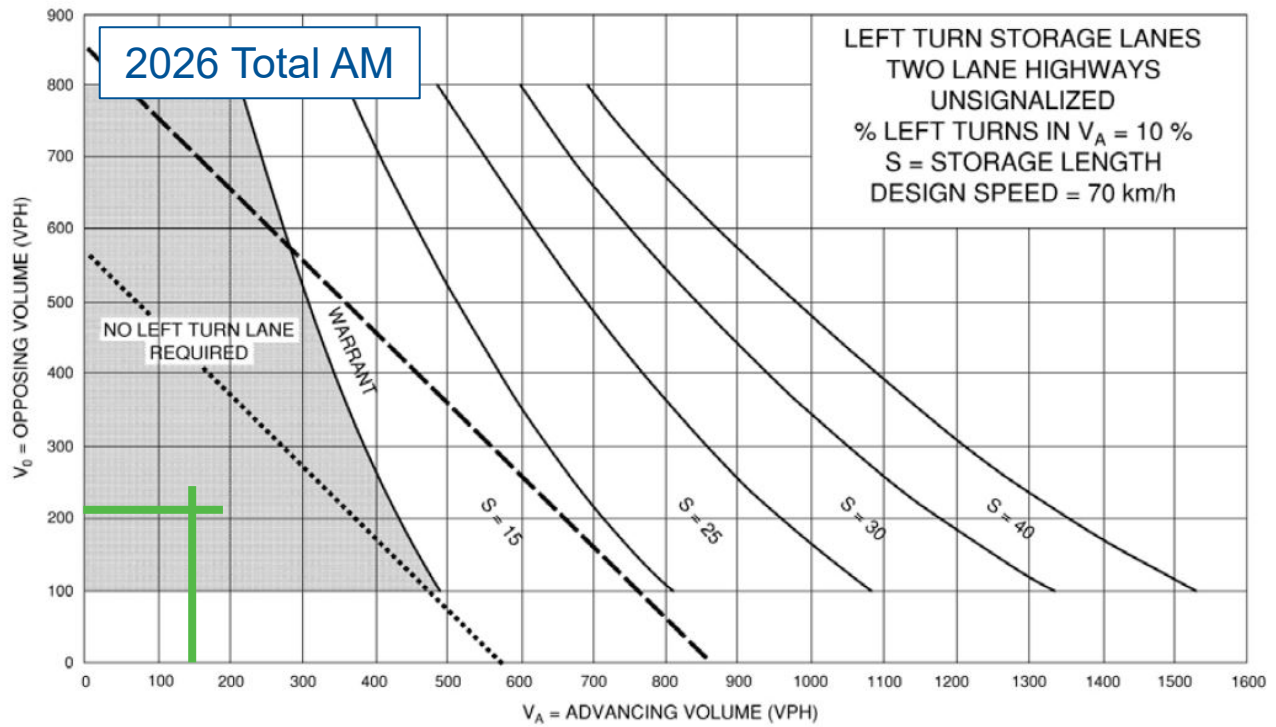
Intersection	Int Delay, s/veh											
Int Delay, s/veh	1.2											
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	4 4 4 4 4 4											
Traffic Vol, veh/h	31	8	795	50	12	612						
Future Vol, veh/h	31	8	795	50	12	612						
Conflicting Peds, #/hr	0	0	0	0	0	0						
Sign Control	Stop	Stop	Free	Free	Free	Free						
RT Channelized	-	None	-	None	-	None						
Storage Length	0	-	-	-	-	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	92	92	92	92	92	92						
Heavy Vehicles, %	0	0	3	0	0	5						
Mvmt Flow	34	9	864	54	13	665						
Major/Minor	Minor1	Major1	Major2									
Conflicting Flow All	1582	891	0	0	918	0						
Stage 1	891	-	-	-	-	-						
Stage 2	691	-	-	-	-	-						
Critical Hwy	6.4	6.2	-	-	4.1	-						
Critical Hwy Stg 1	5.4	-	-	-	-	-						
Critical Hwy Stg 2	5.4	-	-	-	-	-						
Follow-up Hwy	3.5	3.3	-	-	2.2	-						
Pot Cap-1 Maneuver	121	344	-	-	752	-						
Stage 1	404	-	-	-	-	-						
Stage 2	501	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	118	344	-	-	752	-						
Mov Cap-2 Maneuver	118	-	-	-	-	-						
Stage 1	404	-	-	-	-	-						
Stage 2	487	-	-	-	-	-						
Approach	WB	NB	SB									
HCM Control Delay, s	43	0	0.2									
HCM LOS	E											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	136	752	-	-						
HCM Lane V/C Ratio	-	-	0.312	0.017	-	-						
HCM Control Delay (s)	-	-	43	9.9	0	-						
HCM Lane LOS	-	-	E	A	A	-						
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-	-						

# Appendix H

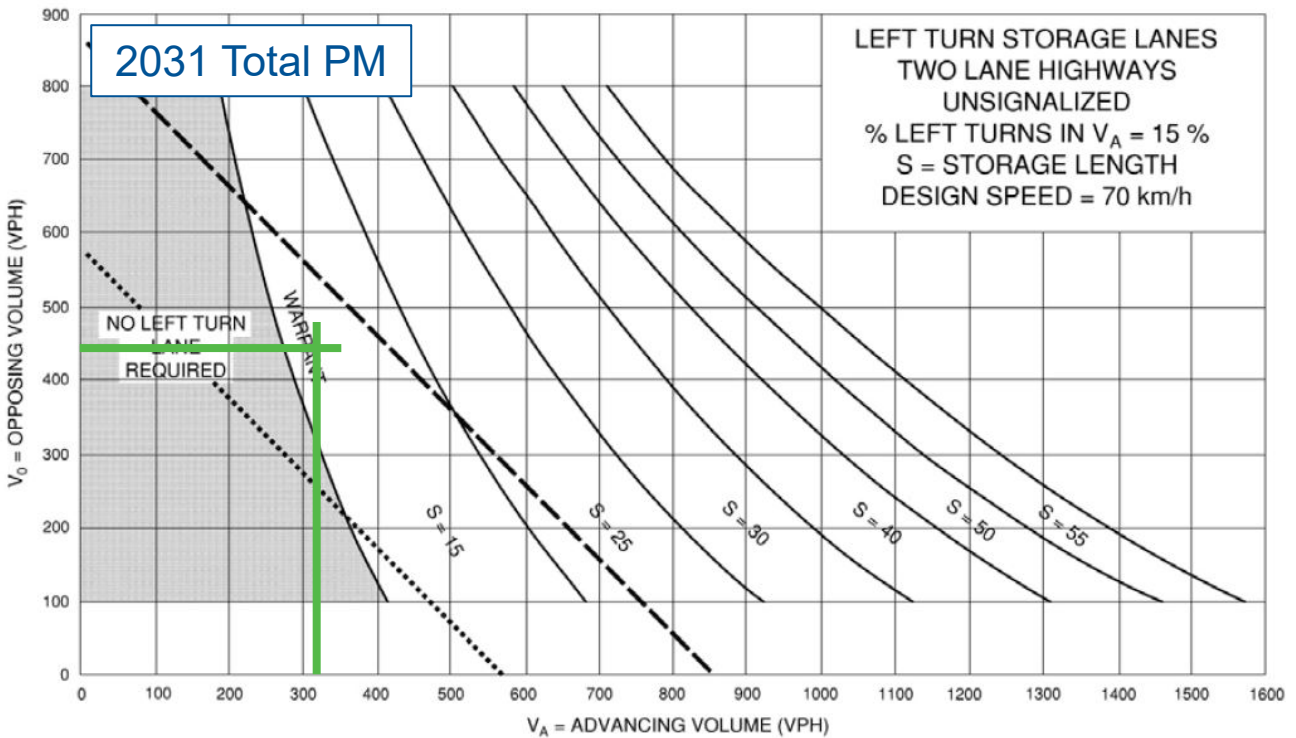
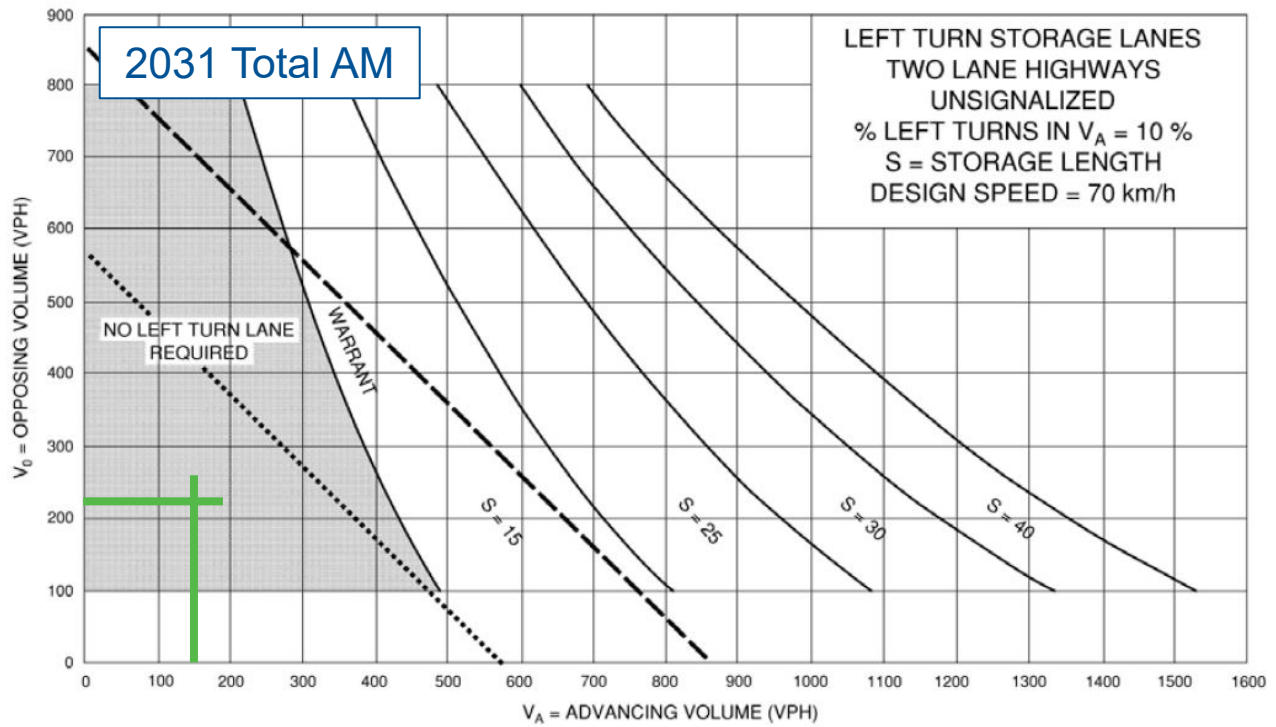
## Left-Turn Lane Warrants



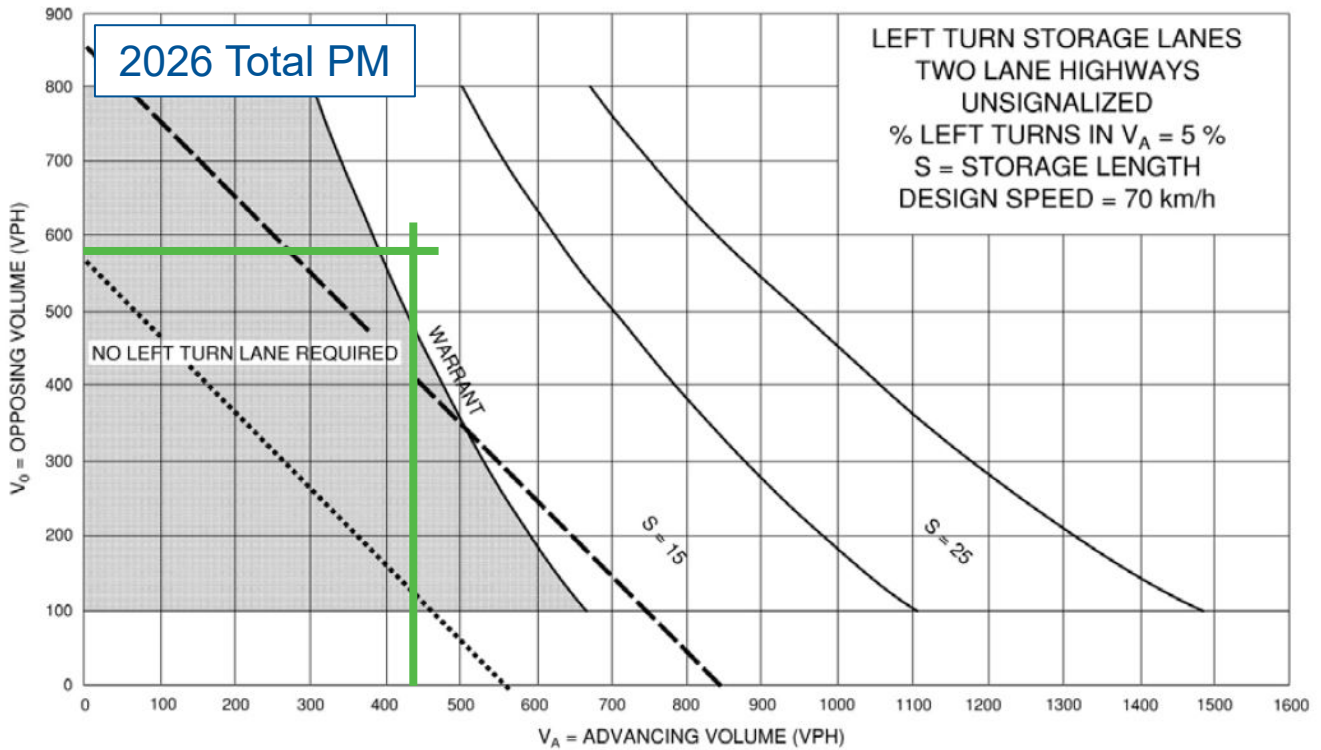
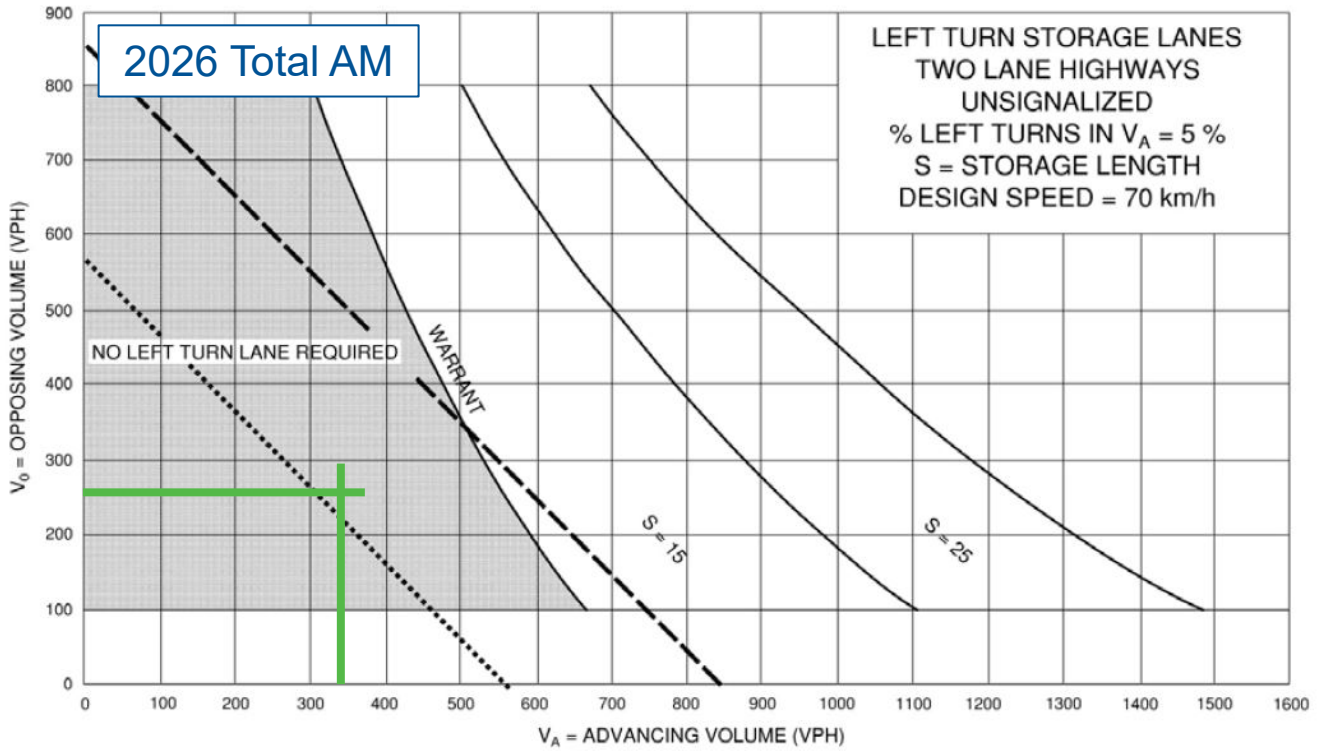




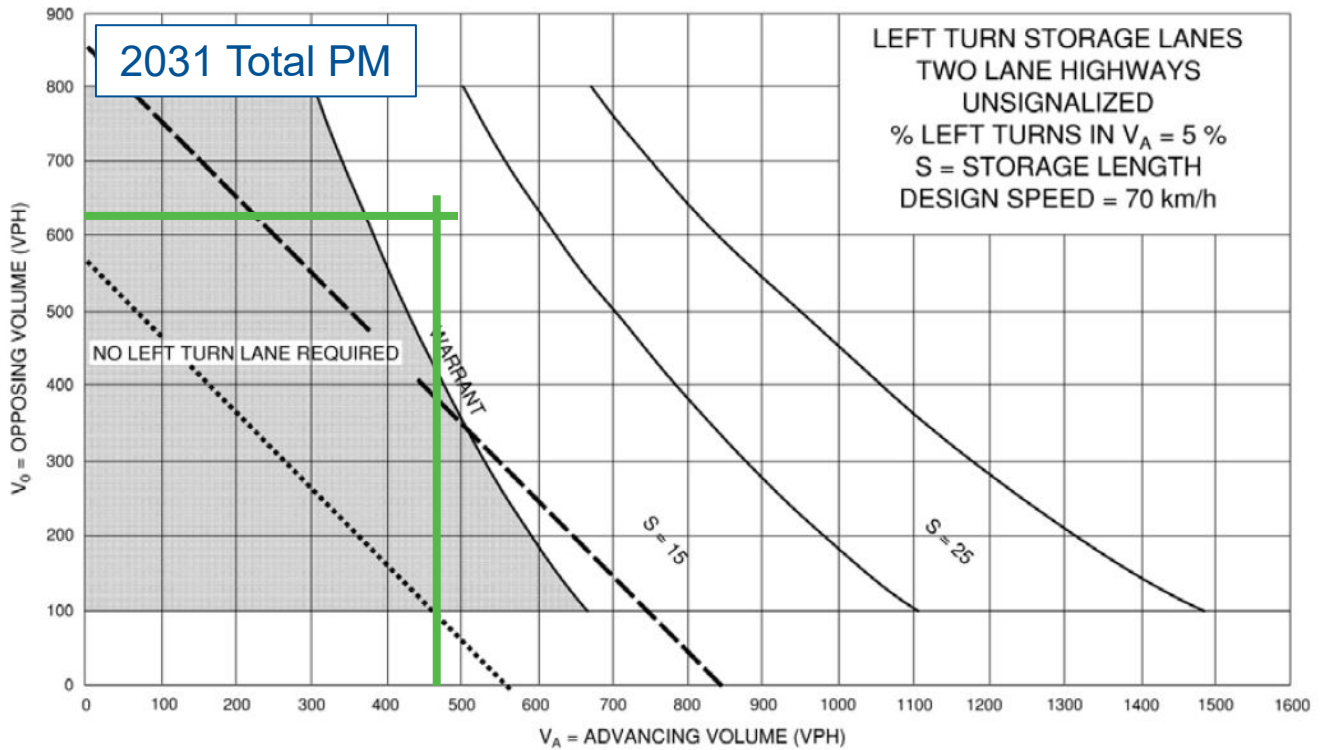
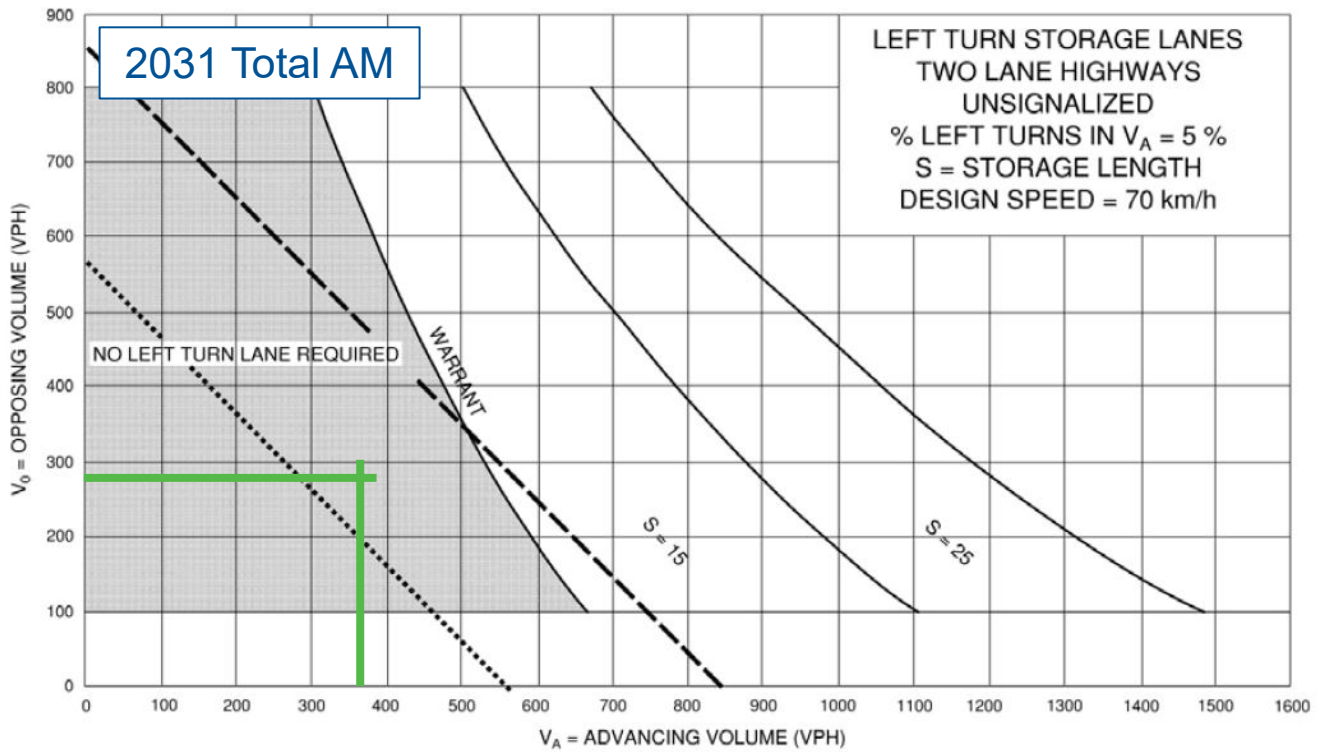
## Eastbound Left-Turn Lane Warrants Sunningdale Road & Street A Mount Pleasant Subdivision



## Eastbound Left-Turn Lane Warrants Sunningdale Road & Street A Mount Pleasant Subdivision

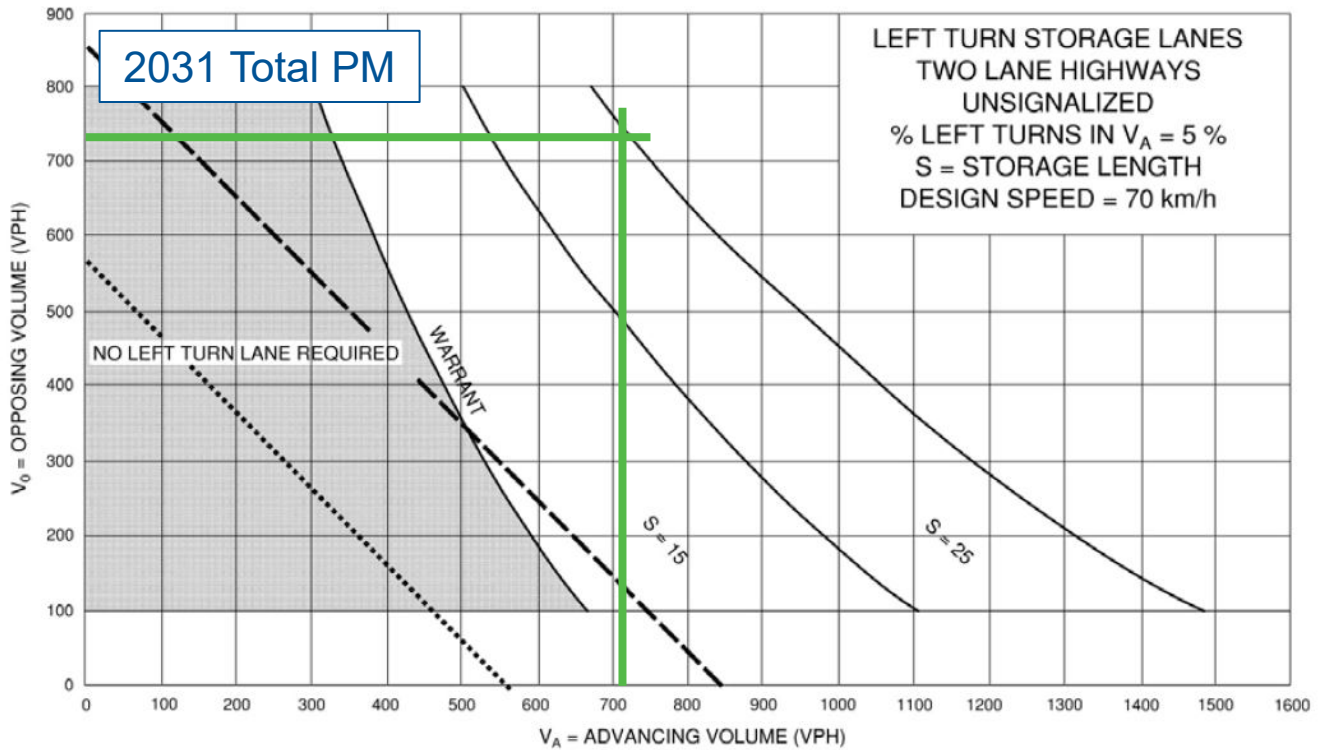
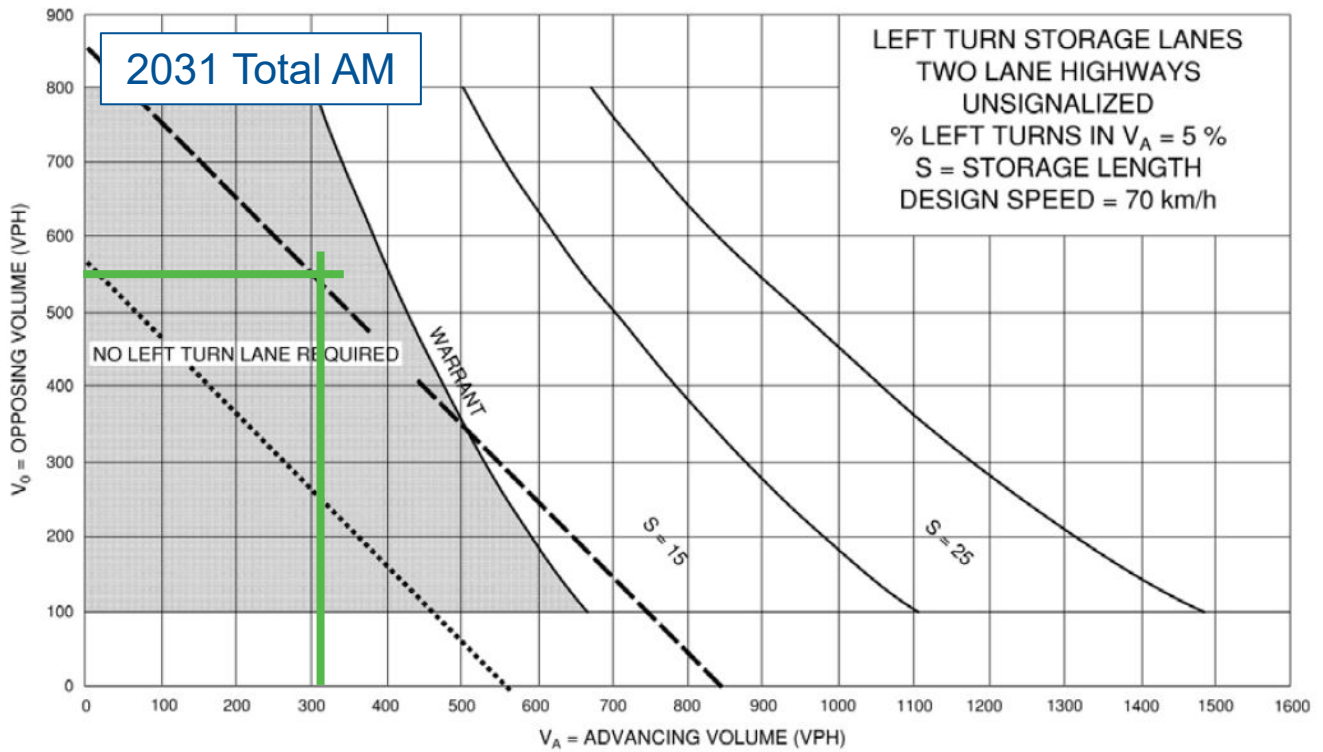


## Southbound Left-Turn Lane Warrants Hyde Park Road & Street A Mount Pleasant Subdivision

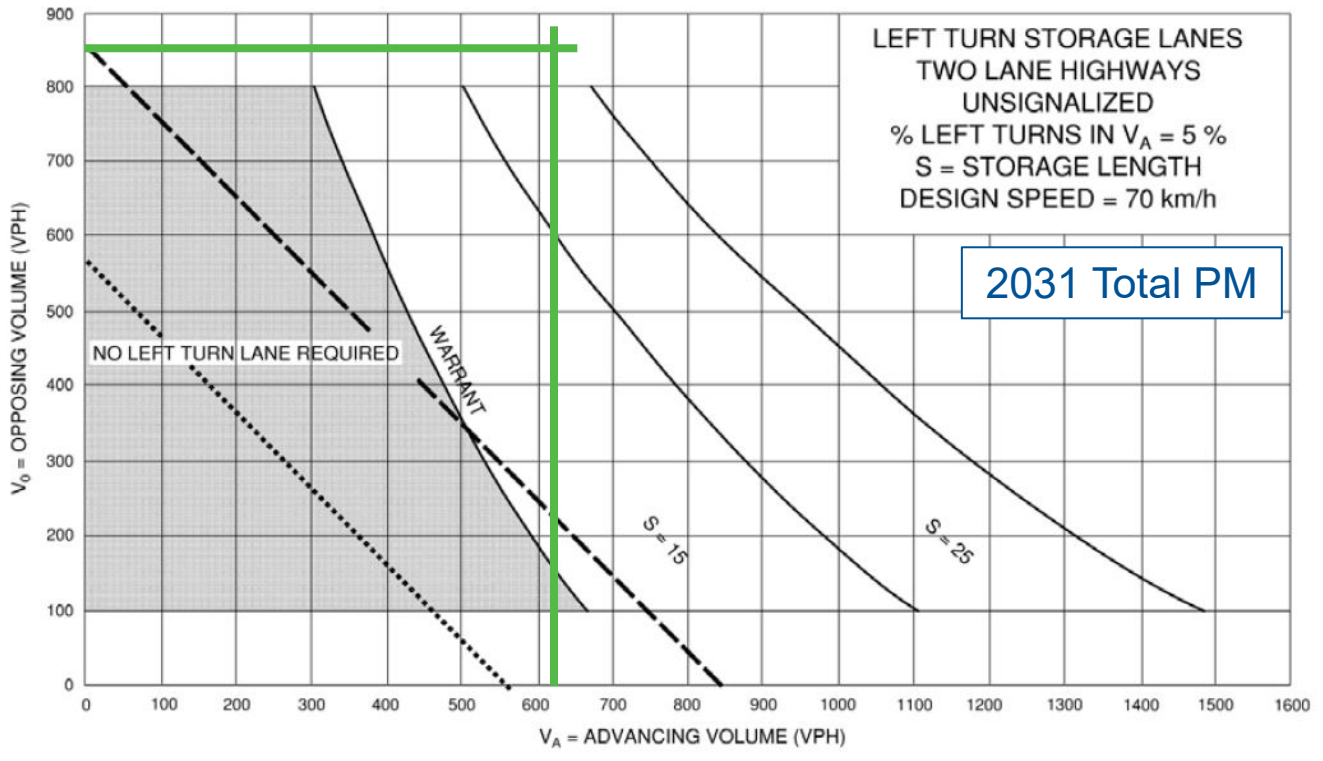
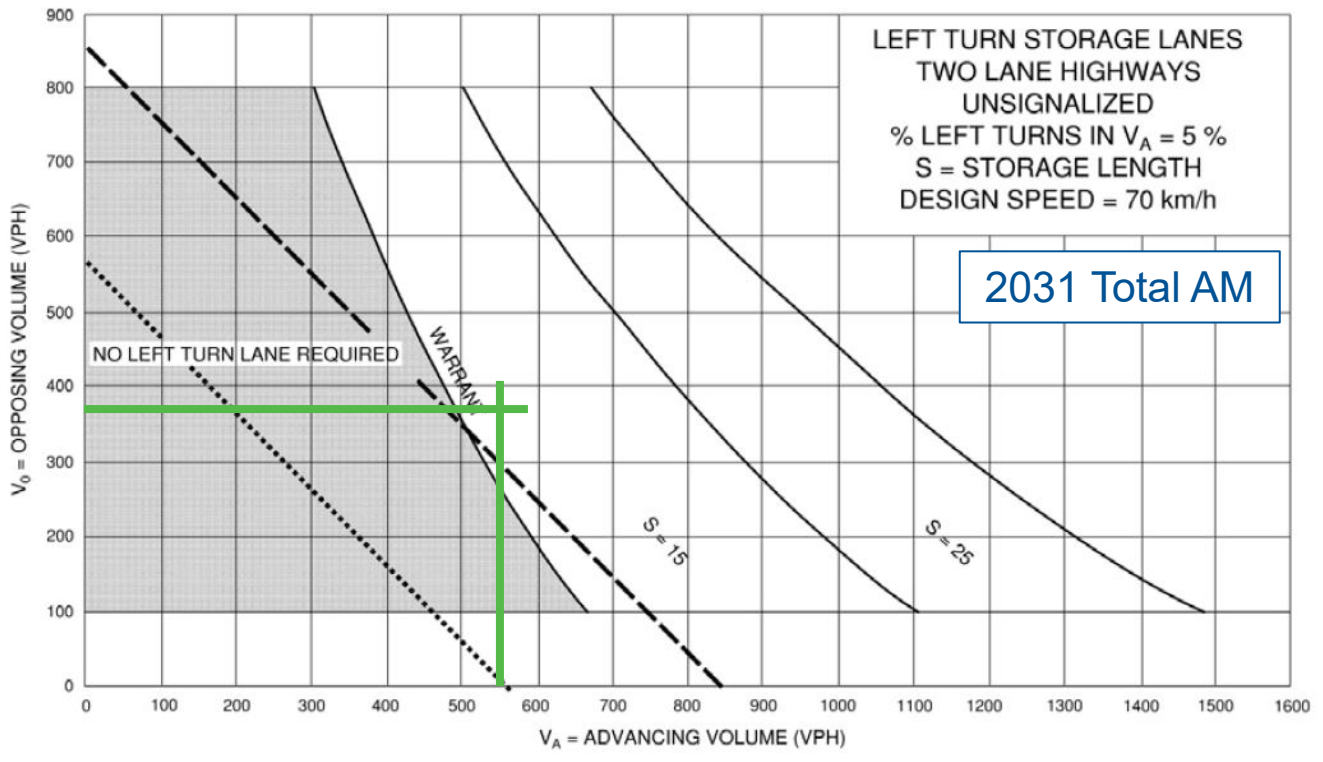


## Southbound Left-Turn Lane Warrants Hyde Park Road & Street A Mount Pleasant Subdivision





## Eastbound Left-Turn Lane Warrants Sunningdale Road & Street A Northwest Planning Area Cumulative



# Southbound Left-Turn Lane Warrants Hyde Park Road & Street A Northwest Planning Area Cumulative

# Appendix I

## 2031 Total Traffic Operations Reports – Network Improvements





## Junctions 8

Version: 8.0.0.541 (192126/11/2015)  
Copyright: The Authors. All rights reserved. Contact: TEL: +44 (0)1344 770758 email: software@arcady.com Web: http://www.arcadyware.co.uk

**ARCADY 8 - Roundabout Module**

The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Files: C:\Users\AdamMorrison\Parade\Projects - (210088) 1521 Summingdale\Road - Junc\_8a8  
 Path: C:\Users\AdamMorrison\Parade\Projects - (210088) 1521 Summingdale\Analysis\Arcady  
 Report generation date: 2021-03-26 2:52:28 PM

### Summary of intersection performance

AM						
Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Total 2031						
Leg North	0.46	~1	3.60	0.30	B	
Leg West	3.45	8.30	10.32	0.77	A	7.11
Leg South	1.57	1.06	6.82	0.60	A	
Leg East	0.63	1.04	3.69	0.38	A	

Values above are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D9 - Total 2031, AM" model duration: 6:00 AM - 9:30 AM  
 "D10 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM  
 Run using Junctions 8.0.6.541 at 2021-03-26 2:52:28 PM

### File summary

Title	(untitled)
Location	
Site Number	
Date	2021-03-25
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	7.50	Do Queue Variations	x	Residual Capacity	N/A	V/C Ratio Threshold	0.85	Average Delay Threshold (s)	36.00	Queue Threshold (PCE)	20.00
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### Units

Distance Units	m	Speed Units	mph	Traffic Units Input	PCE	Traffic Units Results	PCE	Average Delay Units	s	Total Delay Units	veh	Rate Of Delay Units	perMin
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## (Default Analysis Set) - Total 2031, AM

### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name (Default Analysis Set)	ARCADY	Description		Include In Report	x	Use Specific Demand Set(s)		Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	100.000	Network Capacity Scaling factor (%)	100.000	Reason For Scaling Factors	
-----------------------------	--------	-------------	--	-------------------	---	----------------------------	--	-------------------------	--------	---------------------------------	---------	-------------------------------------	---------	----------------------------	--

### Demand Set Details

Scenario Name	Time Period	Description	Traffic Profile	Model Start (HH:MM)	Model Finish (HH:MM)	Model Period Length (min)	Time Segment Length (min)	Results Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Relationship
Total 2031, AM	AM		ONE HOUR	08:00	09:30	90	15				x	

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Log Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	2 Lanes Summingdale	Roundabout	North,West,South,East				7.11	A

### Intersection Network Options

Drinking Side	Right	Lighting	Normal/intercom
---------------	-------	----------	-----------------

## Legs

### Legs

Leg	Log	Name	Description
North	North	Wondesland Road N	
West	West	Summingdale Road W	
South	South	Wondesland Road S	
East	East	Summingdale Road E	

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Full Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PH - Conflict (entry) angle (deg)	Exit Only
North	3.50	8.00	30.00	20.00	50.00	25.00	
West	3.50	8.00	30.00	20.00	50.00	25.00	
South	3.50	8.00	30.00	20.00	50.00	25.00	
East	3.50	8.00	30.00	20.00	50.00	25.00	

### Slope / Intercept / Capacity

**Roundabout Slope and Intercept used in model**

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North	(calculated)	(calculated)	(calculated)	0.673	2015.168
West	(calculated)	(calculated)	(calculated)	0.673	2015.168
South	(calculated)	(calculated)	(calculated)	0.673	2015.168
East	(calculated)	(calculated)	(calculated)	0.673	2015.168

The slope and intercept shown above include any corrections and adjustments.

**Traffic Flows**

**Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Over Time	Vehicle Mix Over Turn	Vehicle Mix Source	PCE Factor for a Truck	Default Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	x	x	Truck Percentages	2.00				x	x

**Entry Flows**

**General Flows Data**

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	418.00	100.000
West	ONE HOUR	x	1117.00	100.000
South	ONE HOUR	x	761.00	100.000
East	ONE HOUR	x	558.00	100.000

**Turning Proportions**

**Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)**

		To			
		North	West	South	East
From	North	85.000	0.000	308.000	49.000
	West	292.000	142.000	0.000	327.000
	South	31.000	310.000	217.000	0.000

**Turning Proportions (PCE) - Intersection 1 (for whole period)**

		To			
		North	West	South	East
From	North	0.00	0.15	0.74	0.12
	West	0.08	0.00	0.29	0.63
	South	0.38	0.19	0.00	0.43
	East	0.06	0.56	0.39	0.00

**Vehicle Mix**

**Average PCE Per Vehicle - Intersection 1 (for whole period)**

		To			
		North	West	South	East
From	North	1.000	1.020	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.030	1.130	1.000	1.050

		To			
		East	West	South	East
From	North	0.0	2.0	8.0	0.0
	West	9.0	6.0	0.0	5.0
	South	3.0	13.0	0.0	5.0
	East	0.0	5.0	4.0	0.0

**Truck Percentages - Intersection 1 (for whole period)**

		To			
		North	West	South	East
From	North	0.0	2.0	8.0	0.0
	West	9.0	6.0	0.0	5.0
	South	3.0	13.0	0.0	5.0
	East	0.0	5.0	4.0	0.0

**Results**

**Results Summary for whole modelled period**

Leg	Mix V/C Ratio	Mix Delay (s)	Mix Sat. per vehicle Queue (PCE)	Max LOS	Average Delay (PCE/hr)	Total Queuing Delay (PCE-hr)	Pedestrian Demand (Ped/hr)	Circulating Flow (PCE/hr)	Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Intersection Arrivals (PCE)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Delay (s)	Inclusive Total Queuing Delay (PCE-hr)	Average Delay (s)	Rate Of Queuing Delay (PCE-m/hr)
North	0.30	3.80	0.46	-1	A	383.56	575.35	501.98	305.89	313.72	78.67	1678.15	937.93	0.188	0.00	0.24	30.66	3.20	0.34
West	0.77	10.32	3.45	B	1024.96	1537.47	174.84	628.02	638.81	570.56	143.23	1726.09	1106.05	0.487	0.00	0.98	174.66	6.82	1.94
South	0.60	6.82	1.57	A	698.31	1047.46	89.93	389.09	809.49	418.78	105.02	1593.29	1416.06	0.360	0.00	0.59	89.94	5.15	1.00
East	0.38	3.89	0.63	A	512.03	768.05	41.55	389.09	809.49	105.02	1754.17	1415.70	1415.70	0.239	0.00	0.33	41.55	0.46	

**Main Results for each time segment**

**Main results: (08:00-08:15)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Delay (s)	LOS
North	314.69	78.67	313.72	305.89	501.98	0.00	1678.15	937.93	0.233	0.24	0.32	3.089
West	840.94	210.23	837.03	638.81	628.02	0.00	1726.09	1106.05	0.487	0.00	0.98	4.183
South	572.92	143.23	570.56	638.81	628.02	0.00	1593.29	1416.06	0.360	0.00	0.59	3.710
East	420.09	105.02	418.78	809.49	389.09	0.00	1754.17	1415.70	0.239	0.00	0.33	2.810

**Main results: (08:15-08:30)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Delay (s)	LOS
North	375.77	93.94	375.46	368.16	600.81	0.00	1611.61	937.94	0.233	0.24	0.32	3.089
West	1004.16	251.04	1001.89	460.69	515.59	0.00	1688.69	1106.06	0.602	0.68	1.54	5.590
South	684.12	171.03	683.01	765.77	751.71	0.00	1510.00	1416.06	0.453	0.59	0.87	4.582
East	501.63	125.41	501.20	988.96	465.76	0.00	1702.54	1415.70	0.295	0.33	0.43	3.126

**Main results: (08:30-08:45)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Delay (s)	LOS
North	460.23	115.06	459.68	447.57	735.35	0.00	1521.01	937.94	0.303	0.32	0.46	3.596
West	1229.84	307.46	1222.53	563.81	631.22	0.00	1591.13	1106.05	0.773	1.54	3.37	9.941
South	837.88	208.47	835.14	936.32	917.43	0.00	1398.41	1416.06	0.599	0.87	1.55	6.716
East	614.37	153.59	613.60	1183.26	569.31	0.00	1632.81	1415.70	0.376	0.43	0.63	3.683

**Main results: (08:45-09:00)**

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Delay (s)	LOS
North	460.23	115.06	460.22	446.16	736.56	0.00	1520.20	937.94	0.303	0.46	0.46	3.602
West	1229.84	307.46	1229.52	564.80	631.98	0.00	1596.02	1106.05	0.773	3.37	3.45	10.319
South	837.88	208.47	837.79	936.07	922.43	0.00	1396.04	1416.06	0.601	1.55	1.57	6.820

East	614.37	153.59	614.36	1188.86	571.36	0.00	1631.44	1415.70	0.377	0.63	3.691	A
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**Main results: (09:00-09:15)**

Leg	Total Demand (PCE/hr)	Intersections Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	375.77	95.94	376.31	388.44	602.64	0.00	1610.37	937.94	0.233	0.46	0.32	3.095	A
West	1004.16	251.04	1011.59	462.19	516.77	0.00	1688.20	1106.06	0.602	3.45	1.59	5.753	A
South	684.12	171.03	686.86	759.66	759.66	0.00	1595.32	1416.06	0.454	1.57	0.89	4.661	A
East	501.63	125.41	502.39	976.82	468.69	0.00	1700.57	1415.70	0.295	0.63	0.44	3.138	A

**Main results: (09:15-09:30)**

Leg	Total Demand (PCE/hr)	Intersections Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	314.69	78.67	315.01	307.81	504.28	0.00	1676.60	937.93	0.188	0.32	0.25	2.807	A
West	840.94	210.23	843.33	386.72	423.57	0.00	1724.89	1105.05	0.468	1.59	1.00	4.248	A
South	572.92	143.23	574.06	643.28	632.61	0.00	1590.19	1416.06	0.360	0.86	0.60	3.747	A
East	420.09	105.02	420.53	815.12	381.57	0.00	1752.90	1415.70	0.240	0.44	0.33	2.822	A

**Queueing Delay Results for each time segment**

**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.60	0.24	2.798	A	A
West	14.18	0.95	4.183	A	A
South	8.61	0.57	3.710	A	A
East	4.82	0.32	2.810	A	A

**Queueing Delay results: (08:15-08:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.75	0.32	3.089	A	A
West	22.34	1.46	5.580	A	A
South	12.69	0.85	4.592	A	A
East	6.41	0.43	3.126	A	A

**Queueing Delay results: (08:30-08:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.75	0.45	3.596	A	A
West	46.57	3.10	9.941	A	A
South	22.27	1.48	6.718	A	A
East	9.20	0.61	3.683	A	A

**Queueing Delay results: (08:45-09:00)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.88	0.46	3.602	A	A
West	51.30	3.42	10.319	B	B
South	23.45	1.56	6.820	A	A
East	9.40	0.63	3.691	A	A

**Queueing Delay results: (09:00-09:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.94	0.33	3.095	A	A
West	25.09	1.67	5.753	A	A
South	13.73	0.92	4.661	A	A
East	6.69	0.45	3.138	A	A

**Queueing Delay results: (09:15-09:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.74	0.25	2.807	A	A
West	15.37	1.02	4.248	A	A
South	9.17	0.61	3.747	A	A
East	5.02	0.33	2.922	A	A

**Queue Variation Results for each time segment**

**Queue Variation results: (08:00-08:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.24	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.98	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.59	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:15-08:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.32	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.54	0.00	0.00	3.11	4.15			N/A	N/A
South	0.87	0.00	0.00	1.06	1.06			N/A	N/A
East	0.43	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:30-08:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.46	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.37	0.00	0.00	1.04	8.30			N/A	N/A
South	1.55	?	?	?	?			N/A	N/A
East	0.63	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

**Queue Variation results: (08:45-09:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.46	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.45	?	?	?	?			N/A	N/A
South	1.57	?	?	?	?			N/A	N/A
East	0.63	0.00	0.00	0.00	1.04			N/A	N/A

**Queue Variation results: (09:00-09:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exceeding Reaching Marker
North	0.32	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Leg	Mean (PCE)	0.05 (PCE)	0.50 (PCE)	0.80 (PCE)	1.00 (PCE)	1.15 (PCE)	1.50 (PCE)	2.00 (PCE)	3.00 (PCE)	4.15 (PCE)	5.00 (PCE)
West	1.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
South	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
East	0.44	-1	-1	-1	-1	-1	-1	-1	-1	-1	N/A

**Queue Variation results: (09:15-09:30)**

Leg	Mean (PCE)	0.05 (PCE)	0.50 (PCE)	0.80 (PCE)	0.95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.00	0.00	0.00	1.04	2.08	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.60	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

## Junctions 8

### ARCADY 8 - Roundabout Module

Version: 8.00.634.11982126/112019  
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**The users of this computer program are in no way relieved of their responsibility for the correctness of the solution**

File name: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Summingdale\Analysis\Arcady  
Path: C:\Users\AdamMorrison\Paradigm\Projects - (210088) 1521 Summingdale\Analysis\Arcady  
Report generation date: 2021-03-26 2:53:34 PM

### Summary of intersection performance

PM						
Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
A1 - Total 2031						
Leg North	4.07	13.00	22.41	0.81	C	
Leg West	2.05	2.06	8.43	0.67	A	
Leg South	4.37	13.12	13.02	0.82	B	
Leg East	117.58	183.10	244.75	1.16	F	F

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D9 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM  
"D10 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM

Run using Junctions 8.0.6.541 at 2021-03-26 2:53:33 PM

### File summary

Title	(unfilled)
Location	
Site Number	
Date	2021-03-26
Version	
Status	(new file)
Identifier	
Client	
Job number	
Analyst	AdamMorrison
Description	

### Analysis Options

Vehicle Length (m)	Do Queue Verifications	Calculate Residual Capacity	Residual Capacity Criteria	V/C Ratio Threshold	Queue Threshold (PCE)
7.50	x		N/A	0.85	20.00

### Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

## (Default Analysis Set) - Total 2031, PM



### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name	Roundabout Capacity Model	Description	Include in Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARECADY		x				100.000	100.000	

### Demand Set Details

Scenario Name	Time Period	Description	Traffic Profile Type	Model Start (HH:MM)	Model Finish (HH:MM)	Model Segment Length (min)	Time Segment Length (min)	Results Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Relationship
Total 2031	PM	ONE HOUR	ONE HOUR	16:00	17:30	90	15				x	

## Intersection Network

### Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Duty	Intersection Delay (s)	Intersection LOS
1	2 Lane Summingdale	Roundabout	North,West,South,East				96.14	F

### Intersection Network Options

Driving Side	Right
Lighting	Normal/uniform

## Legs

### Legs

Leg	Leg Name	Description
North	North	Wonderland Road N
West	West	Summingdale Road W
South	South	Wonderland Road S
East	East	Summingdale Road E

### Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

### Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	E - Entry radius (m)	R - Conflict (entry) angle (deg)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only LOS
North	3.50	8.00	20.00	25.00	50.00	25.00	
West	3.50	8.00	20.00	25.00	50.00	25.00	
South	3.50	8.00	20.00	25.00	50.00	25.00	
East	3.50	8.00	20.00	25.00	50.00	25.00	

### Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept (PCE/hr)	Entered slope (calculated)	Entered intercept (PCE/hr)	Final Slope (calculated)	Final Intercept (PCE/hr)
North				0.073	2016.188
West				0.073	2016.188
South				0.073	2016.188
East				0.073	2016.188

The slope and intercept shown above include any corrections and adjustments.

## Traffic Flows

### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Over Time	Vehicle Mix Over Turn	Vehicle Mix Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
				Truck Percentages	2.00					

## Entry Flows

### General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	x	622.00	100.000
West	ONE HOUR	x	806.00	100.000
South	ONE HOUR	x	1135.00	100.000
East	ONE HOUR	x	1416.00	100.000

## Turning Proportions

### Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.000	131.000	414.000
West	107.000	0.000	219.000
South	366.000	437.000	0.000
East	82.000	823.000	513.000

### Turning Proportions (PCE) - Intersection 1 (for whole period)

From	To		
	North	West	South
North	0.00	0.21	0.67
West	0.13	0.00	0.27
South	0.32	0.39	0.00
East	0.06	0.58	0.36

## Vehicle Mix

### Average PCE Per Vehicle - Intersection 1 (for whole period)

From	To		
	North	West	South
North	1.000	1.000	1.000
West	1.000	1.000	1.000
South	1.000	1.000	1.000

East 1.000 | 1.030 | 1.000 | 1.000

Truck Percentages - Intersection 1 (for whole period)

From	To			
	North	West	South	East
North	0.0	0.0	0.0	0.0
West	0.0	0.0	0.0	5.0
South	1.0	0.0	0.0	2.0
East	0.0	3.0	0.0	0.0

## Results

### Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th Percentile Queue (PCE)	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queuing Delay (PCE-min)	Average Queuing Delay (s)	Rate Of Queuing Delay (PCE-min/min)	Inclusive Total Queuing Delay (PCE-min)	Inclusive Queuing Delay (s)
North	0.81	22.41	4.07	13.00	570.76	856.14	189.59	13.29	2.11	189.61	13.29
West	0.87	8.43	2.06	A	738.60	1108.40	114.60	6.20	1.27	114.62	6.20
South	0.82	13.02	4.37	B	1039.66	1559.49	204.97	7.89	2.28	204.99	7.89
East	<b>1.16</b>	<b>244.75</b>	<b>117.58</b>	<b>183.10</b>	<b>1391.18</b>	<b>1951.77</b>	<b>3792.91</b>	<b>116.60</b>	<b>42.14</b>	<b>3793.02</b>	<b>116.60</b>

### Main Results for each time segment

#### Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	468.27	117.07	465.45	415.64	1325.07	0.00	1133.92	885.16	0.417	0.00	0.71	5.445	A
West	606.80	151.70	604.06	1040.01	750.50	0.00	1510.81	1247.21	0.402	0.00	0.69	4.074	A
South	852.98	213.25	848.97	857.01	497.55	0.00	1691.14	1332.42	0.507	0.00	1.03	4.344	A
East	1067.54	266.89	1059.90	684.60	681.81	0.00	1557.06	1288.80	0.686	0.00	2.16	7.231	A

#### Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	684.83	171.21	675.28	594.25	1735.22	0.00	847.74	866.21	0.808	1.39	3.77	19.884	C
West	887.42	221.86	883.70	1394.41	1016.09	0.00	1331.97	1247.20	0.666	1.07	2.00	8.197	A
South	1247.46	311.86	1237.41	1172.61	727.18	0.00	1426.51	1332.42	0.817	1.69	4.20	12.161	B
East	1591.25	390.31	1535.16	970.28	984.32	0.00	1346.64	1288.80	<b>1.159</b>	<b>5.92</b>	<b>62.45</b>	<b>102.292</b>	<b>F</b>

#### Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	684.83	171.21	675.28	594.25	1735.22	0.00	847.74	866.21	0.808	1.39	3.77	19.884	C
West	887.42	221.86	883.70	1394.41	1016.09	0.00	1331.97	1247.20	0.666	1.07	2.00	8.197	A
South	1247.46	311.86	1237.41	1172.61	727.18	0.00	1426.51	1332.42	0.817	1.69	4.20	12.161	B
East	1591.25	390.31	1535.16	970.28	984.32	0.00	1346.64	1288.80	<b>1.159</b>	<b>5.92</b>	<b>62.45</b>	<b>102.292</b>	<b>F</b>

#### Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	684.83	171.21	683.66	598.07	1744.06	0.00	841.79	866.21	0.814	3.77	4.07	22.405	C
West	887.42	221.86	887.24	1403.01	1024.71	0.00	1326.17	1247.20	0.689	2.00	2.05	8.432	A

South	1247.46	311.86	1246.78	1181.15	730.80	0.00	1524.08	1332.42	0.819	4.20	4.37	13.020	B
East	1591.25	390.31	1540.71	976.15	1001.43	0.00	1341.85	1288.80	<b>1.164</b>	<b>62.45</b>	<b>117.58</b>	<b>244.752</b>	<b>F</b>

#### Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	559.17	139.79	566.85	512.75	1760.67	0.00	830.60	865.20	0.673	4.07	2.15	14.022	B
West	724.58	181.14	728.03	1356.39	971.14	0.00	1362.24	1247.20	0.532	2.05	1.19	5.874	A
South	1018.54	254.64	1028.88	1098.78	600.39	0.00	1611.89	1332.42	0.632	4.37	1.76	6.340	A
East	1274.75	318.69	1447.50	803.44	825.93	0.00	1460.02	1288.80	<b>0.873</b>	<b>117.58</b>	<b>74.39</b>	<b>239.724</b>	<b>F</b>

#### Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	468.27	117.07	472.77	435.64	1697.34	0.00	933.85	865.16	0.501	2.15	1.02	7.882	A
West	606.80	151.70	608.50	1216.47	863.64	0.00	1434.63	1247.21	0.423	1.19	0.76	4.493	A
South	852.98	213.25	855.82	970.45	501.69	0.00	1678.35	132.42	0.598	1.76	1.05	4.430	A
East	1067.54	266.89	1355.64	670.18	687.34	0.00	1553.34	1288.80	0.687	<b>74.39</b>	<b>2.37</b>	<b>53.786</b>	<b>F</b>

### Queueing Delay Results for each time segment

#### Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	10.22	0.68	5.445	A
West	9.99	0.67	4.074	A
South	14.91	0.99	4.344	A
East	30.34	2.02	7.231	A

#### Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	19.72	1.31	9.014	A
West	15.56	1.04	5.354	A
South	24.38	1.63	6.034	A
East	76.46	5.10	16.598	C

#### Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	49.34	3.29	19.884	C
West	28.39	1.89	8.197	B
South	56.63	3.78	12.161	B
East	524.24	34.95	<b>102.292</b>	<b>F</b>

#### Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	59.32	3.95	22.405	C
West	30.46	2.03	8.432	A
South	64.60	4.31	13.020	B
East	1350.61	90.04	<b>244.752</b>	<b>F</b>

#### Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service
North	34.84	2.32	14.022	B
West	16.48	1.23	5.874	A
South	28.16	1.83	6.340	A
East	1439.81	95.99	<b>238.724</b>	<b>F</b>

**Queueing Delay Results: (17:15-17:30)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalized Level Of Service	Signalized Level Of Service
North	16.13	1.08	7.882	A	A
West	11.72	0.78	4.493	A	A
South	16.28	1.09	4.430	A	A
East	371.45	24.76	53.769	F	D

**Queue Variation Results for each time segment**

**Queue Variation results: (16:00-16:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.71	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.69	-1	-1	-1	-1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.16	0.00	0.00	4.07	6.10			N/A	N/A

**Queue Variation results: (16:15-16:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.39	0.00	0.00	2.00	4.00			N/A	N/A
West	1.07	0.00	0.00	1.03	2.06			N/A	N/A
South	1.69	0.00	0.00	3.03	5.04			N/A	N/A
East	5.92	0.00	1.02	14.24	22.38			N/A	N/A

**Queue Variation results: (16:30-16:45)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.77	0.00	0.00	5.00	13.00			N/A	N/A
West	2.00	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	4.20	0.00	0.00	3.03	13.12			N/A	N/A
East	62.45	29.45	57.96	94.00	106.81			N/A	N/A

**Queue Variation results: (16:45-17:00)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.07	0.00	0.00	2.00	12.00			N/A	N/A
West	2.05	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	4.37	0.00	0.00	0.00	7.06			N/A	N/A
East	117.58	63.07	112.91	165.80	183.10			N/A	N/A

**Queue Variation results: (17:00-17:15)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.15	0.00	0.00	4.00	6.00			N/A	N/A
West	1.19	0.00	0.00	1.03	2.06			N/A	N/A
South	1.76	0.00	0.00	3.03	5.04			N/A	N/A
East	74.39	43.74	71.20	99.69	106.84			N/A	N/A

**Queue Variation results: (17:15-17:30)**

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q80 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.02	0.00	0.00	1.00	3.00			N/A	N/A
West	0.76	0.00	0.00	1.03	1.03			N/A	N/A
South	1.05	0.00	0.00	1.01	3.03			N/A	N/A

East	2.37	0.00	0.00	0.00	3.05	N/A	N/A
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