



February 27, 2023

Mr. David Hill

Beachcroft Investments Inc.
6-20 Cachet woods Court
Markham, ON
L6C 3G1

**Re: Proposed Residential Subdivision
63 and 63A Trafalgar Road (Wellington Road 24)
Town of Erin, County of Wellington
Transportation Study**

CGE Consulting is pleased to submit this Transportation Study for the above noted development. This report documents the transportation impacts and needs for the proposed residential subdivision Draft Plan of Subdivision situated on a parcel of land located on the east side of Trafalgar Road (Wellington Road 24), north of Wellington Road 22, in the Town of Erin, County of Wellington.

It is noted this is a scoped transportation study reflecting the early planning stages of the development of the Draft Plan of Subdivision and is being prepared in advance of the transportation functional design study and the draft plan approval.

Should you have any questions regarding this study, please do not hesitate to contact the undersigned.

Yours truly,

CGE TRANSPORTATION CONSULTING

A handwritten signature in blue ink, appearing to read 'Casey Ge', is written over a light blue circular stamp.

Casey Ge, P.Eng.
President

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1.0 INTRODUCTION

CGE Transportation Consulting was retained by Beachcroft Investments Inc. to prepare a Transportation Study for a proposed Draft Plan of Subdivision located on of land located on the east side of Trafalgar Road (Wellington Road 24) , north of Wellington Road 22, in the Town of Erin, County of Wellington.

Existing Site Description:

The site is bounded by Trafalgar Road (Wellington Road 24) to the east, the Barbour Fields to the west, residential developments to the north and vacant land to the south. The site is presently vacant and is currently zoned as a *Future Development (FD) Zone*.

The location of the proposed development is illustrated in **Figure 1**.

Development Proposal Description:

Based on the current version of the proposed Draft Plan of Subdivision, the proposal consists of 445 single-family detached units, 353 townhouse units and one heritage house on approximately 129 acres. A mixed-use block (Block 505) for future development has been proposed, but as discussed with the owner, the specific uses and timeline have not been determined. As a result, this block has not been included in the traffic study's analysis.

The proposed development features six external access connections. These include a connection to Wellington Road via Street "1", two connections to Trafalgar Road (Wellington Road 24) via Street "2" and Street "9", an access connection to Spruce Street via Street "3", an access connection to Currie Drive via Street "4" and an access connection to Market Street via Street "16".

The proposed Draft Plan of Subdivision is provided in **Figure 2**.

Scope of Work:

The purpose of this transportation study is to assess the effects of the development on the study area roadways, and evaluate the need for auxiliary lanes at the proposed project accesses from Trafalgar Road (Wellington Road 24) and Wellington Road 22.

As previously mentioned, the scope of this transportation study aligns with the preliminary planning stages of the Draft Plan of Subdivision. It has been developed in anticipation of the transportation functional design study and the draft plan approval.

The study area includes the following intersections, due to the expected low traffic volumes at the Spruce Street and Currie Street access points, these accesses were not included in the analysis.

- Wellington Road 22 & Trafalgar Road (Wellington Road 24)
- Wellington Road 22 & East Collector Road/Street “1”
- Trafalgar Road (Wellington Road 24) & Station Street/ Street “2”
- Trafalgar Road (Wellington Road 24) & Street “9”
- Trafalgar Road (Wellington Road 24) & Market Street/ Street “16”

The study analyzed the following scenarios:

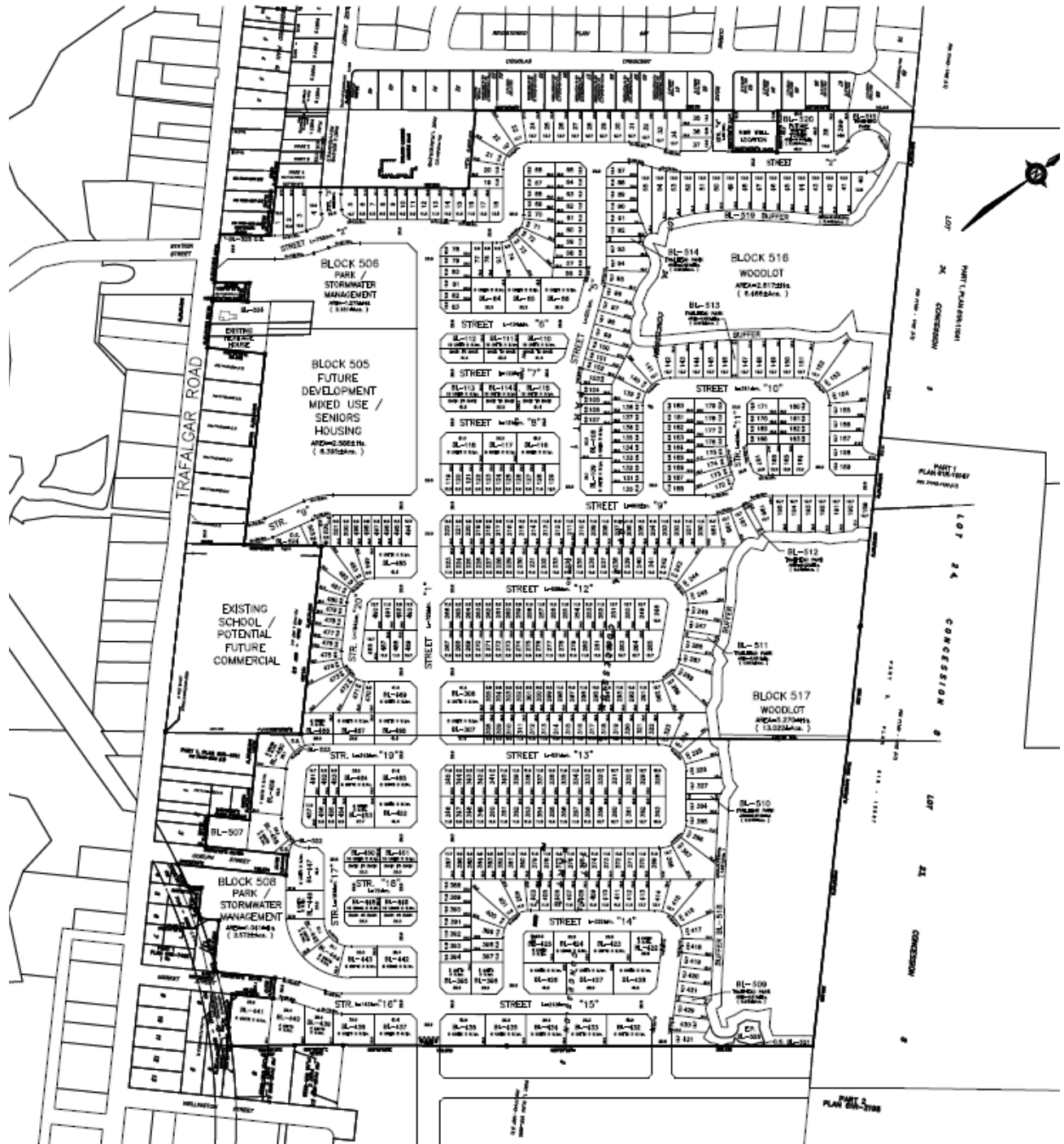
- Existing 2023 Conditions
- Future Background 2031 Conditions
- Full Build 2031 Conditions
- Future Year 2036 Conditions

The analysis is developed for the weekday AM and weekday PM peak hours.

Figure 1 Site Location 



Figure 2 Proposed Draft Plan of Subdivision



2.0 EXISTING AREA

2.1 Existing Roadway Conditions

A summary of the existing roadway conditions in the study area is presented below.

Trafalgar Road (Wellington Road 24)	is a north-south arterial road under the jurisdictional control of the County. The roadway consists of two general-purpose lanes and maintains a posted speed limit of 40 km/h. The sidewalks along Trafalgar Road (Wellington Road 24) within the study area are not continuous.
Wellington Road 22	is an east-west arterial road under the jurisdictional control of the County. The roadway consists of two general-purpose lanes and maintains a posted speed limit of 70 km/h east of Trafalgar Road (Wellington Road 24) and 80 km/h west of Trafalgar Road.
Station Street	is an east-west collector road under the jurisdictional control of the Town. The roadway comprises of two general-purpose lanes, and sidewalks are available on the north side of the roadway near the site.
Market Street	is an east-west local road under the jurisdictional control of the Town. The roadway consists of two general-purpose lanes with no sidewalks.

The *Hillsburgh Heights Inc. Traffic Impact Study*, which was completed in November 2021, pertains to a site that is located immediately west of Trafalgar Road (Wellington Road 24) and approximately two kilometers north of Wellington Road 22. The study notes that Full Build conditions of the proposed residential subdivision development are expected to occur in 2026. In addition, the study takes into account background development trips from Carson Reid Homes Ltd, Thomasfield Homes Ltd., and Chantler, which are located in the vicinity of the site. This transportation study analysis includes trips generated by the proposed development as well as the background developments.

The Town of Erin's Official Plan proposes a minor collector road that will link Trafalgar Road (Wellington Road 24) to Wellington Road 22 and will pass through the proposed subdivision. The *Hillsburgh Heights Inc. Traffic Impact Study* referred to this new collector road as the "East Collector Road", which the study expects to be built by their 2026 horizon year. This new collector road has been included in the analysis.

According to the pre-consultation meeting with Town officials, the Town is currently developing an expansion plan for the Barbour Fields Sports Plex (approximately 66 acres), situated east of the subject site. The proposed Draft Plan of Subdivision exhibits the roadway connections between the two locations. This transportation study analysis includes the trips generated by proposed fields expansion.

2.2 Intersection Geometry

Wellington Road 22 & Trafalgar Road (Wellington Road 24) is a signalized intersection. The eastbound and westbound approaches consist of a single lane. The northbound and southbound approaches consist of a left-turn lane and a shared through-right lane.

Trafalgar Road (Wellington Road 24) & Station Street is a stop-controlled T-intersection. All approaches consist of a single lane.

Trafalgar Road (Wellington Road 24) & Market Street is a stop-controlled T-intersection. All approaches consist of a single lane.

Street “1” is proposed to be a full access connection to the proposed East Collector Road at Wellington Road 22. The East Collector Road will be located approximately 350 metres east of Trafalgar Road (Wellington Road 24).

Street “2” is proposed to be a full access connection to Trafalgar Road (Wellington Road 24). It is located approximately one kilometre north at Wellington Road 22 and will constitute the fourth leg of the existing Trafalgar Road (Wellington Road 24) & Station Street intersection.

Street “3” is proposed to be a full access connection to Spruce Street and will constitute the third leg of the Spruce Street & Douglas Crescent intersection. The conceptual draft plan suggests that the Spruce Street access connection will serve a low unit count and is in close proximity to other access points, which would result in low or insignificant traffic volumes. Consequently, this access has been excluded from the analysis.

Street “4” is proposed to be a full access connection to Currie Street and will constitute the fourth leg of the Douglas Crescent & Currie Drive intersection. Similarly, the draft plan suggests that the Currie Drive access connection will serve a low unit count and is in close proximity to other access points, which would result in low or insignificant traffic volumes. Consequently, this access has been excluded from the analysis.

Street ‘9’ is proposed to be a full access connection to Trafalgar Road (Wellington Road 24). It is located approximately 250 metres south of Station Street.

Street ‘16’ is proposed to be a full access connection to Market Street at Trafalgar Road (Wellington Road 24). It is located approximately 250 metres north of Wellington Road 22.

2.3 Transit Services

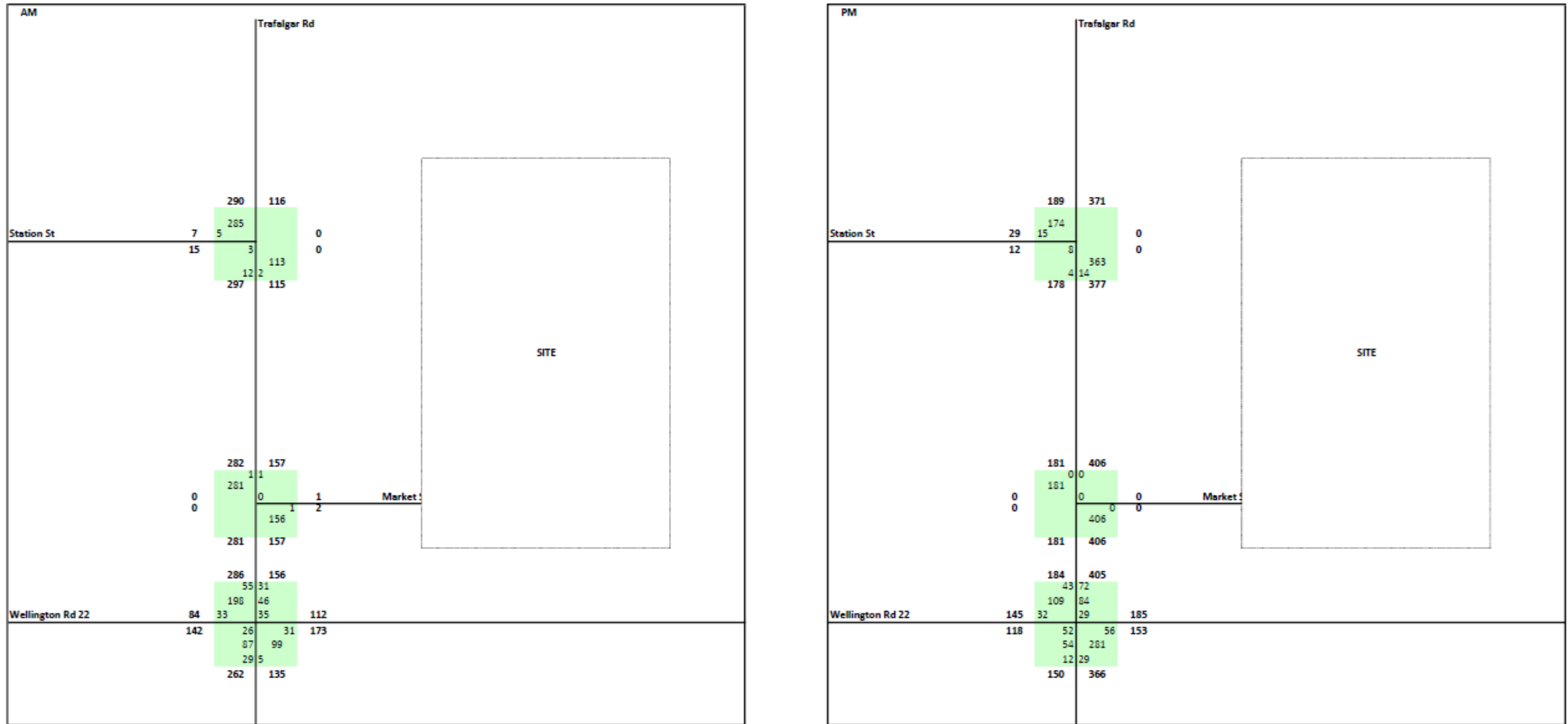
There is no transit service in the vicinity of the site.

2.4 Traffic Volumes

Traffic data collection for the study area intersections was performed on February 08, 2023. These volumes can be found in **Appendix A**.

Figure 3 displays existing traffic volumes.

Figure 3 Existing Traffic Volumes



(Not to Scale)

3.0 METHODOLOGY

3.1 Base Assumptions

Intersection capacity analysis was conducted using Synchro v11.0. Trip generation was calculated using the 11th edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.

Turn lane requirements were examined using the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* as well as the *Geometric Design Standards for Ontario Highways by the Ministry of Transportation, Ontario*.

The signal timing plans for the Wellington Road 22 & Trafalgar Road (Wellington Road 24) intersection were retrieved from the *Hillsburgh Heights Inc Traffic Impact Study*.

3.2 Background Growth

As stated in the *Hillsburgh Heights Inc. Traffic Impact Study*, the County provided an annual growth rate of 2% for Trafalgar Road (Wellington Road 24) and Wellington Road 22. For a consistent analysis, the study increased the existing traffic volumes by 2% each year to approximate the background growth for future year conditions.

3.3 Background Trips

The study accounts for the development trips of Hillsburgh Heights Inc, Carson Reid Homes Ltd, Thomasfield Homes Ltd, and Chantler Properties, all located near the site. Trips generated from these developments were obtained from the the *Hillsburgh Heights Inc Traffic Impact Study*.

The Barbour Field Multi-Use Community Centre conceptual plan includes a public park with various facilities, such as ball fields, basketball courts, soccer fields, picnic areas, dog parks, ice pads, and more, covering approximately 66 acres. In order to estimate the projected trips that the centre will generate, the *ITE Trip Generation Manual, 11th Edition*, was utilized and the results have been included in the analysis. The trip generation graphs are also included in the appendices for reference.

3.4 Site Trip Generation

The development is proposed to consist of 445 single-family detached units, 353 townhouse units and one heritage house. For a conservative analysis, the heritage house was included in the trip generation calculations. The *ITE Trip Generation Manual, 11th Edition* was used to estimate the projected trips by this development. Table 1 below contains the summary of the land uses and sizes used for trip generation estimates.

Table 1 Estimated Traffic Generation

AM Peak Hour						
Land Use	IV	Size	Method	Entry	Exit	Total
			Rate/Equation	Split%	Split%	
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	Dwelling Units	357	Best Fit (LIN) $T = 0.31(X) + 22.85$	32	102	134
				24%	76%	
210 - Single-Family Detached Housing	Dwelling Units	443	Best Fit (LOG) $\ln(T) = 0.91\ln(X) + 0.12$	72	217	289
				25%	75%	
Total						423
PM Peak Hour						
220 - Multifamily Housing (Low-Rise) - Not Close to Rail Transit	Dwelling Units	357	Best Fit (LIN) $T = 0.43(X) + 20.55$	110	64	174
				63%	37%	
210 - Single-Family Detached Housing	Dwelling Units	443	Best Fit (LOG) $\ln(T) = 0.94\ln(X) + 0.27$	254	149	403
				63%	37%	
Total						577

3.5 Trip Distribution

Trips for this proposed development were assigned to the surrounding roadway network based on existing traffic patterns and surrounding land uses.

The proposed trip distribution for this project is:

- 35% to/from north of Trafalgar Road (Wellington Road 24)
- 35% to/from south of Trafalgar Road (Wellington Road 24)
- 15% to/from east of Wellington Road 22
- 15% to/from west of Wellington Road 22

The project site trips are shown in **Figure 4**. Future Background volumes for 2031 are shown in **Figure 5**. Future Total 2031 volumes are shown in **Figure 6**. Future Year 2036 volumes are shown in **Figure 7**.

Figure 4 Site Trips

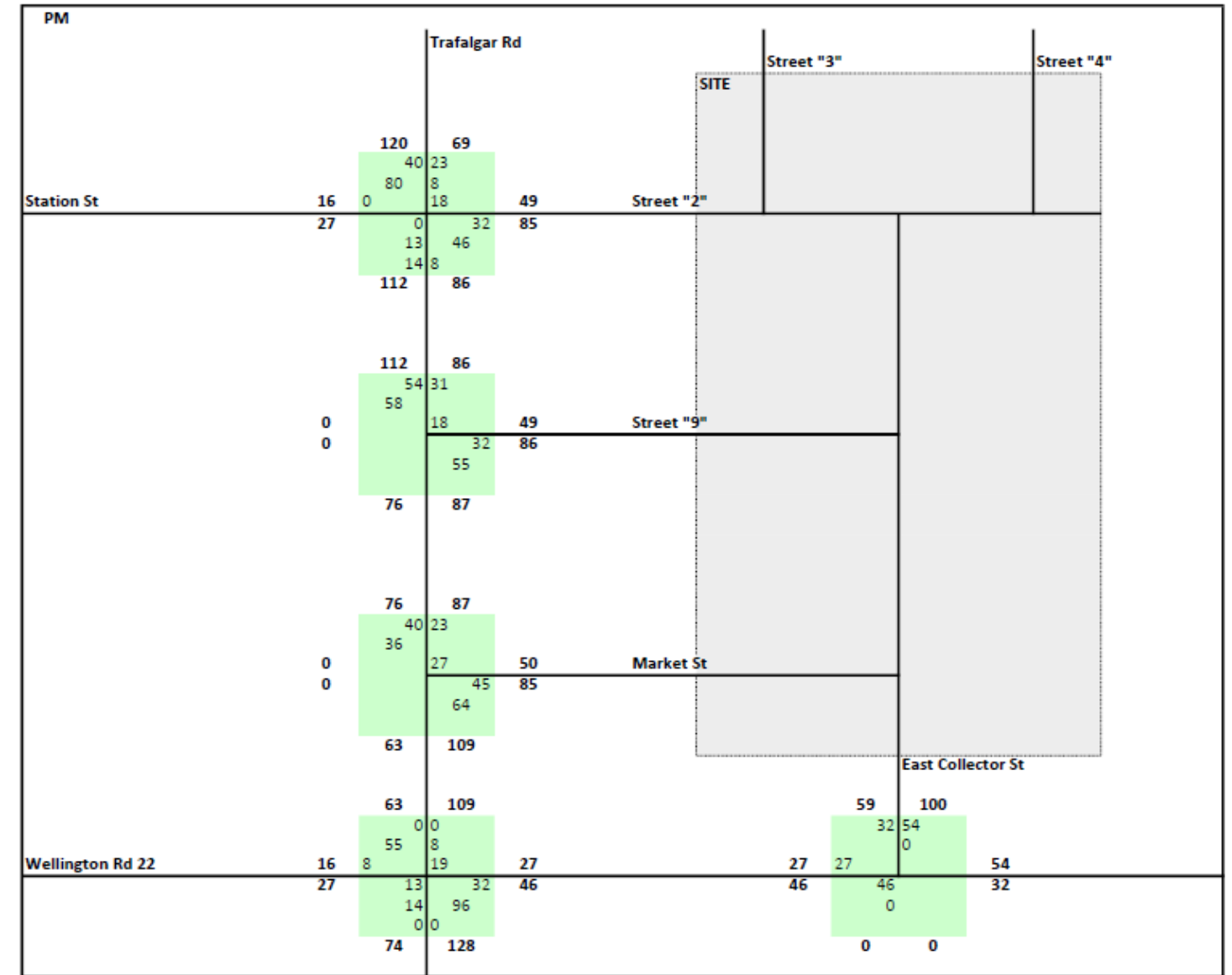
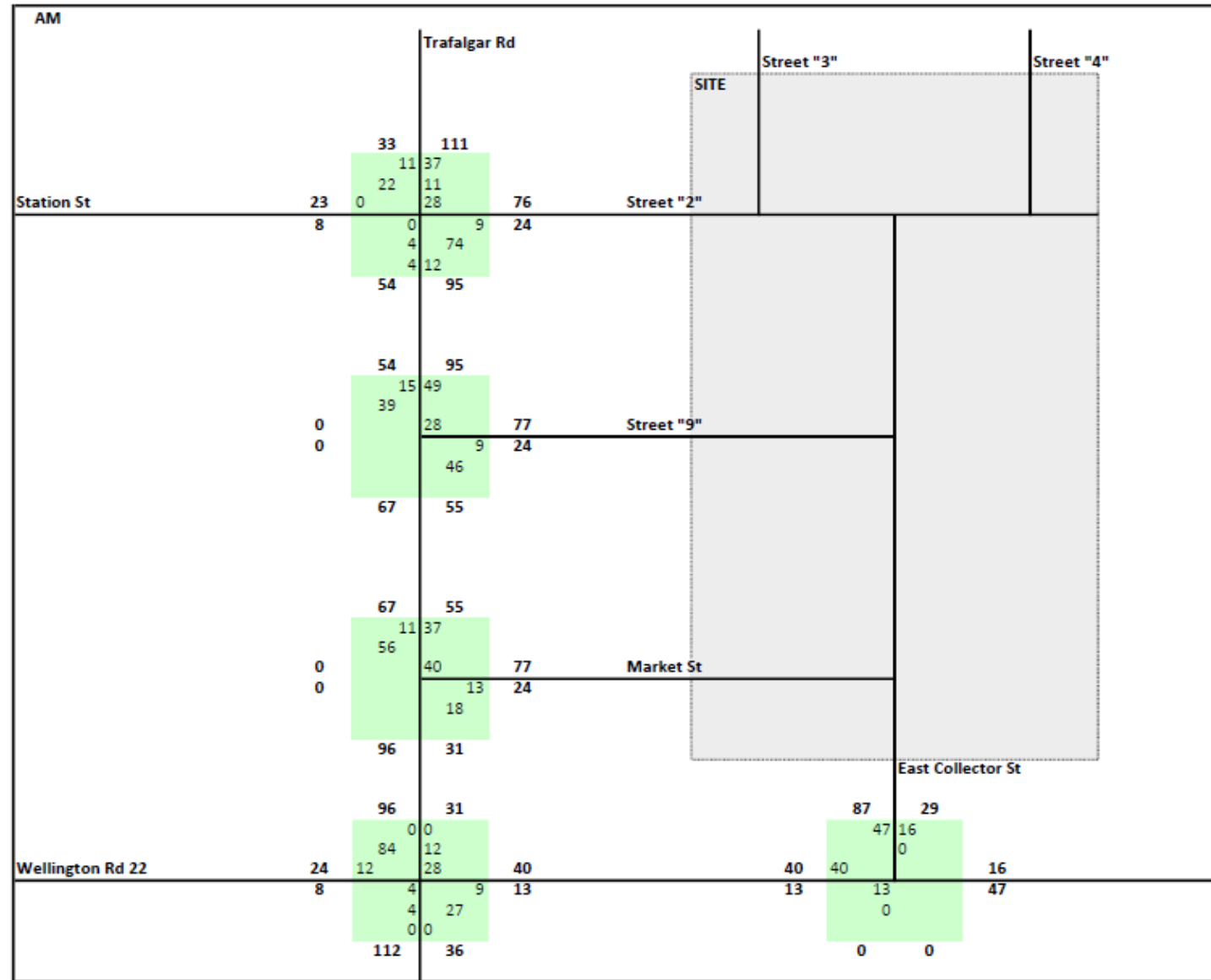


Figure 5 Future Background 2031 Volumes

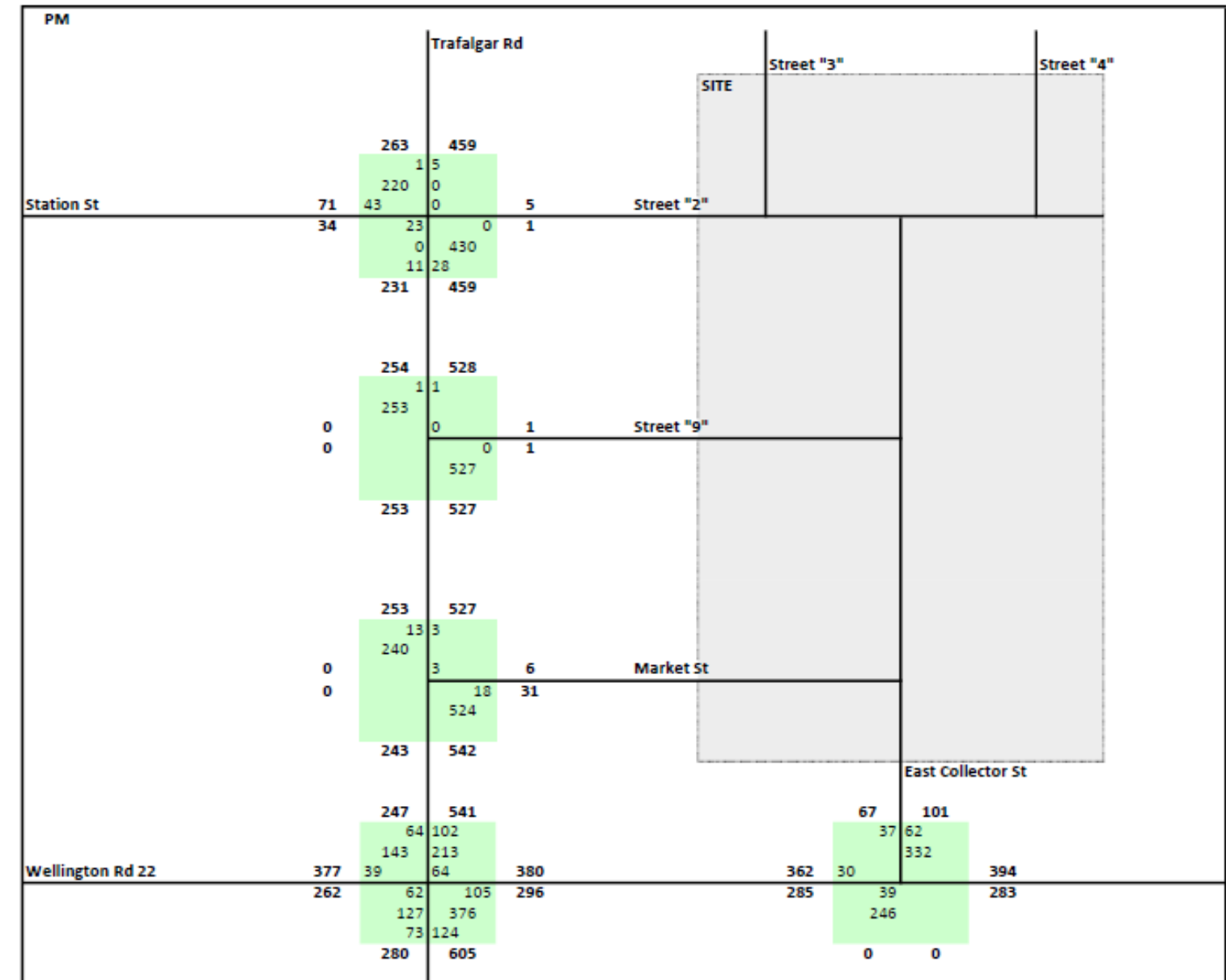
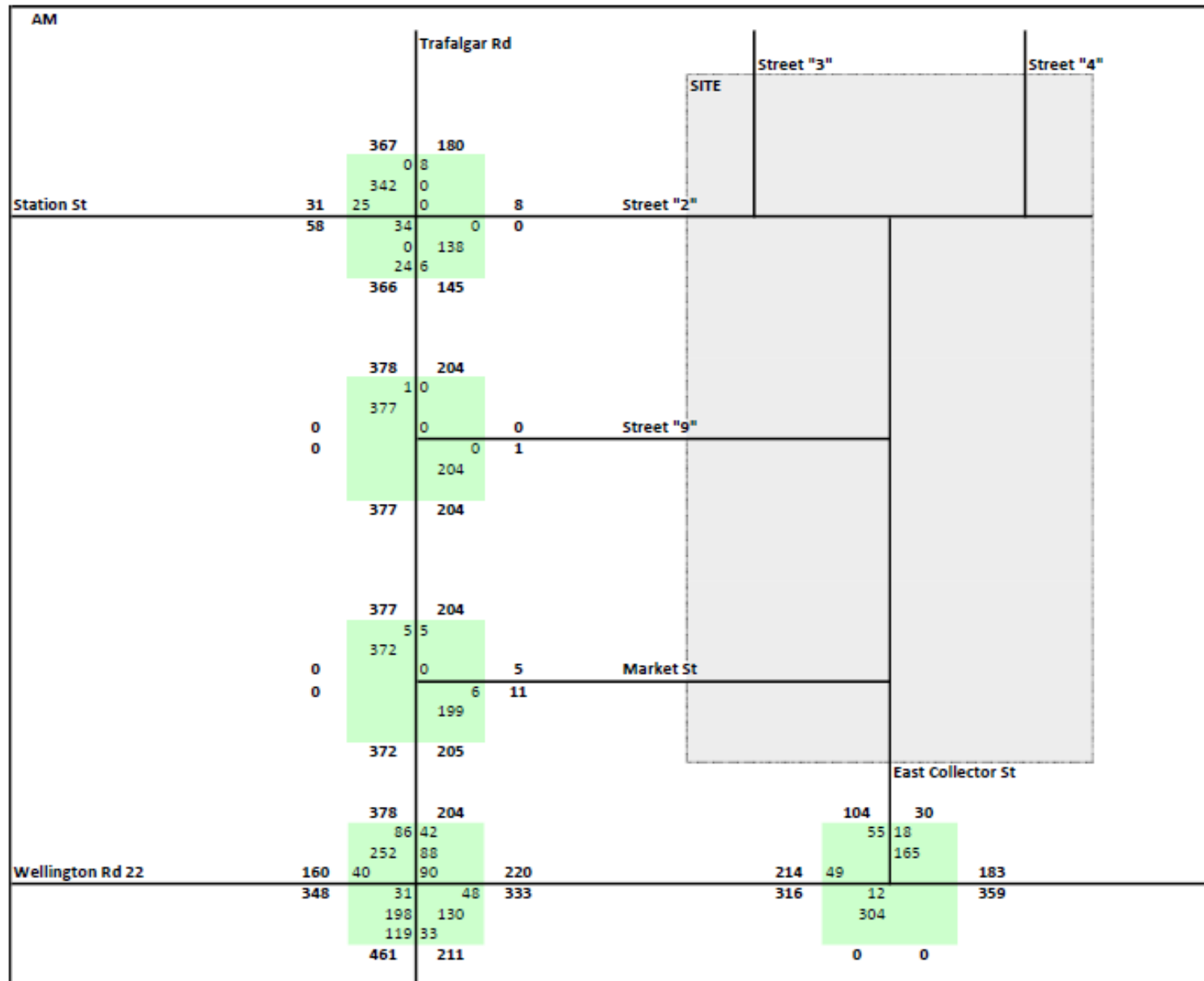


Figure 6 Future Total 2031 Volumes

Transportation Study – 63 and 63A Trafalgar Road (Wellington Road 24)

AM		Trafalgar Rd		Street "3"		Street "4"	
		400	291				
		11	45				
Station St	54	364	11	84			
	66	25	28	24			
		34	9				
		4	212				
		28	18				
		420	240				
		432	299				
		16	49				
0	0	416	28	77			
			9	25			
			250				
		444	259				
		444	259				
		16	42				
0	0	428	40	82			
			19	35			
			217				
		468	236				
		474	235				
		86	42				
Wellington Rd 22	184	336	100	260	254	191	59
		52	118		89	102	34
					25	165	
		356	35	346	329	25	406
			57			304	
			202			0	0
			157				
			119				
			33				
			573				
			247				

PM		Trafalgar Rd		Street "3"		Street "4"	
		383	528				
		41	28				
Station St	87	300	8	54			
	61	43	18	86			
		23	32				
		13	476				
		25	36				
		343	545				
		366	614				
		55	32				
0	0	311	18	50			
			32	87			
			582				
		329	614				
		329	614				
		53	26				
0	0	276	30	56			
			63	116			
			588				
		306	651				
		310	650				
		64	102				
Wellington Rd 22	393	198	221	407	389	126	201
		47	83		57	69	116
					85	332	
		289	75	342	331	85	315
			137			246	
			141			0	0
			472				
			73				
			124				
			354				
			733				

Figure 7 Future Year 2036 Volumes

AM		Trafalgar Rd				Street "3"		Street "4"	
						SITE			
Station St	55	25	435 11 399	305 45 11 28	84				
	67	34	9	24					
		4	226						
		30	19						
		456	254						
		467	318						
		16	49						
	0	451	28	77	Street "9"				
	0		9	25					
			269						
		479	278						
		479	278						
		16	42						
	0	463	40	82	Market St				
	0		19	36					
			236						
		503	255						
		509	254						
		93	46						
Wellington Rd 22	195	56	360	106	274	268	89	191	59
			122					102	34
								179	
								25	
								325	
								0	0
	374	39	61	367		350			427
		213	169						
		123	33						
		605	264						

PM		Trafalgar Rd				Street "3"		Street "4"	
						SITE			
Station St	91	44	406 41 321	573 28 8	54				
	63	24	32	86					
		13	521						
		25	38						
		364	591						
		388	663						
		55	32						
	0	333	18	50	Street "9"				
	0		32	87					
			631						
		351	663						
		351	663						
		53	26						
	0	298	30	56	Market St				
	0		63	116					
			637						
		328	700						
		332	699						
		70	111						
Wellington Rd 22	411	51	211	232	429	411	57	126	201
			87					69	116
								354	
								85	
								265	
								0	0
	304	81	143	361		350			334
		148	507						
		75	128						
		372	777						

4.0 TURN LANE/ACCESS MANAGEMENT

4.1 Right-Turn Lanes

The TAC *Geometric Design Guide for Canadian Roads* recommends the use of an exclusive right-turn lane when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard.

In general, an exclusive right-turn lane may be considered when the volume of right-turning vehicles is between 10 to 20 percent of the through volume, subject to a minimum of 60 vehicles per hour in the design hour.

Table 2 shows the Full Build 2031 and Future Year 2036 volumes used in the analysis.

Intersection	Horizon	Approach	AM Volume			PM Volume			Hourly Threshold	Threshold met?
			Thru	Right	% RT	Thru	Right	% RT		
Wellington Rd & East Collector Rd	2031	WB	165	34	21%	332	116	35%	60	Yes
	2036		179	34	19%	354	116	33%	60	Yes
Trafalgar Rd & Market St / St "16"	2031	NB	217	19	9%	588	63	11%	60	Yes
	2036		236	19	8%	637	63	10%	60	Yes
Trafalgar Rd & St "9"	2031	NB	250	9	4%	582	32	6%	60	No
	2036		269	9	3%	631	32	5%	60	No
Trafalgar Rd & Station St/ St "2"	2031	NB	212	9	4%	476	32	7%	60	No
	2036		226	9	4%	521	32	6%	60	No

Analysis shows that based on both Full Build 2031 and Future Year 2036 volumes, minimum thresholds are met for a right-turn lane from Wellington Road 22 at the proposed East Collector Road and from Trafalgar Road (Wellington Road 24) at Market Street/ Street "16". However, capacity analysis shows that the right-turn lanes are not operationally required (See Section 5.0). As such, right-turn lanes from Trafalgar Road (Wellington Road 24) and Wellington Road 22 are not recommended.

4.2 Left-Turn Lanes

The warrant for left turn lanes was based on *Chapter E, Section E.B.1 of the Geometric Design Standards for Ontario Highways by the Ministry of Transportation, Ontario* for 2-lane undivided roadways.

Table 3 shows the Full Build 2031 and Future Year 2036 volumes used in the analysis.

Table 3 Left-Turn Lane Analysis						
Full Build 2031 Volumes						
Driveway	Peak	Approach	Advancing Volume	Opposing Volume	Left-Turn Vol	Threshold met?
Wellington Rd & East Collector Rd	AM	EB	329	199	34	No
	PM		331	448	116	Yes
Trafalgar Rd & Market St / St "16"	AM	SB	444	236	16	No
	PM		329	651	53	Yes
Trafalgar Rd & St "9"	AM	SB	432	259	16	No
	PM		366	614	55	Yes
Trafalgar Rd & Station St/ St "2"	AM	SB	400	240	11	No
	PM		383	545	41	Yes
Future Year 2036 Volumes						
Wellington Rd & East Collector Rd	AM	EB	350	213	34	No
	PM		350	470	116	Yes
Trafalgar Rd & Market St / St "16"	AM	SB	479	255	16	No
	PM		351	700	53	Yes
Trafalgar Rd & St "9"	AM	SB	467	278	16	No
	PM		388	663	55	Yes
Trafalgar Rd & Station St/ St "2"	AM	SB	435	254	11	No
	PM		406	591	41	Yes

Analysis shows that based on both Full Build 2031 and Future Year 2036 volumes, minimum thresholds are met for left-turn lanes from Wellington Road 22 and Trafalgar Road (Wellington Road 24) at the study area intersections. However, the capacity analysis shows that the left-turn lanes are not operationally required (See Section 5.0). As such, left-turn lanes from Trafalgar Road (Wellington Road 24) and Wellington Road 22 to the property access connections are not recommended.

4.3 Intersection/Decision Sight Distance

Minimum sight distance requirements were evaluated based on the guidelines provided in the Transportation Association of Canada’s *Geometric Design Guide for Canadian Roads, Chapter 9, Intersections (2017)*. The sight distance evaluation was conducted using a design speed of 80 km/h on 2nd Line and 50 km/h on Coles Crescent.

$$ISD = 0.278 V_{\text{major}} t_g \quad (9.9.1)$$

Where:

- ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)
- V_{major} = design speed of the major road (km/h)
- t_g = time gap for minor road vehicle to enter the major road (s)

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

The calculated intersection sight distance using the above formula and parameters results in the following:

- Passenger vehicle
 - $0.278 \times 80 \times 7.5 = 167$ metres
 - $0.278 \times 50 \times 7.5 = 105$ metres

Table 4 summarized the minimum sightline requirements and the proposed sightline distance at the proposed accesses.

Table 4 Sightline Distance Review

Intersection	Speed		Required	Decision Sightline	
	Posted	Design		Meets Requirements?	
			North	South	
Wellington Rd & East Collector Rd	70 km/h	80 km/h	167 m	Yes	Yes
Trafalgar Rd & Market St / St "16"	40 km/h	50 km/h	105 m	Yes	Yes
Trafalgar Rd & St "9"	40 km/h	50 km/h	105 m	Yes	Yes
Trafalgar Rd & Station St/ St "2"	40 km/h	50 km/h	105 m	Yes	Yes

5.0 INTERNAL FUNCTIONAL DESIGN STUDY

As mentioned, following the review of this transportation study report, a transportation functional design study will be completed in support of the Draft Plan of Subdivision approval. The report will document the design requirements for the internal road network and transportation elements for the proposed development.

The functional design study will include the following elements and will be informed by the *Design Criteria for the Township of Mono* (1992), *Geometric Design Guide for Canadian Roads* (TAC), the *Ontario traffic Manual*, among others:

- Internal Road Classification (ROW, Driveway Dimensions etc) and Hierarchy
- Internal Design Elements such as Curb Radii, Sight Daylight Triangles, Intersection spacing and horizontal curves.
- Potential Roundabout Locations
- Potential Transit Facilities Plan
- Pedestrians and Sidewalk Plan
- On-street Parking Plan
- Traffic Calming Plan and strategies
- Transportation Demand Management (TDM) plan

6.0 CAPACITY ANALYSIS

The Transportation Research Board’s Highway Capacity Manual (HCM) utilizes a term “level of service” (LOS) to measure how traffic operates in intersections. There are currently six levels of service ranging from A to F. Level of Service “A” represents the best conditions and Level of Service “F” represents the worst. Synchro software was used to determine the level of service for intersections in the study area. All worksheet reports from the analyses can be found in the Appendix.

Table 6 shows the control delay per vehicle associated with LOS A through F for signalized and unsignalized intersections.

Table 5 Highway Capacity Manual Levels of Service and Control Delay			
Signalized Intersection		Unsignalized Intersection	
Level of Service	Control Delay per Vehicle (sec)	Level of Service	Control Delay per Vehicle (sec)
A	≤ 10	A	≤ 10
B	> 10 and ≤ 20	B	> 10 and ≤ 15
C	> 20 and ≤ 35	C	> 15 and ≤ 25
D	> 35 and ≤ 55	D	> 25 and ≤ 35
E	> 55 and ≤ 80	E	> 35 and ≤ 50
F	> 80	F	> 50

6.1 Capacity Analysis

Table 6 shows the LOS, control delay, and 95th percentile queue length for existing, future background and future years conditions.

Table 6 Intersection LOS, Delay, and Queue by Movement

Intersection	Movement	Existing Traffic Conditions								Background 2031 Traffic Conditions								Total 2031 Traffic Conditions								Total 2036 Traffic Conditions							
		AM Peak Hour				PM Peak Hour				AM Peak Hour				PM Peak Hour				AM Peak Hour				PM Peak Hour				AM Peak Hour				PM Peak Hour			
		V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS	V/C	Delays	Queue 95th (m)	LOS
Trafalgar Road & Wellington Road 22	EBLTR	0.390	21.9	30.0	C	0.400	24.0	27.2	C	0.750	30.1	71.1	C	0.700	29.5	58.3	C	0.710	27.6	73.7	C	0.760	33.8	75.6	C	0.730	28.6	79.6	C	0.790	36.4	83.8	D
	WBLTR	0.350	19.8	23.3	B	0.510	21.8	35.2	C	0.790	41.3	56.7	D	0.850	39.8	95.9	D	0.880	51.7	78.9	D	0.900	45.8	110.4	D	0.910	56.9	85.7	E	0.930	50.8	121.3	D
	NBL	0.010	7.0	1.6	A	0.050	7.8	5.6	A	0.070	11.3	8.2	B	0.230	13.5	23.8	B	0.090	12.5	8.4	B	0.250	14.4	24.3	B	0.090	12.8	8.4	B	0.270	14.8	25.1	B
	NBTR	0.130	6.5	14.3	A	0.380	9.9	42.8	A	0.220	10.0	27.1	B	0.610	17.6	89.9	B	0.280	11.8	33.5	B	0.790	25.4	144.4	C	0.300	12.4	36.1	B	0.850	30.5	160.7	C
	SBL	0.080	7.8	8.5	A	0.100	8.4	7.8	A	0.170	12.1	17.3	B	0.240	15.2	15.6	B	0.180	13.4	17.4	B	0.380	21.9	19.2	C	0.200	13.8	18.9	B	0.530	32.7	28.3	C
Trafalgar Road & Market Street	SBTR	0.230	7.9	26.8	A	0.160	7.0	16.6	A	0.370	12.9	49.5	B	0.230	11.3	28.6	B	0.510	16.3	69.9	B	0.310	13.2	39.5	B	0.550	17.5	76.4	B	0.340	13.7	42.4	B
	WBLR	0.001	9.1	0.0	A	0.000	0.0	0.0	A	0.007	9.4	0.0	A	0.016	14.2	0.1	B	0.173	13.4	0.6	B	0.208	20.5	0.8	C	0.183	14.1	0.7	B	0.231	22.7	0.9	C
	NBTR	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A
Trafalgar Road & Station Street	SBLT	0.001	7.5	0.0	A	0.000	0.0	0.0	A	0.004	7.7	0.0	A	0.014	8.7	0.0	A	0.013	7.8	0.0	A	0.064	9.3	0.2	A	0.013	7.8	0.0	A	0.067	9.5	0.2	A
	EBLR	0.023	10.3	0.1	B	0.025	12.1	0.1	B																								
	NBTR	0.002	8.0	0.0	A	0.011	7.7	0.0	A																								
Trafalgar Road & Station Street/ Street 2	SBLT	0.000	0.0	0.0	A	0.000	0.0	0.0	A																								
	EBLTR									0.124	13.1	0.4	B	0.016	7.3	0.0	A	0.183	16.3	0.7	C	0.264	24.4	1.0	C	0.203	17.4	0.7	C	0.304	28.1	1.2	D
	WBLTR									0.010	9.0	0.0	A	0.000	0.0	0.0	A	0.192	14.3	0.7	B	0.216	21.8	0.8	C	0.206	15.2	0.8	C	0.243	24.6	0.9	C
	NBLTR									0.006	8.2	0.0	A	0.635	17.2	4.6	C	0.018	8.3	0.1	A	0.034	8.2	0.1	A	0.019	8.4	0.1	A	0.036	8.3	0.1	A
Wellington Road 22 & East Collector Road	SBLTR									0.000	0.0	0.0	A	0.344	11.6	1.5	B	0.009	7.7	0.0	A	0.043	8.7	0.1	A	0.009	7.8	0.0	A	0.045	8.8	0.1	A
	EBLT									0.009	7.6	0.0	A	0.037	8.3	0.1	A	0.020	7.7	0.1	A	0.086	8.7	0.3	A	0.020	7.8	0.1	A	0.088	8.7	0.3	A
	WBTR									0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A
Trafalgar Road & Street 9	SBLR									0.184	12.2	0.7	B	0.016	14.4	0.6	B	0.354	14.5	1.6	B	0.359	19.6	1.6	C	0.369	15.1	1.7	C	0.379	20.9	1.7	C
	WBLR									0.000	0.0	0.0	A	0.002	12.0	0.0	B	0.153	12.8	0.5	A	0.166	18.2	0.6	C	0.162	13.3	0.6	B	0.182	19.8	0.7	C
	NBTR									0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A	0.000	0.0	0.0	A
SBLT									0.001	7.7	0.0	A	0.001	8.6	0.0	A	0.014	7.9	0.0	A	0.065	9.2	0.2	A	0.014	7.9	0.0	A	0.068	9.4	0.2	A	

6.1.1 Wellington Road 22 & Trafalgar Road (Wellington Road 24)

Analysis shows that the intersection is projected to experience significant delays for the westbound approach in both background and future year conditions. Similar to the observations of the *Hillsburgh Heights Inc Traffic Impact Study*, modified signal timing plans improve the intersection operations.

6.1.2 Wellington Road 22 & East Collector Road/Street “1”

Analysis shows that the proposed East Collector Road at Wellington Road 22 is expected to operate acceptably in both background and future year conditions without the requirements of auxiliary turning lanes. It is recommended that the proposed East Collector Road be implemented by year 2031.

6.1.3 Trafalgar Road (Wellington Road 24) & Station Street/ Street “2”

Analysis shows that acceptable levels of service are maintained with the 2031 Full Build development traffic as well as Future Year 2036 Conditions without the requirements of auxiliary turning lanes.

6.1.4 Trafalgar Road (Wellington Road 24) & Street “9”

Analysis shows that Street “9” connection to Trafalgar Road (Wellington Road 24) is expected to operate acceptably with the 2031 Full Build development traffic as well as Future Year 2036 conditions without the requirements of auxiliary turning lanes.

6.1.5 Trafalgar Road (Wellington Road 24) & Market Street/ Street “16”

Analysis shows that acceptable levels of service are maintained with the 2031 Full Build development traffic as well as Future Year 2036 Conditions without the requirements of auxiliary turning lanes.

7.0 CONCLUSIONS

This study serves as an analysis of the traffic impacts from the proposed Draft Plan of Subdivision situated on a parcel of land located on the east side of Trafalgar Road (Wellington Road 24), north of Wellington Road 22, in the Town of Erin, County of Wellington.

This analysis was necessary to determine the impacts on and improvements required to accommodate the additional traffic volumes which will be generated by proposed Draft Plan of Subdivision consisting of 445 single-family detached units, 353 townhouse units and one heritage house.

Trip Generation

The proposed new development is expected to generate 104 entering and 319 exiting trips in the AM peak hour, and 364 entering and 213 exiting trips in the PM peak hour.

Turn Lanes

Analysis shows that projected volumes at the proposed accesses meet thresholds for right-turn and left-turn lanes, however, capacity analysis shows they are not operationally required at future year 2036 conditions.

Traffic Impacts

Analysis shows that acceptable LOS will be maintained on all approaches at all intersections for the 2036 future year traffic volumes except for the Wellington Road 22 & Trafalgar Road (Wellington Road 24) intersection. **It is recommended that the signal timing plan be modified to improve operations.**

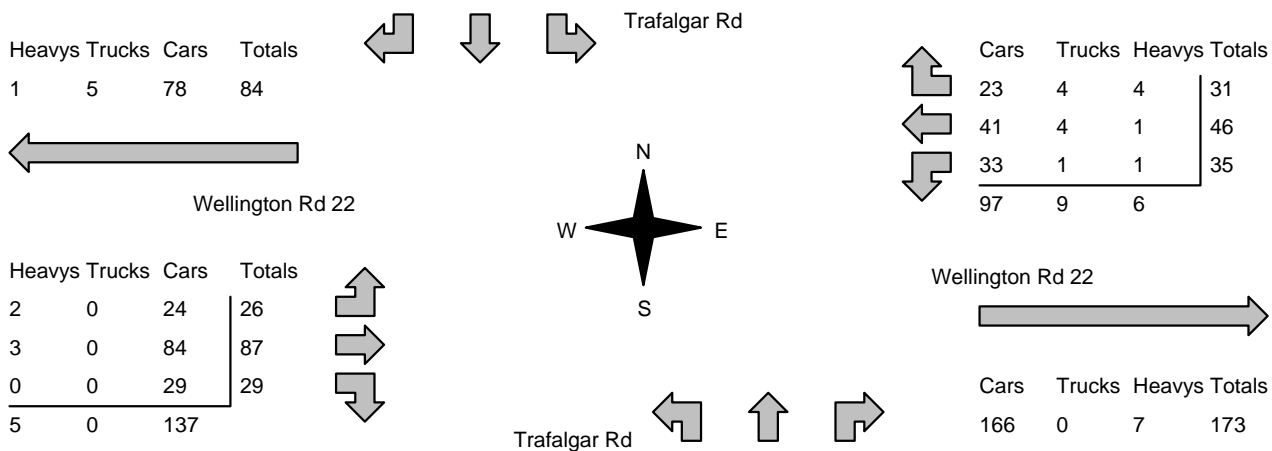
Internal Functional Design Study

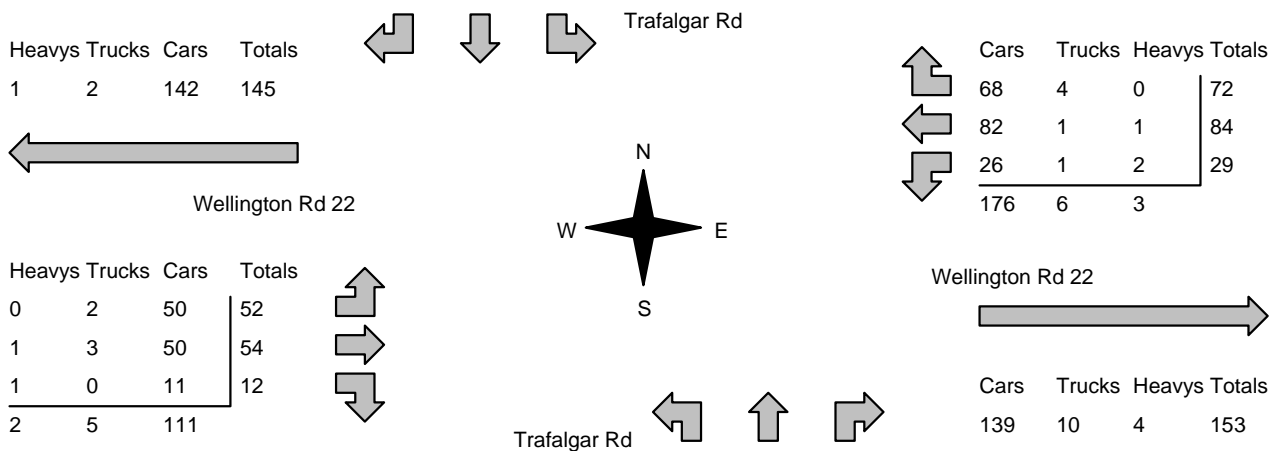
A transportation functional design study will be completed in support of the Draft Plan of Subdivision approval. The report will document the design requirements for the internal road network and transportation elements for the proposed development.

Appendix A:

Existing Traffic Data



Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 7:45:00 To: 8:45:00																												
Municipality: Erin Site #: 2302600001 Intersection: Trafalgar Rd & Wellington Rd 22 TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																													
** Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																													
North Leg Total: 442 North Entering: 286 North Peds: 0 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>15</td><td>4</td><td>19</td></tr> <tr><td>Trucks</td><td>1</td><td>5</td><td>0</td><td>6</td></tr> <tr><td>Cars</td><td>32</td><td>178</td><td>51</td><td>261</td></tr> <tr><td>Totals</td><td>33</td><td>198</td><td>55</td><td></td></tr> </table>	Heavys	0	15	4	19	Trucks	1	5	0	6	Cars	32	178	51	261	Totals	33	198	55		<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>14</td></tr> <tr><td>Trucks</td><td>5</td></tr> <tr><td>Cars</td><td>137</td></tr> <tr><td>Totals</td><td>156</td></tr> </table>	Heavys	14	Trucks	5	Cars	137	Totals	156	East Leg Total: 285 East Entering: 112 East Peds: 0 Peds Cross: ☒
Heavys	0	15	4	19																											
Trucks	1	5	0	6																											
Cars	32	178	51	261																											
Totals	33	198	55																												
Heavys	14																														
Trucks	5																														
Cars	137																														
Totals	156																														
																															
<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>1</td><td>5</td><td>78</td><td>84</td></tr> </table>	Heavys	Trucks	Cars	Totals	1	5	78	84		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Heavys</td><td>Totals</td></tr> <tr><td>23</td><td>4</td><td>4</td><td>31</td></tr> <tr><td>41</td><td>4</td><td>1</td><td>46</td></tr> <tr><td>33</td><td>1</td><td>1</td><td>35</td></tr> <tr><td>97</td><td>9</td><td>6</td><td></td></tr> </table>	Cars	Trucks	Heavys	Totals	23	4	4	31	41	4	1	46	33	1	1	35	97	9	6		
Heavys	Trucks	Cars	Totals																												
1	5	78	84																												
Cars	Trucks	Heavys	Totals																												
23	4	4	31																												
41	4	1	46																												
33	1	1	35																												
97	9	6																													
<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>2</td><td>0</td><td>24</td><td>26</td></tr> <tr><td>3</td><td>0</td><td>84</td><td>87</td></tr> <tr><td>0</td><td>0</td><td>29</td><td>29</td></tr> <tr><td>5</td><td>0</td><td>137</td><td></td></tr> </table>	Heavys	Trucks	Cars	Totals	2	0	24	26	3	0	84	87	0	0	29	29	5	0	137				<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Heavys</td><td>Totals</td></tr> <tr><td>166</td><td>0</td><td>7</td><td>173</td></tr> </table>	Cars	Trucks	Heavys	Totals	166	0	7	173
Heavys	Trucks	Cars	Totals																												
2	0	24	26																												
3	0	84	87																												
0	0	29	29																												
5	0	137																													
Cars	Trucks	Heavys	Totals																												
166	0	7	173																												
Peds Cross: ☒ West Peds: 0 West Entering: 142 West Leg Total: 226	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>240</td></tr> <tr><td>Trucks</td><td>6</td></tr> <tr><td>Heavys</td><td>16</td></tr> <tr><td>Totals</td><td>262</td></tr> </table>	Cars	240	Trucks	6	Heavys	16	Totals	262	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>5</td><td>90</td><td>31</td><td>126</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Heavys</td><td>0</td><td>8</td><td>0</td><td>8</td></tr> <tr><td>Totals</td><td>5</td><td>99</td><td>31</td><td></td></tr> </table>	Cars	5	90	31	126	Trucks	0	1	0	1	Heavys	0	8	0	8	Totals	5	99	31		Peds Cross: ☒ South Peds: 0 South Entering: 135 South Leg Total: 397
Cars	240																														
Trucks	6																														
Heavys	16																														
Totals	262																														
Cars	5	90	31	126																											
Trucks	0	1	0	1																											
Heavys	0	8	0	8																											
Totals	5	99	31																												
Comments																															

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:30:00 To: 17:30:00																												
Municipality: Erin Site #: 2302600001 Intersection: Trafalgar Rd & Wellington Rd 22 TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																													
** Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																													
North Leg Total: 589 North Entering: 184 North Peds: 0 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>4</td><td>3</td><td>7</td></tr> <tr><td>Trucks</td><td>1</td><td>0</td><td>3</td><td>4</td></tr> <tr><td>Cars</td><td>31</td><td>105</td><td>37</td><td>173</td></tr> <tr><td>Totals</td><td>32</td><td>109</td><td>43</td><td></td></tr> </table>	Heavys	0	4	3	7	Trucks	1	0	3	4	Cars	31	105	37	173	Totals	32	109	43		<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>7</td></tr> <tr><td>Trucks</td><td>10</td></tr> <tr><td>Cars</td><td>388</td></tr> <tr><td>Totals</td><td>405</td></tr> </table>	Heavys	7	Trucks	10	Cars	388	Totals	405	East Leg Total: 338 East Entering: 185 East Peds: 0 Peds Cross: ☒
Heavys	0	4	3	7																											
Trucks	1	0	3	4																											
Cars	31	105	37	173																											
Totals	32	109	43																												
Heavys	7																														
Trucks	10																														
Cars	388																														
Totals	405																														
																															
<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>1</td><td>2</td><td>142</td><td>145</td></tr> </table>	Heavys	Trucks	Cars	Totals	1	2	142	145		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Heavys</td><td>Totals</td></tr> <tr><td>68</td><td>4</td><td>0</td><td>72</td></tr> <tr><td>82</td><td>1</td><td>1</td><td>84</td></tr> <tr><td>26</td><td>1</td><td>2</td><td>29</td></tr> <tr><td>176</td><td>6</td><td>3</td><td></td></tr> </table>	Cars	Trucks	Heavys	Totals	68	4	0	72	82	1	1	84	26	1	2	29	176	6	3		
Heavys	Trucks	Cars	Totals																												
1	2	142	145																												
Cars	Trucks	Heavys	Totals																												
68	4	0	72																												
82	1	1	84																												
26	1	2	29																												
176	6	3																													
<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>Trucks</td><td>Cars</td><td>Totals</td></tr> <tr><td>0</td><td>2</td><td>50</td><td>52</td></tr> <tr><td>1</td><td>3</td><td>50</td><td>54</td></tr> <tr><td>1</td><td>0</td><td>11</td><td>12</td></tr> <tr><td>2</td><td>5</td><td>111</td><td></td></tr> </table>	Heavys	Trucks	Cars	Totals	0	2	50	52	1	3	50	54	1	0	11	12	2	5	111				<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>Trucks</td><td>Heavys</td><td>Totals</td></tr> <tr><td>139</td><td>10</td><td>4</td><td>153</td></tr> </table>	Cars	Trucks	Heavys	Totals	139	10	4	153
Heavys	Trucks	Cars	Totals																												
0	2	50	52																												
1	3	50	54																												
1	0	11	12																												
2	5	111																													
Cars	Trucks	Heavys	Totals																												
139	10	4	153																												
Peds Cross: ☒ West Peds: 0 West Entering: 118 West Leg Total: 263	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>142</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Heavys</td><td>7</td></tr> <tr><td>Totals</td><td>150</td></tr> </table>	Cars	142	Trucks	1	Heavys	7	Totals	150	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>29</td><td>270</td><td>52</td><td>351</td></tr> <tr><td>Trucks</td><td>0</td><td>4</td><td>4</td><td>8</td></tr> <tr><td>Heavys</td><td>0</td><td>7</td><td>0</td><td>7</td></tr> <tr><td>Totals</td><td>29</td><td>281</td><td>56</td><td></td></tr> </table>	Cars	29	270	52	351	Trucks	0	4	4	8	Heavys	0	7	0	7	Totals	29	281	56		Peds Cross: ☒ South Peds: 0 South Entering: 366 South Leg Total: 516
Cars	142																														
Trucks	1																														
Heavys	7																														
Totals	150																														
Cars	29	270	52	351																											
Trucks	0	4	4	8																											
Heavys	0	7	0	7																											
Totals	29	281	56																												
Comments																															

Total Count Diagram

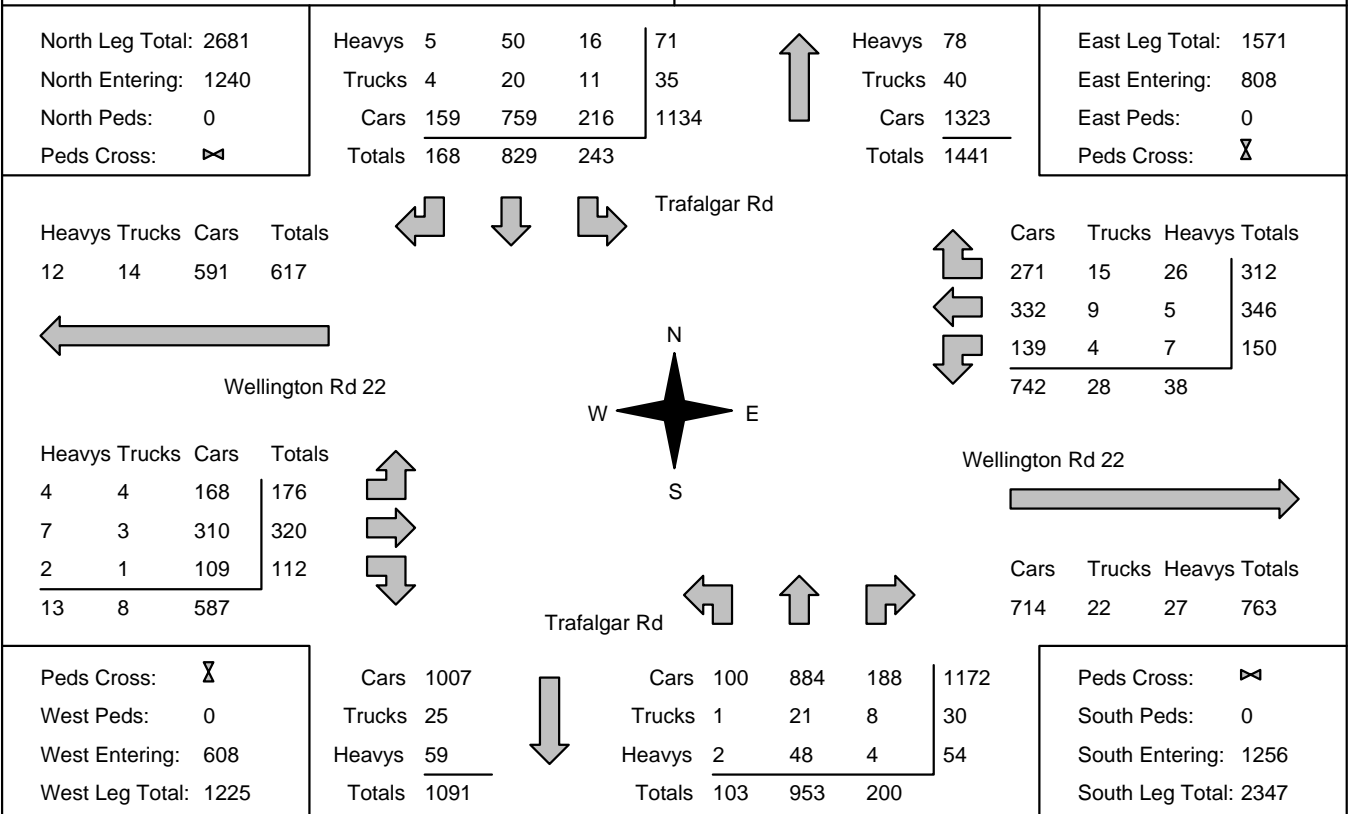
Municipality: Erin
Site #: 2302600001
Intersection: Trafalgar Rd & Wellington Rd 22
TFR File #: 1
Count date: 8-Feb-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

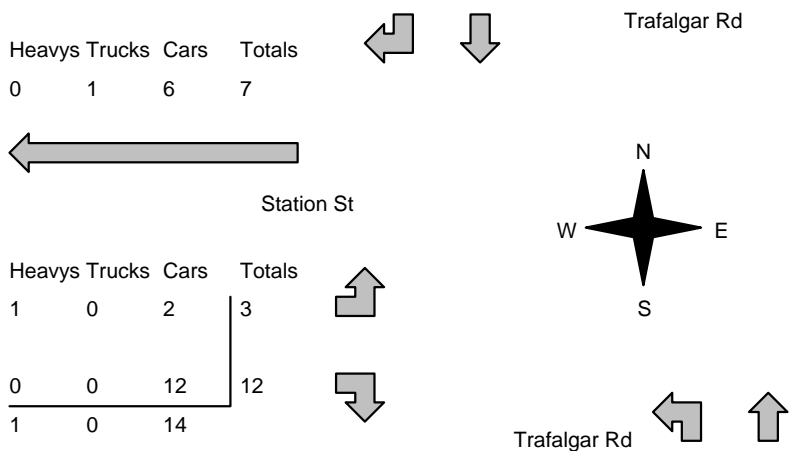


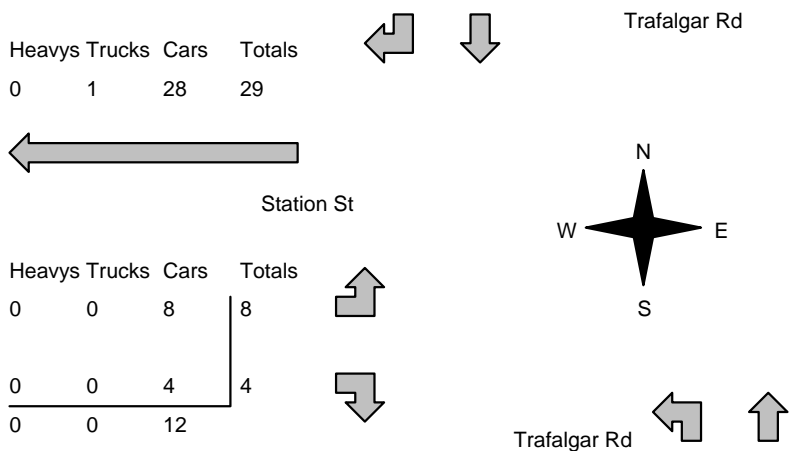
Comments

Traffic Count Summary

Intersection: Trafalgar Rd & Wellington Rd 22 Count Date: 8-Feb-23 Municipality: Erin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	58	212	33	303	0	405	8:00:00	5	71	26	102	0
9:00:00	53	181	27	261	0	397	9:00:00	8	107	21	136	0
10:00:00	33	120	14	167	0	264	10:00:00	10	73	14	97	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	29	96	30	155	0	375	16:00:00	24	167	29	220	0
17:00:00	43	113	38	194	0	541	17:00:00	34	262	51	347	0
18:00:00	27	107	26	160	0	514	18:00:00	22	273	59	354	0
Totals:	243	829	168	1240	0	2496	S Totals:	103	953	200	1256	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	26	46	21	93	0	202	8:00:00	15	64	30	109	0
9:00:00	35	47	32	114	0	250	9:00:00	24	83	29	136	0
10:00:00	17	36	42	95	0	172	10:00:00	18	44	15	77	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	17	57	76	150	0	239	16:00:00	38	35	16	89	0
17:00:00	32	79	70	181	0	282	17:00:00	40	49	12	101	0
18:00:00	23	81	71	175	0	271	18:00:00	41	45	10	96	0
Totals:	150	346	312	808	0	1416	W Totals:	176	320	112	608	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	7:00	8:00	9:00	10:00			15:00	16:00	17:00	18:00		
Crossing Values:	0	105	142	79			0	112	151	145		

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 7:00:00 To: 8:00:00																								
Municipality: Erin Site #: 2302600002 Intersection: Trafalgar Rd & Station St TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																									
** Non-Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																									
North Leg Total: 406 North Entering: 290 North Peds: 0 Peds Cross: ☒	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>13</td><td style="border-left: 1px solid black;">13</td></tr> <tr><td>Trucks</td><td>1</td><td>3</td><td style="border-left: 1px solid black;">4</td></tr> <tr><td>Cars</td><td>4</td><td>269</td><td style="border-left: 1px solid black;">273</td></tr> <tr><td>Totals</td><td>5</td><td>285</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	0	13	13	Trucks	1	3	4	Cars	4	269	273	Totals	5	285		<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>14</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cars</td><td>99</td></tr> <tr><td>Totals</td><td>116</td></tr> </table>	Heavys	14	Trucks	3	Cars	99	Totals	116	
Heavys	0	13	13																								
Trucks	1	3	4																								
Cars	4	269	273																								
Totals	5	285																									
Heavys	14																										
Trucks	3																										
Cars	99																										
Totals	116																										
																											
Heavys Trucks Cars Totals 0 1 6 7	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>1</td><td>0</td><td>2</td><td style="border-left: 1px solid black;">3</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>12</td><td style="border-left: 1px solid black;">12</td></tr> <tr><td>Cars</td><td>1</td><td>0</td><td>14</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	1	0	2	3	Trucks	0	0	12	12	Cars	1	0	14												
Heavys	1	0	2	3																							
Trucks	0	0	12	12																							
Cars	1	0	14																								
Peds Cross: ☒ West Peds: 0 West Entering: 15 West Leg Total: 22	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>281</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Heavys</td><td>13</td></tr> <tr><td>Totals</td><td>297</td></tr> </table>	Cars	281	Trucks	3	Heavys	13	Totals	297	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>2</td><td>97</td><td style="border-left: 1px solid black;">99</td></tr> <tr><td>Trucks</td><td>0</td><td>3</td><td style="border-left: 1px solid black;">3</td></tr> <tr><td>Heavys</td><td>0</td><td>13</td><td style="border-left: 1px solid black;">13</td></tr> <tr><td>Totals</td><td>2</td><td>113</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	2	97	99	Trucks	0	3	3	Heavys	0	13	13	Totals	2	113		Peds Cross: ☒ South Peds: 0 South Entering: 115 South Leg Total: 412
Cars	281																										
Trucks	3																										
Heavys	13																										
Totals	297																										
Cars	2	97	99																								
Trucks	0	3	3																								
Heavys	0	13	13																								
Totals	2	113																									
Comments																											

<h1>Afternoon Peak Diagram</h1>		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:30:00 To: 17:30:00																								
Municipality: Erin Site #: 2302600002 Intersection: Trafalgar Rd & Station St TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																									
** Non-Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																									
North Leg Total: 560 North Entering: 189 North Peds: 1 Peds Cross: <input checked="" type="checkbox"/>	<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>4</td><td style="border-left: 1px solid black;">4</td></tr> <tr><td>Trucks</td><td>0</td><td>2</td><td style="border-left: 1px solid black;">2</td></tr> <tr><td>Cars</td><td>15</td><td>168</td><td style="border-left: 1px solid black;">183</td></tr> <tr><td>Totals</td><td>15</td><td>174</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	0	4	4	Trucks	0	2	2	Cars	15	168	183	Totals	15	174		<table style="width:100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>6</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Cars</td><td style="border-bottom: 1px solid black;">362</td></tr> <tr><td>Totals</td><td>371</td></tr> </table>	Heavys	6	Trucks	3	Cars	362	Totals	371	
Heavys	0	4	4																								
Trucks	0	2	2																								
Cars	15	168	183																								
Totals	15	174																									
Heavys	6																										
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Cars	362																										
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Heavys Trucks Cars Totals 0 1 28 29 ← Station St																											
Heavys Trucks Cars Totals 0 0 8 8 0 0 4 4 0 0 12																											
Peds Cross: <input checked="" type="checkbox"/> West Peds: 0 West Entering: 12 West Leg Total: 41	<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>172</td><td style="border-left: 1px solid black;">354</td></tr> <tr><td>Trucks</td><td>2</td><td style="border-left: 1px solid black;">4</td></tr> <tr><td>Heavys</td><td>4</td><td style="border-left: 1px solid black;">6</td></tr> <tr><td>Totals</td><td>178</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	172	354	Trucks	2	4	Heavys	4	6	Totals	178		<table style="width:100%; border-collapse: collapse;"> <tr><td>Cars</td><td>13</td><td style="border-left: 1px solid black;">367</td></tr> <tr><td>Trucks</td><td>1</td><td style="border-left: 1px solid black;">4</td></tr> <tr><td>Heavys</td><td>0</td><td style="border-left: 1px solid black;">6</td></tr> <tr><td>Totals</td><td>14</td><td style="border-left: 1px solid black;">363</td></tr> </table>	Cars	13	367	Trucks	1	4	Heavys	0	6	Totals	14	363	Peds Cross: <input checked="" type="checkbox"/> South Peds: 0 South Entering: 377 South Leg Total: 555
Cars	172	354																									
Trucks	2	4																									
Heavys	4	6																									
Totals	178																										
Cars	13	367																									
Trucks	1	4																									
Heavys	0	6																									
Totals	14	363																									
<h2>Comments</h2>																											

Total Count Diagram

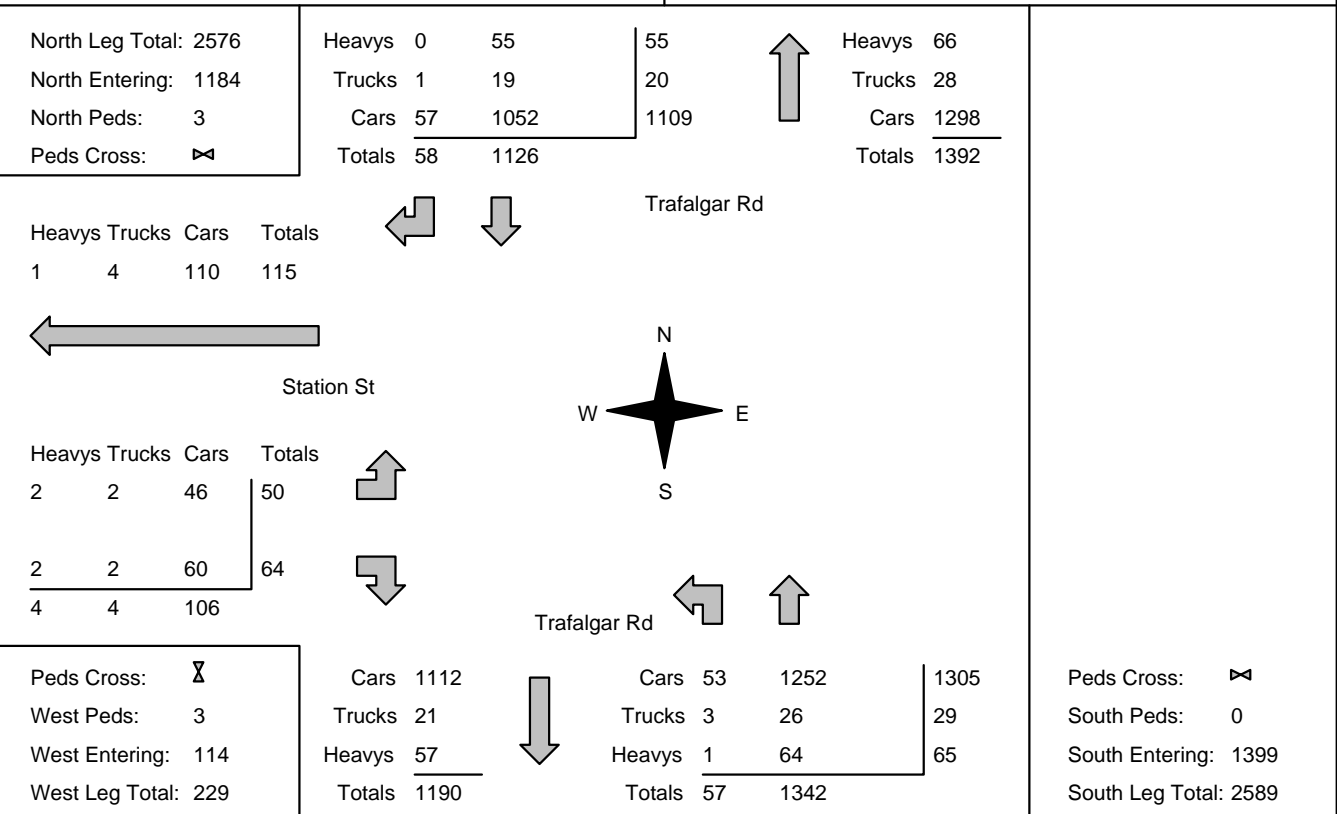
Municipality: Erin
Site #: 2302600002
Intersection: Trafalgar Rd & Station St
TFR File #: 1
Count date: 8-Feb-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

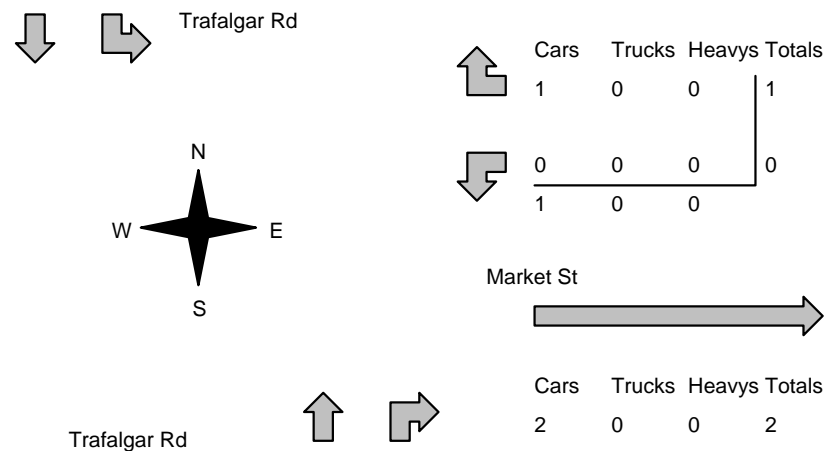
Major Road: Trafalgar Rd runs N/S

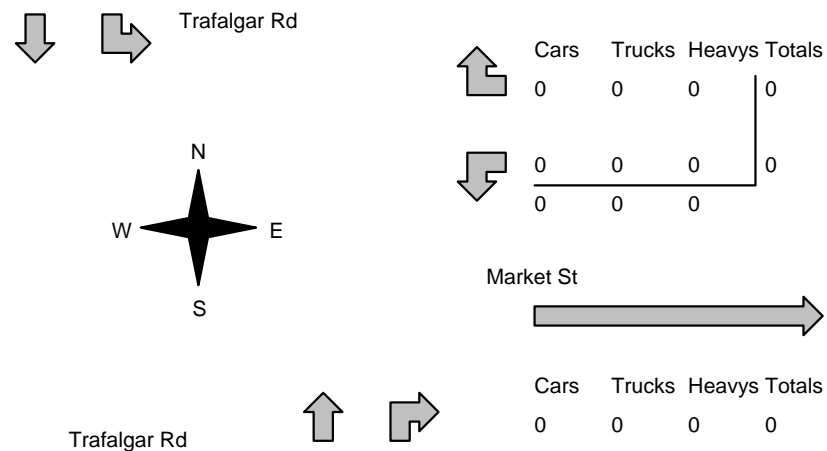


Comments

Traffic Count Summary

Intersection: Trafalgar Rd & Station St					Count Date: 8-Feb-23		Municipality: Erin					
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	285	5	290	0	405	8:00:00	2	113	0	115	0
9:00:00	0	226	2	228	0	388	9:00:00	8	152	0	160	0
10:00:00	0	162	5	167	1	306	10:00:00	5	134	0	139	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	140	10	150	1	421	16:00:00	11	260	0	271	0
17:00:00	0	181	12	193	0	541	17:00:00	11	337	0	348	0
18:00:00	0	132	24	156	1	522	18:00:00	20	346	0	366	0
Totals:	0	1126	58	1184	3	2583	S Totals:	57	1342	0	1399	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	15	8:00:00	3	0	12	15	0
9:00:00	0	0	0	0	0	21	9:00:00	3	0	18	21	0
10:00:00	0	0	0	0	0	16	10:00:00	13	0	3	16	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	21	16:00:00	11	0	10	21	1
17:00:00	0	0	0	0	0	11	17:00:00	7	0	4	11	0
18:00:00	0	0	0	0	0	30	18:00:00	13	0	17	30	0
Totals:	0	0	0	0	0	114	W Totals:	50	0	64	114	3
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	7:00	8:00	9:00	10:00		15:00	16:00	17:00	18:00			
Crossing Values:	0	3	3	14		0	12	7	14			

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 7:45:00 To: 8:45:00																																																
Municipality: Erin Site #: 2302600003 Intersection: Trafalgar Rd & Market St TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																																																	
** Non-Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																																																	
North Leg Total: 439 North Entering: 282 North Peds: 0 Peds Cross: ☒	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Heavys</td> <td style="width:10%; text-align: right;">19</td> <td style="width:10%; text-align: right;">0</td> <td style="width:10%; border-left: 1px solid black; text-align: right;">19</td> <td style="width:10%;"></td> <td style="width:10%;"></td> </tr> <tr> <td>Trucks</td> <td style="text-align: right;">4</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">4</td> <td></td> <td></td> </tr> <tr> <td>Cars</td> <td style="text-align: right;">258</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">259</td> <td></td> <td></td> </tr> <tr> <td>Totals</td> <td style="text-align: right;">281</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">281</td> <td></td> <td></td> </tr> </table>	Heavys	19	0	19			Trucks	4	0	4			Cars	258	1	259			Totals	281	1	281			<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Heavys</td> <td style="width:10%; text-align: right;">14</td> <td style="width:10%; text-align: right;">0</td> <td style="width:10%; border-left: 1px solid black; text-align: right;">14</td> <td style="width:10%;"></td> <td style="width:10%;"></td> </tr> <tr> <td>Trucks</td> <td style="text-align: right;">4</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">4</td> <td></td> <td></td> </tr> <tr> <td>Cars</td> <td style="text-align: right;">139</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">139</td> <td></td> <td></td> </tr> <tr> <td>Totals</td> <td style="text-align: right;">157</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">157</td> <td></td> <td></td> </tr> </table>	Heavys	14	0	14			Trucks	4	0	4			Cars	139	0	139			Totals	157	0	157			East Leg Total: 3 East Entering: 1 East Peds: 0 Peds Cross: ☒
Heavys	19	0	19																																																
Trucks	4	0	4																																																
Cars	258	1	259																																																
Totals	281	1	281																																																
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Trucks	4	0	4																																																
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Totals	281	1	281																																																
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Cars	138	1	139																																																
Trucks	4	0	4																																																
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Totals	156	1	157																																																
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Cars	1	0	1																																																
Trucks	0	0	0																																																
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Trucks	0	0	0																																																
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South Leg Total:	438	0	438																																																
Comments																																																			

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:30:00 To: 17:30:00																								
Municipality: Erin Site #: 2302600003 Intersection: Trafalgar Rd & Market St TFR File #: 1 Count date: 8-Feb-23		Weather conditions: Person counted: Person prepared: Person checked:																									
** Non-Signalized Intersection **		Major Road: Trafalgar Rd runs N/S																									
North Leg Total: 587 North Entering: 181 North Peds: 0 Peds Cross: ☒	<table style="margin: auto;"> <tr> <td>Heavys</td><td>9</td><td>0</td><td>9</td></tr> <tr> <td>Trucks</td><td>3</td><td>0</td><td>3</td></tr> <tr> <td>Cars</td><td>169</td><td>0</td><td>169</td></tr> <tr> <td>Totals</td><td>181</td><td>0</td><td></td></tr> </table>	Heavys	9	0	9	Trucks	3	0	3	Cars	169	0	169	Totals	181	0		<table style="margin: auto;"> <tr> <td>Heavys</td><td>11</td></tr> <tr> <td>Trucks</td><td>6</td></tr> <tr> <td>Cars</td><td>389</td></tr> <tr> <td>Totals</td><td>406</td></tr> </table>	Heavys	11	Trucks	6	Cars	389	Totals	406	East Leg Total: 0 East Entering: 0 East Peds: 0 Peds Cross: ☒
Heavys	9	0	9																								
Trucks	3	0	3																								
Cars	169	0	169																								
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Cars	389																										
Totals	406																										
																											
<table style="margin: auto;"> <tr> <td>Cars</td><td>169</td></tr> <tr> <td>Trucks</td><td>3</td></tr> <tr> <td>Heavys</td><td>9</td></tr> <tr> <td>Totals</td><td>181</td></tr> </table>		Cars	169	Trucks	3	Heavys	9	Totals	181	<table style="margin: auto;"> <tr> <td>Cars</td><td>389</td><td>0</td><td>389</td></tr> <tr> <td>Trucks</td><td>6</td><td>0</td><td>6</td></tr> <tr> <td>Heavys</td><td>11</td><td>0</td><td>11</td></tr> <tr> <td>Totals</td><td>406</td><td>0</td><td></td></tr> </table>		Cars	389	0	389	Trucks	6	0	6	Heavys	11	0	11	Totals	406	0	
Cars	169																										
Trucks	3																										
Heavys	9																										
Totals	181																										
Cars	389	0	389																								
Trucks	6	0	6																								
Heavys	11	0	11																								
Totals	406	0																									
Peds Cross: ☒ South Peds: 0 South Entering: 406 South Leg Total: 587																											
Comments																											

Total Count Diagram

Municipality: Erin
Site #: 2302600003
Intersection: Trafalgar Rd & Market St
TFR File #: 1
Count date: 8-Feb-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Trafalgar Rd runs N/S

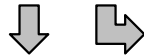
North Leg Total: 2668
 North Entering: 1232
 North Peds: 0
 Peds Cross:

Heavys	75	0	75
Trucks	23	0	23
Cars	1132	2	1134
Totals	1230	2	

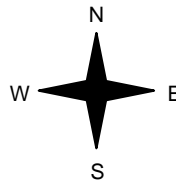


Heavys	86
Trucks	29
Cars	1321
Totals	1436

East Leg Total: 9
 East Entering: 4
 East Peds: 0
 Peds Cross:



Trafalgar Rd



Cars	Trucks	Heavys	Totals
2	0	0	2



2	0	0	2
4	0	0	

Market St



Trafalgar Rd

Cars	1134
Trucks	23
Heavys	75
Totals	1232



Cars	1319	3	1322
Trucks	29	0	29
Heavys	86	0	86
Totals	1434	3	

Cars	Trucks	Heavys	Totals
5	0	0	5

Peds Cross:
 South Peds: 0
 South Entering: 1437
 South Leg Total: 2669

Comments

Traffic Count Summary

Intersection: Trafalgar Rd & Market St

Count Date: 8-Feb-23

Municipality: Erin

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	1	302	0	303	0	409	8:00:00	0	106	0	106	0
9:00:00	1	257	0	258	0	421	9:00:00	0	162	1	163	0
10:00:00	0	165	0	165	0	300	10:00:00	0	133	2	135	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	156	0	156	0	432	16:00:00	0	276	0	276	0
17:00:00	0	195	0	195	0	573	17:00:00	0	378	0	378	0
18:00:00	0	155	0	155	0	534	18:00:00	0	379	0	379	0
Totals:	2	1230	0	1232	0	2669	S Totals:	0	1434	3	1437	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	1	1	0	1	8:00:00	0	0	0	0	0
9:00:00	0	0	1	1	0	1	9:00:00	0	0	0	0	0
10:00:00	2	0	0	2	0	2	10:00:00	0	0	0	0	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0
18:00:00	0	0	0	0	0	0	18:00:00	0	0	0	0	0
Totals:	2	0	2	4	0	4	W Totals:	0	0	0	0	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	7:00	8:00	9:00	10:00		15:00	16:00	17:00	18:00			
Crossing Values:	0	0	0	2		0	0	0	0			

Appendix B:

Trip Generation Graphs – Barbour Fields



Query

Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

411

LAND USE GROUP:

(400-499) Recreational

LAND USE:

411 - Public Park

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Acres

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:

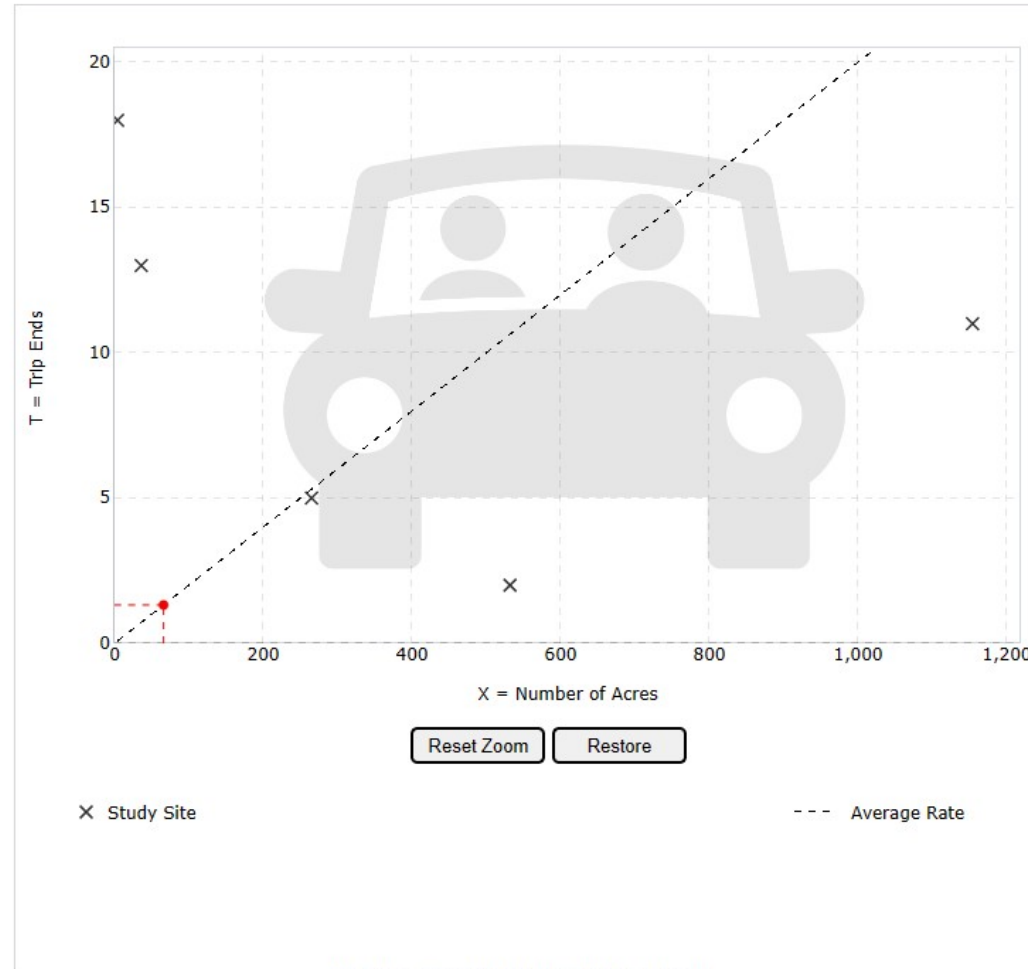
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

66 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use: Public Park (411) [Click for Description and Data Plots](#)

Independent Variable: Acres

Time Period: Weekday Peak Hour of Adjacent Street Traffic One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 5

Avg. Num. of Acres: 398

Average Rate: 0.02

Range of Rates: 0.00 - 4.50

Standard Deviation: 0.23

Fitted Curve Equation: Not Given

R²: ****

Directional Distribution: 59% entering, 41% exiting

Calculated Trip Ends: Average Rate: 1 (Total), 1 (Entry), 0 (Exit)

Query

Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

411

LAND USE GROUP:

(400-499) Recreational

LAND USE:

411 - Public Park

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Acres

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

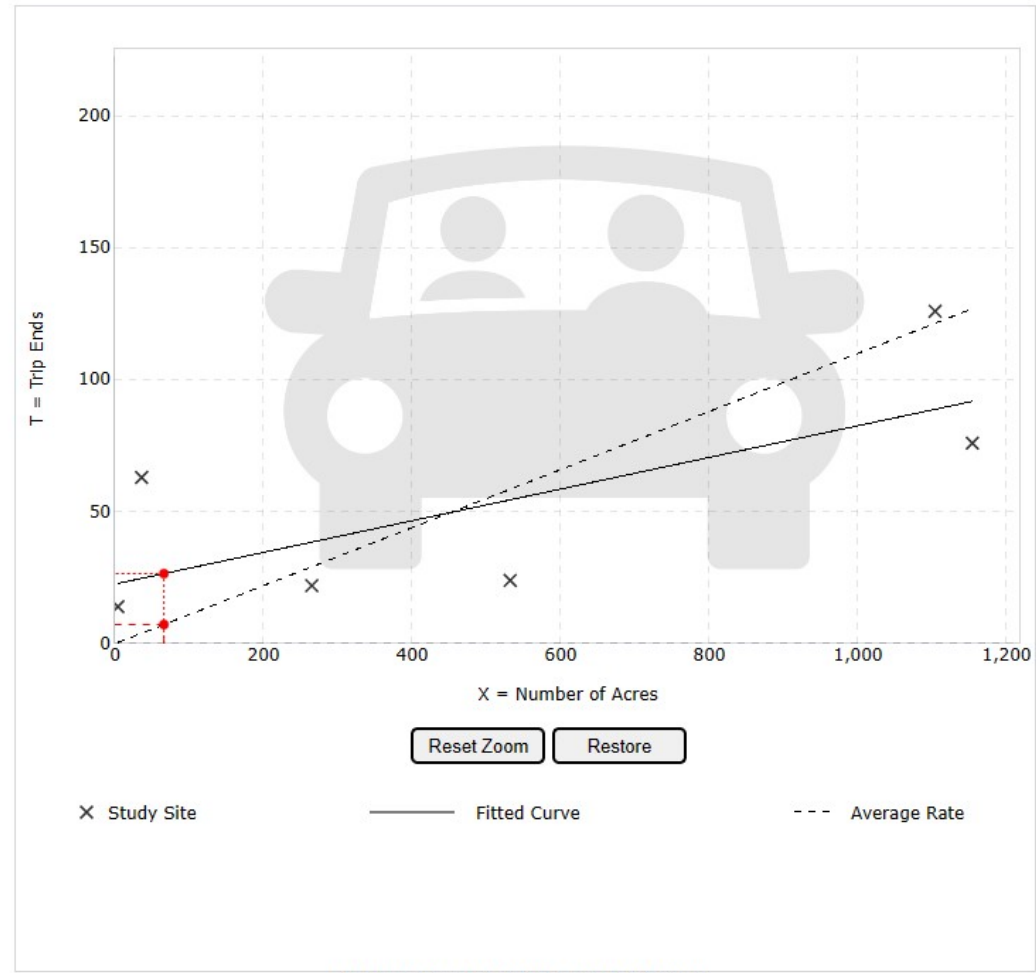
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

66 Calculate

Data Plot and Equation



X Study Site — Fitted Curve - - - Average Rate

Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:	Public Park (411) Click for Description and Data Plots
Independent Variable:	Acres
Time Period:	Weekday Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.
Setting/Location:	General Urban/Suburban
Trip Type:	Vehicle
Number of Studies:	6
Avg. Num. of Acres:	516
Average Rate:	0.11
Range of Rates:	0.05 - 3.50
Standard Deviation:	0.24
Fitted Curve Equation:	$T = 0.06(X) + 22.60$
R²:	0.53
Directional Distribution:	55% entering, 45% exiting
Calculated Trip Ends:	Average Rate: 7 (Total), 4 (Entry), 3 (Exit) Fitted Curve: 27 (Total), 15 (Entry), 12 (Exit)

Appendix C:

Synchro Outputs



Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	26	87	29	35	46	31	5	99	31	55	198	33
Future Volume (vph)	26	87	29	35	46	31	5	99	31	55	198	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972			0.962			0.964			0.978	
Flt Protected		0.991			0.985		0.950			0.950		
Satd. Flow (prot)	0	1772	0	0	1585	0	1805	1714	0	1687	1705	0
Flt Permitted		0.907			0.869		0.603			0.666		
Satd. Flow (perm)	0	1622	0	0	1398	0	1146	1714	0	1183	1705	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			28			27			14	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			880.8			555.2			339.8	
Travel Time (s)		31.5			45.3			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	0%	6%	11%	26%	0%	9%	0%	7%	10%	3%
Adj. Flow (vph)	28	95	32	38	50	34	5	108	34	60	215	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	155	0	0	122	0	5	142	0	60	251	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.0			15.0		40.1	40.1		40.1	40.1	
Actuated g/C Ratio		0.24			0.24		0.63	0.63		0.63	0.63	
v/c Ratio		0.39			0.35		0.01	0.13		0.08	0.23	
Control Delay		21.9			19.8		7.0	6.5		7.8	7.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
 3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		21.9			19.8		7.0	6.5		7.8	7.9	
LOS		C			B		A	A		A	A	
Approach Delay		21.9			19.8			6.5				7.9
Approach LOS		C			B			A				A

Intersection Summary

Area Type:	Other
Cycle Length:	77
Actuated Cycle Length:	63.5
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	12.6
Intersection LOS:	B
Intersection Capacity Utilization	70.7%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	155	122	5	142	60	251
v/c Ratio	0.39	0.35	0.01	0.13	0.08	0.23
Control Delay	21.9	19.8	7.0	6.5	7.8	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	19.8	7.0	6.5	7.8	7.9
Queue Length 50th (m)	14.5	9.9	0.3	6.6	3.4	14.7
Queue Length 95th (m)	30.0	23.3	1.6	14.3	8.5	26.8
Internal Link Dist (m)	589.2	856.8		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	701	612	723	1091	746	1080
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20	0.01	0.13	0.08	0.23
Intersection Summary						

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	156	1	1	281
Future Vol, veh/h	0	1	156	1	1	281
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	4	0	0	7
Mvmt Flow	0	1	170	1	1	305

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	478	171	0	0	171
Stage 1	171	-	-	-	-
Stage 2	307	-	-	-	-
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	550	878	-	-	1418
Stage 1	864	-	-	-	-
Stage 2	751	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	549	878	-	-	1418
Mov Cap-2 Maneuver	549	-	-	-	-
Stage 1	864	-	-	-	-
Stage 2	750	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	878	1418
HCM Lane V/C Ratio	-	-	0.001	0.001
HCM Control Delay (s)	-	-	9.1	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	3	12	2	113	285	5
Future Vol, veh/h	3	12	2	113	285	5
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	7	2	3	0
Mvmt Flow	3	13	2	123	310	5

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	440	313	315	0	0
Stage 1	313	-	-	-	-
Stage 2	127	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-
Pot Cap-1 Maneuver	578	732	1217	-	-
Stage 1	746	-	-	-	-
Stage 2	904	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	577	732	1217	-	-
Mov Cap-2 Maneuver	577	-	-	-	-
Stage 1	745	-	-	-	-
Stage 2	904	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1217	-	695	-	-
HCM Lane V/C Ratio	0.002	-	0.023	-	-
HCM Control Delay (s)	8	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
 10: Trafalgar Road & George Street/Mill Street

02-23-2023

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	0	0	116	0	0	290	0
Future Vol, veh/h	0	0	0	0	0	0	0	116	0	0	290	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	-	-	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	126	0	0	315	0



















Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	441	441	315	441	441	126	315	0	0	126	0	0
Stage 1	315	315	-	126	126	-	-	-	-	-	-	-
Stage 2	126	126	-	315	315	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	527	510	725	527	510	924	1245	-	-	1460	-	-
Stage 1	696	656	-	878	792	-	-	-	-	-	-	-
Stage 2	878	792	-	696	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	527	510	725	527	510	924	1245	-	-	1460	-	-
Mov Cap-2 Maneuver	527	510	-	527	510	-	-	-	-	-	-	-
Stage 1	696	656	-	878	792	-	-	-	-	-	-	-
Stage 2	878	792	-	696	656	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0		0		0		0	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	-	-	1460	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Lanes, Volumes, Timings
3: Trafalgar Road & Wellington Road 22

02-23-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	54	12	29	84	72	29	281	56	43	109	32
Future Volume (vph)	52	54	12	29	84	72	29	281	56	43	109	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.948			0.975			0.966	
Flt Protected		0.978			0.992		0.950			0.950		
Satd. Flow (prot)	0	1732	0	0	1690	0	1805	1773	0	1583	1769	0
Flt Permitted		0.783			0.920		0.660			0.539		
Satd. Flow (perm)	0	1387	0	0	1567	0	1254	1773	0	898	1769	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			46			17			25	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			880.8			555.2			339.8	
Travel Time (s)		31.5			45.3			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	7%	8%	6%	2%	10%	0%	4%	7%	14%	4%	3%
Adj. Flow (vph)	57	59	13	32	91	78	32	305	61	47	118	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	129	0	0	201	0	32	366	0	47	153	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		15.4			15.4		36.6	36.6		36.6	36.6	
Actuated g/C Ratio		0.23			0.23		0.55	0.55		0.55	0.55	
v/c Ratio		0.40			0.51		0.05	0.38		0.10	0.16	
Control Delay		24.0			21.8		7.8	9.9		8.4	7.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
 3: Trafalgar Road & Wellington Road 22

02-23-2023

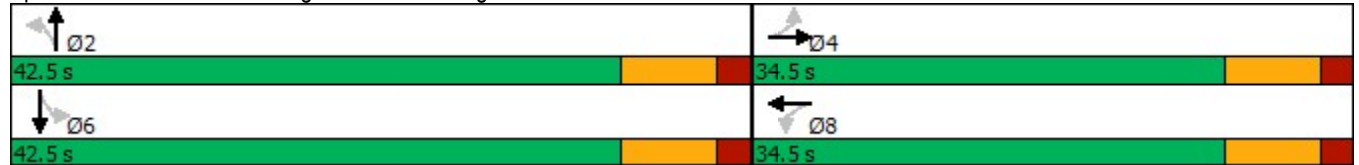


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		24.0			21.8		7.8	9.9		8.4	7.0	
LOS		C			C		A	A		A	A	
Approach Delay		24.0			21.8			9.7			7.4	
Approach LOS		C			C			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	77
Actuated Cycle Length:	67.1
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	13.8
Intersection LOS:	B
Intersection Capacity Utilization:	62.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	201	32	366	47	153
v/c Ratio	0.40	0.51	0.05	0.38	0.10	0.16
Control Delay	24.0	21.8	7.8	9.9	8.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	21.8	7.8	9.9	8.4	7.0
Queue Length 50th (m)	13.0	16.8	1.8	23.2	2.7	7.4
Queue Length 95th (m)	27.2	35.2	5.6	42.8	7.8	16.6
Internal Link Dist (m)	589.2	856.8		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	564	659	684	975	490	977
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.31	0.05	0.38	0.10	0.16
Intersection Summary						

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	0	406	0	0	181
Future Vol, veh/h	0	0	406	0	0	181
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	8	0	0	8
Mvmt Flow	0	0	441	0	0	197

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	638	441	0	0	441	0
Stage 1	441	-	-	-	-	-
Stage 2	197	-	-	-	-	-
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	444	621	-	-	1130	-
Stage 1	653	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	444	621	-	-	1130	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1130	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

HCM 2010 TWSC
 9: Trafalgar Road & Station Street

02-23-2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	8	4	14	363	174	15
Future Vol, veh/h	8	4	14	363	174	15
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, %	8	6	7	7	7	2
Mvmt Flow	9	4	15	395	189	16

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	622	197	205	0	-	0
Stage 1	197	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Critical Hdwy	6.48	6.26	4.17	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.354	2.263	-	-	-
Pot Cap-1 Maneuver	441	834	1337	-	-	-
Stage 1	822	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	435	834	1337	-	-	-
Mov Cap-2 Maneuver	435	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	647	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1337	-	518	-	-
HCM Lane V/C Ratio	0.011	-	0.025	-	-
HCM Control Delay (s)	7.7	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
 10: Trafalgar Road & George Street/Mill Street

02-23-2023

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	0	0	371	0	0	189	0
Future Vol, veh/h	0	0	0	0	0	0	0	371	0	0	189	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	-	-	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	403	0	0	205	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	608	608	205	608	608	403	205	0	0	403	0	0
Stage 1	205	205	-	403	403	-	-	-	-	-	-	-
Stage 2	403	403	-	205	205	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	408	410	836	408	410	647	1366	-	-	1156	-	-
Stage 1	797	732	-	624	600	-	-	-	-	-	-	-
Stage 2	624	600	-	797	732	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	408	410	836	408	410	647	1366	-	-	1156	-	-
Mov Cap-2 Maneuver	408	410	-	408	410	-	-	-	-	-	-	-
Stage 1	797	732	-	624	600	-	-	-	-	-	-	-
Stage 2	624	600	-	797	732	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0		0		0		0	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1366	-	-	-	-	1156	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Lanes, Volumes, Timings
3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	31	198	119	90	88	42	33	130	48	86	252	40
Future Volume (vph)	31	198	119	90	88	42	33	130	48	86	252	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.954			0.974			0.960			0.980	
Flt Protected		0.996			0.980		0.950			0.950		
Satd. Flow (prot)	0	1763	0	0	1622	0	1805	1711	0	1687	1707	0
Flt Permitted		0.949			0.612		0.568			0.636		
Satd. Flow (perm)	0	1679	0	0	1013	0	1079	1711	0	1129	1707	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			17			32			13	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			341.2			555.2			339.8	
Travel Time (s)		31.5			17.5			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	0%	6%	11%	26%	0%	9%	0%	7%	10%	3%
Adj. Flow (vph)	34	215	129	98	96	46	36	141	52	93	274	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	378	0	0	240	0	36	193	0	93	317	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		20.2			20.2		35.2	35.2		35.2	35.2	
Actuated g/C Ratio		0.29			0.29		0.50	0.50		0.50	0.50	
v/c Ratio		0.75			0.79		0.07	0.22		0.17	0.37	
Control Delay		30.1			41.3		11.3	10.0		12.1	12.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		30.1			41.3		11.3	10.0		12.1	12.9	
LOS		C			D		B	B		B	B	
Approach Delay		30.1			41.3			10.2				12.7
Approach LOS		C			D			B				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 70.4

Natural Cycle: 65

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.0

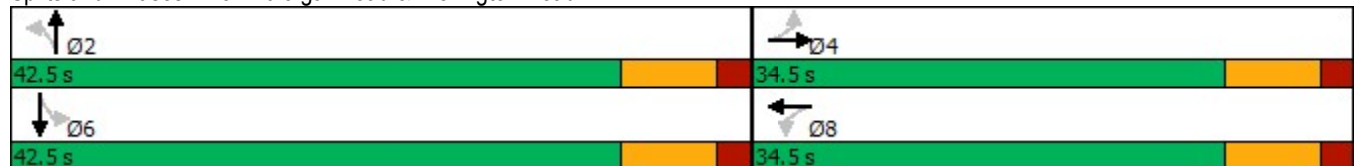
Intersection LOS: C

Intersection Capacity Utilization 104.4%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	240	36	193	93	317
v/c Ratio	0.75	0.79	0.07	0.22	0.17	0.37
Control Delay	30.1	41.3	11.3	10.0	12.1	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	41.3	11.3	10.0	12.1	12.9
Queue Length 50th (m)	42.5	28.3	2.4	11.3	6.5	23.6
Queue Length 95th (m)	71.1	#56.7	8.2	27.1	17.3	49.5
Internal Link Dist (m)	589.2	317.2		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	669	400	538	870	563	859
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.60	0.07	0.22	0.17	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	5	199	6	5	372
Future Vol, veh/h	0	5	199	6	5	372
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	4	0	0	7
Mvmt Flow	0	5	216	7	5	404

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	634	220	0	0	223	0
Stage 1	220	-	-	-	-	-
Stage 2	414	-	-	-	-	-
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	446	825	-	-	1358	-
Stage 1	821	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	444	825	-	-	1358	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	825	1358
HCM Lane V/C Ratio	-	-	0.007	0.004
HCM Control Delay (s)	-	-	9.4	7.7
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	0	24	0	0	8	6	138	0	0	342	25
Future Vol, veh/h	34	0	24	0	0	8	6	138	0	0	342	25
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
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	0	0	0	0	0	7	2	0	0	3	0
Mvmt Flow	37	0	26	0	0	9	7	150	0	0	372	27

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	555	550	386	563	563	150	399	0	0	150	0	0
Stage 1	386	386	-	164	164	-	-	-	-	-	-	-
Stage 2	169	164	-	399	399	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.263	-	-	2.2	-	-
Pot Cap-1 Maneuver	445	446	666	440	438	902	1133	-	-	1444	-	-
Stage 1	641	614	-	843	766	-	-	-	-	-	-	-
Stage 2	838	766	-	631	606	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	438	443	666	421	435	902	1133	-	-	1444	-	-
Mov Cap-2 Maneuver	438	443	-	421	435	-	-	-	-	-	-	-
Stage 1	637	614	-	837	761	-	-	-	-	-	-	-
Stage 2	824	761	-	606	606	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s	13.1		9		0.3		0			
HCM LOS	B		A							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1133	-	-	510	902	1444	-	-
HCM Lane V/C Ratio	0.006	-	-	0.124	0.01	-	-	-
HCM Control Delay (s)	8.2	0	-	13.1	9	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0	-	-

HCM 2010 TWSC
 15: Wellington Road 22 & East Collector Street

02-23-2023

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	12	304	165	18	55	49
Future Vol, veh/h	12	304	165	18	55	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	2	2	2	2	2	2
Mvmt Flow	13	330	179	20	60	53



















Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	199	0	-	0	545 189
Stage 1	-	-	-	-	189 -
Stage 2	-	-	-	-	356 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1373	-	-	-	499 853
Stage 1	-	-	-	-	843 -
Stage 2	-	-	-	-	709 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1373	-	-	-	493 853
Mov Cap-2 Maneuver	-	-	-	-	493 -
Stage 1	-	-	-	-	833 -
Stage 2	-	-	-	-	709 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1373	-	-	-	615
HCM Lane V/C Ratio	0.009	-	-	-	0.184
HCM Control Delay (s)	7.6	0	-	-	12.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Lanes, Volumes, Timings
3: Trafalgar Road & Wellington Road 22

02-23-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	127	73	64	213	102	124	376	105	64	143	39
Future Volume (vph)	62	127	73	64	213	102	124	376	105	64	143	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.964			0.967			0.968	
Flt Protected		0.988			0.992		0.950			0.950		
Satd. Flow (prot)	0	1695	0	0	1733	0	1805	1756	0	1583	1772	0
Flt Permitted		0.738			0.869		0.634			0.366		
Satd. Flow (perm)	0	1266	0	0	1518	0	1205	1756	0	610	1772	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			26			24			23	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			352.1			555.2			339.8	
Travel Time (s)		31.5			18.1			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	7%	8%	6%	2%	10%	0%	4%	7%	14%	4%	3%
Adj. Flow (vph)	67	138	79	70	232	111	135	409	114	70	155	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	413	0	135	523	0	70	197	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		22.3			22.3		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.31			0.31		0.48	0.48		0.48	0.48	
v/c Ratio		0.70			0.85		0.23	0.61		0.24	0.23	
Control Delay		29.5			39.8		13.5	17.6		15.2	11.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		29.5			39.8		13.5	17.6		15.2	11.3	
LOS		C			D		B	B		B	B	
Approach Delay		29.5			39.8			16.8				12.3
Approach LOS		C			D			B				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 72.5

Natural Cycle: 65

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 24.1

Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	284	413	135	523	70	197
v/c Ratio	0.70	0.85	0.23	0.61	0.24	0.23
Control Delay	29.5	39.8	13.5	17.6	15.2	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	39.8	13.5	17.6	15.2	11.3
Queue Length 50th (m)	31.8	51.6	11.2	51.6	5.8	14.1
Queue Length 95th (m)	58.3	#95.9	23.8	89.9	15.6	28.6
Internal Link Dist (m)	589.2	328.1		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	491	584	583	863	295	871
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.71	0.23	0.61	0.24	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	3	3	524	18	13	240
Future Vol, veh/h	3	3	524	18	13	240
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	8	0	0	8
Mvmt Flow	3	3	570	20	14	261

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	869	580	0	0	590
Stage 1	580	-	-	-	-
Stage 2	289	-	-	-	-
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	325	518	-	-	995
Stage 1	564	-	-	-	-
Stage 2	765	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	320	518	-	-	995
Mov Cap-2 Maneuver	320	-	-	-	-
Stage 1	564	-	-	-	-
Stage 2	753	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.2	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	396	995
HCM Lane V/C Ratio	-	-	0.016	0.014
HCM Control Delay (s)	-	-	14.2	8.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection												
Int Delay, s/veh	14.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	0	11	0	0	5	28	430	0	1	220	43
Future Vol, veh/h	23	0	11	0	0	5	28	430	0	1	220	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	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
Heavy Vehicles, %	8	0	6	0	0	0	7	7	0	0	7	2
Mvmt Flow	25	0	12	0	0	5	30	467	0	1	239	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	5	0	0	12	0	0	202	61	6	293	65	3
Stage 1	-	-	-	-	-	-	56	56	-	3	3	-
Stage 2	-	-	-	-	-	-	146	5	-	290	62	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.17	6.57	6.2	7.1	6.57	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.1	5.57	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.1	5.57	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.563	4.063	3.3	3.5	4.063	3.318
Pot Cap-1 Maneuver	1578	-	-	1620	-	-	746	820	1083	663	816	1081
Stage 1	-	-	-	-	-	-	944	838	-	1025	883	-
Stage 2	-	-	-	-	-	-	845	882	-	722	833	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1578	-	-	1620	-	-	543	807	1083	354	803	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	543	807	-	354	803	-
Stage 1	-	-	-	-	-	-	929	825	-	1009	883	-
Stage 2	-	-	-	-	-	-	590	882	-	308	820	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	5			0			17.2			11.6		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	784	1578	-	-	1620	-	-	834
HCM Lane V/C Ratio	0.635	0.016	-	-	-	-	-	0.344
HCM Control Delay (s)	17.2	7.3	0	-	0	-	-	11.6
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	4.6	0	-	-	0	-	-	1.5

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	39	246	332	62	37	30
Future Vol, veh/h	39	246	332	62	37	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	267	361	67	40	33

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	428	0	-	0	746 395
Stage 1	-	-	-	-	395 -
Stage 2	-	-	-	-	351 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1131	-	-	-	381 654
Stage 1	-	-	-	-	681 -
Stage 2	-	-	-	-	713 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1131	-	-	-	364 654
Mov Cap-2 Maneuver	-	-	-	-	364 -
Stage 1	-	-	-	-	651 -
Stage 2	-	-	-	-	713 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1131	-	-	-	454
HCM Lane V/C Ratio	0.037	-	-	-	0.16
HCM Control Delay (s)	8.3	0	-	-	14.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	202	119	118	100	42	33	157	57	86	336	52
Future Volume (vph)	35	202	119	118	100	42	33	157	57	86	336	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955			0.978			0.960				0.980
Flt Protected		0.995			0.978		0.950			0.950		
Satd. Flow (prot)	0	1762	0	0	1635	0	1805	1711	0	1687	1707	0
Flt Permitted		0.941			0.596		0.456			0.613		
Satd. Flow (perm)	0	1666	0	0	996	0	866	1711	0	1089	1707	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			14			31				13
Link Speed (k/h)		70			70			40				40
Link Distance (m)		613.2			341.2			555.2				339.8
Travel Time (s)		31.5			17.5			50.0				30.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	0%	6%	11%	26%	0%	9%	0%	7%	10%	3%
Adj. Flow (vph)	38	220	129	128	109	46	36	171	62	93	365	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	387	0	0	283	0	36	233	0	93	422	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		22.9			22.9		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.31			0.31		0.48	0.48		0.48	0.48	
v/c Ratio		0.71			0.88		0.09	0.28		0.18	0.51	
Control Delay		27.6			51.7		12.5	11.8		13.4	16.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		27.6			51.7		12.5	11.8		13.4	16.3	
LOS		C			D		B	B		B	B	
Approach Delay		27.6			51.7			11.9				15.8
Approach LOS		C			D			B				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 73.1

Natural Cycle: 65

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 25.2

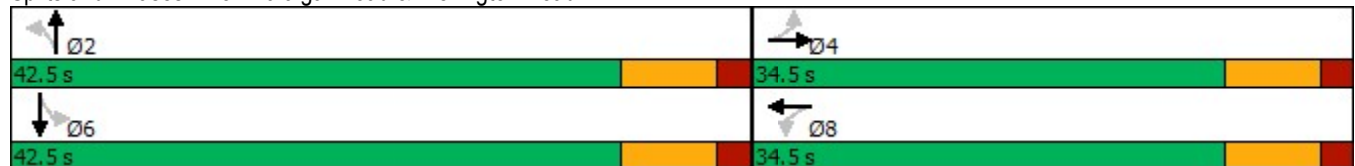
Intersection LOS: C

Intersection Capacity Utilization 109.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	387	283	36	233	93	422
v/c Ratio	0.71	0.88	0.09	0.28	0.18	0.51
Control Delay	27.6	51.7	12.5	11.8	13.4	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	51.7	12.5	11.8	13.4	16.3
Queue Length 50th (m)	44.1	36.5	2.9	17.9	8.0	42.1
Queue Length 95th (m)	73.7	#78.9	8.4	33.5	17.4	69.9
Internal Link Dist (m)	589.2	317.2		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	640	378	416	838	523	827
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.75	0.09	0.28	0.18	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	40	42	217	19	16	428
Future Vol, veh/h	40	42	217	19	16	428
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	4	0	0	7
Mvmt Flow	43	46	236	21	17	465

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	746	247	0	0	257
Stage 1	247	-	-	-	-
Stage 2	499	-	-	-	-
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	384	797	-	-	1320
Stage 1	799	-	-	-	-
Stage 2	614	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	377	797	-	-	1320
Mov Cap-2 Maneuver	377	-	-	-	-
Stage 1	799	-	-	-	-
Stage 2	604	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	516	1320
HCM Lane V/C Ratio	-	-	0.173	0.013
HCM Control Delay (s)	-	-	13.4	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	28	28	11	45	18	212	9	11	364	25
Future Vol, veh/h	34	4	28	28	11	45	18	212	9	11	364	25
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
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	0	0	0	0	0	7	2	0	0	3	0
Mvmt Flow	37	4	30	30	12	49	20	230	10	12	396	27

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	740	714	410	726	722	235	423	0	0	240	0	0
Stage 1	434	434	-	275	275	-	-	-	-	-	-	-
Stage 2	306	280	-	451	447	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.263	-	-	2.2	-	-
Pot Cap-1 Maneuver	335	359	646	343	355	809	1110	-	-	1339	-	-
Stage 1	604	585	-	736	686	-	-	-	-	-	-	-
Stage 2	708	683	-	592	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	299	347	646	316	343	809	1110	-	-	1339	-	-
Mov Cap-2 Maneuver	299	347	-	316	343	-	-	-	-	-	-	-
Stage 1	591	578	-	721	672	-	-	-	-	-	-	-
Stage 2	640	669	-	553	570	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	16.3		14.3		0.6		0.2	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1110	-	-	391	476	1339	-	-
HCM Lane V/C Ratio	0.018	-	-	0.183	0.192	0.009	-	-
HCM Control Delay (s)	8.3	0	-	16.3	14.3	7.7	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.7	0	-	-

HCM 2010 TWSC
 15: Wellington Road 22 & East Collector Street

02-23-2023

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	25	304	165	34	102	89
Future Vol, veh/h	25	304	165	34	102	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	2	2	2	2	2	2
Mvmt Flow	27	330	179	37	111	97

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	216	0	-	0	582 198
Stage 1	-	-	-	-	198 -
Stage 2	-	-	-	-	384 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1354	-	-	-	475 843
Stage 1	-	-	-	-	835 -
Stage 2	-	-	-	-	688 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1354	-	-	-	464 843
Mov Cap-2 Maneuver	-	-	-	-	464 -
Stage 1	-	-	-	-	815 -
Stage 2	-	-	-	-	688 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1354	-	-	-	587
HCM Lane V/C Ratio	0.02	-	-	-	0.354
HCM Control Delay (s)	7.7	0	-	-	14.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.6

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	49	250	9	16	416
Future Vol, veh/h	28	49	250	9	16	416
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, %	2	2	2	2	2	2
Mvmt Flow	30	53	272	10	17	452



















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	763	277	0	0	282
Stage 1	277	-	-	-	-
Stage 2	486	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	372	762	-	-	1280
Stage 1	770	-	-	-	-
Stage 2	618	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	365	762	-	-	1280
Mov Cap-2 Maneuver	365	-	-	-	-
Stage 1	770	-	-	-	-
Stage 2	607	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	546	1280
HCM Lane V/C Ratio	-	-	0.153	0.014
HCM Control Delay (s)	-	-	12.8	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0

Lanes, Volumes, Timings
3: Trafalgar Road & Wellington Road 22

02-23-2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	141	73	83	221	102	124	472	137	64	198	47
Future Volume (vph)	75	141	73	83	221	102	124	472	137	64	198	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.966			0.966			0.971	
Flt Protected		0.987			0.990		0.950			0.950		
Satd. Flow (prot)	0	1701	0	0	1733	0	1805	1753	0	1583	1777	0
Flt Permitted		0.707			0.831		0.595			0.232		
Satd. Flow (perm)	0	1219	0	0	1455	0	1130	1753	0	387	1777	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			24			25			20	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			352.1			555.2			339.8	
Travel Time (s)		31.5			18.1			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	7%	8%	6%	2%	10%	0%	4%	7%	14%	4%	3%
Adj. Flow (vph)	82	153	79	90	240	111	135	513	149	70	215	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	0	0	441	0	135	662	0	70	266	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		24.4			24.4		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.33			0.33		0.47	0.47		0.47	0.47	
v/c Ratio		0.76			0.90		0.25	0.79		0.38	0.31	
Control Delay		33.8			45.8		14.4	25.4		21.9	13.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		33.8			45.8		14.4	25.4		21.9	13.2	
LOS		C			D		B	C		C	B	
Approach Delay		33.8			45.8			23.6				15.0
Approach LOS		C			D			C				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 74.5

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 28.9

Intersection LOS: C

Intersection Capacity Utilization 104.7%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	314	441	135	662	70	266
v/c Ratio	0.76	0.90	0.25	0.79	0.38	0.31
Control Delay	33.8	45.8	14.4	25.4	21.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	45.8	14.4	25.4	21.9	13.2
Queue Length 50th (m)	37.9	58.0	12.3	81.5	6.9	22.9
Queue Length 95th (m)	#75.6	#110.4	24.3	#144.4	19.2	39.5
Internal Link Dist (m)	589.2	328.1		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	458	543	532	839	182	847
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.81	0.25	0.79	0.38	0.31

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	26	588	63	53	276
Future Vol, veh/h	30	26	588	63	53	276
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	8	0	0	8
Mvmt Flow	33	28	639	68	58	300

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1089	673	0	0	707
Stage 1	673	-	-	-	-
Stage 2	416	-	-	-	-
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	241	459	-	-	901
Stage 1	511	-	-	-	-
Stage 2	670	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	222	459	-	-	901
Mov Cap-2 Maneuver	222	-	-	-	-
Stage 1	511	-	-	-	-
Stage 2	618	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	292	901
HCM Lane V/C Ratio	-	-	0.208	0.064
HCM Control Delay (s)	-	-	20.5	9.3
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	13	25	18	8	28	36	476	32	41	300	43
Future Vol, veh/h	23	13	25	18	8	28	36	476	32	41	300	43
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
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, %	8	0	6	0	0	0	7	7	0	0	7	2
Mvmt Flow	25	14	27	20	9	30	39	517	35	45	326	47

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1072	1070	350	1073	1076	535	373	0	0	552	0	0
Stage 1	440	440	-	613	613	-	-	-	-	-	-	-
Stage 2	632	630	-	460	463	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.5	6.26	7.1	6.5	6.2	4.17	-	-	4.1	-	-
Critical Hdwy Stg 1	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4	3.354	3.5	4	3.3	2.263	-	-	2.2	-	-
Pot Cap-1 Maneuver	193	223	684	200	221	549	1159	-	-	1028	-	-
Stage 1	584	581	-	483	486	-	-	-	-	-	-	-
Stage 2	458	478	-	585	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	163	200	684	168	198	549	1159	-	-	1028	-	-
Mov Cap-2 Maneuver	163	200	-	168	198	-	-	-	-	-	-	-
Stage 1	555	548	-	459	462	-	-	-	-	-	-	-
Stage 2	404	455	-	517	536	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	24.4		21.8		0.5		0.9	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1159	-	-	251	272	1028	-	-
HCM Lane V/C Ratio	0.034	-	-	0.264	0.216	0.043	-	-
HCM Control Delay (s)	8.2	0	-	24.4	21.8	8.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.8	0.1	-	-

HCM 2010 TWSC
 14: Wellington Road 22 & East Collector Street

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Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	85	246	332	116	69	57
Future Vol, veh/h	85	246	332	116	69	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	2	2	2	2	2	2
Mvmt Flow	92	267	361	126	75	62

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	487	0	-	0	875 424
Stage 1	-	-	-	-	424 -
Stage 2	-	-	-	-	451 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1076	-	-	-	320 630
Stage 1	-	-	-	-	660 -
Stage 2	-	-	-	-	642 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1076	-	-	-	288 630
Mov Cap-2 Maneuver	-	-	-	-	288 -
Stage 1	-	-	-	-	594 -
Stage 2	-	-	-	-	642 -

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1076	-	-	-	382
HCM Lane V/C Ratio	0.086	-	-	-	0.359
HCM Control Delay (s)	8.7	0	-	-	19.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.6

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	18	32	582	32	55	311
Future Vol, veh/h	18	32	582	32	55	311
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, %	2	2	2	2	2	2
Mvmt Flow	20	35	633	35	60	338

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1109	651	0	0	668
Stage 1	651	-	-	-	-
Stage 2	458	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	232	469	-	-	922
Stage 1	519	-	-	-	-
Stage 2	637	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	213	469	-	-	922
Mov Cap-2 Maneuver	213	-	-	-	-
Stage 1	519	-	-	-	-
Stage 2	586	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	327	922
HCM Lane V/C Ratio	-	-	0.166	0.065
HCM Control Delay (s)	-	-	18.2	9.2
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2

Lanes, Volumes, Timings
3: Trafalgar Road & Wellington Road 22

02-23-2023

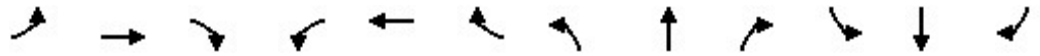


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	39	213	123	122	106	46	33	169	61	93	360	56
Future Volume (vph)	39	213	123	122	106	46	33	169	61	93	360	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956			0.977			0.960			0.980	
Flt Protected		0.995			0.978		0.950			0.950		
Satd. Flow (prot)	0	1763	0	0	1631	0	1805	1711	0	1687	1707	0
Flt Permitted		0.936			0.587		0.422			0.604		
Satd. Flow (perm)	0	1658	0	0	979	0	802	1711	0	1073	1707	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			15			31			13	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			341.2			555.2			339.8	
Travel Time (s)		31.5			17.5			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	0%	6%	11%	26%	0%	9%	0%	7%	10%	3%
Adj. Flow (vph)	42	232	134	133	115	50	36	184	66	101	391	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	408	0	0	298	0	36	250	0	101	452	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		24.0			24.0		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.32			0.32		0.47	0.47		0.47	0.47	
v/c Ratio		0.73			0.91		0.09	0.30		0.20	0.55	
Control Delay		28.6			56.9		12.8	12.4		13.8	17.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		28.6			56.9		12.8	12.4		13.8	17.5	
LOS		C			E		B	B		B	B	
Approach Delay		28.6			56.9			12.5				16.9
Approach LOS		C			E			B				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 74.1

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 26.9

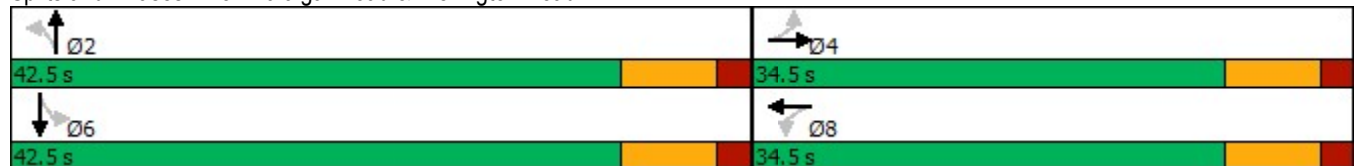
Intersection LOS: C

Intersection Capacity Utilization 111.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	408	298	36	250	101	452
v/c Ratio	0.73	0.91	0.09	0.30	0.20	0.55
Control Delay	28.6	56.9	12.8	12.4	13.8	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	56.9	12.8	12.4	13.8	17.5
Queue Length 50th (m)	47.8	39.5	3.0	20.1	8.9	47.6
Queue Length 95th (m)	79.6	#85.7	8.4	36.1	18.9	76.4
Internal Link Dist (m)	589.2	317.2		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	628	367	379	826	508	815
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.81	0.09	0.30	0.20	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	42	236	19	16	463
Future Vol, veh/h	40	42	236	19	16	463
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	4	0	0	7
Mvmt Flow	43	46	257	21	17	503

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	805	268	0	0	278	0
Stage 1	268	-	-	-	-	-
Stage 2	537	-	-	-	-	-
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	355	776	-	-	1296	-
Stage 1	782	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	349	776	-	-	1296	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	486	1296
HCM Lane V/C Ratio	-	-	0.183	0.013
HCM Control Delay (s)	-	-	14.1	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.7	0

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	30	28	11	45	19	226	9	11	399	25
Future Vol, veh/h	34	4	30	28	11	45	19	226	9	11	399	25
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
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	0	0	0	0	0	7	2	0	0	3	0
Mvmt Flow	37	4	33	30	12	49	21	246	10	12	434	27

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	796	770	448	783	778	251	461	0	0	256	0	0
Stage 1	472	472	-	293	293	-	-	-	-	-	-	-
Stage 2	324	298	-	490	485	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.263	-	-	2.2	-	-
Pot Cap-1 Maneuver	307	333	615	314	330	793	1074	-	-	1321	-	-
Stage 1	576	562	-	719	674	-	-	-	-	-	-	-
Stage 2	692	671	-	564	555	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	272	321	615	286	318	793	1074	-	-	1321	-	-
Mov Cap-2 Maneuver	272	321	-	286	318	-	-	-	-	-	-	-
Stage 1	563	555	-	702	658	-	-	-	-	-	-	-
Stage 2	623	656	-	524	548	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	17.4		15.2		0.6			0.2		
HCM LOS	C		C							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1074	-	-	365	444	1321	-	-
HCM Lane V/C Ratio	0.019	-	-	0.203	0.206	0.009	-	-
HCM Control Delay (s)	8.4	0	-	17.4	15.2	7.8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.8	0	-	-

HCM 2010 TWSC
 15: Wellington Road 22 & East Collector Street

02-23-2023

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	25	325	179	34	102	89
Future Vol, veh/h	25	325	179	34	102	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	2	2	2	2	2	2
Mvmt Flow	27	353	195	37	111	97

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	232	0	-	0	621 214
Stage 1	-	-	-	-	214 -
Stage 2	-	-	-	-	407 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1336	-	-	-	451 826
Stage 1	-	-	-	-	822 -
Stage 2	-	-	-	-	672 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1336	-	-	-	440 826
Mov Cap-2 Maneuver	-	-	-	-	440 -
Stage 1	-	-	-	-	801 -
Stage 2	-	-	-	-	672 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1336	-	-	-	562
HCM Lane V/C Ratio	0.02	-	-	-	0.369
HCM Control Delay (s)	7.8	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.7

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	49	269	9	16	451
Future Vol, veh/h	28	49	269	9	16	451
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, %	2	2	2	2	2	2
Mvmt Flow	30	53	292	10	17	490

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	821	297	0	0	302	0
Stage 1	297	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	344	742	-	-	1259	-
Stage 1	754	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	337	742	-	-	1259	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	754	-	-	-	-	-
Stage 2	583	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	516	1259
HCM Lane V/C Ratio	-	-	0.162	0.014
HCM Control Delay (s)	-	-	13.3	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	81	148	75	87	232	111	128	507	143	70	211	51
Future Volume (vph)	81	148	75	87	232	111	128	507	143	70	211	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	45.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.965			0.967			0.971	
Flt Protected		0.987			0.990		0.950			0.950		
Satd. Flow (prot)	0	1704	0	0	1731	0	1805	1756	0	1583	1777	0
Flt Permitted		0.692			0.825		0.584			0.185		
Satd. Flow (perm)	0	1194	0	0	1442	0	1110	1756	0	308	1777	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			25			24			21	
Link Speed (k/h)		70			70			40			40	
Link Distance (m)		613.2			352.1			555.2			339.8	
Travel Time (s)		31.5			18.1			50.0			30.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	7%	8%	6%	2%	10%	0%	4%	7%	14%	4%	3%
Adj. Flow (vph)	88	161	82	95	252	121	139	551	155	76	229	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	331	0	0	468	0	139	706	0	76	284	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		30.0	30.0		30.0	30.0	
Minimum Split (s)	25.5	25.5		25.5	25.5		37.5	37.5		37.5	37.5	
Total Split (s)	34.5	34.5		34.5	34.5		42.5	42.5		42.5	42.5	
Total Split (%)	44.8%	44.8%		44.8%	44.8%		55.2%	55.2%		55.2%	55.2%	
Maximum Green (s)	27.0	27.0		27.0	27.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.5			7.5		7.5	7.5		7.5	7.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		25.6			25.6		35.1	35.1		35.1	35.1	
Actuated g/C Ratio		0.34			0.34		0.46	0.46		0.46	0.46	
v/c Ratio		0.79			0.93		0.27	0.85		0.53	0.34	
Control Delay		36.4			50.8		14.8	30.5		32.7	13.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		36.4			50.8		14.8	30.5		32.7	13.7	
LOS		D			D		B	C		C	B	
Approach Delay		36.4			50.8			27.9				17.8
Approach LOS		D			D			C				B

Intersection Summary

Area Type: Other

Cycle Length: 77

Actuated Cycle Length: 75.7

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 32.8

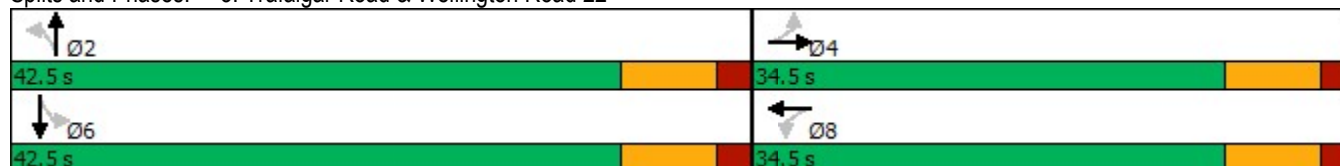
Intersection LOS: C

Intersection Capacity Utilization 108.3%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Wellington Road 22



Queues

3: Trafalgar Road & Wellington Road 22

02-23-2023



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	331	468	139	706	76	284
v/c Ratio	0.79	0.93	0.27	0.85	0.53	0.34
Control Delay	36.4	50.8	14.8	30.5	32.7	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	50.8	14.8	30.5	32.7	13.7
Queue Length 50th (m)	41.1	63.7	12.7	90.7	8.1	24.7
Queue Length 95th (m)	#83.8	#121.3	25.1	#160.7	#28.3	42.4
Internal Link Dist (m)	589.2	328.1		531.2		315.8
Turn Bay Length (m)			40.0		45.0	
Base Capacity (vph)	442	530	513	826	143	834
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.88	0.27	0.85	0.53	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	30	26	637	63	53	298
Future Vol, veh/h	30	26	637	63	53	298
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	8	0	0	8
Mvmt Flow	33	28	692	68	58	324

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1166	726	0	0	760
Stage 1	726	-	-	-	-
Stage 2	440	-	-	-	-
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	216	428	-	-	861
Stage 1	483	-	-	-	-
Stage 2	653	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	198	428	-	-	861
Mov Cap-2 Maneuver	198	-	-	-	-
Stage 1	483	-	-	-	-
Stage 2	599	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.7	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	264	861
HCM Lane V/C Ratio	-	-	0.231	0.067
HCM Control Delay (s)	-	-	22.7	9.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.9	0.2

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	13	25	18	8	28	38	521	32	41	321	44
Future Vol, veh/h	24	13	25	18	8	28	38	521	32	41	321	44
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
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, %	8	0	6	0	0	0	7	7	0	0	7	2
Mvmt Flow	26	14	27	20	9	30	41	566	35	45	349	48

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1148	1146	373	1150	1153	584	397	0	0	601	0	0
Stage 1	463	463	-	666	666	-	-	-	-	-	-	-
Stage 2	685	683	-	484	487	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.5	6.26	7.1	6.5	6.2	4.17	-	-	4.1	-	-
Critical Hdwy Stg 1	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4	3.354	3.5	4	3.3	2.263	-	-	2.2	-	-
Pot Cap-1 Maneuver	171	201	664	177	199	515	1135	-	-	986	-	-
Stage 1	568	568	-	452	460	-	-	-	-	-	-	-
Stage 2	429	452	-	568	554	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	142	179	664	146	177	515	1135	-	-	986	-	-
Mov Cap-2 Maneuver	142	179	-	146	177	-	-	-	-	-	-	-
Stage 1	537	534	-	427	435	-	-	-	-	-	-	-
Stage 2	374	427	-	499	521	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	28.1		24.6		0.5			0.9		
HCM LOS	D		C							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1135	-	-	222	242	986	-	-
HCM Lane V/C Ratio	0.036	-	-	0.304	0.243	0.045	-	-
HCM Control Delay (s)	8.3	0	-	28.1	24.6	8.8	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.2	0.9	0.1	-	-

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	85	265	354	116	69	57
Future Vol, veh/h	85	265	354	116	69	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	2	2	2	2	2	2
Mvmt Flow	92	288	385	126	75	62

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	511	0	-	0	920 448
Stage 1	-	-	-	-	448 -
Stage 2	-	-	-	-	472 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1054	-	-	-	301 611
Stage 1	-	-	-	-	644 -
Stage 2	-	-	-	-	628 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1054	-	-	-	270 611
Mov Cap-2 Maneuver	-	-	-	-	270 -
Stage 1	-	-	-	-	577 -
Stage 2	-	-	-	-	628 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	20.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1054	-	-	-	361
HCM Lane V/C Ratio	0.088	-	-	-	0.379
HCM Control Delay (s)	8.7	0	-	-	20.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.7

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	18	32	631	32	55	333
Future Vol, veh/h	18	32	631	32	55	333
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, %	2	2	2	2	2	2
Mvmt Flow	20	35	686	35	60	362

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1186	704	0	0	721
Stage 1	704	-	-	-	-
Stage 2	482	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	208	437	-	-	881
Stage 1	490	-	-	-	-
Stage 2	621	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	190	437	-	-	881
Mov Cap-2 Maneuver	190	-	-	-	-
Stage 1	490	-	-	-	-
Stage 2	568	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	298	881
HCM Lane V/C Ratio	-	-	0.182	0.068
HCM Control Delay (s)	-	-	19.8	9.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2