

New High School, 16th Street and 28th Avenue, Owen Sound

Transportation Impact Study

Paradigm Transportation Solutions Limited

2024-05 230607





Project Summary



Project Number:

230607

Date and Version:

2024-05 1.0.0

Client:

Bruce-Grey Catholic District School Board

Consultant Project Team

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New High School, 16th Street and 28th Avenue, Owen Sound Transportation Impact Study

<< Original Signed By >> Rajan Philips, P.Eng.

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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed new School located at the southwest quadrant of 16th Street and 28th Avenue in the City of Owen Sound.

The impact assessment also includes the future development of currently vacant lands to the north and south of the school site for commercial and residential uses, respectively.

This TIS includes an analysis of existing traffic conditions, a description of the proposed development, analysis of future traffic conditions, and assessment of development traffic impacts with recommendations as appropriate to accommodate the proposed development.

Background

The proposed New High School is to be located on the west side of 28th Avenue East, approximately 300 metres south of 16th Street. The school site is 20 acres in area, with a frontage of approximately 160 metres on 28th Avenue East, and a depth of approximately 520 metres.

The north boundary of the site will abut a proposed future local road, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection, approximately 240 metres south of 16th Street; and a north-south portion that will connect to 16th Street at a restricted Right-in-Right-out intersection, approximately 300 metres west of 28th Avenue. Only the east-west portion of the local road is to be constructed in conjunction with school construction.

A similar future local road alignment is proposed for the area south of the school site, comprising an east-west portion and a north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.

The proposed local roads are intended to serve development of the lands to the north and south of the school site to respectively accommodate commercial and residential land uses.

The School Development

The school will include a two-storey building (7,700 m², footprint accommodating 12,634 m² GFA) located at the easterly end along 28^{th} Avenue East; and an Athletic Field located to the west of the School



Building. Two separate driveways are identified on the proposed future road (as noted above) for entrance and exit, along with a Fire Route, Bus Drop Off location, and a parking layout of 143 spaces. The easterly driveway is located approximately 50 metres from the east property line, and the two driveways are separated by 80 metres.

The school will accommodate 1,012 students and 90-95 staff including teachers and custodians.

The new school is expected to be opened for the school year starting in 2028.

Adjacent Lands

The lands north and south of the school site are slated to be developed for commercial and residential uses, respectively. The transportation impact assessment for the development of the adjacent lands is based on the following road network, land use and timing assumptions identified in consultation with the City of Owen Sound:

- Proposed Future Roads
 - North of the school site, a future local road is proposed, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection; and a northsouth portion that will connect to 16th Street at a restricted Right-in-Right-out (RIRO) intersection.
 - A similar future local road alignment is proposed for the area south of the school site, comprising an east-west portion and a north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.
 - As noted, only the east-west portion of the future local road abutting the school site will be constructed in conjunction with the school development for anticipated opening in 2028.
 - All other local road sections will be constructed in conjunction with the development of the Adjacent Lands.
- Development Statistics:
 - Commercial Development (North): 37,200 m² GFA.
 - Residential Development (South): 500 units low density housing, and 200 units medium/high density.
- Development Timing:
 - 2028 No development on the Adjacent Lands.



- 2033 50% of both commercial and residential developments.
- 2038 100% of both commercial and residential developments.

An additional development scenario for the residential lands corresponding to a maximum yield of 1,500 dwelling units by 2038 is also analysed for transportation impact assessment.

TIS Scope

The scope of the Transportation Impact Study (TIS) was finalized through the development of a Terms of Reference for the TIS in consultation with the City of Owen Sound, the County of Grey and the Ministry of Transportation. The main elements of the Terms of Reference (included in **Appendix A**) are:

- Study Area Intersections:
 - 16th Street (Highway 26) and 28th Avenue (Grey Road 5) (signalized);
 - 8th Street (Grey Road 5) and 28th Avenue (Grey Road 5) (unsignalized);
 - proposed Future Road (North) and 28th Avenue (all-moves T-intersection);
 - proposed Future Road (North) and 16th Street (RIRO T-Intersection);
 - school access points on the Proposed Future Road (North) (with need assessment for left-turn lane); and
 - future local road (south) intersection on 28th Avenue and 8th Street to the south of the school site.
- Analysis Periods: Weekday AM and PM peak hours. It is noted that school traffic AM peak hour coincides with road traffic AM peak hour; and although school traffic PM peak hour is ahead of the road traffic PM peak hour, the two are conservatively assumed to coincide for the analysis.
- Background Developments: The following background developments are assumed to in place by 2028:
 - Industrial Development (16th Street and 28th Avenue);
 - 2275 16th Street; and
 - Heritage Grove Centre.



- Adjacent Lands: Commercial and Residential Developments as noted above:
 - Commercial Development (to the north of the school site); and
 - Residential Development (to the south of the school site).
- Traffic Conditions: Existing (2024) Traffic Conditions and the following Future Traffic Conditions:
 - 2028: School Development and in-stream other area developments.
 - 2033: 2028 developments and 50% development of adjacent commercial and residential uses.
 - 2038: 2028 developments and 100% development of adjacent commercial and residential uses.
 - 2038 (Maximum Yield Scenario): Includes 1,500 residential units in the adjacent lands to the south.
- Intersection Lane Configurations: The following lane configurations are assumed for the existing and future study area intersections:
 - The existing lane configurations are assumed for the two existing intersections of 28th Avenue at 16th Street and at 8th Street.
 - The future local road intersection abutting the school site, which will be constructed in conjunction with the school development, is proposed to include a northbound left-turn lane; southbound right-turn lane; and two separate left-turn and right-turn lanes for the eastbound approach.
 - Other future local intersections include auxiliary turn lanes as appropriate in this study, subject to finalization at the time of development of the Adjacent Lands.

Conclusions

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

- Existing Traffic Conditions: The study area intersections are operating at acceptable levels of service, and with no problem movements.
- Development Trip Generation: The school development is forecast to generate 408 equivalent vehicle trips (that include 54 school bus trips) during both the AM and PM peak hours.



- 2028 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2028 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.

The Site Driveway intersections on the Future Road (North) are forecast to operate at LOS A during the AM and PM peak hours.

- 2033 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2033 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.

The School Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

- 2038 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2038 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service with a few critical movements.

The School Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

2038 Total Traffic Conditions: Maximum Yield Scenario: The study area intersections are forecast to operate at similar levels of service as under 2038 total traffic conditions under the original development scenario summarized above, with some additional critical movements:

The Site Driveway intersections on the future road are noted to operate at satisfactory levels of service (LOS A/B) under 2038 total traffic conditions under the additional scenario.

Highway 26 (16th Street) and Grey County Road 5 (28th Avenue) Intersection: This intersection is under MTO's jurisdiction and operates under traffic signal control. MTO's Access Management Policy requires a minimum separation distance of 400 metres from this intersection to any new road connection or intersection on either 28th Avenue or 16th Street.

The future Local Road connection north of the School Site, at an all-moves T-intersection, on 28th Avenue is to be located at approximately 237 metres south of the intersection. A second



Local Road connection at a restricted RIRO intersection on 16th Street is to be located at approximately 300 metres west of the intersection.

The above intersection separation distances are based on the locations of property appropriate for development and existing physical constraints. The road system is also a part of land use changes and corresponding access requirements.

The intersection operational and queuing analyses indicate acceptable levels of service and adequate separation distances to accommodate queuing, under future traffic conditions for all three horizon years and the respective land use scenarios.

Grey County Road 5 (28th Avenue) Classification and Rightof-Way: Based on traffic projections for the 2038 Horizon Year, the roadway could remain as a Minor Arterial Road, as currently classified. The posted speed limit on 28th Avenue to the north of 8th Street could be reduced to 60 km/h, which would be same as the posted speed limit to the south of 8th Street. Although, no road widening is identified as required, the Right-of-Way for future improvements should be protected including the fivemetre-wide land dedication along the frontage of the school site.

Recommendations

Based on the findings and conclusions of this study, it is recommended that the Site Plan for the proposed New School on 28th Avenue be considered for approval, along with the construction of the new east-west local road abutting the school site as identified herein.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed new School located at the southwest quadrant of 16th Street and 28th Avenue in the City of Owen Sound.

The impact assessment also includes the future development of currently vacant lands to the north and south of the school site for commercial and residential uses, respectively.

The proposed New High School is to be located on the west side of 28th Avenue East, approximately 300 metres south of 16th Street. The school site is 20 acres in area, with a frontage of approximately 160 metres on 28th Avenue East, and a depth of approximately 520 metres.

The north boundary of the site will abut a proposed future local road, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection, approximately 240 metres south of 16th Street; and a north-south portion that will connect to 16th Street at a restricted Right-in-Right-out (RIRO) intersection, approximately 300 metres west of 28th Avenue. Only the east-west portion of the local road is to be constructed in conjunction with school construction.

A similar future local road alignment is proposed for the area south of the school site, comprising an east-west portion and a north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.

The proposed local roads are intended to serve development of the lands to the north and south of the school site to respectively accommodate commercial and residential land uses.

Figure 1.1 details the subject development location.

The school will include a two-storey building (7,700 m², footprint accommodating 12,634 m² GFA) located at the easterly end along 28th Avenue East; and an Athletic Field located to the west of the School Building. Two separate driveways are identified on the proposed future road (as noted above) for entrance and exit, along with a Fire Route, Bus Drop Off location, and a parking layout of 143 spaces. The easterly driveway is located approximately 50 metres from the east property line, and the two driveways are separated by 80 metres.



The school will accommodate 1,012 students and 90-95 staff including teachers and custodians.

The new school is expected to be opened for the school year starting in 2028.

1.1.1 Adjacent Lands

The lands north and south of the school site are slated to be developed for commercial and residential uses, respectively. The transportation impact assessment for the development of the adjacent lands is based on the following road network, land use and timing assumptions identified in consultation with the City of Owen Sound:

- Proposed Future Roads
 - North of the school site, a future local road is proposed, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection; and a northsouth portion that will connect to 16th Street at a restricted RIRO intersection.
 - A similar future local road alignment is proposed for the area south of the school site, comprising an east-west portion and a north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.
- Development Statistics:
 - Commercial Development (North): 37,200 m² GFA.
 - Residential Development (South): 500 units low density housing and 200 units medium/high density.
- Development Timing:
 - 2028 No development on the Adjacent Lands.
 - 2033 50% of both commercial and residential developments.
 - 2038 100% of both commercial and residential developments.

An additional development scenario for the residential lands corresponding to 1,500 dwelling units by 2038 is also analysed for transportation impact assessment.

1.2 Purpose and Scope

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



the study, developed through a Terms of Reference prepared in consultation with the Ministry of Transportation Ontario (MTO), Grey County, and City of Owen Sound staff, the main elements of which includes:

- assessment of the current traffic and site conditions within the study area;
- estimates of background traffic growth for opening year of development (2028), five years after development (2033), and ten years after development (2038);
- the following background developments are assumed to in place by 2028:
 - Industrial Development (16th Street and 28th Avenue);
 - 2275 16th Street; and
 - Heritage Grove Centre.
- Commercial and Residential Developments as noted above:
 - Commercial Development (to the north of the school site); and
 - Residential Development (to the south of the school site).
- estimates of additional traffic generated by the subject site;
- analyses of the impact of the future traffic on the surrounding road network, including the following study area intersections:
 - 16th Street (Highway 26) and 28th Avenue (Grey Road 5) (signalized);
 - 8th Street (Grey Road 5) and 28th Avenue (Grey Road 5) (unsignalized);
 - proposed Future Road (North) and 28th Avenue (all-moves T-intersection);
 - proposed Future Road (North) and 16th Street (RIRO T-Intersection);
 - school access points on the Proposed Future Road (North) (with need assessment for left-turn lane); and
 - future local road (south) intersection on 28th Avenue and 8th Street to the south of the school site.
- recommendations, if necessary, to mitigate the site generated traffic in a satisfactory manner.

Appendix A contains the Terms of Reference for the TIS.



This study has been prepared in accordance with the requirements detailed by the City of Owen Sound Traffic Impact Study Guidelines¹ and MTO Traffic Impact Study Guidelines².

² 2023.



¹ City of Owen Sound, Site Development Engineering Standards: Appendix H "Scope Traffic Impact Study – Terms of Reference", March 2021. MTO, "General Guidelines for the Preparation of Traffic Impact Studies", March





Location of Subject Site

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 1.1

2 Existing Conditions

2.1 Existing Roadways

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

- 16th Street East (Highway 26) east-west roadway, which is identified as Provincial Highway to the east of 28th Avenue, and a Connecting Link to the west. The signalized intersection at 28th Avenue is under Provincial jurisdiction. The posted speed limit is 80 km/h.
- 28th Avenue East (Grey Road 5) is a north-south roadway and is classified as a Minor Arterial/County Highway under the jurisdiction of Grey County as Grey Road 5. The posted speed limit is 80 km/h north of 8th Street and 60 km/h to the south.
- 8th Street East (Grey Road 5) is a continuation of Grey Road 5, on an east-west alignment to the west of the 28th Avenue East that extends south.

Traffic signals are provided at the intersection of 28th Avenue and 16th Street, with exclusive left-turn lanes in all directions with storage lengths of 120 metres for the westbound lane, 70 metres for the eastbound lane, and 55 metres each for the northbound and southbound lanes. An exclusive right-turn lane is provided in eastbound direction only with a storage length of 70 metres.

The intersection of 28th Avenue and 8th Street operates under sidestreet stop-control.

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







Existing Lane Configuration and Traffic Controls

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 2.1

2.2 Transit Service

There are currently no transit routes provided in proximity of the subject site.

2.3 Traffic Volumes

Paradigm conducted turning movement counts at the intersections of 28th Avenue and 8th Street and at 28th Avenue and 16th Street on 14 November 2023.

Figure 2.2a and **Figure 2.2b** respectively illustrate the existing AM and PM weekday peak hour turning movement traffic volumes. **Table 2.1** summarizes the peak hours at each intersection.

TABLE 2.1: INTERSECTION PEAK HOURS

Intersection	AM Peak Hour	PM Peak Hour
28 th Avenue and 8 th Street	7:45 – 8:45	4:00 - 5:00
28 th Avenue and 16 th Street	7:45 – 8:45	4:00 - 5:00

Appendix B contains the detailed traffic counts and signal timings for the study area intersections.







Existing Traffic Volumes AM Peak Hour

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 2.2a





Existing Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 2.2b

2.4 Traffic Operations

The level of service conditions at the study area intersections have been assessed through intersection operational analysis using Synchro 11.

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

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity (v/c) ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

As per MTO guidelines, movements are considered critical under the following conditions for the intersection of 16th Street and 28th Avenue:

- v/c ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.85 or above; or
- v/c ratios for ramp terminal movements increased to 0.75 or above.

Movements are considered critical at the balance of the study area intersections under the following conditions:

- volume/capacity ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above;
- v/c ratios for exclusive movements that will exceed 1.00;
- 95th percentile queue lengths for individual movements exceed the available lane storage.

Table 2.2 summarizes the results of the intersection operational analysis under existing conditions, including the AM and PM peak hour LOS, v/c ratios, and 95th percentile queues experienced.



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

Appendix C contains the detailed Synchro 11 reports.



σ				Direction/Movement/Approach																
erio					Eastb	ound			Westk	ound			Northl	oound	l	;	South	bound	k	
Analysis P	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
ak Hour	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.03 0 70 70	A 10 0.20 0 - -	A 9 0.02 0 70 70	A 10	A 6 0.23 0 120 120	A 6 0.32 1 -	~ ~ ~ ~ ~ ~	A 6	B 18 0.06 0 55 55	B 18 0.35 1 - -	v v v v v v	B 18	B 20 0.15 1 55 54	B 17 0.10 0 - -	~ ~ ~ ~ ~ ~	B 19	A 10
AM Pe	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.08 2 -		A 9 0.02 1 20 19	B 11					~ ~ ~ ~ ~ ~	A 8 0.06 2 -		A 4		A 0 0.00 0 -	^ ^ ^ ^ ^ ^	A 0	
k Hour	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.02 0 70 70	B 11 0.43 1 -	A 9 0.07 0 70 70	B 11	A 7 0.16 0 120 120	A 7 0.30 1 -	v v v v v	A 7	B 18 0.07 0 55 55	C 20 0.62 2 -	v v v v v	B 20	C 22 0.14 1 55 54	B 17 0.25 1 -	~ ~ ~ ~ ~ ~	B 18	B 12
PM Pea	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor.	B 11 0.20 6 -		A 9 0.06 2 20 18	B 11					~ ~ ~ ~ ~ ~	A 7 0.02 1 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	

TABLE 2.2: EXISTING TRAFFIC OPERATIONS

MOE - Measure of Effectiveness LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</></>
- Shared with through movement



2.5 Queue Analysis

In addition to the Synchro 11 analysis, queue length analysis for through and left-turn lanes were carried out at all approaches at the intersection of 16th Street and 28th Avenue.

This method was completed using the MTO Traffic Signal Operating and Timing Policy³ Table 1 under Level of Service (LOS) A conditions and assuming a vehicle length of 7.5 metres.

In addition, queue length analysis for the eastbound right-turn lane was carried out at the intersection. This was completed using the methodology outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁴. The right-turn queue length is calculated by multiplying the average number of vehicles stored per cycle by 2 for roadways with design speeds greater than 60 km/h.

These methods require the conversion of volumes to Passenger Car Equivalents (PCE) by multiplying the number of heavy vehicles by a conversion factor of 2^5 .

Table 2.3a and **Table 2.3b** summarize the results of the queue length analysis under existing traffic conditions. The results indicate that the queue lengths are within the existing storage for all turning movements.

It is noted that according to the MTO queue length method, the northbound through/right-turn queue length reaches 67.5 metres under existing traffic conditions during the PM peak hour. The queue length is not projected to reach the future east-west roadway on 28th Avenue approximately 237 metres south of 16th Street.

⁵ Canadian Capacity Guide, February 2008.



³ Traffic Signal Operating and Timing Policy 2010-02, Ministry of Transportation Ontario, June 2016.

⁴ Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, 2017.

TABLE 2.3A: EXISTING THROUGH AND LEFT-TURN QUEUE ANALYSIS

Intersection	Horizon	Lana	# of	Cycle Length (s)		Volumes (vph)		m may	Calc'd Length	Existing					
Intersection		Lane	Lanes	AM	PM	AM	PM	m _u max	per Lane (m)	Storage (m)					
		NBL	1			22	25	0.7	15.0	55					
	Existing	NBTR	1			103	175	4.9	67.5	-					
		SBL	1	100		47	33	1.3	22.5	55					
28th Avenue &		SBTR	1		100	100	100	100	100	100	30	85.0	2.4	37.5	-
16th Street		EBL	1			100	100			14	10.0	0.4	15.0	70	
		EBT	1			141	303.0	8.4	97.5	-					
		WBL	1			159	86.0	4.4	60.0	120					
		WBTR	1			313	290.0	8.7	105.0	-					

TABLE 2.3B: EXISTING RIGHT-TURN QUEUE ANALYSIS

Interestion	Herimon	Marrant	Cycle Length (s)		Right Turn V	Volume (vph)	Average Arriv	val Rate (vpc)	Calc'd Le	Existing	
Intersection	Horizon	wovement	AM	PM	AM	PM	AM	PM	AM	PM	Storage (m)
28th Avenue & 16th Street	Existing	EBR	100	100	11	44	0.3	1.2	4.5	18.0	70



3 School Development

3.1 The School Site Plan

The school will include a two-storey building (7,700 m², footprint accommodating 12,634 m² GFA) located at the easterly end along 28th Avenue East; and an Athletic Field located to the west of the School Building. Two separate driveways are identified on the proposed future road (as noted above) for entrance and exit, along with a Fire Route, Bus Drop Off location, and a parking layout of 143 spaces. The easterly driveway is located approximately 50 metres from the east property line, and the two driveways are separated by 80 metres.

The school will accommodate 1,012 students and 90-95 staff including teachers and custodians.

The new school is expected to be opened for the school year starting in 2028.

Figure 3.1 shows the preliminary site plan.







NEW OWEN SOUND HIGH SCHOOL

PRELIMINARY SITE PLAN





Preliminary Site Plan

Bruce-Grey Catholic District School Board TIA 230607

Figure 3.1

3.2 School Trip Generation

The trip generation for the subject school development was developed on a first principles basis based on information provided by the Bruce-Grey Catholic District School Board (School Board).

The following Home-School travel information for the proposed school was provided by the School Board:

- 1,012 students are expected to attend the new school;
- Approximately 90-95 employees including teachers and support staff will work at the proposed new high school;
- Primary home-school-home student transportation will be provided by 27 school buses; and
- School Hours: 8:00 or 9:00 AM to 3:30 or 4:00 PM.

Based on the above information, the following Trip Generation assumptions are made for estimating subject school traffic:

- All school trips will occur during the road traffic peak hours, viz., 7:45 – 8:45 AM and 4:00 – 5:00 PM.
- All 1,012 students are anticipated to have access to transportation provided by school buses. However, 100 vph AM/PM peak hour trips in each direction (inbound and outbound) are conservatively assumed to account for students who could either be dropped off/picked up by parents or be selfdriving.
- The number of employee trips is also conservatively assumed to be 100 vph inbound in the AM and outbound in the PM peak hours; and
- The school bus trips are converted to twice as many passenger car equivalents (PCEs) for operational analysis.

Table 3.1 summarizes the forecast number of net new trips generatedby the proposed development.

	AM	Peak H	our	PM Peak Hour				
TTP Fulpose	In	Out	Total	In	Out	Total		
Student Drop-off	100	100	200	100	100	200		
Employees	100	0	100	0	100	100		
Bus Drop-off (in PCEs)	54	54	108	54	54	108		
Total Trip Generation	254	154	408	154	254	408		

TABLE 3.1: TRIP GENERATION



3.3 Development Trip Distribution and Assignment

The School Board advised that the buses are expected to arrive in the following directions based on the distribution of the student population:

- 18 buses from the south and west via 8th Street;
- 4 buses from the north via 28th Avenue;
- 2 buses from the south via 28th Avenue;
- 2 buses from the east via 16th Street; and
- ▶ 1 bus from the west via 16th Street.

In summary, 20 of the 27 buses will be arriving from the south on 28th Avenue, and seven will be arriving from the north.

The trip distribution for vehicle trips by parents/employees was determined based on the above bus routing information.

Table 3.2 summarizes the breakdown of directional proportions based on the above information.

To/From	Distribution
North via 28th Avenue north of 16th Street	15%
South via 28th Avenue south of 8th Street	15%
16th Street to/from East	10%
16th Street to/from West	5%
8th Street to/from West	55%
Total	100%

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

It is noted that in the opening year for the school (2028), only the eastwest section of the future road (north) will be completed with connection to 28th Avenue.

The north-south section with right-in/right-out (RIRO) intersection at 16th Street is assumed to be open by 2033.

School traffic volumes have therefore been assigned corresponding to the above timing the future connections to the north of the school site.

Figure 3.2a and **Figure 3.2b** illustrate the 2028 site-generated traffic volumes for the AM and PM peak hours, respectively, based on the single connection of the future road (north) to 28th Avenue.



Figure 3.3a and **Figure 3.3b** illustrate the 2033 and 2038 sitegenerated traffic volumes for the AM and PM peak hours, respectively, and correspond to future connections to both 28th Avenue and 16th Street.

It is noted that the school traffic volumes will remain the same for all future horizon years analysed herein.







2028 Site-Generated Traffic Volumes AM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 3.2a





2028 Site-Generated Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 3.2b



2033 & 2038 Site-Generated Traffic Volumes – AM Peak Hour



Figure 3.3a



2033 & 2038 Site-Generated Traffic Volumes – PM Peak Hour

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

paradigm

Figure 3.3b
4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates and analysis of future background and total traffic volumes, as noted below:

- ▶ 2028 School Opening Year:
 - Background Traffic Volumes comprising increases in background road traffic volumes from 2024 to 2028; and development traffic generated by three Other Area Developments.
 - Total Traffic Volumes comprising Background Traffic Volumes and the addition of School Traffic Volumes.
- ▶ 2033 Five Years after School Opening:
 - Background Traffic Volumes comprising increases in background road traffic volumes from 2024 to 2033; development traffic generated by three Other Area Developments; and development traffic generated by 50% of commercial and residential development on the adjacent lands.
 - Total Traffic Volumes comprising 2033 Background Traffic Volumes and the addition of School Traffic Volumes.
- ▶ 2038 Ten years after School Opening:
 - Background Traffic Volumes comprising increases in background road traffic volumes from 2024 to 2038; development traffic generated by three Other Area Developments; and development traffic generated by 100% of commercial and residential development on the adjacent lands.
 - Total Traffic Volumes comprising 2038 Background Traffic Volumes and the addition of School Traffic Volumes.

4.1 Background Traffic Volumes

Background traffic volumes include a background road traffic component and a background development traffic component.

The background road traffic component involves the growth road traffic and is estimated based on a growth rate of 1.0% per annum applied to the existing roadway traffic volumes. This growth rate was also used in Traffic Impact Studies for properties in vicinity to the school site and is appropriate considering the direct addition of future development traffic



from adjacent lands. Background development traffic was estimated based on three other area developments that are anticipated to be in place by 2028, and the future development of adjacent lands north and south of the school site as outlined below.

Figure 4.1 illustrates the location of the three other area developments and the future development lands adjacent to the school site.







Other Area Development Locations

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS TOR 230607

Figure 4.1

4.2 Other Area Developments

The following other area developments are included in estimating the background traffic volumes based on previous traffic studies for those lands:

- Industrial Development: Located on the west side of 27th Avenue East and south of 17th Street East. The proposed development includes 5,686 m² (61,200 sq. ft.) of storage space in ten buildings and 3,426 m² (36,900 sq. ft.) of light industrial uses in three buildings. A TIS completed in October 2022⁶ indicates that the development is estimated to generate a total of 58 AM and PM peak hour trips.
- <u>2275 16th Avenue</u>: Located on the south side of 16th Street East immediately east of the existing commercial plaza and west of the Grey County CP Rail Trail. The proposed development includes two commercial buildings totalling 1,200 m² (12,917 sq. ft.) GFA, one 500 m² (5,382 sq. ft.) GFA commercial-office building, a 311 m² (3,348 sq. ft.) GFA restaurant with drive-through, a 300 m² (3,229 sq. ft.) GFA restaurant and three apartment buildings accommodating a total of 120 residential units. The development is estimated to generate a total of 238 AM peak hour trips and 158 PM peak hour trips.
- Heritage Grove Centre: Located at 2125 16th Street East, a commercial development located west of the subject site on the south side of 16th Street and east of 20th Avenue. A TIS was completed by Crozier Consulting Engineers (Crozier) in April 2019⁷, and a TIS update⁸ was prepared by Crozier in December 2022 to reflect changes to the site plan. The Draft Plan has since been updated⁹.

The background development traffic volumes used in this analysis have been updated to account for these changes. The updated background traffic volumes exclude development traffic from portions of the Heritage Grove Centre commercial development that had been completed prior to November 2023 when traffic counts were conducted. The excluded commercial development traffic volumes are captured in the November 2023

⁹ KLM Planning Partners Inc., *Planning Justification Report Heritage Grove Centre* 2125 16th Street East City of Owen Sound, March 2023.



⁶ Prepared by Paradigm Transportation Solutions Limited, 16th Street and 28th Avenue East, Owen Sound, ON Transportation Impact Study, October 2022.

⁷ Crozier Consulting Engineers, 2125 16th Street East (Heritage Grove) Commercial Development, April 2019.

⁸ Crozier Consulting Engineers, *Traffic Opinion Letter 2125 16th Street East* (*Heritage Grove*) Commercial Development City of Owen Sound, December 2022.

traffic counts. **Appendix D** contains the trip generation estimates and updated development plan.

Each of the above developments are assumed to be in place by 2028.

Appendix D contains the traffic volumes for the other area developments during the AM and PM peak hours.

4.3 Adjacent Lands

The lands north and south of the school site are slated to be developed for commercial and residential uses, respectively. These developments will be supported by future local road connections north and south of the school site.

4.3.1 Future Local Roads

North of the school site, a future local road is proposed, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection, approximately 240 metres south of 16th Street; and a north-south portion that will connect to 16th Street at a restricted Right-in-Right-out (RIRO) intersection, approximately 300 metres west of 28th Avenue.

A similar future local road alignment is proposed for the area south of the school site, comprising an east-west portion and a north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.

It is noted that the east-west portion of the local road to the north of the school site, and connecting to 28th Avenue, will be in place by 2028 to accommodate the proposed school driveways.

The north-south portion of the local road to the north and the two segments of the future local road to the south of the school site are assumed to be in place by 2033 to accommodate the development of the adjacent lands.

Figure 4.2 illustrates the future local roads and intersections including proposed traffic controls and lane configurations. It is noted that:

The lane configuration for the north local road intersection at 28th Avenue includes separate eastbound left-turn (with 30-metre storage) and right-turn lanes; a southbound right-turn lane with 15-metre storage and a separate through lane; and a northbound left-turn lane with 40-metre storage and a separate through lane.



The lane configuration for the south local road intersection at 28th Avenue, for the 2033 Horizon Year, includes a single shared lane for the eastbound approach; a shared southbound right-turn and through lane; and a shared northbound left-turn and through lane. For the 2038 Horizon Year, the single shared lane for eastbound approach will be modified to include separate left- and right-turn lanes.







Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.2

4.3.2 Development Traffic

Trip generation estimates for the development of the adjacent lands are based on the following land use and timing assumptions identified in consultation with the City of Owen Sound:

- ► Development Statistics:
 - Commercial Development (North): 37,200 m² GFA.
 - Residential Development (South): 500 units low density housing, and 200 units medium/high density.
- Development Timing:
 - 2028 No development on the above two lands.
 - 2033 50% of both commercial and residential developments.
 - 2038 100% of both commercial and residential developments.

An additional development scenario corresponding to 1,500 residential units by 2038 was also analysed for transportation impact assessment.

The Institute of Transportation Engineers (ITE) Trip Generation Manual¹⁰ equations were used to estimate the trip generation due to development of the adjacent lands to accommodate commercial and residential land uses.

Commercial Lands

The development of the commercial lands will accommodate a maximum of GFA of $37,200 \text{ m}^2$ (400,421 sq. ft.) of commercial uses. ITE Business Park land use classification was used for trip generation estimates.

Table 4.1 summarizes the forecast number of new trips generated bythe Commercial Lands.

TABLE 4.1: COMMERCIAL LANDS TRIP GENERATION

Land Llas Code	Gross Floor		AM Pea	ak Hour	•		PM Pea	ık Hour	
Land Use Code	Area	Rate	In	Out	Total	Rate	In	Out	Total
770: Business Park	400,421 sq. ft.	Eq	428	76	504	Eq	128	366	494
Total Trip Generat	ion		428	76	504		128	366	494
$1 \cup C 770 = 0.04$	$l_{\rm P}$ (X) + 0.50 l DM	$ - - p/T \rangle$	- 0 00 1 6	$\sqrt{N+0}$	12				

LUC 770 | **AM**: Ln(T) = 0.94 Ln(X) + 0.59 | **PM**: Ln(T) = 0.88 Ln(X) + 0.93

¹⁰ Institute of Transportation Engineers, *Trip Generation Manual,* 11th ed., (Washington, DC: ITE, 2021).



The trip distribution was determined based on the existing traffic patterns on 16th Street, 28th Avenue, and 8th Street. **Table 4.2** displays the breakdown of trip distributions used in this study for the Commercial Lands.

To/Erom	AM Pe	ak Hour	PM Pe	ak Hour
TO/FIOIII	Inbound	Outbound	Inbound	Outbound
North via 28th Avenue	15%	5%	5%	15%
South via 28th Avenue	20%	10%	10%	20%
East via 16th Street	35%	30%	30%	35%
West via 16th Street	5%	35%	35%	5%
West via 8th Street	25%	20%	20%	25%
Total Trip Generation	100%	100%	100%	100%

TABLE 4.2: COMMERCIAL LANDS ESTIMATED TRIP DISTRIBUTION

It is noted that the Commercial Lands are assumed to 50% built-out by 2033 and fully built-out by 2038.

Residential Lands

The residential development of the lands south of the school is expected to accommodate 200 medium/high-density residential units and 500 low-density residential units.

The ITE Trip Generation Manual equations were used to estimate the trip generation of the expected maximum unit yield for the subject lands.

Table 4.3 summarizes the forecast number of new trips generated bythe Residential Lands.

Land Lise Code	Unite		AM Pea	ak Hour	•		PM Pea	ak Hour	,
Lanu Use Coue	Units	Rate	In	Out	Total	Rate	In	Out	Total
210: Single-Family	100	Гa	10	EE	74	۲a	60	27	00
Detached Housing	100	⊏q	19	55	/4	⊏q	02	57	99
215: Single-Family	400	Гa	E 1	151	202	۲a	120	07	226
Attached Housing	400	⊏q	51	151	202	⊏q	139	97	230
220: Multifamily	200	Ea	20	65	05	Ea	67	40	107
Housing (Low-Rise)	200	⊑q	20	05	05	⊑q	07	40	107
Total Trip Genera	tion		90	271	361		268	174	442
LUC 210 AM: Ln(T) = 0	.91 Ln(X) +	+ 0.12	PM: L	n(T) = 0.	94 Ln(X)	+ 0.27			

TABLE 4.3: RESIDENTIAL LANDS TRIP GENERATION

LUC 215 | **AM**: T = 0.52(X) - 5.70 | **PM**: T = 0.60(X) - 3.93

LUC 220 | **AM**: T = 0.31(X) + 22.85 | **PM**: T = 0.43(X) + 20.55



The residential trip distribution was determined based on the location of the employment areas in Owen Sound, and residential traffic was accordingly assigned to the study area roadways.

Figure 4.3 illustrates the location of the employment zones considered in determining the distribution, including the land area of each zone and its percentage share of the total employment land area.

Table 4.4 summarizes the breakdown of trip distributions corresponding to the proportionate land area of each zone.

TABLE 4.4: RESIDENTIAL LANDS ESTIMATED TRIP DISTRIBUTION

To/From	Distribution
North via 28th Avenue	40%
South via 28th Avenue	5%
East via 16th Street	5%
West via 16th Street	25%
West via 8th Street	25%
Total Trip Generation	100%

It is noted that the Residential Lands are assumed to be 50% built-out by 2033 and fully built-out by 2038.

Appendix D contains the traffic volumes for the potential development of the Commercial and Residential Lands adjacent to the subject school site during the AM and PM peak hours.







Owen Sound Employment Zones

Bruce-Grey Catholic District School Board TIA 230607

Figure 4.3

4.4 2028 Traffic Forecasts

The 2028 traffic forecasts reflect the opening year of the subject school development. The background traffic volumes comprise increases in background road traffic volumes and development traffic generated by the three Other Area Developments. The total traffic volumes comprise Background Traffic Volumes and the addition of School Traffic Volumes.

4.4.1 2028 Background Traffic Conditions

Figure 4.4a and **Figure 4.4b** illustrate the 2028 background traffic volumes, including road traffic growth and other area approved development traffic.

The 2028 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

Table 4.5 summarizes the results of the 2028 background traffic operations. The results indicate that the study area intersections are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

Appendix E contains the supporting detailed Synchro 11 reports.







2028 Background Traffic Volumes AM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.4a





2028 Background Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.4b

77		1							[Directi	on/Mo	oveme	nt/App	oroach	ı					
erio					Eastb	ound			Westk	ound			North	oound	I	;	South	bound	ł	
Analysis P	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
ak Hour	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.08 0 70 70	B 10 0.24 1 - -	A 9 0.02 0 70 70	B 10	A 6 0.25 0 120 120	A 7 0.38 1 - -	~ ~ ~ ~ ~ ~	A 7	B 18 0.06 0 55 55	B 18 0.37 1 - -	~ ~ ~ ~ ~ ~	B 18	C 20 0.17 1 55 54	B 17 0.12 0 - -	~ ~ ~ ~ ~ ~	B 19	B 10
AM Pe	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.09 2 -		A 9 0.02 1 20 19	B 11					~ ~ ~ ~ ~ ~	A 8 0.06 2 -		A 4		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
k Hour	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.03 0 70 70	B 12 0.50 2 -	A 10 0.08 0 70 70	B 12	A 8 0.18 0 120 120	A 7 0.36 1 -	v v v v v	A 7	B 18 0.08 0 55 55	B 20 0.60 2 -	v v v v v	B 20	C 22 0.20 1 55 54	B 17 0.32 1 -	~ ~ ~ ~ ~ ~	B 18	B 13
PM Pea	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor.	B 12 0.21 6 -		A 9 0.06 2 20 18	B 11					~ ~ ~ ~ ~ ~	A 7 0.02 1 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	

TABLE 4.5: 2028 BACKGROUND TRAFFIC OPERATIONS

MOE - Measure of Effectiveness LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</>< - Shared with through movement



4.4.2 2028 Total Traffic Conditions

Figure 4.5a and **Figure 4.5b** illustrate the 2028 total traffic volumes, including trips generated by the proposed school development.

The 2028 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

Table 4.6 summarizes the results of the 2028 total traffic operations. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours.

The Site Driveway intersections on the Future Road (North) are forecast to operate at LOS A during the AM and PM peak hours.

The eastbound (outbound) movement at 28th Avenue and the Future Road (North) is forecast to operate at LOS B/C and with a maximum 95th percentile queue length of seven metres. The queue length is not projected to reach the easterly Site Driveway (Driveway B), which is 50 metres west of 28th Avenue.

Appendix F contains the supporting detailed Synchro 11 reports.





2028 Total Traffic Volumes AM Peak Hour



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.5a





2028 Total Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.5b

q									[Directi	on/Mo	oveme	nt/App	oroact	า					
erio.					Eastb	ound			West	ound			North	oound	I		South	bound	1	
Analysis Pe	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.08 0 70 70	B 11 0.24 1 - -	A 10 0.04 0 70 70	B 10	A 7 0.29 0 120 120	A 7 0.38 1 -	^ ^ ^ ^ ^ ^	A 7	B 19 0.10 0 55 55	B 19 0.49 1 -	^ ^ ^ ^ ^ ^	B 19	C 21 0.19 1 55 54	B 18 0.25 1 - -	~ ~ ~ ~ ~ ~	B 19	B 11
Hour	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	C 18 0.15 4 - -		B 10 0.14 4 -	B 12					A 8 0.15 4 40 36	A 0 0.00 0 -		A 5		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
AM Peak I	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	C 17 0.41 15 -		A 9 0.02 1 20 19	C 16					~ ~ ~ ~ ~ ~	A 8 0.06 2 -		A 3		A 0 0.00 0 -	v v v v v	A 0	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ^ ^ ^	A 0	v v v v	A 8 0.11 3		A 8	A 8 0.05 2		^ ^ ^ ^	A 8					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	v v v v	A 8 0.06 2		A 3	A 9 0.11 3		v v v v	A 9					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 11 0.03 0 70 70	B 14 0.53 2 - -	B 11 0.10 0 70 70	B 14	A 9 0.23 0 120 120	A 9 0.38 1 -	~ ^ ^ ^ ^	A 9	B 18 0.11 0 55 55	C 20 0.68 2 -	^ ^ ^ ^ ^ ^	B 20	C 23 0.21 2 55 53	B 17 0.32 1 -	~ ~ ~ ~ ~ ~	B 18	B 14
Hour	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	C 16 0.21 6 -		B 11 0.23 7 - -	B 12					A 8 0.09 2 40 38	A 0.00 0 -		A 3		A 0 0.00 0 - -	A 0.00 0 15 15	A 0	
PM Peak I	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	C 16 0.42 15 - -		A 10 0.07 2 20 18	B 14					v v v v v v	A 8 0.02 1 -		A 2		A 0 0.00 0 - -	^ ^ ^ ^ ^ ^	A 0	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	^ ^ ^ ^ ^	A 0	v v v v	A 7 0.07 2		A 7	A 9 0.10 2		~ ^ ^ ^	A 9					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C		A 0 0.00	> > > >	A 0	<pre></pre>	A 8 0.04 1		A 3	A 10 0.17 4		~ ~ ~ ~	A 10					

TABLE 4.6: 2028 TOTAL TRAFFIC OPERATIONS

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio

Stor. - Existing Storage (m)

TWSC - Two-Way Stop Control

</>< - Shared with through movement

4.4.3 2028 Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2028 background and total traffic conditions were carried out at the intersection of 28th Avenue and 16th Street, the same as under existing traffic conditions.

The queue analysis has been conducted using the same methodology as under existing traffic conditions.

Table 4.7a and **Table 4.7b** summarize the results of the queue length analysis for 2028 background and total traffic conditions. The results indicate that the queue lengths are projected to stay within the existing storage for all turning movements.

It is noted that according to the MTO queue length method, the northbound through/right-turn queue length is projected to reach 90 metres under 2028 total traffic conditions during the PM peak hour. The queue length is not projected to reach the future east-west roadway on 28th Avenue approximately 237 metres south of 16th Street.



TABLE 4.7A: 2028 THROUGH AND LEFT-TURN QUEUE ANALYSIS

Intersection	Horizon	Lana	# of	Cycle Le	ength (s)	Volume	es (vph)	m may	Calc'd Length	Existing
Intersection	Horizon	Lane	Lanes	AM	PM	MA	PM	m _u max	per Lane (m)	Storage (m)
		NBL	1			23	26	0.7	15.0	55
		NBTR	1			109	182	5.1	67.5	-
		SBL	1			53	49	1.5	30.0	55
	2028	SBTR	1	100	100	38	116	3.2	45.0	-
	Background	EBL	1	100	100	41	18	1.1	22.5	70
		EBT	1			167	343	9.5	112.5	-
		WBL	1			165	89	4.6	60.0	120
28th Avenue &		WBTR	1			368	339	10.2	120.0	-
16th Street		NBL	1			32	40	1.1	22.5	55
		NBTR	1			149	252	7.0	90.0	-
		SBL	1			53	49	1.5	30.0	55
	2029 Total	SBTR	1	100	100	83	139	3.9	52.5	-
	2020 10181	EBL	1	100	100	41	18	1.1	22.5	70
		EBT	1			167	343	9.5	112.5	-
		WBL	1			190	105	5.3	67.5	120
		WBTR	1			368	339	10.2	120.0	-

TABLE 4.7B: 2028 RIGHT-TURN QUEUE ANALYSIS

Interrection	Herizon	Mayamant	Cycle Le	ength (s)	Right Turn \	/olume (vph)	Average Arriv	val Rate (vpc)	Calc'd Le	ength (m)	Existing
Intersection	Horizon	wovement	AM	PM	AM	PM	AM	PM	AM	PM	Storage (m)
28th Avenue &	2028 Background	EBR	100	100	11	46	0.3	1.3	4.5	19.5	70
16th Street	2028 Total	EBR	100	100	25	54	0.7	1.5	10.5	22.5	70



4.5 2033 Traffic Forecasts

The 2033 traffic forecasts reflect five years after the opening year of the subject school development. The background traffic volumes comprise increases in background road traffic volumes; development traffic generated by three Other Area Developments; and development traffic generated by 50% of commercial and residential development on the adjacent lands. The total traffic volumes comprise Background Traffic Volumes and the addition of School Traffic Volumes.

4.5.1 2033 Background Traffic Conditions

Figure 4.6a and **Figure 4.6b** illustrate the 2033 background traffic volumes, including road traffic growth, other area approved development traffic, and the traffic from the lands adjacent to the subject site to be potentially developed. It is noted that the potential Residential and Commercial developments adjacent to the subject site are assumed to be 50% built-out by 2033.

The 2033 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

Table 4.8 summarizes the results of the 2033 background traffic operations. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours.

The eastbound (outbound) movement at 28th Avenue and the Future Road (North) is forecast to operate at LOS C/D and with a maximum 95th percentile queue length of four metres. The projected queue length would not reach the easterly Site Driveway (Driveway B) of the subject school development, 50 metres west of 28th Avenue.

Appendix G contains the supporting detailed Synchro 11 reports.





2033 Background Traffic Volumes AM Peak Hour



Figure 4.6a



2033 Background Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.6b

σ									[Directi	on/Mo	veme	nt/Ap	proact	ı					
⊜rio					East	oound			West	oound			North	bound	I	:	South	bound	1	
Analysis Pe	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	A 0		A 0 0.00 0		A 0			A 10 0.02 1	A 10					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 11 0.09 0 70 70	B 12 0.28 1 -	B 11 0.04 0 70 70	B 12	A 7 0.39 0 120 120	A 7 0.39 1 -	^ ^ ^ ^ ^ ^	A 7	C 21 0.24 1 55 54	C 21 0.56 2 -	^ ^ ^ ^ ^ ^	C 21	C 23 0.21 2 55 53	B 19 0.30 2 -	^ ^ ^ ^ ^ ^	C 20	B 12
^{>} eak Hour	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	C 16 0.05 1 - -		A 10 0.02 1 -	B 13					A 8 0.09 2 40 38	A 0 0.00 0 - -		A 2		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
AME	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	B 14 0.18 4		~ ~ ~ ~	B 14					v v v v	A 8 0.00 0		A 0		A 0 0.00 0	~ ^ ^ ^	A 0	
	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	B 14 0.26 8 -		A 9 0.03 1 20 19	B 14					~ ~ ~ ~ ~ ~	A 8 0.06 2 -		A 3		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	~ ~ ~ ~	A 8 0.01 0		A 1		A 0 0.00 0	^ ^ ^ ^	A 0					B 11 0.10 2		^ ^ ^ ^	B 11	
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ^ ^ ^	4 0		A 0 0.00 0		4 0			B 13 0.17 4	B 13					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 11 0.07 0 70 70	B 16 0.66 3 -	B 12 0.15 0 70 70	B 15	B 10 0.32 0 120 120	A 9 0.41 1 -	^ ^ ^ ^ ^ ^	ح م	C 21 0.19 1 55 54	C 21 0.67 2 -	^ ^ ^ ^ ^ ^	C 21	C 24 0.22 2 55 53	B 18 0.41 2 -	^ ^ ^ ^ ^ ^	B 20	B 15
^{>} eak Hour	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	B 14 0.07 2 - -		B 11 0.14 4 -	B 12					A 8 0.02 1 40 39	A 0 0.00 0 - -		A 1		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
M	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	B 14 0.13 3		> > > >	B 14					v v v v	A 8 0.00 0		A 0		A 0 0.00 0	~ ^ ^ ^	A 0	
	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	B 14 0.31 10 - -		A 10 0.07 2 20 18	B 13					~ ~ ~ ~ ~ ~	A 8 0.02 1 - -		A 2		A 0 0.00 0 - -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C	~ ~ ~ ~	A 8 0.03		A 1		A 0 0.00	~ ~ ~ ^	A 0					B 11 0.06		~ ~ ~ ~	B 11	

TABLE 4.8: 2033 BACKGROUND TRAFFIC OPERATIONS

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

Avail. - Available Storage (m) TCS - Traffic Control Signal

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio

Stor. - Existing Storage (m)

TWSC - Two-Way Stop Control </> - Shared with through movement

4.5.2 2033 Total Traffic Conditions

Figure 4.7a and **Figure 4.7b** illustrate the 2033 total traffic volumes, including trips generated by the proposed school development.

The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours.

The Site Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

The eastbound (outbound) movement at 28th Avenue and the Future Road (North) is forecast to operate at LOS B/C and with a maximum 95th percentile queue length of 15 metres. The queue length is not projected to reach the easterly Site Driveway (Driveway B), which is 50 metres west of 28th Avenue.

Appendix H contains the supporting detailed Synchro 11 reports.





2033 Total Traffic Volumes AM Peak Hour



Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 4.7a



2033 Total Traffic Volumes PM Peak Hour



Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 4.7b

TABLE 4.9A: 2033 TOTAL TRAFFIC OPERATIONS - AM PEAK HOUR

σ									[Directi	on/Mo	oveme	nt/App	oroach	ı					
erio					Eastb	ound			Westk	ound		l	North	bound		:	South	bound	1	
Analysis Po	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ^ ^ ^	A 0		A 0 0.00 0		A 0			A 10 0.02 1	A 10					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 12 0.09 0 70 70	B 14 0.30 1 -	B 12 0.05 0 70 70	B 13	A 8 0.44 0 120 120	A 8 0.40 1 -	~ ~ ~ ~ ~ ~	A 8	C 22 0.28 2 55 53	C 21 0.61 3 -	~ ~ ~ ~ ~ ~	C 21	C 24 0.22 2 55 53	A 0 0.00 0 -	~ ~ ~ ~ ~ ~	C 20	B 14
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	E 40 0.40 13 -		B 10 0.17 4 -	C 20					A 9 0.27 8 40 32	A 0 0.00 0 -		A 5		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
Peak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	C 19 0.27 8		~ ~ ~ ~	C 19					v v v v	A 8 0.00 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
AMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	D 27 0.65 34 - -		A 10 0.03 1 20 19	D 26					v v v v v v	A 8 0.06 2 -		A 3		A 0.00 0 -	^ ^ ^ ^ ^ ^	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	v v v v	A 8 0.01 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0					B 13 0.12 3		~ ^ ^ ^	B 13	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	v v v v	A 0	v v v v	A 8 0.11 3		A 3	A 9 0.06 2		v v v v	A 9					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	~ ~ ~ ~	A 8 0.06 2		A 1	A 9 0.11 3		~ ~ ~ ~	A 9					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</> - Shared with through movement



TABLE 4.9B: 2033 TOTAL TRAFFIC OPERATIONS - PM PEAK HOUR

σ		· · · · ·	Direction/Movement/Approach																	
erio					Eastb	ound			Westk	ound			North	oound	(;	South	bound	1	
Analysis Pe	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	A 0		A 0 0.00 0		A 0			B 13 0.16 4	B 13					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 13 0.08 0 70 70	B 18 0.68 4 -	B 13 0.15 1 70 69	B 17	B 12 0.38 0 120 120	B 10 0.41 1 -	~ ~ ~ ~ ~	B 11	C 21 0.22 2 55 53	C 22 0.73 4 -	~ ~ ~ ~ ~	C 21	C 26 0.23 2 55 53	A 0 0.00 0 -	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	B 19	B 17
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	D 27 0.40 14 -		B 13 0.41 15 -	C 17					A 8 0.12 3 40 37	A 0 0.00 0 -		A 3		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
eak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	C 20 0.20 5		> > > >	C 20					v v v v	A 9 0.00 0		A 0		A 0 0.00 0	> > > >	A 0	
PMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	C 21 0.55 25 -		B 11 0.08 2 20 18	C 19					~ ~ ~ ~ ~ ~	A 8 0.02 1 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	<pre></pre>	A 8 0.03 1		A 1		A 0 0.00 0	> > > > > > > > > > > > > > > > > > >	A 0					B 13 0.08 2		> > > > > > > > > > > > > > > > > > >	В 13	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	<pre></pre>	A 8 0.07 2		A 5	A 9 0.12 3		~ ^ ^	A 9					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	A 0	<pre></pre>	A 8 0.04 1		A 2	B 11 0.21 6		> > > > >	B 11					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</> - Shared with through movement



4.5.3 2033 Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2033 background and total traffic conditions were carried out at the intersection of 28th Avenue and 16th Street, the same as under existing traffic conditions.

The queue analysis has been conducted using the same methodology as under existing traffic conditions.

Table 4.10a and **Table 4.10b** summarize the results of the queue length analysis for 2033 background and total traffic conditions. The results indicate that the queue lengths are projected to stay within the existing storage for all turning movements.

It is noted that according to the MTO queue length method, the northbound through/right-turn queue length is projected to reach 105 metres under 2033 total traffic conditions during the PM peak hour. The queue length is not projected to reach the future east-west roadway on 28th Avenue approximately 237 metres south of 16th Street.



TABLE 4.10A: 2033 THROUGH AND LEFT-TURN QUEUE ANALYSIS

Intersection	Horizon	Lano	# of	Cycle Le	ength (s)	Volume	es (vph)	m may	Calc'd Length	Existing
Intersection	nonzon	Lane	Lanes	AM	PM	MA	PM	m _u max	per Lane (m)	Storage (m)
		NBL	1			79	61	2.2	37.5	55
		NBTR	1			185	255	7.1	90.0	-
		SBL	1			55	51	1.5	30.0	55
	2033	SBTR	1	100	100	103	181	5.0	67.5	-
	Background	EBL	1	100	100	42	36	1.2	22.5	70
	_	EBT	1			187	430	11.9	135.0	-
		WBL	1			255	124	7.1	90.0	120
28th Avenue &		WBTR	1			385	355	10.7	120.0	-
16th Street		NBL	1			88	75	2.4	37.5	55
		NBTR	1			225	325	9.0	105.0	-
		SBL	1			55	51	1.5	30.0	55
	2022 Total	SBTR	1	100	100	148	204	5.7	75.0	-
	2033 Total	EBL	1	100	100	42	36	1.2	22.5	70
		EBT	1			187	430	11.9	135.0	-
		WBL	1			280	140	7.8	97.5	120
		WBTR	1			385	355	10.7	120.0	-

TABLE 4.10B: 2033 RIGHT-TURN QUEUE ANALYSIS

Interrection	Horizon	Movement	Cycle Le	ength (s)	Right Turn \	/olume (vph)	Average Arriv	val Rate (vpc)	Calc'd Le	Existing	
Intersection			AM	PM	AM	PM	AM	PM	AM	PM	Storage (m)
28th Avenue &	2033 Background	EBR	100	100	25	83	0.7	2.3	10.5	34.5	70
16th Street	2033 Total	EBR	100	100	25	83	0.7	2.3	10.5	34.5	70



4.6 2038 Traffic Forecasts

The 2038 traffic forecasts represent ten years after the opening year of the subject school development. The background traffic volumes comprise increases in background road traffic volumes; development traffic generated by three Other Area Developments; and development traffic generated by 100% of commercial and residential development on the adjacent lands. The total traffic volumes comprise Background Traffic Volumes and the addition of School Traffic Volumes.

4.6.1 2038 Background Traffic Conditions

Figure 4.8a and **Figure 4.8b** illustrate the 2038 background traffic volumes, including road traffic growth, other area approved development traffic, and the traffic from the lands adjacent to the subject site to be potentially developed. It is noted that the potential Residential and Commercial developments adjacent to the subject site are assumed to be fully built-out by 2038.

The 2038 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

Table 4.11 summarizes the results of the 2038 background traffic operations. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours.

The eastbound (outbound) movement at 28th Avenue and the Future Road (North) is forecast to operate at LOS C/D and with a maximum 95th percentile queue length of nine metres. The projected queue length would not reach the easterly Site Driveway (Driveway B) of the subject school development, 50 metres west of 28th Avenue.

Appendix I contains the supporting detailed Synchro 11 reports.





2038 Background Traffic Volumes AM Peak Hour



Figure 4.8a



2038 Background Traffic Volumes PM Peak Hour

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 4.8b

q				Direction/Movement/Approach																
erio	ario			Eastbound					Westbound				Northbound				Southbound			
Analysis Pe	sischie Sischi	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
AM Peak Hour	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	A 0		A 0 0.00 0		A 0			A 10 0.04 1	A 10					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.11 0 70 70	B 16 0.35 2 - -	B 14 0.07 0 70 70	B 15	A 10 0.55 1 120 119	A 9 0.42 1 -	~ ~ ~ ~ ~ ~	A 9	C 24 0.39 3 55 52	C 21 0.62 4 -	~ ~ ~ ~ ~ ~	C 22	C 26 0.23 2 55 53	B 19 0.37 3 - -	~ ~ ~ ~ ~ ~	C 21	B 15
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	D 27 0.16 4 -		A 10 0.03 1 - -	C 20					A 9 0.20 6 40 34	A 0 0.00 0 -		A 4		A 0 0.00 0 - -	A 0.00 0 15 15	A 0	
	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	C 20 0.40 14		A 10 0.01 0	C 19					v v v v	A 8 0.00 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	C 20 0.47 18 - -		A 9 0.03 1 20 19	C 18					v v v v v v	A 8 0.07 2 -		A 3		A 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	v v v v	A 8 0.02 1		A 1		A 0 0.00 0	^ ^ ^ ^	A 0					B 12 0.20 5		~ ^ ^ ^	B 12	
PM Peak Hour	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0		A 0 0.00 0		A 0			C 15 0.33 10	C 15					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.10 1 70 69	B 20 0.72 10 - -	B 14 0.20 2 70 68	B 18	B 13 0.45 0 120 120	B 11 0.40 1 - -	^ ^ ^ ^ ^ ^	B 11	C 26 0.32 4 55 51	C 24 0.73 10 - -	~ ~ ~ ~ ~ ~	C 25	C 30 0.26 3 55 52	C 21 0.47 8 - -	~ ~ ~ ~ ~ ~	C 23	B 19
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	C 19 0.16 4 - -		B 13 0.29 9 - -	B 14					A 8 0.04 1 40 39	A 0 0.00 0 - -		A 1		A 0.00 0 - -	A 0.00 0 15 15	A 0	
	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	C 20 0.31 10		B 11 0.01 0	C 20					v v v v	A 9 0.01 0		A 0		A 0 0.00 0	~ ^ ^ ^	A 0	
	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	C 16 0.41 15 - -		B 10 0.09 2 20 18	B 15					~ ~ ~ ~ ~ ~	A 8 0.03 1 - -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	~ ~ ~ ~	A 8 0.06 2		A 2		A 0 0.00 0	~ ~ ~ ~	A 0					B 12 0.14 4		~ ~ ~ ~	B 12	

TABLE 4.11: 2038 BACKGROUND TRAFFIC OPERATIONS

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio

Stor. - Existing Storage (m)

TWSC - Two-Way Stop Control </>< - Shared with through movement

Avail. - Available Storage (m) TCS - Traffic Control Signal
4.6.2 2038 Total Traffic Operations

Figure 4.9a and **Figure 4.9b** illustrate the 2038 total traffic volumes, including trips generated by the proposed school development.

The 2038 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

Table 4.12a and **Table 4.12b** summarize the results of the 2038 total traffic operations during the AM and PM peak hours. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours, except for the following movements:

- ▶ 28th Avenue and 8th Street
 - The eastbound left-turn movement is forecast to operate at LOS F with a v/c ratio of 0.93 during the AM peak hour.
- ▶ 28th Avenue and Future Road (North)
 - The eastbound movement is forecast to operate at LOS F during the AM and PM peak hours. The v/c ratio is also projected to reach 0.98 during the AM peak hour.

The Site Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

The eastbound (outbound) movement at 28th Avenue and the Future Road (North) is projected to have a maximum 95th percentile queue length of 40 metres. The queue length is not projected to reach the easterly Site Driveway (Driveway B), which is 50 metres west of 28th Avenue.

Appendix J contains the supporting detailed Synchro 11 reports.





2038 Total Traffic Volumes AM Peak Hour



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.9a



2038 Total Traffic Volumes PM Peak Hour



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Figure 4.9b

TABLE 4.12A: 2038 TOTAL TRAFFIC OPERATIONS - AM PEAK HOUR

σ				Direction/Movement/Approach																
erio					Eastb	ound			Westk	ound		I	North	bound	l	:	South	bound	1	
Analysis Po	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ^ ^ ^	A 0		A 0 0.00 0		A 0			A 10 0.04 1	A 10					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 15 0.11 1 70 69	B 17 0.37 3 -	B 15 0.08 1 70 69	B 17	B 12 0.62 2 120 118	B 10 0.44 1 -	~ ~ ~ ~ ~ ~	B 11	C 24 0.42 4 55 51	C 21 0.63 4 -	~ ~ ~ ~ ~ ~	C 22	C 26 0.23 2 55 53	B 19 0.42 4 -	~ ~ ~ ~ ~ ~	C 20	B 16
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	F 183 0.98 40 -		B 11 0.19 5 -	F 74					B 11 0.41 16 40 24	A 0 0.00 0 -		A 6		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
Peak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	E 38 0.62 28		B 11 0.01 0	E 37					v v v v	A 8 0.00 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
AMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	F 63 0.93 76 -		A 10 0.04 1 20 19	F 59					v v v v v v	A 8 0.07 2 -		A 2		A 0 0.00 0 -	^ ^ ^ ^ ^ ^	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	v v v v	A 8 0.02 1		4 0		A 0 0.00 0	v v v v	4 0					B 15 0.25 8		~ ^ ^ ^	B 15	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	v v v v	A 8 0.11 3		A 2	A 9 0.06 2		~ ~ ~ ~	A 9					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	~ ~ ~ ~	A 8 0.06 2		A 1	A 9 0.12 3		~ ~ ~ ~	A 9					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</> - Shared with through movement



TABLE 4.12B: 2038 TOTAL TRAFFIC OPERATIONS - PM PEAK HOUR

7		,		Direction/Movement/Approach																
erio (Eastb	ound			Westk	ound		I	North	oound		;	South	bound	1	
Analysis Pe	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > > >	A 0		A 0 0.00 0		A 0			C 15 0.33 10	C 15					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 16 0.11 2 70 68	C 23 0.75 20 -	B 16 0.21 3 70 67	C 22	B 16 0.52 1 120 119	B 12 0.41 2 -	~ ~ ~ ~ ~ ~	B 14	C 28 0.35 6 55 49	C 30 0.79 20 -	~ ~ ~ ~ ~	C 30	C 35 0.30 4 55 5 <u>1</u>	C 21 0.46 10 -	~ ~ ~ ~ ~ ~	C 24	C 22
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	F 57 0.69 32 -		C 19 0.60 29 -	D 29					A 9 0.15 4 40 36	A 0 0.00 0 -		A 3		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
eak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	E 36 0.48 18		B 13 0.01 0	D 35					v v v v	A 9 0.01 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
PMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	D 30 0.71 40 -		B 11 0.10 2 20 18	D 27					~ ~ ~ ~ ~ ~ ~	A 8 0.03 1 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	V V V V V V	A 8 0.06 2		A 2		A 0 0.00 0	~ ~ ~ ~	A 0					C 15 0.18 5		~ ~ ~ ~	C 15	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > >	A 0	~ ~ ~ ~	A 8 0.08 2		A 4	B 10 0.14 4		~ ~ ~ ~	B 10					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > > > >	A 0	~ ~ ~ ~	A 8 0.04 1		A 2	B 12 0.23 7		~ ~ ~ ~	B 12					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</>< - Shared with through movement



4.6.3 2038 Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2038 background and total traffic conditions were carried out at the intersection of 28th Avenue and 16th Street, the same as under existing traffic conditions.

The queue analysis has been conducted using the same methodology as under existing traffic conditions.

Table 4.13a and **Table 4.13b** summarize the results of the queue length analysis for 2038 background and total traffic conditions. The results indicate that the queue lengths are projected to stay within the existing storage for all turning movements.

It is also noted that according to the MTO queue length method, the northbound through/right-turn queue length is projected to reach 127.5 metres under 2038 total traffic conditions during the PM peak hour. The queue length is not projected to reach the future east-west roadway on 28th Avenue approximately 237 metres south of 16th Street.



TABLE 4.13A: 2038 THROUGH AND LEFT-TURN QUEUE ANALYSIS

Intersection	Horizon	Lano	# of	Cycle Le	ength (s)	Volume	es (vph)	m may	Calc'd Length	Existing
Intersection	Horizon	Lane	Lanes	AM	PM	MA	PM	m _u max	per Lane (m)	Storage (m)
		NBL	1			129	94	3.6	52.5	55
		NBTR	1			252	324	9.0	105.0	-
		SBL	1			58	53	1.6	30.0	55
	2038	SBTR	1	100	100	159	240	6.7	Calc'd Length per Lane (m) Etc State 52.5 105.0 30.0 82.5 30.0 157.5 112.5 127.5 52.5 127.5 30.0 90.0 30.0 157.5 127.5 30.0 90.0 30.0 157.5 120.0 127.5 120.0	-
	Background	EBL	1	100	100	44	49	1.4		70
	_	EBT	1			207	507	14.1	157.5	-
		WBL	1			339	152	9.4	112.5	120
28th Avenue &		WBTR	1			401	369	11.1	127.5	-
16th Street		NBL	1			138	107	3.8	52.5	55
		NBTR	1			293	393	10.9	127.5	-
		SBL	1			58	53	1.6	per Lane (m) Stora 6 52.5 0 105.0 6 30.0 7 82.5 4 30.0 .1 157.5 4 112.5 .1 127.5 6 30.0 .3 90.0 .4 30.0 .1 157.5 6 30.0 .3 90.0 .4 30.0 .1 157.5 0.1 120.0 .1 127.5	55
	2029 Total	SBTR	1	100	100	204	263	7.3	90.0	-
	2036 10181	EBL	1	100	100	44	49	1.4	30.0	70
		EBT	1			207	507	14.1	157.5	-
		WBL	1			364	168	10.1	120.0	120
		WBTR	1			401	369	11.1	127.5	-

TABLE 4.13B: 2038 RIGHT-TURN QUEUE ANALYSIS

Interropotion	Herizon	Maxamant	Cycle Le	ength (s)	Right Turn \	/olume (vph)	Average Arriv	val Rate (vpc)	Calc'd Le	ength (m)	Existing
Intersection	Horizon	wovement	AM	PM	AM	PM	AM	PM	MA	PM	Storage (m)
28th Avenue &	2038 Background	EBR	100	100	36	118	1	3.3	15.0	49.5	70
16th Street	2038 Total	EBR	100	100	36	118	1	3.3	15.0	49.5	70



4.7 Maximum Yield Residential Development

An additional development scenario was considered for the residential development of the lands south of the school site, in which up to 1,500 residential units comprising predominantly townhouses are assumed as maximum development yield.

The study area intersections were analyzed under 2038 total traffic conditions herein, with the traffic volumes adjusted for the increased residential unit count.

4.7.1 Trip Generation

The 1,500 residential units were assumed to be split into 1,200 townhomes, 150 single-family detached homes, and 150 low-rise apartment units.

Table 4.14 summarizes the forecast number of new trips generated by the Residential Lands with up to 1,500 units.

Land Lice Code	Unite		AM Pea	ık Houi	Ī		PM Pea	ak Hour			
Land Use Code	Units	Rate	In	Out	Total	Rate	In	Out	Total		
210: Single-Family	150	Ea	27	81	108	Ea	01	54	145		
Detached Housing	150	∟ч	21	01	100	∟ч	51	54	113		
215: Single-Family	1200	Fa	155	463	618	Fa	122	201	716		
Attached Housing	1200	∟ч	100	400	010	∟y	722	204	710		
220: Multifamily Housing	150	Ea	17	52	69	Ea	54	31	85		
(Low-Rise)	150	∟ч	17	52	03	∟ч	54	51	00		
Total Trip Generation		199	596	795		567	379	946			
LUC 210 AM: Ln(T) = 0.91 Ln(X) + 0.12 PM: Ln(T) = 0.94 Ln(X) + 0.27											

TABLE 4.14: RESIDENTIAL LANDS TRIP GENERATION -**MAXIMUM YIELD**

LUC 215 | AM: T = 0.52(X) - 5.70 | PM: T = 0.60(X) - 3.93

LUC 220 | AM: T = 0.31(X) + 22.85 | PM: T = 0.43(X) + 20.55

The traffic volumes for the residential lands were assigned to the study area road network based on the same trip distribution previously used for the residential lands, summarized in Table 4.4.

Appendix D contains the traffic volumes for the Maximum Yield Scenario of the potential development of the Residential Lands adjacent to the subject school site during the AM and PM peak hours.

4.7.2 2038 Maximum Yield Scenario Total Traffic Conditions

The 2038 total traffic volumes have been updated to include development traffic corresponding to 1,500 dwelling units of residential



development along with traffic generated by the school site, other area developments, and 100% development of the commercial lands.

Figure 4.10a and Figure 4.10b illustrate the 2038 total traffic volumes.

The 2038 total traffic volumes have been analyzed using the same methodology as under existing traffic conditions. Signal timings have not been optimized.

Table 4.15a and **Table 4.15b** summarize the results of the 2038 total traffic operations during the AM and PM peak hours. The results indicate that the study area intersections are forecast to operate at similar levels of service as under 2038 total traffic conditions under the original development scenario summarized in **Section 4.6.2**, with the following additional critical movements:

- ▶ 28th Avenue and 16th Street
 - The northbound shared through/right-turn movement is forecast to operate at LOS D with a v/c ratio of 0.92 during the PM peak hour.
- 28th Avenue and Future Road (South)
 - The eastbound movement is forecast to operate at LOS F with a v/c ratio greater than 1.00 during the PM peak hour.

The Site Driveway intersections on the future road (north) are noted to operate at satisfactory levels of service (LOS A/B) under 2038 total traffic conditions.

Appendix K contains the supporting detailed Synchro 11 reports.





2038 Total Traffic Volumes Maximum Yield Scenario AM Peak Hour



Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 4.10a



2038 Total Traffic Volumes Maximum Yield Scenario PM Peak Hour



Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Figure 4.10b

TABLE 4.15A: 2038 TOTAL TRAFFIC OPERATIONS - AM PEAK HOUR

7				Direction/Movement/Approach																
erio					Eastb	ound			Westk	ound			North	bound			South	bound	1	
Analysis Po	Intersection	Control Type	MOE	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	^ ^ ^ ^	A 0		A 0 0.00 0		A 0			B 10 0.04 1	В 10					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 20 0.13 2 70 68	C 22 0.42 8 -	B 20 0.16 2 70 68	C 21	C 22 0.75 8 120 112	B 15 0.50 3 -	v v v v v v	B 19	C 26 0.59 8 55 47	C 23 0.73 10 -	~ ~ ~ ~ ~ ~	C 24	C 29 0.25 3 55 52	B 17 0.40 4 -	v v v v v	B 19	C 21
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	F 489 1.63 58 -		B 12 0.21 6 -	F 186					B 12 0.44 17 40 23	A 0 0.00 0 -		A 5		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
eak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	F 315 1.57 169		B 11 0.03 1	F 302					v v v v	A 8 0.01 0		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
AMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	F 100 1.07 102 -		A 10 0.05 2 20 18	F 92					~ ~ ~ ~ ~ ~	A 8 0.07 2 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	v v v v	A 8 0.05 1		A 1		A 0 0.00 0	~ ^ ^ ^	4 0					C 21 0.56 25		^ ^ ^ ^	C 21	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	v v v v	A 8 0.11 3		A 2	A 9 0.06 2		~ ~ ~ ~	A 9					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	~ ~ ~ ~	A 8 0.06 2		A 1	A 9 0.12 3		~ ~ ~ ~	A 9					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m)

Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</>< - Shared with through movement



TABLE 4.15B: 2038 TOTAL TRAFFIC OPERATIONS - PM PEAK HOUR

σ				Direction/Movement/Approach																
erio					Eastb	ound			Westk	ound		I	Northl	bound	I		South	bound	I	
Analysis P	Intersection	Control Type	MOE	tteft	Through	Right	Approach	tteft	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Overall
	Future Road & 16th Street	TWSC	LOS Delay V/C Q		A 0 0.00 0	^ ^ ^ ^	A 0		A 0 0.00 0		A 0			C 17 0.36 12	C 17					
	28th Avenue & 16th Street	TCS	LOS Delay V/C Q Stor. Avail.	B 18 0.11 2 70 68	C 27 0.76 29 -	B 20 0.34 8 70 62	C 24	B 18 0.59 4 120 116	B 14 0.41 6 -	~ ~ ~ ~ ~ ~	В 16	D 44 0.69 17 55 38	D 48 0.92 47 - -	~ ~ ~ ~ ~ ~	D 47	D 45 0.46 6 55 49	C 25 0.63 22 - -	~ ~ ~ ~ ~ ~	C 28	C 29
	28th Avenue & Future Road (North)	TWSC	LOS Delay V/C Q Stor. Avail.	F 230 1.22 65 - -		E 38 0.80 56 - -	F 88					B 10 0.19 5 40 35	A 0 0.00 0 -		A 2		A 0 0.00 0 -	A 0.00 0 15 15	A 0	
eak Hour	28th Avenue & Future Road (South)	TWSC	LOS Delay V/C Q	F 237 1.34 103		B 15 0.03 1	F 228					v v v v	B 10 0.02 1		A 0		A 0 0.00 0	~ ~ ~ ~	A 0	
PMF	28th Avenue & 8th Street	TWSC	LOS Delay V/C Q Stor. Avail.	E 42 0.82 56 -		B 11 0.11 3 20 17	E 37					~ ~ ~ ~ ~ ~	A 8 0.04 1 -		A 2		A 0 0.00 0 -	~ ~ ~ ~ ~ ~	A 0	
	8th Street & Future Road	TWSC	LOS Delay V/C Q	v v v v	A 9 0.13 4		A 3		A 0 0.00 0	v v v v	A 0					C 25 0.49 19		v v v v	C 25	
	Driveway A & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	v v v v	A 8 0.08 2		A 4	B 10 0.14 4		~ ~ ~ ~	В 10					
	Driveway B & Future Road (North)	TWSC	LOS Delay V/C Q		A 0 0.00 0	~ ~ ~ ~	A 0	~ ~ ~ ~	A 8 0.04 1		A 2	B 12 0.23 7		~ ~ ~ ~	B 12					

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds V/C - Volume to Capacity Ratio Q - 95th Percentile Queue Length (m) Stor. - Existing Storage (m) Avail. - Available Storage (m) TCS - Traffic Control Signal TWSC - Two-Way Stop Control

</> - Shared with through movement



4.7.3 2038 Maximum Yield Scenario Queueing Analysis

In addition to the Synchro 11 analysis, queue length analysis for the 2038 total traffic conditions were carried out at the intersection of 28th Avenue and 16th Street under the maximum yield scenario.

The queue analysis has been conducted using the same methodology as under existing traffic conditions.

Table 4.16a and **Table 4.16b** summarize the results of the queue length analysis for 2038 total traffic conditions under the maximum yield scenario. The results indicate that the following queue lengths are projected to exceed the existing storages:

- the northbound left-turn movement queue length is projected to reach 82.5 metres, exceeding the existing storage of 55 metres; and
- the eastbound right-turn movement is projected to reach 81 metres, exceeding the available storage of 70 metres.

It is also noted that according to the MTO queue length method, the northbound through/right-turn queue length is projected to reach 150 metres under the maximum yield scenario of the 2038 total traffic conditions. The queue length is not projected to reach the future east-west roadway on 28th Avenue approximately 237 metres south of 16th Street.



TABLE 4.16A:2038 MAXIMUM YIELD SCENARIO THROUGH AND LEFT-TURN QUEUE
ANALYSIS

Intersection	Horizon	Lano	# of	Cycle Le	ength (s)	Volume	es (vph)	m may	Calc'd Length	Existing
Intersection	HUHZUH	Laite	Lanes	AM	PM	AM	PM	m _u max	per Lane (m)	Storage (m)
		NBL	1			228	160	6.3	82.5	55
		NBTR	# of Lanes Cycle Length (s) V/c 1 AM PM AM 1 44 58 58 1 100 100 25 1 100 100 44 1 36 36 1 40 40	448	501	13.9	150.0	-		
		SBL	1			58	53	1.6	30.0	55
28th Avenue &	2029 Total	SBTR	1	100	100	255	382	10.6	120.0	-
16th Street	2036 1018	EBL	1	100	100	44	49	1.4	30.0	70
		EBT	1			207	507	14.1	157.5	-
		WBL	1			369	184	10.3	120.0	120
		WBTR	1			401	369	11.1	127.5	-

TABLE 4.16B: 2038 MAXIMUM YIELD SCENARIO RIGHT-TURN QUEUE ANALYSIS

Intersection	Horizon	Movement	Cycle Le	ength (s)	Right Turn \	/olume (vph)	Average Arriv	val Rate (vpc)	Calc'd Le	ength (m)	Existing
intersection	Horizon	wovement	AM	PM	AM	PM	AM	PM	AM	PM	Storage (m)
28th Avenue & 16th Street	2038 Total	EBR	100	100	67	193	1.9	5.4	28.5	81.0	70



5 Study Area Intersections and Road Classification

The results of the intersection operational analyses under different future traffic conditions are summarized in **Section 4**. The implications of the results for the study area road system and intersections are summarized in this section.

5.1 16th Street (Highway 26) & 28th Avenue (Grey County Road 5) Intersection

The above intersection is under MTO's jurisdiction and operates under traffic signal control. MTO's Access Management Policy requires a minimum separation distance of 400 metres from this intersection to any new road connection or intersection on either 28th Avenue or 16th Street.

The future Local Road connection north of the School Site, at an allmoves T-intersection, on 28th Avenue is to be located at approximately 237 metres south of the intersection. A second Local Road connection at a restricted RIRO intersection on 16th Street is to be located at approximately 300 metres west of the intersection.

The above intersection distances are based on the locations of property appropriate for development and existing physical constraints. The road system is also part of land use changes and corresponding access requirements.

The TIS provides operational justification for the future intersection locations based on the results in **Section 4**.

Northbound Approach Lane:

The existing northbound left-turn lane on 28th Avenue has a storage length of 55 metres and a taper length of 140 metres, thus extending for a total distance of 195 metres south of the intersection.

The proposed new intersection is located at 237 metres south of the intersection, 42 metres outside the end of the taper.

The projected maximum northbound 95th percentile queue length in Synchro analysis is 17 metres (well within existing the storage of 55 metres), during the PM peak hour under 2038 total traffic conditions corresponding to the maximum yield of 1,500 dwelling units on the residential lands. The corresponding through/right-turn queue length is



47 metres, which would be 190 metres clear of the future Local Road intersection on 28th Avenue.

The queue length estimates based on the MTO methodology are 52.5 metres and 127.5 metres for the left-turn lane and the through/right-turn lane, respectively, under 2038 total traffic conditions. The projected queue lengths are respectively within the existing left-turn lane storage and clear of the separation of the new local road intersection.

It is noted that in the maximum yield scenario assuming 1,500 dwelling units for residential development, the queue length for the northbound left-turn lane is projected to be 82.5 metres under MTO queue length methodology. This would exceed the existing storage of 55 metres.

The northbound through/right-turn queuing is projected to be 150 metres and would be clear of the location of the new local road (north) intersection on 28th Avenue.

It should be noted that the projected queue length of 82.5 metres for the northbound left-turn movement exceeding the existing storage of 55 metres, corresponds to a maximum yield scenario of 1,500 units, which may or not be reached and likely would not be reached until long after 2038. At the same time the distance of 237 metres to the new local road (north) intersection provides sufficient space to extend the northbound lane storage and taper to accommodate future increases in traffic volumes.

Southbound Discharge Lane

As noted, a southbound right-turn lane is to be implemented at the new Local Road intersection (north) on 28th Avenue. The lane will have a storage length of 15 metres and a taper length of 70 metres, for a total length of 85 metres which would be 152 metres clear of the intersection to the north.

Eastbound Approach Lane

The RIRO intersection for the new Local Road on 16th Street is to be located at approximately 300 metres west of 28th Avenue.

The projected maximum eastbound left-turn and eastbound right-turn 95th percentile queue lengths are two metres and eight metres, respectively (well within existing the storage lengths of 70 metres each), during the PM peak hour under 2038 total traffic conditions corresponding to the maximum yield of 1,500 dwelling units on the residential lands. The corresponding queue length for the through



movement is 29 metres, which would be 269 metres clear of the future Local Road RIRO intersection on 16th Street.

The queue lengths based on the MTO methodology are 30 metres, 157.5 metres, and 81 metres for the eastbound left turn, through, and right-turn movements, respectively, all of which are well within the separation distance of 300 metres to the new RIRO intersection.

The above queue length projections indicate that the proposed Local Road (North) intersections on 28th Avenue and on 16th Street are adequately separated from the intersection of 16th Street and 28th Avenue.

5.2 Future Intersection of 28th Avenue and Local Road (North)

As noted in **Section 4.3.1**, the new Local Road intersection on 28th Avenue abutting the School Site will include northbound left-turn and southbound right-turn lanes with 40 metres and 15 metres of storage lengths, respectively. In addition, the eastbound approach lane will include separate left-turn and right-turn lanes.

For the northbound left-turn lane, the storage requirements under future traffic conditions were assessed using the Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads¹¹, and based on the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 10-20 kilometres per hour over the posted speed limit. The corresponding storage lengths are:

- ▶ 2028 Total Traffic Conditions: 15 metres;
- ▶ 2033 Total Traffic Conditions: 40 metres; and
- ▶ 2038 Total Traffic Conditions: 80 metres.

We recommend that a northbound left-turn lane with 40 metres of storage be included as part of the road modifications for the school opening in 2028. It would be appropriate to reassess the need for extending the storage length in conjunction with the full development of the residential lands to the south.

Appendix L includes left-turn lane nomographs.

¹¹ *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*, June 2017.



5.2.1 Southbound Right-Turn Lane

Exclusive right-turn lanes are generally considered for implementation when the volume of the right-turning vehicles is between 10-20 percent¹² of the through volumes, subject to a minimum of 60 vehicles per hour in the design hour or when turning traffic creates a hazard.

The projected AM/PM peak hour southbound right-turn volumes for the 2028 (school opening year) total traffic conditions, are respectively, 76 vph and 46 vph, respectively. These volumes are higher than the 10% threshold and increase under future traffic conditions.

Based on the above projection, it would be appropriate to include a southbound right-turn lane with 15 metres of storage and 70-metre taper at the new intersection from 2028.

5.2.2 Eastbound Left-Turn Lane and Right-Turn Lane

As noted, separate left-turn and right-turn lanes should be provided for the eastbound approach at the T-intersection of the new Local Road at 28th Avenue (north). The left-turn lane could have a storage of 40 metres and a taper length of 70 metres that would extend to a point between the two driveways to the school site.

5.2.3 Sight Distances

Available sight distances for the Future Road (North) at 28th Avenue were measured during a field visit on 15 November 2023 and are compared with sight distance requirements identified in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads¹³ (GDGCR).

It is noted that the measurements were taken from a location on the west side of 28th Avenue 315 metres south of 16th Street, where the school access on 28th Avenue was to be located. The location of the proposed Future Road (North) to 28th Avenue is 237 metres south of 16th Street.

Stopping and Decision Sight Distance requirements were reviewed for a vehicular speed of 100 km/h, 20 km/h higher than the posted speed limit of 80 km/h.

¹³ Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*, June 2017.



¹² Transportation Research Board, National Research Council, Highway Capacity Manual, Special Report 209, Third Edition, Washington, 1998.

Table 5.1 summarizes the sight distance measurements and requirements at the Future Road (North) on 28th Avenue.

The left-turn and right-turn from stop decision sight distances from the Future Road (North) to 28th Avenue satisfy the corresponding TAC requirements. It is also noted that the stopping sight distance from the south on 28th Avenue approaching the Future Road (North) satisfies the requirement; however, the stopping sight distance from the north fails to satisfy the minimum requirement.

It is noted that the location of the Future Road (North) on 28th Avenue is expected to have more optimal available sight distances given its location in relation to the vertical curve to the north along 28th Avenue. This will be confirmed as part of the design of the future intersection.



TABLE 5.1: FUTURE ROAD (NORTH) SIGHT DISTANCE ASSESSMENT

	De	cision Sigh	t Distance	(m)	Stopp	ing Sight
Intersection	Left-	Turn	Right	-Turn	Dista Required	nce (m)
	Required	Measured	Required	Measured	Required	Measured
28th Avenue and Future Road (North)	210	215	185	185	185	162 (north) 215 (south)



5.3 Site Driveways

The need for an auxiliary westbound left-turn turning lane on the future east-west local roadway at the school site driveways, based on the same requirements and guidelines identified in **Section 5.2.1**.

Based on the above criteria, westbound left-turn lanes on the Future Road (North) at Site Driveway A and Site Driveway B are not warranted under 2038 total traffic conditions.

Appendix L includes the warrant nomographs.

5.4 OTM Signal Warrant

The requirement for traffic signal control at the future intersections of (1) 28th Avenue and the Future Road (North) and (2) 28th Avenue and 8th Street were assessed using the Ontario Traffic Manual (OTM) signal warrant guidelines¹⁴.

The assessments were undertaken under 2038 total traffic conditions, under both development scenarios for the residential lands south of the subject school site.

Based on the warrant analysis, traffic signal control is not warranted under either analysis scenario of the 2038 forecast total traffic conditions at the intersection of 28th Avenue and the Future Road (North) or at 28th Avenue and 8th Street.

Appendix M contains the warrant analysis worksheets.

5.5 28th Avenue Classification and Right-of-Way

28th Avenue is currently classified as a Minor Arterial Road and has a two-lane rural cross-section. Its classification status and potential widening requirement have been reviewed based on the future total traffic volumes projected for the roadway.

5.5.1 Minor Arterial Road

The existing PM peak hour traffic volumes correspond to AADT volumes below 4,000 vehicles per day on 28th Avenue between 8th Street and 16th Street and exceeding 2,000 vehicles per day north of 16th Street and south of 8th Street.

The projected traffic volumes for the 2038 Horizon Year correspond AADT volumes below 10,000 (9,500) vehicles per day on 28th Avenue



¹⁴ Ontario Traffic Manual, Book 12: Traffic Signals.

between 8th Street and 16th Street, below 6,000 vehicles per day north of 16th Street, and exceeding 4,000 vehicles per day south of 8th Street.

However, the AADT projections indicate a maximum 12,500 vpd for the 2038 Horizon Year corresponding to a maximum residential yield of 1,500 dwelling units on the Adjacent Lands to the south.

The projected AADT volumes on 28th Avenue are within the range of 5,000 vehicles per day to 20,000 vehicles per day for Minor Arterial Roads¹⁵. They are also less than the lower threshold of 10,000 vehicles per day for Major Arterial roads, except under maximum yield residential development scenario.

Based on the above projections of future traffic volumes including the maximum yield residential development scenario, it would be appropriate for 28th Avenue (Grey County Road 5) to remain classified as a Minor Arterial Road.

The intersection spacing for the intersections of the two future local roads on 28th Avenue, between 16th Street and 8th Street exceeds the minimum requirement of 200 metres for Minor Arterial Roads.

The current posted speed limits on 28th Avenue are 80 km/h to the north of 8th Street, and 60 km/h to the south of 8th Street. With the proposed development of the New School on 28th Avenue, it would be appropriate have a consistent posted speed limit of 60 km/h north and south of 8th Street.

5.5.2 Road Right-of-Way

The AADT projections are based on two-way traffic volumes during the PM peak hour. The maximum peak directional volume projected for either peak hour is 687 vph, in the southbound direction for the PM peak hour, just north of the school site.

As the maximum peak hour, peak directional volume is within the single lane capacity of a minor arterial roadway, the widening of 28th Avenue will not be required to accommodate the land use projections assessed in this study. However, it is appropriate to protect Right-of-Way for future improvements and accommodate the 5.0-metre widening requirement along the school site frontage.

¹⁵ Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*, Table 2.6.4: Characteristics of Urban Roads, June 2017.



5.6 Active Transportation

As noted, the transport of school students will primarily be undertaken by school buses. The existing road system is generally based on rural cross-sections with minimal active transportation infrastructure. However, given the potential future development of the Adjacent Lands, it would be appropriate to include sidewalks and bicycle lanes as appropriate as part of road reconstruction and new road construction.



6 Conclusions and Recommendations

6.1 Conclusions

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

- Existing Traffic Conditions: The study area intersections are operating at acceptable levels of service, and with no problem movements.
- Development Trip Generation: The school development is forecast to generate 408 equivalent vehicle trips (that include 54 school bus trips) during both the AM and PM peak hours.
- 2028 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2028 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.

The Site Driveway intersections on the Future Road (North) are forecast to operate at LOS A during the AM and PM peak hours.

- 2033 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2033 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.

The School Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

- 2038 Background Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service.
- 2038 Total Traffic Conditions: The study area intersections are forecast to operate at acceptable levels of service with a few critical movements.

The School Driveway intersections on the Future Road (North) are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

2038 Total Traffic Conditions: Maximum Yield Scenario: The study area intersections are forecast to operate at similar levels of service as under 2038 total traffic conditions under the original development scenario summarized above, with some additional critical movements:



The Site Driveway intersections on the future road are noted to operate at satisfactory levels of service (LOS A/B) under 2038 total traffic conditions under the additional scenario.

Highway 26 (16th Street) and Grey County Road 5 (28th Avenue) Intersection: This intersection is under MTO's jurisdiction and operates under traffic signal control. MTO's Access Management Policy requires a minimum separation distance of 400 metres from this intersection to any new road connection or intersection on either 28th Avenue or 16th Street.

The future Local Road connection north of the School Site, at an all-moves T-intersection, on 28th Avenue is to be located at approximately 237 metres south of the intersection. A second Local Road connection at a restricted RIRO intersection on 16th Street is to be located at approximately 300 metres west of the intersection.

The above intersection separation distances are based on the locations of property appropriate for development and existing physical constraints. The road system is also part of land use changes and corresponding access requirements.

The intersection operational and queuing analyses indicate acceptable levels of service and adequate separation distances to accommodate queuing, under future traffic conditions for all three horizon years and the respective land use scenarios.

Grey County Road 5 (28th Avenue) Classification and Rightof-Way: Based on traffic projections for the 2038 Horizon Year, the roadway could remain as a Minor Arterial Road, as currently classified. The posted speed limit on 28th Avenue to the north of 8th Street could be reduced to 60 km/h, which would be same as the posted speed limit to the south of 8th Street. Although, no road widening is identified as required, the Right-of-Way for future improvements should be protected including the fivemetre-wide land dedication along the frontage of the school site.

6.2 **Recommendations**

Based on the findings and conclusions of this study, it is recommended that the Site Plan for the proposed New School on 28th Avenue be considered for approval, along with the construction of the new east-west local road abutting the school site as identified herein.



Appendix A

Terms of Reference





Bruce-Grey Catholic District School Board New School at 16th Street and 28th Avenue, Owen Sound Terms of Reference for Transportation Impact Assessment

Paradigm Transportation Solutions Limited

2024-04 230607







5A-150 Pinebush Road Cambridge ON N1R 8J8 p: 519.896.3163 905.381.2229 416.479.9684

www.ptsl.com

2024-04-10 Project: 230607

RE: BRUCE-GREY CATHOLIC DISTRICT SCHOOL BOARD – NEW SCHOOL AT 16TH STREET & 28TH AVENUE, OWEN SOUND: TERMS OF REFERENCE FOR TRANSPORTATION IMPACT STUDY

The Bruce-Grey Catholic District School Board is undertaking the development of a New Secondary School, located at 16th Street and 28th Avenue, in the City of Owen Sound. **Paradigm Transportation Solutions Limited** (Paradigm) has been retained by the School Board to prepare the Transportation Impact Study (TIS) for the New School. As part of the preconsultation process for Planning Act approvals, Paradigm has prepared the following Terms of Reference (TOR) for the TIS, incorporating comments and input provided by the City of Owen Sound, the County of Grey, and the Ministry of Transportation Ontario (MTO).

Background

The proposed New Secondary School is to be located on the west side of 28th Avenue East, approximately 237 metres south of 16th Street. The school site is 20 acres in area, with a frontage of approximately 160 metres on 28th Avenue East, and a depth of approximately 518 metres. The north boundary of the site will abut a Proposed Future Road, comprising an east-west portion that will connect to 28th Avenue East at an all-moves T-intersection, and a north-south portion that will connect to 16th Street at a restricted Right-in-Right-out intersection, approximately 298 metres west of 28th Avenue.

A corresponding future road alignment is proposed for the area south of the school site and comprising an east-west portion and north-south portion respectively connecting to 28th Avenue East and 8th Street at two all-moves T-intersections.

Figure 1 (attached) illustrates the location of the proposed School Site and the surrounding road system including the proposed future roads.

The Site Plan for the school indicates a two-storey building (7,500 m², footprint accommodating 12,634 m² GFA) located at the easterly end along 28th Avenue East; and an Athletic Field located to the west of the School Building. Two separated driveways are identified on the proposed future road for entrance and exit, along with a Fire Route, Bus Drop Off location, and a Parking Layout of 150 spaces. The easterly driveway is located approximately 50 metres from the east property line, and the two driveways are separated by 80 metres.

The school will accommodate 1,012 students and 90-95 staff including teachers and custodians.

The new school is expected to be completed and be operational by 2028.

Figure 2 (attached) shows the Preliminary Site Plan for the school.

The lands are currently zoned 'Rural' (RUR) and 'Hazard Lands' (ZH), and a Zoning By-law Amendment (ZBA) is required to permit the school use. A transportation impact study is identified among the supporting studies required as part of a complete Application for Planning Act approvals.

The City's Pre-Consultation Response indicates the requirement for Terms of Reference for supporting studies, including the TIS, to be reviewed and approved as appropriate, by the City of Owen Sound, the County of Grey, the Ministry of Transportation Ontario (MTO), and the Grey Sauble Conservation Authority.

Paradigm has prepared the Terms of Reference for the Transportation Impact Study based on the requirements identified in the Pre-Consultation Response and its Enclosures, viz.,

- Schedule A: Issue Summary and Completeness Requirements
 - Section A City of Owen Sound Official Plan Requirements
 - Section H City's Engineering Services Decision Comments
 - Section J MTO Comments
 - Section K County of Grey Transportation Services Comments
- Schedule B: Agency Comments
- Schedule C: Property Summary

In addition, and as noted above, the Terms of Reference outlined below incorporate the comments and input provided by City of Owen Sound, the County of Grey, and the Ministry of Transportation Ontario (MTO).

Terms of Reference

Issues and Requirements

The following summarizes the Study Area Road System, issues and requirements pertaining to the transportation impact assessment for the New School.

- Study Area Road System: As shown in Figure 1, the Study Area Road System includes the following existing and new roads:
 - 16th Street East (Highway 26) is an east-west roadway, which is identified as Provincial Highway to the east of 28th Avenue, and a Connecting Link to the west. The signalized intersection at 28th Avenue is under Provincial jurisdiction.



- 28th Avenue East is a north-south roadway and is designated as a Minor Arterial/County Highway under the jurisdiction of Grey County as Grey Road 5.
- 8th Street East is a continuation of Grey Road 5, on an east-west alignment to the west of the 28th Avenue East that extends south.
- The Proposed Future Roads are being considered as municipal Local Roads of the City Owen Sound connecting 16th Street East and 28th Avenue within the southwest quadrant of their intersection, and 8th Street East and 28th Avenue within the northwest quadrant of their intersection.
- The westerly boundary of the Study Area is located along the existing Grey County CP Rail Trail.
- MTO Requirements:
 - In accordance with MTO's Access Management Policy a public road/intersection must be located a minimum of 400m down a County or Municipal/Township Road from an existing highway intersection. The current proposal for a new public road/intersection 237m south of the existing intersection of Highway 26 (16th Street East) and 28th Avenue East does not meet MTO's requirements for access management. However, MTO will review a TIS prepared in support of the proposed arrangement and determine whether the proposal is acceptable.
- The County of Grey Comments & Requirements:
 - <u>28th Avenue Road Classification & Intersection Spacing</u>: 28th Avenue is currently classified as a Minor Arterial roadway; however, future traffic increases could potentially require the road to be classified as a Major Arterial road. This would have implications for intersection spacing for future connections to 28th Avenue. The TIS should assess the potential for reclassifying 28th Avenue based on future traffic projections and make recommendations, including the appropriateness of intersection spacing.
 - <u>Road Widening</u>: 5-metre severance off the frontage to Grey Road 28 for road widening purposes for future development/road upgrades.
 - <u>Vehicular access</u>: Access arrangement must provide for: 60 metre separation between school entrance and exit access points; adequate sight distances for safe driveway operations; and assessment of Auxiliary Left-lane requirement.
- Parking: Onsite parking must meet the requirements of the City's Zoning By-law, AODA, and Site Development and Engineering Standards. Barrier-free parking stalls must satisfy the City's design and signage requirements.
- <u>Active Transportation</u>: Pedestrian walkways, sidewalks, and connections to City Streets should be addressed in the Site Plan, as appropriate.
- Public Transit: There are no City transit stops or routes in close proximity to this site. The Core route is available on 16th Avenue East. Opportunities for transit access will be addressed through the Transportation Plan.



- Transportation Plan (TP): is required to ensure pedestrian access and compatibility with sidewalks, transit routes, bicycle routes, and multi-use trails. The TP must demonstrate regard for the goals and intent of the:
 - City's Official Plan (2021)
 - Transportation Master Plan (2010)
 - Trails Master Plan (2012)
 - Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, c. 11
- Transportation Impact Study (TIS) Requirements:
 - Study Area will include Highway 26 (16th Street E), Grey Road 5 (28th Avenue E), and Grey Road 5 (8th Street E).
 - Study Area Intersections will include (see Figure 1):
 - Highway 26 (16th Street E) and Grey Road 5 (28th Avenue E)
 - Grey Road 5 (28th Avenue E) and Grey Road 5 (8th Street E)
 - Proposed Future Road and 28th Avenue East (All Moves T intersection)
 - Proposed Future Road and 16th Street (RIRO T intersection)
 - School Access Points on the Proposed Future Road (with need assessment for left-turn lane)
 - Future local road intersections on 28th Avenue E and on 8th Street E to the south of the school site.
 - Analysis Periods: Weekday AM/PM peak hours
 - Horizon Years: Opening Year (2028); Five years after opening (2033); Ten years after opening (2038).
 - Future Background Traffic:
 - Confirm Background Traffic Growth Rate (1%/2%)
 - o Identify Other Area Developments for Background Development Traffic

Additional Information

The following additional information pertaining to school transportation and other area developments has been obtained since the circulation of the draft TOR. The information will be used in the preparation of the TIS.

School Transportation:

As noted, the school will accommodate 1,012 students and 90-95 staff members. The operating hours will be between 8:00 AM and 4:00 on weekdays, with in-class hours between 9:00 AM and 3:30 PM.

All of the students are expected to be transported by bus, with 27 buses taking students from home to school in the morning and 27 buses doing the return trip in the afternoon.

Based on the school catchment area, 20 of the 27 buses are expected to be arriving/leaving from/to north on 28th Avenue, and seven of them arriving/leaving from/to south on 28th Avenue.



The approximately 100 staff members are expected to use private cars with the same direction of travel as the school buses.

There would likely be morning drop-off and afternoon pick-up of students using their private vehicles. A conservatively high proportion of 10% will be used, in trip generation estimates, for student drop-off/pick-up using private vehicles.

The student/staff arrivals in the morning would likely be during the AM peak for road traffic; however, the afternoon departures from the school are likely to precede the PM peak hour for road traffic.

For this reason, in addition to the analysis of intersection operations during AM/PM peak hours for road traffic, the TIS will also include analysis during the school traffic peak hour (3:00 to 4:00) in the afternoon.

Other Area Developments:

As illustrated in **Figure 3**, three other area developments located along 16t Street East have been identified for inclusion in estimating future background road traffic volumes. Independent transportation impact studies have been completed for each of the three developments and the trip generation estimates from these studies will be used in the subject TIS for estimating background road traffic volumes.

All three developments will be assumed to be in place by 2028, the assumed School Opening Year, for the purpose future horizon year traffic analysis.

Figure 3 also illustrates two areas identified for potential future developments. The first area is to the north of the new school site and is slated to be developed for commercial uses, and the second area is to the south of the school site and is planned to accommodate residential uses.

Based on information provided by the City of Owen Sound, the following land use statistics will be used for estimating future development traffic from these lands:

- ▶ Commercial Development (North): 37,200 m² GFA.
- Residential Development (South): 500 units low density housing, and 200 units medium/high density housing.

Trip generation will be estimated as part of the subject TIS and will be based on ITE trip rates corresponding to appropriate land use classification.

The development of the two areas will be in the future and they are not part of any current planning approval process. For the purpose of impact assessment under future traffic conditions, the following timelines will be assumed in the subject TIS:

- ▶ 2028 No development on the above two lands.
- ▶ 2033 50% of both commercial and residential developments.



▶ 2038 – 100% of both commercial and residential developments.

Future Road Connections:

As noted, the proposed future local roads (north and south of the school site) will provide access connections for future commercial and residential developments in the two areas.

For the purposes of impact assessment, only the east-west portion of the local road system to the north will be assumed to be in place by 2028. As noted, the school access points are located on this roadway section.

All sections of the future road system, north and south of the school site, will be assumed to be in place by 2033.

TIS Framework

The TIS study will be based on the TOR and undertaken in conformance with:

- Ministry of Transportation TIS Guidelines¹
- Ontario Traffic Manual (OTM) Signal Warrants Justification 7²
- OTM Pedestrian Crossing Treatments Book 15³
- ▶ Transportation Association of Canada (TAC) Canadian Roundabout Design Guide⁴
- ▶ TIS Work Plan

TIS Work Plan

- Confirm Terms of Reference & Scope of Work: Circulate TOR for review, input and approval by the City of Owen Sound, County of Grey, and Ministry of Transportation.
- Background Review & Data Collection:
 - Confirm Background Traffic Growth Rate
 - Identify Other Area Development for Background Traffic
 - Conduct new Intersection Traffic Counts (2)
 - Obtain Signal Timing Plans
 - Site visit to review road conditions and sight distance assessment
- **New School Information:** Obtain/confirm information on

⁴ Transportation Association of Canada, *Canadian Roundabout Design Guide*, (Ottawa: TAC, 2017).



¹ Ministry of Transportation Ontario, *General Guidelines for the Preparation of Traffic Impact Studies*, 2023.

² Ontario Ministry of Transportation, *Ontario Traffic Manual Book 12: Traffic Signals*, (Toronto: Queen's Printer for Ontario, 2012).

³ Ontario Ministry of Transportation, *Ontario Traffic Manual Book 15: Pedestrian Crossing Treatments*, (Toronto: Queen's Printer for Ontario, 2016).

- Site Statistics: Building GFA & Parking Supply
- School Statistics: Number of Students / Staff / Hours
- School Transport: School Catchment & Anticipated School Bus Traffic; North/South directional split on 28th Avenue
- Site Plan: Access Locations / Internal Roadways / Parking
- Anticipated Opening Year
- Note: Information on school statistics is now available and is summarized above in this TOR.
- New School Traffic Estimates: New School Traffic Volumes for AM/PM peak hours will be based on:
 - <u>Trip Generation</u>: Will be based on information provided by BGCDSB. ITE Trip Rates (Trip Generation Manual, 11th Edition) will be used for comparative assessment.
 - <u>Trip Distribution:</u> Based on road traffic distribution & School Catchment Area location.
 - <u>Modal Share:</u> No non-auto modal share will be assumed except for School Bus Share.
- Traffic Analysis: Intersection operational analysis at the Study Area intersections will be undertaken using Synchro software and applying MTO methodology for queuing analysis, for the following traffic conditions:
 - Base Year/Existing (2024) based on 2024 traffic counts
 - Future Traffic Conditions Opening Year (2028), Five-Year Horizon (2033) & Ten-Year Horizon (2038), for:
 - Background Traffic Conditions including background road traffic & other area development traffic volumes; and
 - Total Traffic Conditions with new School Traffic added to Future Background Traffic.
- ► **Traffic Impact Assessment:** Based on the results of the analysis, which will include Volume-to-capacity (v/c) ratios, Level of Service (LOS) and Queuing, the TIS will identify any operational deficiencies, the net impact of the proposed school on the study area road system, and feasible remedial measures if required.
- Proposed Future Road & 28th Avenue: Review the implications of the Proposed Future Road intersection at 28th Avenue to confirm that the new intersection will not affect intersection operations at the existing signalized intersection at 28th Avenue and 16th Street, based on the following:
 - operational analysis for the 16th Street / Highway 26 intersection;
 - operational analysis for the new intersection on 28th Avenue East; and
 - sight distance requirements for the new intersection on 28th Avenue East.



- Access Review: Review of the school access locations on the Future Road:
 - results of operation analysis;
 - sight distance assessment; and
 - inbound left-turn lane assessment.
- Input to Transportation Plan: Based on the TIS results and findings, provide input the preparation of the Transportation Plan, for active transportation infrastructure and facilities, and future transit connections.

Transportation Impact Study Report

We will document the study methodologies, findings and conclusions in a draft report for review by the City of Owen Sound, the County of Grey, and the Ministry of Transportation. The final report will incorporate review comments and changes therefrom. The final report will include appendices containing the detailed analysis results and any data collected.

We are pleased to submit the above Terms of Reference for review and input from the Township of City of Owen Sound, the County of Grey, and the Ministry of Transportation.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Rajan Philips M.SC, P.Eng. Senior Transportation Consultant


Attachments







Location of Subject Site

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS TOR 230607

Figure 1



NEW SECONDARY SCHOOL	PRELIMINARY SITE PLAN	23025 2024-01-25 SRM7
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Preliminary Site Plan

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS TOR 230607

Figure 2





Other Area Development Locations

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS TOR 230607

Figure 3

Appendix B

Existing Traffic Data





Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 1

Turning Movement Data

	1		8th Street		1	i un	ing wo		Julu	1			28th Avonuo			l
			Sur Sueer					2011 Avenue					2011 Avenue			
Start Time	Left	Right	LI-Turp	Pode	App. Total	l oft	Thru		Pode	App. Total	Thru	Right	LL-Turp	Pade	App. Total	Int Total
7.00 AM	15	4	0	0	19	4	9	0	0	13	7	11	0	0	18	50
7:15 AM	12	2	0	0	14	8	10	0	0	18	8	15	0	0	23	55
7:30 AM	10	2	0	0	12	6	13	0	0	19	7	31	0	0	38	69
7:45 AM	8	5	0	0	13	24	27	0	0	51	11	40	0	0	51	115
Hourly Total	45	13	0	0	58	42	59	0	0	101	33	97	0	0	130	289
8:00 AM	13	4	0	0	17	14	19	0	0	33	7	34	0	0	41	91
8:15 AM	14	3	0	0	17	22	17	0	0	39	13	28	0	0	41	97
8:30 AM	10	5	0	0	15	18	12	0	0	30	11	41	0	0	52	97
8:45 AM	8	2	0	0	10	12	24	0	0	36	12	27	0	0	39	85
Hourly Total	45	14	0	0	59	66	72	0	0	138	43	130	0	0	173	370
9:00 AM	9	3	0	0	12	5	13	0	0	18	13	22	0	0	35	65
9:15 AM	7	3	0	0	10	4	8	0	0	12	12	18	0	0	30	52
9:30 AM	15	5	0	0	20	6	7	0	0	13	13	14	0	0	27	60
9:45 AM	8	4	0	0	12	11	12	0	0	23	9	11	0	0	20	55
Hourly Total	39	15	0	0	54	26	40	0	0	66	47	65	0	0	112	232
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	10	5	0	0	15	4	11	0	0	15	19	23	0	0	42	72
11:45 AM	18	6	0	0	24	9	11	0	0	20	15	11	0	0	26	70
Hourly Total	28	11	0	0	39	13	22	0	0	35	34	34	0	0	68	142
12:00 PM	14	6	0	0	20	7	13	0	0	20	16	17	0	0	33	73
12:15 PM	15	4	0	0	19	3	18	0	0	21	31	21	0	0	52	92
12:30 PM	13	8	0	0	21	6	11	0	0	17	11	25	0	0	36	74
12:45 PM	21	7	0	0	28	7	13	0	0	20	25	18	0	0	43	91
Hourly Total	63	25	0	0	88	23	55	0	0	78	83	81	0	0	164	330
1:00 PM	15	5	0	0	20	9	22	0	0	31	12	22	0	0	34	85
1:15 PM	17	6	0	0	23	7	9	0	0	16	20	9	0	0	29	68
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	32	11	0	0	43	16	31	0	0	47	32	31	0	0	63	153
3:00 PM	31	11	0	0	42	7	14	0	0	21	19	25	0	0	44	107
3:15 PM	27	9	0	0	36	5	15	0	0	20	17	13	0	0	30	86
3:30 PM	28	14	0	0	42	8	13	0	0	21	16	13	0	0	29	92
3:45 PM	19	15	0	0	34	6	7	0	0	13	17	17	0	0	34	81
Hourly Total	105	49	0	0	154	26	49	0	0	75	69	68	0	0	137	366
4:00 PM	46	17	0	0	63	3	13	0	0	16	22	24	0	0	46	125
4:15 PM	29	8	0	0	37	10	9	0	0	19	22	23	0	0	45	101
4:30 PM	31	16	0	0	47	8	14	0	0	22	24	26	0	0	50	119

1:45 PM	27	5	0	0	32	4	21	0	0	25	22	16	0	0	38	95
Hourly Total	133	46	0	0	179	25	57	0	0	82	90	89	0	0	179	440
5:00 PM	32		0	0	40	5	20	0		25	19	22	0	0		106
5:15 PM	15		0	0	19	10	14	0	0	20	32	22	0	0	55	98
5:20 PM	0	7	0	0	15	7	10	0	0	17	11	12	0	0	24	57
5.30 FM	11	/ 	0	0	10	2	7	0	0	10	14	13	0	0	24	57
5.45 FM	67	34	0	0	01	3	/ 	0	0	76	76	71	0	0	147	214
	67	24	0	0	91	25		0	0	70	70	17	0	0	147	314
	557	208	0	0	601	262	430	0		098	507	500		0	1173	2030
Approach %	72.8	27.2	0.0	-	-	37.5	62.5	0.0	-	-	43.2	56.8	0.0	-		-
l otal %	21.1	7.9	0.0	-	29.0	9.9	16.5	0.0	-	26.5	19.2	25.3	0.0	-	44.5	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.1	0.0
Cars & Light Goods	543	203	0	-	746	257	391	0	-	648	464	653	0	-	1117	2511
% Cars & Light Goods	97.5	97.6	-	-	97.5	98.1	89.7	-	-	92.8	91.5	98.0	-	-	95.2	95.3
Buses	4	4	0	-	8	4	3	0	-	7	1	2	0	-	3	18
% Buses	0.7	1.9	-	-	1.0	1.5	0.7	-	-	1.0	0.2	0.3	-	-	0.3	0.7
Single-Unit Trucks	5	0	0	-	5	1	29	0	-	30	28	8	0	-	36	71
% Single-Unit Trucks	0.9	0.0	-	-	0.7	0.4	6.7	-	-	4.3	5.5	1.2	-	-	3.1	2.7
Articulated Trucks	5	1	0	-	6	0	13	0	-	13	13	3	0	-	16	35
% Articulated Trucks	0.9	0.5	-	-	0.8	0.0	3.0	-	-	1.9	2.6	0.5	-	-	1.4	1.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
% Bicycles on Crosswalk Pedestrians	-	-	-	-	-	-			- 0	-	-	-	-	- 0	-	-



Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 3



Turning Movement Data Plot



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

					1 011111	, 1110 001			Duiu (1	. 10 / 101/						
			8th Street					28th Avenue					28th Avenue			
Stort Time			Eastbound					Northbound					Southbound			
Start Time	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:45 AM	8	5	0	0	13	24	27	0	0	51	11	40	0	0	51	115
8:00 AM	13	4	0	0	17	14	19	0	0	33	7	34	0	0	41	91
8:15 AM	14	3	0	0	17	22	17	0	0	39	13	28	0	0	41	97
8:30 AM	10	5	0	0	15	18	12	0	0	30	11	41	0	0	52	97
Total	45	17	0	0	62	78	75	0	0	153	42	143	0	0	185	400
Approach %	72.6	27.4	0.0	-	-	51.0	49.0	0.0	-	-	22.7	77.3	0.0	-	-	-
Total %	11.3	4.3	0.0	-	15.5	19.5	18.8	0.0	-	38.3	10.5	35.8	0.0	-	46.3	-
PHF	0.804	0.850	0.000	-	0.912	0.813	0.694	0.000	-	0.750	0.808	0.872	0.000	-	0.889	0.870
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	45	17	0	-	62	74	69	0	-	143	38	141	0	-	179	384
% Cars & Light Goods	100.0	100.0	-	-	100.0	94.9	92.0	-	-	93.5	90.5	98.6	-	-	96.8	96.0
Buses	0	0	0	-	0	4	0	0	-	4	0	2	0	-	2	6
% Buses	0.0	0.0	-	-	0.0	5.1	0.0	-	-	2.6	0.0	1.4	-	-	1.1	1.5
Single-Unit Trucks	0	0	0	-	0	0	4	0	-	4	4	0	0	-	4	8
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	5.3	-	-	2.6	9.5	0.0	-	-	2.2	2.0
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	2.7	-	-	1.3	0.0	0.0	-	-	0.0	0.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

			8th Street		_			28th Avenue		-			28th Avenue			
Start Time	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:15 PM	15	4	0	0	19	3	18	0	0	21	31	21	0	0	52	92
12:30 PM	13	8	0	0	21	6	11	0	0	17	11	25	0	0	36	74
12:45 PM	21	7	0	0	28	7	13	0	0	20	25	18	0	0	43	91
1:00 PM	15	5	0	0	20	9	22	0	0	31	12	22	0	0	34	85
Total	64	24	0	0	88	25	64	0	0	89	79	86	0	0	165	342
Approach %	72.7	27.3	0.0	-	-	28.1	71.9	0.0	-	-	47.9	52.1	0.0	-	-	-
Total %	18.7	7.0	0.0	-	25.7	7.3	18.7	0.0	-	26.0	23.1	25.1	0.0	-	48.2	-
PHF	0.762	0.750	0.000	-	0.786	0.694	0.727	0.000	-	0.718	0.637	0.860	0.000	-	0.793	0.929
Motorcycles	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.3	0.0	-	-	0.6	0.3
Cars & Light Goods	63	24	0	-	87	25	60	0	-	85	73	81	0	-	154	326
% Cars & Light Goods	98.4	100.0	-	-	98.9	100.0	93.8	-	-	95.5	92.4	94.2	-	-	93.3	95.3
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	1	0	0	-	1	0	4	0	-	4	3	4	0	-	7	12
% Single-Unit Trucks	1.6	0.0	-	-	1.1	0.0	6.3	-	-	4.5	3.8	4.7		-	4.2	3.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	2	1	0	-	3	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	2.5	1.2	-	-	1.8	0.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 7



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



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 8

Turning Movement Peak Hour Data (4:00 PM)

					1 011111	, 100001			Juiu							
			8th Street					28th Avenue					28th Avenue			
Start Time			Eastbound					Northbound					Southbound			
Start Time	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	46	17	0	0	63	3	13	0	0	16	22	24	0	0	46	125
4:15 PM	29	8	0	0	37	10	9	0	0	19	22	23	0	0	45	101
4:30 PM	31	16	0	0	47	8	14	0	0	22	24	26	0	0	50	119
4:45 PM	27	5	0	0	32	4	21	0	0	25	22	16	0	0	38	95
Total	133	46	0	0	179	25	57	0	0	82	90	89	0	0	179	440
Approach %	74.3	25.7	0.0	-	-	30.5	69.5	0.0	-	-	50.3	49.7	0.0	-	-	-
Total %	30.2	10.5	0.0	-	40.7	5.7	13.0	0.0	-	18.6	20.5	20.2	0.0	-	40.7	-
PHF	0.723	0.676	0.000	-	0.710	0.625	0.679	0.000	-	0.820	0.938	0.856	0.000	-	0.895	0.880
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	133	46	0	-	179	25	49	0	-	74	88	88	0	-	176	429
% Cars & Light Goods	100.0	100.0	-	-	100.0	100.0	86.0	-	-	90.2	97.8	98.9	-	-	98.3	97.5
Buses	0	0	0	-	0	0	2	0	-	2	0	0	0	-	0	2
% Buses	0.0	0.0	-	-	0.0	0.0	3.5	-	-	2.4	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	0	0	0	-	0	0	2	0	-	2	2	1	0	-	3	5
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	3.5	-	-	2.4	2.2	1.1	-	-	1.7	1.1
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	0	0	0	-	0	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	7.0	-	-	4.9	0.0	0.0	-	-	0.0	0.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-						-								-	



Count Name: 8th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 1

Turning Movement Data

			16th East	Street bound			16th Street Westbound								28th A North	Avenue bound					28th A South	Avenue Ibound			
Start Time	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	3	28	0	0	0	31	11	24	9	0	0	44	3	7	14	0	0	24	7	7	8	0	0	22	121
7:15 AM	3	41	1	0	0	45	22	40	6	0	0	68	2	3	14	0	0	19	6	2	6	0	0	14	146
7:30 AM	1	46	1	0	0	48	35	39	10	0	0	84	3	6	15	0	0	24	10	2	2	0	0	14	170
7:45 AM	5	36	5	0	0	46	43	63	16	0	0	122	5	15	14	0	0	34	13	2	1	0	0	16	218
Hourly Total	12	151	7	0	0	170	111	166	41	0	0	318	13	31	57	0	0	101	36	13	17	0	0	66	655
8:00 AM	3	35	2	0	0	40	36	56	10	0	0	102	5	9	18	0	0	32	14	3	6	0	0	23	197
8:15 AM	6	27	1	0	0	34	34	61	12	0	0	107	7	12	14	0	0	33	9	8	1	0	0	18	192
8:30 AM	0	36	2	0	0	38	45	70	4	0	0	119	3	6	11	0	0	20	3	3	2	0	0	8	185
8:45 AM	3	45	6	0	0	54	29	48	7	0	0	84	9	13	12	0	0	34	7	4	2	0	0	13	185
Hourly Total	12	143	11	0	0	166	144	235	33	0	0	412	24	40	55	0	0	119	33	18	11	0	0	62	759
9:00 AM	1	38	4	0	0	43	26	56	10	0	0	92	5	5	8	0	0	18	7	5	2	0	0	14	167
9:15 AM	3	42	5	0	0	50	25	48	7	0	0	80	3	5	8	0	0	16	4	2	6	0	0	12	158
9:30 AM	3	49	7	0	0	59	14	40	9	0	0	63	3	8	9	0	0	20	9	1	6	0	0	16	158
9:45 AM	2	39	4	0	0	45	13	50	7	0	0	70	6	3	11	0	0	20	7	3	5	0	0	15	150
Hourly Total	9	168	20	0	0	197	78	194	33	0	0	305	17	21	36	0	0	74	27	11	19	0	0	57	633
*** BREAK ***	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	4	63	14	0	0	81	15	47	8	0	0	70	6	5	10	0	0	21	11	8	4	0	0	23	195
11:45 AM	6	47	11	0	0	64	11	38	9	0	0	58	9	8	12	0	0	29	5	3	7	0	0	15	166
Hourly Total	10	110	25	0	0	145	26	85	17	0	0	128	15	13	22	0	0	50	16	11	11	0	0	38	361
12:00 PM	8	53	14	0	0	75	12	52	5	0	0	69	12	4	11	0	0	27	3	11	10	0	0	24	195
12:15 PM	6	60	17	0	0	83	22	53	7	0	0	82	9	7	14	0	0	30	5	11	8	0	0	24	219
12:30 PM	2	62	12	0	0	76	19	47	5	0	0	71	6	11	11	0	0	28	5	6	7	0	0	18	193
12:45 PM	6	57	17	0	0	80	19	56	12	0	0	87	8	5	17	0	0	30	8	4	5	0	0	17	214
Hourly Total	22	232	60	0	0	314	72	208	29	0	0	309	35	27	53	0	0	115	21	32	30	0	0	83	821
1:00 PM	5	62	7	0	0	74	22	48	6	0	0	76	16	7	15	0	0	38	5	7	7	0	0	19	207
1:15 PM	2	62	9	0	0	73	13	46	8	0	0	67	4	12	12	0	0	28	3	6	8	0	0	17	185
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	7	124	16	0	0	147	35	94	14	0	0	143	20	19	27	0	0	66	8	13	15	0	0	36	392
3:00 PM	3	67	17	0	0	87	25	60	6	0	0	91	4	12	27	0	0	43	5	6	5	0	0	16	237
3:15 PM	3	75	7	0	0	85	15	44	13	0	0	72	5	16	19	0	0	40	11	6	4	0	0	21	218
3:30 PM	5	73	10	0	0	88	9	49	8	0	0	66	5	11	27	0	1	43	16	11	9	0	0	36	233
3:45 PM	5	55	10	0	0	70	17	47	6	0	0	70	2	6	16	0	0	24	7	11	8	0	0	26	190
Hourly Total	16	270	44	0	0	330	66	200	33	0	0	299	16	45	89	0	1	150	39	34	26	0	0	99	878
4:00 PM	5	87	8	0	0	100	24	51	17	0	0	92	3	12	41	0	0	56	5	11	10	0	0	26	274
4:15 PM	0	66	10	0	0	76	19	49	15	0	0	83	8	11	21	0	0	40	15	14	7	0	0	36	235

4:30 PM	3	73	12	0	0	88	27	62	6	0	0	95	6	7	29	0	0	42	4	12	9	0	0	25	250
4:45 PM	1	72	14	0	0	87	12	53	11	0	0	76	7	17	29	0	0	53	7	13	5	0	0	25	241
Hourly Total	9	298	44	0	0	351	82	215	49	0	0	346	24	47	120	0	0	191	31	50	31	0	0	112	1000
5:00 PM	6	75	11	0	0	92	17	53	9	0	0	79	9	10	29	0	0	48	7	13	7	0	0	27	246
5:15 PM	6	75	20	0	0	101	23	54	4	0	0	81	5	6	22	0	0	33	5	11	8	0	0	24	239
5:30 PM	0	59	5	0	0	64	12	45	2	0	0	59	5	3	10	0	0	18	8	7	2	0	0	17	158
5:45 PM	0	38	11	0	0	49	12	52	1	0	0	65	3	5	11	0	0	19	2	2	1	0	0	5	138
Hourly Total	12	247	47	0	0	306	64	204	16	0	0	284	22	24	72	0	0	118	22	33	18	0	0	73	781
Grand Total	109	1743	274	0	0	2126	678	1601	265	0	0	2544	186	267	531	0	1	984	233	215	178	0	0	626	6280
Approach %	5.1	82.0	12.9	0.0	-	-	26.7	62.9	10.4	0.0	-	-	18.9	27.1	54.0	0.0	-	-	37.2	34.3	28.4	0.0	-	-	-
Total %	1.7	27.8	4.4	0.0	-	33.9	10.8	25.5	4.2	0.0	-	40.5	3.0	4.3	8.5	0.0	-	15.7	3.7	3.4	2.8	0.0	-	10.0	-
Motorcycles	0	2	0	0	-	2	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	4
% Motorcycles	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.4	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.2	0.1
Cars & Light Goods	105	1674	267	0	-	2046	653	1506	198	0	-	2357	180	230	516	0	-	926	186	191	165	0	-	542	5871
% Cars & Light	96.3	96.0	97 4	-	_	96.2	96.3	94 1	74 7	_		02.6	06.9	86.1	97.2	_	_	0/1	70.8	88.8	02.7	_	_	86.6	93.5
Goods	00.0		0111			00.2	00.0	04.1	74.7	-	-	92.0	90.0	00.1	51.2	-		34.1	75.0	00.0	92.1	-			
Goods Buses	0	5	0	0	-	5	1	14	14	0	-	29	90.0 0	5	3	0	-	8	11	2	2	0	-	15	57
Buses % Buses	0.0	5 0.3	0.0	0	-	5 0.2	1 0.1	14 0.9	14 5.3	0	-	29 1.1	0	5 1.9	3 0.6	0	-	8 0.8	11 4.7	2 0.9	2 1.1	0	-	15 2.4	57 0.9
Goods Buses % Buses Single-Unit Trucks	0 0.0 3	5 0.3 49	0 0.0 4	0 - 0	-	5 0.2 56	1 0.1 17	14 0.9 58	14 5.3 45	- 0 - 0	-	29 1.1 120	0 0.0 5	5 1.9 20	3 0.6 5	0 - 0	-	8 0.8 30	11 4.7 29	2 0.9 15	2 1.1 7	0 - 0	-	15 2.4 51	57 0.9 257
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks	0 0.0 3 2.8	5 0.3 49 2.8	0 0.0 4 1.5	0 - 0 -	-	5 0.2 56 2.6	1 0.1 17 2.5	14 0.9 58 3.6	14 5.3 45 17.0	0 - 0 -	-	29 1.1 120 4.7	0 0.0 5 2.7	5 1.9 20 7.5	3 0.6 5 0.9	0 - 0 -	-	8 0.8 30 3.0	11 4.7 29 12.4	2 0.9 15 7.0	2 1.1 7 3.9	0 - 0 -	- - -	15 2.4 51 8.1	57 0.9 257 4.1
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks	0 0.0 3 2.8 1	5 0.3 49 2.8 12	0 0.0 4 1.5 2	0 - 0 - 0	-	5 0.2 56 2.6 15	1 0.1 17 2.5 7	14 0.9 58 3.6 22	14 5.3 45 17.0 7	0 - 0 - 0	-	29 1.1 120 4.7 36	0 0.0 5 2.7 1	5 1.9 20 7.5 12	3 0.6 5 0.9 7	0 - 0 - 0	-	8 0.8 30 3.0 20	11 4.7 29 12.4 7	2 0.9 15 7.0 6	2 1.1 7 3.9 4	0 - 0 - 0	-	15 2.4 51 8.1 17	57 0.9 257 4.1 88
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks	0 0.0 3 2.8 1 0.9	5 0.3 49 2.8 12 0.7	0 0.0 4 1.5 2 0.7	0 - 0 - 0 -		5 0.2 56 2.6 15 0.7	1 0.1 17 2.5 7 1.0	14 0.9 58 3.6 22 1.4	14 5.3 45 17.0 7 2.6	- 0 - 0 - 0 -	-	29 1.1 120 4.7 36 1.4	0 0.0 5 2.7 1 0.5	5 1.9 20 7.5 12 4.5	3 0.6 5 0.9 7 1.3	0 - 0 - 0 -		8 0.8 30 3.0 20 2.0	11 4.7 29 12.4 7 3.0	2 0.9 15 7.0 6 2.8	2 1.1 7 3.9 4 2.2	- 0 - 0 - 0 -	-	15 2.4 51 8.1 17 2.7	57 0.9 257 4.1 88 1.4
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks Bicycles on Road	0 0.0 3 2.8 1 0.9 0	5 0.3 49 2.8 12 0.7 1	0 0.0 4 1.5 2 0.7 1	0 - 0 - 0 - 0	- - - - - -	5 0.2 56 2.6 15 0.7 2	1 0.1 17 2.5 7 1.0 0	14 0.9 58 3.6 22 1.4 1	14 5.3 45 17.0 7 2.6 0	- 0 - 0 - 0 - 0 -		32.6 29 1.1 120 4.7 36 1.4 1	0 0.0 5 2.7 1 0.5 0	5 1.9 20 7.5 12 4.5 0	3 0.6 5 0.9 7 1.3 0	0 - 0 - 0 - 0 - 0		8 0.8 30 3.0 20 2.0 0	11 4.7 29 12.4 7 3.0 0	2 0.9 15 7.0 6 2.8 0	2 1.1 7 3.9 4 2.2 0	0 - 0 - 0 - 0 - 0	-	15 2.4 51 8.1 17 2.7 0	57 0.9 257 4.1 88 1.4 3
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks Bicycles on Road % Bicycles on Road	0 0.0 3 2.8 1 0.9 0 0.0	5 0.3 49 2.8 12 0.7 1 0.1	0 0.0 4 1.5 2 0.7 1 0.4	0 - 0 - 0 - 0 -	-	5 0.2 56 2.6 15 0.7 2 0.1	1 0.1 17 2.5 7 1.0 0 0.0	14 0.9 58 3.6 22 1.4 1 0.1	14 5.3 45 17.0 7 2.6 0 0.0	- 0 - 0 - 0 - 0 -	-	32.6 29 1.1 120 4.7 36 1.4 0.0	0 0.0 5 2.7 1 0.5 0 0.0	5 1.9 20 7.5 12 4.5 0 0.0	3 0.6 5 0.9 7 1.3 0 0.0	0 - 0 - 0 - 0 -	-	8 0.8 30 3.0 20 2.0 0 0.0	11 4.7 29 12.4 7 3.0 0 0.0	2 0.9 15 7.0 6 2.8 0 0.0	2 1.1 7 3.9 4 2.2 0 0.0	- 0 - 0 - 0 - 0 -	-	15 2.4 51 8.1 17 2.7 0 0.0	57 0.9 257 4.1 88 1.4 3 0.0
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks Bicycles on Road % Bicycles on Road Bicycles on Crosswalk	0 0.0 3 2.8 1 0.9 0 0.0 -	5 0.3 49 2.8 12 0.7 1 0.1	0 0.0 4 1.5 2 0.7 1 0.4	0 - - - - 0 - - - -	- - - - - - - 0	5 0.2 56 2.6 15 0.7 2 0.1	1 0.1 17 2.5 7 1.0 0 0 0.0 -	14 0.9 58 3.6 22 1.4 0.1	14 5.3 45 17.0 7 2.6 0 0.0	0 - - - - 0 - - -	- - - - - - -	92.0 29 1.1 120 4.7 36 1.4 1 0.0	0 0.0 5 2.7 1 0.5 0 0 0.0 -	30.1 5 1.9 20 7.5 12 4.5 0 0.0	3 0.6 5 0.9 7 1.3 0 0.0	0 - 0 - 0 - 0 - 0 -	- - - - - - - 1	8 0.8 30 3.0 20 2.0 0 0.0	11 4.7 29 12.4 7 3.0 0 0.0	2 0.9 15 7.0 6 2.8 0 0.0	2 1.1 7 3.9 4 2.2 0 0.0 -	0 - 0 - 0 - 0 - 0 -	- - - - - - - -	15 2.4 51 8.1 17 2.7 0 0.0	57 0.9 257 4.1 88 1.4 3 0.0
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks Bicycles on Road % Bicycles on Crosswalk % Bicycles on Crosswalk	0 0.0 3 2.8 1 0.9 0 0.0 -	5 0.3 49 2.8 12 0.7 1 0.1	0 0.0 4 1.5 2 0.7 1 0.4 -	0 0 0	- - - - - - - - - - - - -	5 0.2 56 2.6 15 0.7 2 0.1 -	1 0.1 17 2.5 7 1.0 0 0.0 -	14 0.9 58 3.6 22 1.4 0.1	14 5.3 45 17.0 7 2.6 0 0.0 -	0 - 0 - 0 - 0 - - -	- - - - - - - - - - -	29 29 1.1 120 4.7 36 1.4 1 0.0 -	0 0.0 5 2.7 1 0.5 0 0.0 -	30.1 5 1.9 20 7.5 12 4.5 0 0.0 -	3,72 3 0,6 5 0,9 7 1,3 0 0,0 - -	0 - - 0 - 0 - - 0 - -	- - - - - - 1 100.0	8 0.8 30 3.0 20 2.0 0 0 0.0 -	11 4.7 29 12.4 7 3.0 0 0.0 -	2 0.9 15 7.0 6 2.8 0 0.0 -	2 1.1 7 3.9 4 2.2 0 0.0 -	0 - 0 - 0 - 0 - - - - - -	- - - - - - - - - - -	15 2.4 51 8.1 17 2.7 0 0.0 -	57 0.9 257 4.1 88 1.4 3 0.0
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks Bicycles on Road % Bicycles on Crosswalk % Bicycles on Crosswalk % Bicycles on Crosswalk Pedestrians	0 0.0 3 2.8 1 0.9 0 0.0 - - -	5 0.3 49 2.8 12 0.7 1 0.1 - -	0 0.0 4 1.5 2 0.7 1 0.4 - -	0 0	- - - - - - - - - - - - - - - - - - -	5 0.2 56 2.6 15 0.7 2 0.1 - -	1 0.1 17 2.5 7 1.0 0 0.0 - -	14 0.9 58 3.6 22 1.4 1 0.1 - - -	14 5.3 45 17.0 7 2.6 0 0.0 - -	0 - - 0 - 0 - - - - - - -	- - - - - - - - - - - - - - - - - - -	29 29 1.1 120 4.7 36 1.4 1 0.0 - -	0 0 0.0 5 2.7 1 0.5 0 0 0 0 - - -	S0.1 5 1.9 20 7.5 12 4.5 0 0.0 - -	3,72 3 0,6 5 0,9 7 1,3 0 0,0 - - -	0 - - 0 - - 0 - - - - - -	- - - - - - 1 100.0 0	8 0.8 30 3.0 20 2.0 0 0.0 - -	11 4.7 29 12.4 7 3.0 0 0 - -	2 0.9 15 7.0 6 2.8 0 0.0 - -	2 1.1 7 3.9 4 2.2 0 0.0 - -	0 - - 0 - - 0 - - - - - -	- - - - - - - - - - - - - - - - 0	15 2.4 51 8.1 17 2.7 0 0.0 - -	57 0.9 257 4.1 88 1.4 3 0.0 -
Goods Buses % Buses Single-Unit Trucks % Single-Unit Trucks Articulated Trucks % Articulated Trucks Bicycles on Road % Bicycles on Crosswalk % Bicycles on Crosswalk Pedestrians % Pedestrians	0 0.0 3 2.8 1 0.9 0 0.0 - - - -	5 0.3 49 2.8 12 0.7 1 0.1 - -	0 0.0 4 1.5 2 0.7 1 0.4 - - -	0 0	- - - - - - - - - - - - - - - - - - -	5 0.2 56 2.6 15 0.7 2 0.1 - - - - -	1 0.1 17 2.5 7 1.0 0 0.0 - - -	14 0.9 58 3.6 22 1.4 1 0.1 - - - - - - - - - -	14 5.3 45 17.0 7 2.6 0 0.0 - - - - - -	0 - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - -	92.0 29 1.1 120 4.7 36 1.4 1 0.0 - - - - - - - - -	30.3 0 0.0 5 2.7 1 0.5 0 0.5 0 0.5 0 0.0 - - - - -	30.1 5 1.9 20 7.5 12 4.5 0 0.0 - - - - -	3 0.6 5 0.9 7 1.3 0 0 0.0 - - - - - -	0 - 0 - 0 - 0 - - - - - - - -	- - - - - - 1 100.0 0 0.0	8 0.8 30 3.0 20 2.0 0 0 0.0 - - - - -	11 4.7 29 12.4 7 3.0 0 0.0 - - - - -	2 0.9 15 7.0 6 2.8 0 0.0 - - -	2 1.1 7 3.9 4 2.2 0 0.0 - - - -	0 - - 0 - - 0 - - - - - - - -	- - - - - - - - - - - - - 0 -	15 2.4 51 8.1 17 2.7 0 0.0 - - - -	57 0.9 257 4.1 88 1.4 3 0.0 - - -



Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 3



Turning Movement Data Plot



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

			16th	Street					16th	Street					28th A	Avenue					28th A	venue			
			East	bound					West	bound					North	bound					South	bound			
Start Time	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:45 AM	5	36	5	0	0	46	43	63	16	0	0	122	5	15	14	0	0	34	13	2	1	0	0	16	218
8:00 AM	3	35	2	0	0	40	36	56	10	0	0	102	5	9	18	0	0	32	14	3	6	0	0	23	197
8:15 AM	6	27	1	0	0	34	34	61	12	0	0	107	7	12	14	0	0	33	9	8	1	0	0	18	192
8:30 AM	0	36	2	0	0	38	45	70	4	0	0	119	3	6	11	0	0	20	3	3	2	0	0	8	185
Total	14	134	10	0	0	158	158	250	42	0	0	450	20	42	57	0	0	119	39	16	10	0	0	65	792
Approach %	8.9	84.8	6.3	0.0	-	-	35.1	55.6	9.3	0.0	-	-	16.8	35.3	47.9	0.0	-	-	60.0	24.6	15.4	0.0	-	-	-
Total %	1.8	16.9	1.3	0.0	-	19.9	19.9	31.6	5.3	0.0	-	56.8	2.5	5.3	7.2	0.0	-	15.0	4.9	2.0	1.3	0.0	-	8.2	-
PHF	0.583	0.931	0.500	0.000	-	0.859	0.878	0.893	0.656	0.000	-	0.922	0.714	0.700	0.792	0.000	-	0.875	0.696	0.500	0.417	0.000	-	0.707	0.908
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	14	127	9	0	-	150	157	240	31	0	-	428	18	39	56	0	-	113	31	13	9	0	-	53	744
% Cars & Light Goods	100.0	94.8	90.0	-	-	94.9	99.4	96.0	73.8	-	-	95.1	90.0	92.9	98.2	-	-	95.0	79.5	81.3	90.0	-	-	81.5	93.9
Buses	0	0	0	0	-	0	1	2	5	0	-	8	0	0	0	0	-	0	1	1	0	0	-	2	10
% Buses	0.0	0.0	0.0	-	-	0.0	0.6	0.8	11.9	-	-	1.8	0.0	0.0	0.0	-	-	0.0	2.6	6.3	0.0	-	-	3.1	1.3
Single-Unit Trucks	0	6	1	0	-	7	0	7	5	0	-	12	1	3	0	0	-	4	6	2	1	0	-	9	32
% Single-Unit Trucks	0.0	4.5	10.0	-	-	4.4	0.0	2.8	11.9	-	-	2.7	5.0	7.1	0.0	-	-	3.4	15.4	12.5	10.0	-	-	13.8	4.0
Articulated Trucks	0	1	0	0	-	1	0	1	1	0	-	2	1	0	1	0	-	2	1	0	0	0	-	1	6
% Articulated Trucks	0.0	0.7	0.0	-	-	0.6	0.0	0.4	2.4	-	-	0.4	5.0	0.0	1.8	-	-	1.7	2.6	0.0	0.0	-	-	1.5	0.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 6

Turning Movement Peak Hour Data (12:15 PM)

			16th Eastl	Street bound					16th West	Street bound				,	28th A North	Avenue					28th A South	venue bound			
Start Time	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:15 PM	6	60	17	0	0	83	22	53	7	0	0	82	9	7	14	0	0	30	5	11	8	0	0	24	219
12:30 PM	2	62	12	0	0	76	19	47	5	0	0	71	6	11	11	0	0	28	5	6	7	0	0	18	193
12:45 PM	6	57	17	0	0	80	19	56	12	0	0	87	8	5	17	0	0	30	8	4	5	0	0	17	214
1:00 PM	5	62	7	0	0	74	22	48	6	0	0	76	16	7	15	0	0	38	5	7	7	0	0	19	207
Total	19	241	53	0	0	313	82	204	30	0	0	316	39	30	57	0	0	126	23	28	27	0	0	78	833
Approach %	6.1	77.0	16.9	0.0	-	-	25.9	64.6	9.5	0.0	-	-	31.0	23.8	45.2	0.0	-	-	29.5	35.9	34.6	0.0	-	-	-
Total %	2.3	28.9	6.4	0.0	-	37.6	9.8	24.5	3.6	0.0	-	37.9	4.7	3.6	6.8	0.0	-	15.1	2.8	3.4	3.2	0.0	-	9.4	-
PHF	0.792	0.972	0.779	0.000	-	0.943	0.932	0.911	0.625	0.000	-	0.908	0.609	0.682	0.838	0.000	-	0.829	0.719	0.636	0.844	0.000	-	0.813	0.951
Motorcycles	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	3.3	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	3.6	0.0	-	-	1.3	0.2
Cars & Light Goods	18	232	52	0	-	302	76	193	18	0	-	287	39	27	55	0	-	121	20	24	25	0	-	69	779
% Cars & Light Goods	94.7	96.3	98.1	-	-	96.5	92.7	94.6	60.0	-	-	90.8	100.0	90.0	96.5	-	-	96.0	87.0	85.7	92.6	-	-	88.5	93.5
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.4	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	1	5	1	0	-	7	5	5	10	0	-	20	0	2	1	0	-	3	2	2	1	0	-	5	35
% Single-Unit Trucks	5.3	2.1	1.9	-	-	2.2	6.1	2.5	33.3	-	-	6.3	0.0	6.7	1.8	-	-	2.4	8.7	7.1	3.7	-	-	6.4	4.2
Articulated Trucks	0	3	0	0	-	3	1	6	1	0	-	8	0	1	1	0	-	2	1	1	1	0	-	3	16
% Articulated Trucks	0.0	1.2	0.0	-	-	1.0	1.2	2.9	3.3	-	-	2.5	0.0	3.3	1.8	-	-	1.6	4.3	3.6	3.7	-	-	3.8	1.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
								-		-															



Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 7



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



Cambridge, Ontario, Canada N1R 8J8 519-896-3163 cbowness@ptsl.com Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 8

Turning Movement Peak Hour Data (4:00 PM)

			16th	Street					16th	Street					28th A	Avenue					28th A	venue			
			East	bound					West	bound					North	bound					South	bound			
Start Time	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	5	87	8	0	0	100	24	51	17	0	0	92	3	12	41	0	0	56	5	11	10	0	0	26	274
4:15 PM	0	66	10	0	0	76	19	49	15	0	0	83	8	11	21	0	0	40	15	14	7	0	0	36	235
4:30 PM	3	73	12	0	0	88	27	62	6	0	0	95	6	7	29	0	0	42	4	12	9	0	0	25	250
4:45 PM	1	72	14	0	0	87	12	53	11	0	0	76	7	17	29	0	0	53	7	13	5	0	0	25	241
Total	9	298	44	0	0	351	82	215	49	0	0	346	24	47	120	0	0	191	31	50	31	0	0	112	1000
Approach %	2.6	84.9	12.5	0.0	-	-	23.7	62.1	14.2	0.0	-	-	12.6	24.6	62.8	0.0	-	-	27.7	44.6	27.7	0.0	-	-	-
Total %	0.9	29.8	4.4	0.0	-	35.1	8.2	21.5	4.9	0.0	-	34.6	2.4	4.7	12.0	0.0	-	19.1	3.1	5.0	3.1	0.0	-	11.2	-
PHF	0.450	0.856	0.786	0.000	-	0.878	0.759	0.867	0.721	0.000	-	0.911	0.750	0.691	0.732	0.000	-	0.853	0.517	0.893	0.775	0.000	-	0.778	0.912
Motorcycles	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Motorcycles	0.0	0.7	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	8	291	44	0	-	343	78	204	34	0	-	316	23	39	120	0	-	182	29	50	27	0	-	106	947
% Cars & Light Goods	88.9	97.7	100.0	-	-	97.7	95.1	94.9	69.4	-	-	91.3	95.8	83.0	100.0	-	-	95.3	93.5	100.0	87.1	-	-	94.6	94.7
Buses	0	0	0	0	-	0	0	2	4	0	-	6	0	2	0	0	-	2	0	0	0	0	-	0	8
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.9	8.2	-	-	1.7	0.0	4.3	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.8
Single-Unit Trucks	1	4	0	0	-	5	4	9	9	0	-	22	1	3	0	0	-	4	2	0	3	0	-	5	36
% Single-Unit Trucks	11.1	1.3	0.0	-	-	1.4	4.9	4.2	18.4	-	-	6.4	4.2	6.4	0.0	-	-	2.1	6.5	0.0	9.7	-	-	4.5	3.6
Articulated Trucks	0	1	0	0	-	1	0	0	2	0	-	2	0	3	0	0	-	3	0	0	1	0	-	1	7
% Articulated Trucks	0.0	0.3	0.0	-	-	0.3	0.0	0.0	4.1	-	-	0.6	0.0	6.4	0.0	-	-	1.6	0.0	0.0	3.2	-	-	0.9	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 16th Street & 28th Avenue Site Code: 230607 Start Date: 11/14/2023 Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)

Cover Sheet

Location: Hig	ghway 26 @ 28th Avenue	Area/District: Owen Sound
Timing Based On T.M. Dat	ed: Aug-04	Traffic Signal #
Timing Developed By:	Plut / Burns	Approved By:
Installed By:		Installation Date:
28th	Avenue	4+5 Overlap $4+5$ $0 verlap$ 5 EVA EVB 6 $6+7$ $0 verlap$ $6+7$ $0 verlap$ 6 6
2	Bth Avenue	$R.R. \neq 1 2 + 3$ Overlap 3 8 Overlap
Dial Out TelephorNumberD0# OF DIGITS111st DIGIT122nd DIGIT133rd DIGIT1	1 Redial Time = 10 9 (C\5 + C + 0) Default is Report All Alarms (no flags set)	COMMUNICATIONS ADDRESSING
4 4th DIGIT 5 5th DIGIT 6 6th DIGIT 7 7th DIGIT 8 8th DIGIT 9 9th DIGIT A 10th DIGIT B 11th DIGIT C 0 E 0 F 0 <	5 Disable Alarm Reporting Column F 4 1 2 3 4 5 6 3 0 OMIT ALARMS Image: State Sta	t Used) COMM ADDRESS (C/0 + 0 + 0) = 1 $ZONE ADDRESS (C/0 + 0 + 0) = 1$ $AREA NUMBER (C/0 + 0 + 0) = 1$ $AREA ADDRESS (C/0 + 0 + 0) = 1$
NOTE: If Local Controller is part of an Intercon Ensure Phone Numb Is Removed	nect Observe Redial Timer ner (E/2 + D + 6)	

ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

				Р	HAS	E													I				C	οιι	JMN	IFF	РНА	SE	s			G	4 1	
		1	2	3	4	5	6	7	8			9	Α	В	С	D		E	ן ך		Ī	1	2	3	4	5	6	7	8	D 51	0 Bercut Dr.,	Sacrer	nento, Calif.	95814
0	WALK	-	17	-	12	-	17	-	12	0				_	-	_	RR1 D	LY		0	PERMIT	Х	X		X	-	X		X		91 Traffic Signal	Progra	-0260 am 233 Ont	tario
1	DON'T WALK	-	12	-	7	-	12	-	7	1	PHASE 1	-					RR1 CL	R		1	RED LOCK											ning si	leet #2	
2	MIN INITIAL	5	20		10		20		10	2	PHASE 2	-					EVA DL	Y	11	2	YELLOW LOCK									ł				
3	TYPE 3 LIMIT	-		-		-		-		3	PHASE 3	-					EVA CL	R		3	VEH MIN CALL									1	Date:		<u>18-Ju</u>	ul-05
4	ADD PER VEH	-		-		-		-		4	PHASE 4	-					EVB DL	Y	11	4	PED RECALL		Х				Х							
5	VEH EXT	2.0	4.5	-	3.0	-	4.5	-	3.0	5	PHASE 5	-					EVB CL	R	11	5	PEDESTRIANS			V	iew	Only	y				LC)CA	ATION	1
6	MAX GAP	2.0	4.5	-	3.0	-	4.5	-	3.0	6	PHASE 6	-					EVC DI	Y	11	6	YIELD AT FLSH D/W										-lwy:		26	_
7	MIN GAP	2.0	4.5	-	3.0	-	4.5	-	3.0	7	PHASE 7	-					EVC CL	R	11	7	RED REST									Ì				
8	MAX LIMIT	10	45		30		45		30	8	PHASE 8	-					EVD DL	Y	11	8	DOUBLE ENTRY		Х		Х		Х		Х	1	At:		28th	Ave
9	MAXIMUM 2	-		-		-		-				MAX	ALT	ALT	ALT	ALT	EVD CL	R		9	VEH MAX CALL													
А	ADV /DLY WALK	-		1		1		-				INT	WALK	FLH	INT	EXT	RR2 DL	Y		А	SOFT RECALL												A B	B C
В	SEQUENCE TO	4		-		1		-						D/W			RR2 CL	R		В	MAXIMUM 2									PR	EEMPT	F	RR1-2 SF	P EMER
С	COND SRV MIN	-		-		-		-			ALL RED STAI	RT					EV CL	R]	С	COND SERVICE									MI	VIMUMS	s	PEV1 EV	2 VEH
D	REDUCE EVERY	1		1		I		-			(F/1+C+O)	=		5.	0		EV DL	Y		D	MAN CONT CALL									А	WLK (DF	LT)	4.0 4.	0 4.0
Е	YELLOW	2.0	5.4		4.1		5.4		4.1		RED REVERT						RR CL	R		Е	YELLOW START		Χ				Χ			В	FD WAL	<		
F	RED CLEAR		1.6		1.9		1.6		1.9		(F/1 + O + F)	=		5.	0		RR DL	Y		F	FIRST PHASES				Χ				Х	С	INITAL	-		
	PHASE BANK #	¢1 <	C +	0 + I	F = 1	>													Ì			< C	+ 0) + F	= -	>				Ì	< C + (0 +	F = 1 >	>
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0	EXCLUSIVE		2	3	4	3	0	'	0			-	2	3	-	5	0	/ °	- 1			-	2	5	-	5	•	-	0	101/		PL		
1										1								_	- 1	1	DHASE ELASH					_	-	_			<u> -/U + A</u>		FOET	
2	BR2 CLEAR									2	EXT PERMIT 2								-	2	FLASH WALK					_						- 1		
2	RR2 I TD SRV									2										2	GUAR PASS					_					<u>5/0 + A</u> ANIIAI	95		
4	PROT/PERM	x								4	EXOLO I ED								- 1	4	SIMUL GAP					_				1417	ANUAL	. 36	LEGI	
5	FLH TO PREMT	~								5	PED 2P OUT		x							5	SEQ TIMING					-								
6	FLASH ENTRY									6	PED 6P OUT		~		_		x		-li	6	ADV WALK			_	_				_	1	ΜΔΝ			N
7	DISABL MIN YEL									7	PED 4P OUT				х		~		1	7	DELAY WALK									0		natio	Maste	er)
8	DISABL OVP YEL									8	PED 8P OUT							x		8	EXT RECALL									0	= Contr		lan 1 - 0	21)
9	OVP FLH YEL									9	FLH YELLOW		х				х		11	9	-									14	(F) = Fr	ree (Isolate	, Y
Ā	EM VEH A									A									11	A	MAX EXTEN									15	(E) = S	oftw	are Flag	sh
в	EM VEH B									В										в	INH PED RSRV										(.) 0			
С	EM VEH C									С									11	С	SEMI ACTUATED										MANL	JAL	OFFS	SET
D	EM VEH D									D									11	D										0	= Autor	natio	c (Maste	er)
Е	EXTRA 1	Х		х		х				Е	RESTRICTED								11	Е	STRT VEH CALL									1	= Offset	A		.,
F	IC SELECT		Х							F	EXTRA 2								11	F	STRT PED CALL		х		Х		х		Х	2	= Offset	в		
								< C	+0	+ E :	= 125 >								┛┃		SPECIALS < C +	- 0	+ F =	2 >	•					3	= Offset	С		
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		0-0			T																													

Appendix C

Existing Traffic Operations Reports



2: 28th Avenue & 1	ioth Str	eet					(230	ou/) BGC	JS Zöth	Avenuê,	Owen SOL	
	≯	-	\mathbf{i}	1	-	*	1	1	1	1	Ŧ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	↑	1	ሻ	4		ሻ	4Î		٦	4	
Traffic Volume (vph)	14	134	10	158	250	42	20	42	57	39	16	10
Future Volume (vph)	14	134	10	158	250	42	20	42	57	39	16	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.978			0.914			0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1734	0	1641	1668	0	1492	1548	0
Flt Permitted	0.568			0.585			0.739			0.687		
Satd. Flow (perm)	1079	1810	1468	1100	1734	0	1276	1668	0	1079	1548	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		14			62			11	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	15	146	11	172	272	46	22	46	62	42	17	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	146	11	172	318	0	22	108	0	42	28	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	24.5	24.5	24.5	33.8	31.8		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.50	0.50	0.50	0.69	0.65		0.21	0.21		0.21	0.21	
v/c Ratio	0.03	0.16	0.01	0.20	0.28		0.08	0.27		0.18	0.08	
Control Delay	11.1	12.1	0.0	4.4	6.4		19.1	11.9		20.8	14.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Paradigm Transportation Solutions Limited

Lanes, Volumes, 1 2: 28th Avenue &	Fimings 16th Stre	eet					(230	607) BGC	Existi DS 28th	ng AN Avenue,	l Peak Owen Sou	Hour und TIS
	٨	-	\mathbf{r}	4	+	•	•	1	1	1	Ŧ	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	11.1	12.1	0.0	4.4	6.4		19.1	11.9		20.8	14.7	
LOS	В	В	А	А	А		В	В		С	В	
Approach Delay		11.2			5.7			13.2			18.4	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	0.9	9.4	0.0	5.5	14.0		1.8	3.9		3.6	1.4	
Queue Length 95th (m)	4.0	20.5	0.0	11.0	25.6		7.0	15.1		11.1	7.0	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	978	1641	1337	895	1734		819	1093		692	998	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.09	0.01	0.19	0.18		0.03	0.10		0.06	0.03	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 48	.7											
Natural Cycle: 75												
Control Type: Semi Act-Ur	icoord											
Maximum v/c Ratio: 0.28												
Intersection Signal Delay:	8.9			In	tersection	1 LOS: A						
Intersection Capacity Utiliz	ation 58.8%			IC	CU Level	of Service	В					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

Paradigm Transportation Solutions Limited

Movement EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Lane Configurations 1 <t< th=""><th>HCM 6th Signalized I 2: 28th Avenue & 16t</th><th>Interso h Stre</th><th>ection eet</th><th>Summ</th><th>ary</th><th></th><th></th><th>(2306</th><th>607) BGC</th><th>Existi</th><th>ng AM Avenue, (</th><th>Peak Owen Sou</th><th>Hour und TIS</th></t<>	HCM 6th Signalized I 2: 28th Avenue & 16t	Interso h Stre	ection eet	Summ	ary			(2306	607) BGC	Existi	ng AM Avenue, (Peak Owen Sou	Hour und TIS
Movement EBL EBT EBR WBL WBT WBT NBT NBT NBR SEL SBT SBR Lane Configurations 1 <t< th=""><th></th><th>۶</th><th>-</th><th>\mathbf{r}</th><th>4</th><th>+</th><th>•</th><th>•</th><th>Ť</th><th>*</th><th>1</th><th>ţ</th><th>~</th></t<>		۶	-	\mathbf{r}	4	+	•	•	Ť	*	1	ţ	~
Lane Configurations Y	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h) 14 134 10 158 250 42 20 42 57 39 16 10 Future Volume (veh/h) 14 134 10 158 250 42 20 42 57 39 16 10 Initial Q (20), veh 0	Lane Configurations	3	*	1	3	î.		<u>8</u>	۴.		<u>8</u>	1.	
Future Volume (veluth) 14 134 10 158 250 42 20 42 57 39 16 10 Initial Q(ab), veh 0 <td>Traffic Volume (veh/h)</td> <td>14</td> <td>134</td> <td>10</td> <td>158</td> <td>250</td> <td>42</td> <td>20</td> <td>42</td> <td>57</td> <td>39</td> <td>16</td> <td>10</td>	Traffic Volume (veh/h)	14	134	10	158	250	42	20	42	57	39	16	10
Initial Q (Qb), veh 0	Future Volume (veh/h)	14	134	10	158	250	42	20	42	57	39	16	10
Ped-Bike Adj(A, pbT) 1.00 <td< td=""><td>Initial Q (Qb), veh</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></td<>	Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Parking Bus, Adj 1.00 No No Adj SLOw Rate, veh/h 15 146 11 172 272 46 22 46 62 42 171 11 Peak Hour Factor 0.92 91 0.9	Ped-Bike Adj(A pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Work Zone On Åpproach No No No No No Ad j Sat Flow, vehvhin 1900 1826 1752 1885 1841 1515 1752 1796 1870 1589 1618 1752 Ad j Glow Rate, vehvh 15 146 11 172 272 46 62 42 17 11 Peak Hour Factor 0.92 9.93 10.92 918 594 Gr 0.92 918 594 Gr Volum(y), vehvh 0.92 0.16 0.0 0.82	Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln 1900 1826 1752 1885 1841 1515 1752 1796 1870 1589 1618 1752 Ad J Flow Rate, veh/h 15 146 11 172 272 46 62 42 17 11 Peak Hour Factor 0.92 0.93 0.92 0.92 0.93 0.92 0.92 0.92 0.92 <td>Work Zone On Approach</td> <td></td> <td>No</td> <td></td> <td></td> <td>No</td> <td></td> <td></td> <td>No</td> <td></td> <td></td> <td>No</td> <td></td>	Work Zone On Approach		No			No			No			No	
Adj Flow Rate, ve/nh 15 146 11 172 272 46 22 46 62 42 17 11 Peack Hour Factor 0.92 0.93 0.93 0.93 0.92 0.92 0.92 0.93 0.92 0.92 0.92 0.7 0.0	Adj Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Peak Hour Factor 0.92 0.93 0.93 0.93 0.93 0.93 0.92 0.0 0.32 0.0 0.33 0.16 0.0 0.0 0.0 0.0 0.0 0.0	Adj Flow Rate, veh/h	15	146	11	172	272	46	22	46	62	42	17	11
Percent Heavy Veh, % 0 5 10 1 4 26 10 7 2 21 19 10 Cap, veh/h 576 732 595 740 847 143 368 130 176 286 172 112 112 112 112 113 0.19 0.10 0.0 0.29 1.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 <td>Peak Hour Factor</td> <td>0.92</td>	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
Cap, velvh 576 732 595 740 847 143 368 130 176 286 172 111 Arrive On Green 0.40 0.40 0.40 0.09 0.55 0.19 0.10 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 <td>Percent Heavy Veh, %</td> <td>0</td> <td>5</td> <td>10</td> <td>1</td> <td>4</td> <td>26</td> <td>10</td> <td>7</td> <td>2</td> <td>21</td> <td>19</td> <td>10</td>	Percent Heavy Veh, %	0	5	10	1	4	26	10	7	2	21	19	10
Arrive On Green 0.40 0.40 0.09 0.55 0.55 0.19 0.18 0.19 0.18 0.19 0.18 0.19 0.16 0.162 100 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10	Cap, veh/h	576	732	595	740	847	143	368	130	176	286	172	112
Sat Flow, veh/h 1078 1826 1485 1795 1534 260 1295 693 935 1092 918 594 Grp Volume(v), veh/h 15 146 11 172 0 318 22 0 108 42 0 28 Grp Sat Flow(s), veh/h/ln 1078 1826 1485 1795 0 174 1295 0 1628 1092 0 1512 Q Serve(g.s), s 0.4 2.6 0.2 2.5 0.0 4.8 0.7 0.0 0.8 Prop In Lane 1.00 1.00 1.00 0.14 1.00 0.57 1.00 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 VIC Ratio(X) 0.03 0.20 0.02 0.23 0.00 0.10 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Arrive On Green	0.40	0.40	0.40	0.09	0.55	0.55	0.19	0.19	0.19	0.19	0.19	0.19
Grp Volume(v), veh/h 15 146 11 172 0 318 22 0 108 42 0 28 Grp Sat Flow(s), veh/h/ln 1078 1826 1485 1795 0 1794 1295 0 1628 1092 0 1512 Q Serve(g_s), s 0.4 2.6 0.2 2.5 0.0 4.8 0.7 0.0 2.9 1.7 0.0 0.8 Cycle Q Clear(g_c), s 0.4 2.6 0.2 2.5 0.0 4.8 1.5 0.0 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 V/C Ratio(X) 0.03 0.20 0.23 0.00 0.32 0.06 0.00 0.35 1.05 0.0 0.10 Avail Cap(c, a), veh/h 1117 1646 1338 900 0 2049 902 978 738 0 908 HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.	Sat Flow, veh/h	1078	1826	1485	1795	1534	260	1295	693	935	1092	918	594
Grp Sat Flow(s), veh/h/ln 1078 1826 1485 1795 0 1794 1295 0 1628 1092 0 1512 Q Servég_s), s 0.4 2.6 0.2 2.5 0.0 4.8 0.7 0.0 2.9 1.7 0.0 0.8 Cycle Q Clear(g_c), s 0.4 2.6 0.2 2.5 0.0 4.8 1.5 0.0 2.9 4.6 0.0 0.8 Prop In Lane 1.00 1.010 1.00 0.14 1.00 0.05 7.10 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 V/C Ratio(X) 0.03 0.20 0.02 0.23 0.00 0.35 0.15 0.00 0.10 Avait Cap(c_a), veh/h 1117 1646 1338 900 0 2049 902 978 738 0 908 HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Grp Volume(v), veh/h	15	146	11	172	0	318	22	0	108	42	0	28
Q Serve(g_s), s 0.4 2.6 0.2 2.5 0.0 4.8 0.7 0.0 2.9 1.7 0.0 0.8 Cycle Q Clear(g_c), s 0.4 2.6 0.2 2.5 0.0 4.8 0.7 0.0 2.9 4.6 0.0 0.8 Prop In Lane 1.00 1.00 1.00 0.14 1.00 0.57 1.00 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 V/C Ratio(X) 0.03 0.20 0.02 0.23 0.00 0.32 0.06 0.00 0.35 0.15 0.00 0.10 Avait Cap(c_a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.0 0.0 0.0 0.0	Grp Sat Flow(s),veh/h/ln	1078	1826	1485	1795	0	1794	1295	0	1628	1092	0	1512
Cycle Q Clear(g_c), s 0.4 2.6 0.2 2.5 0.0 4.8 1.5 0.0 2.9 4.6 0.0 0.8 Prop In Lane 1.00 1.00 1.00 0.14 1.00 0.57 1.00 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 0.62 0.28 0.24 VIC Ratio(X) 0.03 0.20 0.22 0.00 0.32 0.06 0.00 0.35 0.15 0.00 0.10 Avail Cap(c_a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platoon Ratio 1.00	Q Serve(g_s), s	0.4	2.6	0.2	2.5	0.0	4.8	0.7	0.0	2.9	1.7	0.0	0.8
Prop In Lane 1.00 1.00 1.00 0.14 1.00 0.57 1.00 0.39 Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 V/C Ratio(X) 0.03 0.20 0.23 0.00 0.32 0.06 0.05 0.15 0.00 0.10 Avail Cap(c, a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platoon Ratio 1.00	Cycle Q Clear(g_c), s	0.4	2.6	0.2	2.5	0.0	4.8	1.5	0.0	2.9	4.6	0.0	0.8
Lane Grp Cap(c), veh/h 576 732 595 740 0 990 368 0 306 286 0 284 V/C Ratio(X) 0.03 0.20 0.02 0.23 0.00 0.32 0.06 0.00 0.35 0.15 0.00 0.10 Avail Cap(c_a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platcon Ratio 1.00 0.0 0.0 0.0 0.0 0.0 0.0	Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.57	1.00		0.39
V/C Ratio(X) 0.03 0.20 0.02 0.23 0.00 0.32 0.06 0.00 0.35 0.15 0.00 0.10 Avait Cap(c, a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platoon Ratio 1.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Lane Grp Cap(c), veh/h	576	732	595	740	0	990	368	0	306	286	0	284
Avail Cap(c_a), veh/h 1117 1646 1338 900 0 2049 902 0 978 738 0 908 HCM Platoon Ratio 1.00	V/C Ratio(X)	0.03	0.20	0.02	0.23	0.00	0.32	0.06	0.00	0.35	0.15	0.00	0.10
HCM Platoon Ratio 1.00 0.0 <td>Avail Cap(c_a), veh/h</td> <td>1117</td> <td>1646</td> <td>1338</td> <td>900</td> <td>0</td> <td>2049</td> <td>902</td> <td>0</td> <td>978</td> <td>738</td> <td>0</td> <td>908</td>	Avail Cap(c_a), veh/h	1117	1646	1338	900	0	2049	902	0	978	738	0	908
Upstream Filter(I) 1.00 0.0 <td< td=""><td>HCM Platoon Ratio</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td></td<>	HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh 9.1 9.7 9.0 6.3 0.0 6.1 17.4 0.0 17.6 19.6 0.0 16.8 Incr Delay (d2), s/veh 0.0 0.2 0.0 0.1 0.0 0.3 0.1 0.0 0.7 0.2 0.0 0.1 Initial Q Delay(d3), s/veh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Incr Delay (d2), siveh 0.0 0.2 0.0 0.1 0.0 0.3 0.1 0.0 0.7 0.2 0.0 0.1 Initial Q Delay(d3), siveh 0.0 <	Uniform Delay (d), s/veh	9.1	9.7	9.0	6.3	0.0	6.1	17.4	0.0	17.6	19.6	0.0	16.8
Initial Q Delay(d3),s/veh 0.0 <t< td=""><td>Incr Delay (d2), s/veh</td><td>0.0</td><td>0.2</td><td>0.0</td><td>0.1</td><td>0.0</td><td>0.3</td><td>0.1</td><td>0.0</td><td>0.7</td><td>0.2</td><td>0.0</td><td>0.1</td></t<>	Incr Delay (d2), s/veh	0.0	0.2	0.0	0.1	0.0	0.3	0.1	0.0	0.7	0.2	0.0	0.1
%ile BackOfQ(50%),veh/ln 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.1 0.0 <td< td=""><td>Initial Q Delay(d3),s/veh</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></td<>	Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, siveh Unsig. Movement Delay, siveh 9.1 10.0 9.1 6.4 0.0 6.4 17.5 0.0 18.3 19.9 0.0 16.9 LnGrp Delay(d), siveh 9.1 10.0 9.1 6.4 0.0 6.4 17.5 0.0 18.3 19.9 0.0 16.9 LnGrp LOS A A A A B B A B A B A B A B A B A B A B A B A B A B B A B A A A A A A A A A A A<	%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0
LnGrp Delay(d),siveh 9.1 10.0 9.1 6.4 0.0 6.4 17.5 0.0 18.3 19.9 0.0 16.9 LnGrp DOS A A A A A A A A A A A A A A A A A A B B Constance Constan <t< td=""><td>Unsig. Movement Delay, s/veh</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Unsig. Movement Delay, s/veh												
LnGrp LOS A A A A A A A A A B A Dematrix Compare the constraints Constrais Constrais Constra	LnGrp Delay(d),s/veh	9.1	10.0	9.1	6.4	0.0	6.4	17.5	0.0	18.3	19.9	0.0	16.9
Approach Vol, veh/h 172 490 130 70 Approach Delay, s/veh 9.8 6.4 18.2 18.7 Approach LOS A A B B Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 7.5 27.0 15.4 34.5 15.4 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c-t-11), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	LnGrp LOS	A	A	Α	A	Α	A	В	A	В	В	A	B
Approach Delay, s/veh 9.8 6.4 18.2 18.7 Approach LOS A A B B Timer - Assigned Phs 1 2 4 6 8 B Phs Duration (G+Y+Rc), s 7.5 27.0 15.4 34.5 15.4 Change Period (Y+Rc), s 3.0 *7 * 6 *7 * 6 Max Green Setting (Gmax), s 9.0 *45 *30 *57 * 30 *6 6.8 4.9 Green Ext Time (g_c+11), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (g_c, s) 0.2 2.0 0.3 4.4 0.8 1	Approach Vol, veh/h		172			490			130			70	
Approach LOS A A B B Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G-Y+Rc), s 7.5 27.0 15.4 34.5 15.4 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+1), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (g_c, s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th Ctrl Delay 9.9 HCM 6th LOS A A A A A	Approach Delay, s/veh		9.8			6.4			18.2			18.7	
Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 7.5 27.0 15.4 34.5 15.4 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+1), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Approach LOS		А			А			В			В	
Phs Duration (G+Y+Rc), s 7.5 27.0 15.4 34.5 15.4 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+1), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Timer - Assigned Phs	1	2		4		6		8				
Change Period (Y+Rc), s 3.0 *7 *6 *7 *6 Max Green Setting (Gmax), s 9.0 *45 *30 *57 *30 Max Q Clear Time (g_c+f1), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Phs Duration (G+Y+Rc), s	7.5	27.0		15.4		34.5		15.4				
Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+11), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Change Period (Y+Rc), s	3.0	* 7		* 6		*7		* 6				
Max Q Clear Time (g_c+1f), s 4.5 4.6 6.6 6.8 4.9 Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Green Ext Time (p_c), s 0.2 2.0 0.3 4.4 0.8 Intersection Summary Intersection Summary	Max Q Clear Time (q c+l1), s	4.5	4.6		6.6		6.8		4.9				
Intersection Summary HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Green Ext Time (p_c), s	0.2	2.0		0.3		4.4		0.8				
HCM 6th Ctrl Delay 9.9 HCM 6th LOS A	Intersection Summary												
HCM 6th LOS A	HCM 6th Ctrl Delay			9.9									
	HCM 6th LOS			А									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 3

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ň	1		et.	ĥ		
Traffic Volume (vph)	45	17	78	75	42	143	
Future Volume (vph)	45	17	78	75	42	143	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.896		
Flt Protected	0.950			0.975			
Satd. Flow (prot)	1805	1615	0	1740	1652	0	
Flt Permitted	0.950			0.975			
Satd. Flow (perm)	1805	1615	0	1740	1652	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	49	18	85	82	46	155	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	49	18	0	167	201	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							

Paradigm Transportation Solutions Limited

HCM 6th TWSC 5: 28th Avenue & 8th Street

Existing AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection	_					
Int Delay, s/veh	3.1					
Movement	FBI	FBR	NBI	NBT	SBT	SBR
Lane Configurations	*	1	NDL	101	1001	ODIA
	45	17	78	75	42	1/12
Future Vol. veh/h	45	17	70	75	42	143
Conflicting Pode #/hr	45	0	10	15	42	145
Sign Control	Stop	Cton	Eroo	Eroo	Eroo	Eroo
BT Channelized	Stop	Nono	Fiee	None	FIEE	Viold
Storogo Longth	-	20	-	None	-	rieiu
Storage Length	# 0	20	-	-	-	-
ven in Wedian Storage,	,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	49	18	85	82	46	155
Major/Minor N	/linor2		Major1	Ν	Major2	
Conflicting Flow All	376	124	46	0	-	0
Stage 1	124	-	-	-	-	-
Stage 2	252		-			-
Critical Hdwy	64	62	4 15	-	-	-
Critical Hdwy Sto 1	5.4	- 0.2	-			-
Critical Hdwy Stg 7	5.4	-	-	-	-	-
Follow up Hdwy	3.5	33	2 245	-	-	_
Det Con 1 Manaurer	600	020	2.24J	-	-	-
Chara 1	029	952	1040	-	-	-
Stage 1	307	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Platoon blocked, %	500	000	4540	-	-	-
Mov Cap-1 Maneuver	593	932	1543	-	-	-
Mov Cap-2 Maneuver	593	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay s	10.9		3.8		0	
HCM LOS	B		0.0		· ·	
Minor Lane/Major Mvmt	t	NBL	NBT	EBLn1 E	EBLn2	SBT
Capacity (veh/h)		1543	-	593	932	-
HCM Lane V/C Ratio		0.055	-	0.082	0.02	-
HCM Control Delay (s)		7.5	0	11.6	8.9	-
HCM Lane LOS		A	A	В	Α	-
HCM 95th %tile Q(veh)		0.2	-	0.3	0.1	-

Paradigm Transportation Solutions Limited

Lanes, Volumes, T 2: 28th Avenue & 1	imings 6th Str	eet					(230	607) BGC	Existi DS 28th	ing PN Avenue,	l Peak Owen Sou	Hour und TIS
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ኘ	1	1	1	4Î		۲.	f,		۲.	4Î	
Traffic Volume (vph)	9	298	44	82	215	49	24	47	120	31	50	31
Future Volume (vph)	9	298	44	82	215	49	24	47	120	31	50	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.972			0.892			0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	1863	1615	1719	1682	0	1736	1617	0	1687	1704	0
Flt Permitted	0.584			0.492			0.700			0.643		
Satd. Flow (perm)	1000	1863	1615	890	1682	0	1279	1617	0	1142	1704	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		19			130			32	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adj. Flow (vph)	10	324	48	89	234	53	26	51	130	34	54	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	324	48	89	287	0	26	181	0	34	88	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	_
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	20.4	20.4	20.4	31.2	27.2		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.40	0.40	0.40	0.62	0.54		0.21	0.21		0.21	0.21	
v/c Ratio	0.02	0.43	0.07	0.14	0.32		0.10	0.42		0.15	0.24	
Control Delay	10.7	14.2	3.0	4.4	7.1		18.7	10.5		19.5	14.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Paradigm Transportation Solutions Limited

Lanes, Volumes, 2: 28th Avenue &	Timings 16th Stre	eet					(230	607) BGC	Existi DS 28th	ng PN Avenue,	1 Peak Owen Sou	Hour und TIS
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	10.7	14.2	3.0	4.4	7.1		18.7	10.5		19.5	14.6	
LOS	В	В	А	А	А		В	В		В	В	
Approach Delay		12.7			6.4			11.5			16.0	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	0.6	22.3	0.0	2.7	12.1		2.1	4.2		2.8	4.6	
Queue Length 95th (m)	3.1	44.0	4.0	7.1	25.0		7.6	18.6		9.3	14.9	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	885	1649	1437	696	1682		762	1016		681	1029	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.20	0.03	0.13	0.17		0.03	0.18		0.05	0.09	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	0.7											
Natural Cycle: 75												
Control Type: Semi Act-U	Incoord											
Maximum v/c Ratio: 0.43												
Intersection Signal Delay:	: 10.7			Ir	itersection	n LOS: B						
Intersection Capacity Utili	zation 73.2%			IC	CU Level	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1		↓ _{Ø4}	
12 s	52 s	36 s	
₹ø6		1 Ø8	
64 s		36 s	

Paradigm Transportation Solutions Limited

Movement EBI EBT EBR WBI WBT WBR NBI NBT NBR SBI SBR Lane Configurations 1	HCM 6th Signalized I 2: 28th Avenue & 16t	Interse th Stre	ection eet	Summ	ary			(2306	607) BGC	Existi	ng PM Avenue, (Peak Owen Sou	Hour
Movement EBI EBI EBI EBI WBI WBI WBI NBI NBI SBL SBL SBI SBR Lane Configurations T<		۶	→	*	4	+	×	<	1	1	*	Ŧ	•
Lane Configurations Y	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/n) 9 298 44 82 215 49 24 47 120 31 50 31 Future Volume (veh/n) 9 298 44 82 215 49 24 47 120 31 50 31 Future Volume (veh/n) 9 298 44 82 215 49 24 47 120 31 50 31 Initial Q (20), veh 0	Lane Configurations	٦	•	1	۲	ĥ		٦	î,		٦.	ĥ	
Future Volume (veluh) 9 298 44 82 215 49 24 47 120 31 50 31 Initial Q (2b), veh 0	Traffic Volume (veh/h)	9	298	44	82	215	49	24	47	120	31	50	31
Initial (Qb), veh 0	Future Volume (veh/h)	9	298	44	82	215	49	24	47	120	31	50	31
Ped-Bike Adj(A,pbT) 1.00	Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Parking Bus, Adj 1.00 No No No Adj Star Flow, veh/hin 10 324 48 89 234 53 26 51 31 4 17 0 7 0 13 Cap, veh/h 55 5 31 4 17 0 7 0 13 Cap, veh/h 55 5 31 4 17 0 7 0 13 Cap, veh/h 104 1870 1610 1739 1441 326 1288 411 1048 1155 1090 686 Gr 157 652 177 652 177 1652 0 1459 10	Ped-Bike Adj(A pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Work Zone On Åpproach No No No No No No Adj Sat Flow, veh/hin 1737 1870 1900 1826 1826 1441 1841 1648 1900 1707 Adj Sat Flow, veh/hin 10 324 48 89 234 53 26 51 130 34 54 34 Peak Hour Factor 0.92	Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln 1737 1870 1900 1826 1826 1441 1841 1648 1900 1796 1900 1707 Adj Flow Rate, veh/h 10 324 48 89 234 53 26 51 130 34 54 34 Peak Hour Factor 0.92	Work Zone On Approach		No			No			No			No	
Adj Flow Rate, veh/h 10 324 48 89 234 53 26 61 130 34 54 34 Peak Hour Factor 0.92 0.82 216 0 0.10 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.30 0.77 1.00 0.20	Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Peak Hour Factor 0.92 0.9	Adj Flow Rate, veh/h	10	324	48	89	234	53	26	51	130	34	54	34
Percent Heavy Veh, % 11 2 0 5 5 31 4 17 0 7 0 13 Cap, veh/h S56 757 652 546 773 175 350 82 210 246 218 131 Arrive On Green 0.40 0.40 0.40 0.40 0.40 0.74 0.54 0.54 0.20	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
Cap, veh/h 556 757 652 546 773 175 350 82 210 246 218 137 Arrive On Green 0.40 0.40 0.07 0.54 0.54 0.20 0.21 1773 0.0 4.4 2.9 0.0 5.6 1.4 0.0 2.1 100 0.02 1.00 1.00 2.01 0.0 2.3 0.7 0.0 0.21 100 1.00 1.00 1.00 1.00 1.00	Percent Heavy Veh, %	11	2	0	5	5	31	4	17	0	7	0	13
Arrive On Green 0.40 0.40 0.07 0.54 0.20 0.88 0.77 0.78 0 1459 0.0 21 1776 Qserve(g_s), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 7.0 0.0 21 Prop In Lane 1.00 1.00 1.00 1.00 0.01 0.01 0.02 0.44 0.00 0.203 874 0 886 716 0	Cap, veh/h	556	757	652	546	773	175	350	82	210	246	218	137
Sat Flow, veh/h 1014 1870 1610 1739 1441 326 1288 411 1048 1155 1090 686 Grp Volume(v), veh/h 101 324 48 89 0 287 26 0 181 34 0 88 Grp Sat Flow(s), veh/h/ln 1014 1870 1610 1739 0 1767 1288 0 1459 1155 0 1776 Q Serve(g.s), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 7.0 0.0 2.1 Prop In Lane 1.00 1.00 1.00 1.018 1.00 0.72 1.00 0.39 Lane Grp Cap(c), veh/h 556 757 652 546 0 949 350 0 292 246 0 356 Avail Cap(c_a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platcon Ratio 1.00 1.00 1.00 1.00 1.00	Arrive On Green	0.40	0.40	0.40	0.07	0.54	0.54	0.20	0.20	0.20	0.20	0.20	0.20
Grp Volume(v), veh/h 10 324 48 89 0 287 26 0 181 34 0 88 Grp Sat Flow(s), veh/h/lin 1014 1870 1610 1739 0 1767 1288 0 1459 1155 0 1776 Q Serve(g_s), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 1.4 0.0 2.1 Cycle Q Clear(g_c), s 0.3 6.2 0.9 1.3 0.0 4.4 2.9 0.0 5.6 7.0 0.0 2.1 Cycle Q Clear(g_c), weh/h 556 757 652 546 0 949 350 0 292 246 0 0.356 Avail Cap(c, a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 100 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	Sat Flow, veh/h	1014	1870	1610	1739	1441	326	1288	411	1048	1155	1090	686
Grp Sat Flow(s), veh/h/ln 1014 1870 1610 1739 0 1767 1288 0 1459 1155 0 1776 Q Servég_s), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 1.4 0.0 2.1 Cycle Q Clear(g_c), s 0.3 6.2 0.9 1.3 0.0 4.4 2.9 0.0 5.6 7.0 0.0 2.1 Prop In Lane 1.00 1.00 1.01 0.00 0.18 1.00 0.77 1.00 0.356 V/C Ratio(X) 0.02 0.43 0.07 0.16 0.00 0.30 0.07 0.00 0.62 0.14 0.00 0.25 Avail Cap(c_a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Grp Volume(v), veh/h	10	324	48	89	0	287	26	0	181	34	0	88
Q Serve(g_s), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 1.4 0.0 2.1 Cycle Q Clear(g_c), s 0.3 6.2 0.9 1.3 0.0 4.4 0.9 0.0 5.6 7.0 0.0 2.1 Prop In Lane 1.00 1.00 1.00 0.18 1.00 0.72 1.00 0.39 Lane Grp Cap(c), veh/h 556 757 652 546 0 949 350 0 292 246 0 356 V/C Ratio(X) 0.02 0.43 0.07 0.16 0.00 0.30 0.07 0.00 0.62 0.14 0.00 0.25 Avait Cap(c_a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 0.0 0.0 0.0 <td>Grp Sat Flow(s),veh/h/ln</td> <td>1014</td> <td>1870</td> <td>1610</td> <td>1739</td> <td>0</td> <td>1767</td> <td>1288</td> <td>0</td> <td>1459</td> <td>1155</td> <td>0</td> <td>1776</td>	Grp Sat Flow(s),veh/h/ln	1014	1870	1610	1739	0	1767	1288	0	1459	1155	0	1776
Cycle Q Člear(g_c), s 0.3 6.2 0.9 1.3 0.0 4.4 2.9 0.0 5.6 7.0 0.0 2.1 Prop In Lane 1.00 1.00 1.00 0.18 1.00 0.72 1.00 0.39 Lane Grp Cap(c), veh/h 556 757 652 546 0 949 350 0 292 246 0 356 Avail Cap(c_a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platcon Ratio 1.00 1.0	Q Serve(g_s), s	0.3	6.2	0.9	1.3	0.0	4.4	0.9	0.0	5.6	1.4	0.0	2.1
Prop In Lane 1.00 1.00 1.00 0.18 1.00 0.72 1.00 0.39 Lane Grp Cap(c), veh/h 556 757 652 546 0 949 350 0 292 246 0 356 V/C Ratio(X) 0.02 0.43 0.07 0.16 0.00 0.03 0.07 0.00 0.62 0.14 0.00 0.25 Avail Cap(C, a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 100 1.00	Cycle Q Clear(g_c), s	0.3	6.2	0.9	1.3	0.0	4.4	2.9	0.0	5.6	7.0	0.0	2.1
Lane Grp Cap(c), veh/h 556 757 652 546 0 949 350 0 292 246 0 356 VIC Ratio(X) 0.02 0.43 0.07 0.16 0.00 0.30 0.07 0.00 0.62 0.14 0.00 0.25 Avail Cap(c_a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platoon Ratio 1.00 0.0 0.0 0.0 0.0 0.0 0.0	Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.72	1.00		0.39
V/C Ratio(X) 0.02 0.43 0.07 0.16 0.00 0.30 0.07 0.00 0.62 0.14 0.00 0.25 Avail Cap(c, a), veh/h 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platoon Ratio 1.00 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Lane Grp Cap(c), veh/h	556	757	652	546	0	949	350	0	292	246	0	356
Avail Cap(c_a), veh/n 1069 1703 1466 739 0 2038 874 0 886 716 0 1078 HCM Platcon Ratio 1.00 <td< td=""><td>V/C Ratio(X)</td><td>0.02</td><td>0.43</td><td>0.07</td><td>0.16</td><td>0.00</td><td>0.30</td><td>0.07</td><td>0.00</td><td>0.62</td><td>0.14</td><td>0.00</td><td>0.25</td></td<>	V/C Ratio(X)	0.02	0.43	0.07	0.16	0.00	0.30	0.07	0.00	0.62	0.14	0.00	0.25
HCM Platoon Ratio 1.00 1.	Avail Cap(c_a), veh/h	1069	1703	1466	739	0	2038	874	0	886	716	0	1078
Upstream Filter(I) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), siveh 8.8 10.6 9.0 6.8 0.0 6.3 17.9 0.0 18.0 21.2 0.0 16.6 Incr Delay (d2), siveh 0.0 0.7 0.1 0.1 0.0 0.3 0.1 0.0 2.1 0.3 0.0 0.4 Initial Q Delay(d3), siveh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Incr Delay (d2), siveh 0.0 0.7 0.1 0.1 0.0 0.3 0.1 0.0 2.1 0.3 0.0 0.4 Initial Q Delay(d3), siveh 0.0 <	Uniform Delay (d), s/veh	8.8	10.6	9.0	6.8	0.0	6.3	17.9	0.0	18.0	21.2	0.0	16.6
Initial Q Delay(d3), siveh 0.0 </td <td>Incr Delay (d2), s/veh</td> <td>0.0</td> <td>0.7</td> <td>0.1</td> <td>0.1</td> <td>0.0</td> <td>0.3</td> <td>0.1</td> <td>0.0</td> <td>2.1</td> <td>0.3</td> <td>0.0</td> <td>0.4</td>	Incr Delay (d2), s/veh	0.0	0.7	0.1	0.1	0.0	0.3	0.1	0.0	2.1	0.3	0.0	0.4
%ile BackOfQ(50%),veh/ln 0.0 0.1 0.0 0.0 0.1 0.0 0.1 0.0 0.1 0.0 0.1 0.0 0.0 0.1 0.0 0.0 0.1 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.0 0.1 0.0 0.1 0.0 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 <td< td=""><td>Initial Q Delay(d3),s/veh</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></td<>	Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, siveh LnGrp Delay(d), siveh 8.9 11.2 9.1 6.9 0.0 6.6 17.9 0.0 20.2 21.5 0.0 17.0 LnGrp DOS A B A A A B A C C A B Approach Vol, veh/h 382 376 207 122 Approach Delay, s/veh 10.9 6.7 19.9 18.2 Approach LOS B A B B B Timer - Assigned Phs 1 2 4 6 8 B Phs Duration (G+Y+Rc), s 6.5 27.0 15.9 33.5 15.9 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q.Clear Time (g_c+11), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (g_c, c+11), s 3.3 8.2 9.0 6.4 7.6	%ile BackOfQ(50%),veh/In	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.1
LnGrp Delay(d),siveh 8.9 11.2 9.1 6.9 0.0 6.6 17.9 0.0 20.2 21.5 0.0 17.0 LnGrp Dols A B A A A A A A B A C C A B Approach Vol, veh/h 382 376 207 122 Approach Dolay, siveh 10.9 6.7 19.9 18.2 Approach LOS B A B A B </td <td>Unsig. Movement Delay, s/veh</td> <td></td>	Unsig. Movement Delay, s/veh												
LnGrp LOS A B A A A A B A A A B A C C A B A A A A A B A C C C A B A C C A B A C C A B A A B A C C A B A A B A D D Description (120) Description (120) <thdescription (120)<="" th=""> <thdescription (120)<="" th=""></thdescription></thdescription>	LnGrp Delay(d),s/veh	8.9	11.2	9.1	6.9	0.0	6.6	17.9	0.0	20.2	21.5	0.0	17.0
Approach Vol, veh/n 382 376 207 122 Approach Vol, veh/n 10.9 6.7 19.9 18.2 Approach LOS B A B B Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 6.5 27.0 15.9 33.5 15.9 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c-H1), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th CH Delay 12.0 HCM 6th LOS B	LnGrp LOS	A	В	A	A	A	A	В	A	C	C	A	<u> </u>
Approach Delay, s/veh 10.9 6.7 19.9 18.2 Approach LOS B A B <td>Approach Vol, veh/h</td> <td></td> <td>382</td> <td></td> <td></td> <td>376</td> <td></td> <td></td> <td>207</td> <td></td> <td></td> <td>122</td> <td></td>	Approach Vol, veh/h		382			376			207			122	
Approach LOS B A B B Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G-Y+Rc), s 6.5 27.0 15.9 33.5 15.9 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (gc+11), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (gc), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th Ctrl Delay B	Approach Delay, s/veh		10.9			6.7			19.9			18.2	
Timer - Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 6.5 27.0 15.9 33.5 15.9 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+1), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Approach LOS		В			A			В			В	
Phs Duration (G+Y+Rc), s 6.5 27.0 15.9 33.5 15.9 Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+t1), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Timer - Assigned Phs	1	2		4		6		8				
Change Period (Y+Rc), s 3.0 * 7 * 6 * 7 * 6 Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (g_c+t1), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Phs Duration (G+Y+Rc), s	6.5	27.0		15.9		33.5		15.9				
Max Green Setting (Gmax), s 9.0 * 45 * 30 * 57 * 30 Max Q Clear Time (p_g.c+11), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Change Period (Y+Rc), s	3.0	* 7		* 6		* 7		* 6				
Max Q Clear Time (g_c+1), s 3.3 8.2 9.0 6.4 7.6 Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary Intersection Summary 12.0 HCM 6th Ctrl Delay B	Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Green Ext Time (p_c), s 0.1 4.8 0.7 4.0 1.4 Intersection Summary Intersection Summary	Max Q Clear Time (g_c+I1), s	3.3	8.2		9.0		6.4		7.6				
Intersection Summary HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Green Ext Time (p_c), s	0.1	4.8		0.7		4.0		1.4				
HCM 6th Ctrl Delay 12.0 HCM 6th LOS B	Intersection Summary												
HCM 6th LOS B	HCM 6th Ctrl Delay			12.0									
	HCM 6th LOS			В									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Synchro 11 Report Page 3

0. 20017 Wende d	ourouco	<i>.</i>					(200007) BOOBO 2007 Avenue, Owen e
	٦	\mathbf{r}	1	1	ŧ	-	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	1	1		ا	eî		
Traffic Volume (vph)	133	46	25	57	90	89	
Future Volume (vph)	133	46	25	57	90	89	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.933		
Flt Protected	0.950			0.985			
Satd. Flow (prot)	1805	1615	0	1705	1746	0	
Flt Permitted	0.950			0.985			
Satd. Flow (perm)	1805	1615	0	1705	1746	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Adj. Flow (vph)	145	50	27	62	98	97	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	145	50	0	89	195	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 31.9%			10	CU Level of	of Service A	ł

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HCM 6th TWSC 5: 28th Avenue & 8th Street

Existing PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

-			-				
Intersection							ļ
Int Delay, s/veh	4.8						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	*	1		4	1	00.1	1
Traffic Vol. veh/h	133	46	25	57	90	89	
Future Vol. veh/h	133	46	25	57	90	80	
Conflicting Peds #/hr	0		0	0	0	0	
Sign Control	Ston	Stop	Free	Free	Free	Free	
RT Channelized	Otop	None	1100	None	1100	Vield	
Storage Length	0	20	-	None	_	Ticiu	
Veh in Median Storage	# 0	20	-	0	-	-	
Grade %	,# 0	-	-	0	0	-	
Deak Hour Fester	02	- 02	- 02	00	00	- 02	
	92	92	92	92	92	92	
Heavy venicles, %	0	0	0	14	2	07	
MVMt Flow	145	50	27	62	98	97	
Major/Minor N	/linor2	١	Major1		Major2		
Conflicting Flow All	263	147	98	0	-	0	
Stage 1	147	-	-	-	-	-	
Stage 2	116	-	-	-	-		
Critical Hdwy	64	62	41	-	-	-	
Critical Hdwy Sto 1	5.4						
Critical Hdwy Stg 7	5.4	-	_	-	-	_	
Follow-up Hdwy	3.5	33	22	_	_	_	
Pot Con 1 Manautron	720	0.5	1500				
Ful Cap-1 Maneuver	005	900	1500	-	-	-	
Stage 1	000	-	-	-	-	-	
Stage 2	914	-	-	-	-	-	
Platoon blocked, %	740	005	4500	-	-	-	
Mov Cap-1 Maneuver	716	905	1508	-	-	-	
Mov Cap-2 Maneuver	/16	-	-	-	-	-	
Stage 1	868	-	-	-	-	-	
Stage 2	914	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay	10.8		23		0		
HCM LOS	10.0 R		2.0		0		
	D						
Minor Lane/Major Mvmt	t _	NBL	NBT	EBLn1	EBLn2	SBT	
Capacity (veh/h)		1508	-	716	905	-	
HCM Lane V/C Ratio		0.018	-	0.202	0.055	-	
			-				
HCM Control Delay (s)		7.4	0	11.3	9.2	-	
HCM Control Delay (s) HCM Lane LOS		7.4 A	0 A	11.3 B	9.2 A	-	

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Appendix D

Background Development Traffic Volumes





Background Development Traffic Volumes – AM Peak Hour Industrial Development

Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607

Appendix D.1a





Background Development Traffic Volumes – PM Peak Hour Industrial Development

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.1b





Background Development Traffic Volumes – AM Peak Hour 2275 16th Street



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.2a




Background Development Traffic Volumes – PM Peak Hour 2275 16th Street

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.2b

Heritage Grove Site Plan



Heritage Grove Trip Generation

L and Llas	1,000 ft ²	Α	M Pea	k Hou	ır	PM Peak Hour			
	GFA	Rate	In	Out	Total	Rate	In	Out	Total
LUC 821 - Shopping Plaza (40-150k) - Supermarket - No	61.50	1.73	66	40	106	5.19	156	163	319
LUC 850 - Supermarket	35.00	2.86	59	41	100	Eq	165	165	330
LUC 882 - Marijuana Dispensary	1.40	10.54	8	7	15	18.92	13	13	26
LUC 932 - High-Turnover (Sit-Down) Restaurant	4.50	9.57	24	19	43	9.05	25	16	41
Total Trip Generation			157	107	264		359	357	716
Internal Capture		0%	0	0	0	4%	14	14	28
LUC 821 Pass-by		0%	0	0	0	40%	64	64	128
LUC 850 Pass-by		0%	0	0	0	24%	40	40	80
LUC 932 - Pass-by		0%	0	0	0	43%	9	9	18
Net Trip Generation			157	107	264		241	239	480





Background Development Traffic Volumes – AM Peak Hour Heritage Grove Centre

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.3a





Background Development Traffic Volumes – PM Peak Hour Heritage Grove Centre

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.3b





Background Development Traffic Volumes – AM Peak Hour 50% Commercial Lands

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.4a





Background Development Traffic Volumes – PM Peak Hour 50% Commercial Lands

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.4b



Background Development Traffic Volumes – AM Peak Hour 50% Residential Lands

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.5a



Background Development Traffic Volumes – PM Peak Hour 50% Residential Lands

Appendix D.5b





Background Development Traffic Volumes – AM Peak Hour 100% Commercial Lands

Appendix D.6a



Background Development Traffic Volumes – PM Peak Hour 100% Commercial Lands

Appendix D.6b



Background Development Traffic Volumes – AM Peak Hour 100% Residential Lands

Appendix D.7a



Background Development Traffic Volumes – PM Peak Hour 100% Residential Lands

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.7b



Background Development Traffic Volumes AM Peak Hour 100% Residential Lands (Additional Scenario)

Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.8a



Background Development Traffic Volumes PM Peak Hour 100% Residential Lands (Additional Scenario)



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607

Appendix D.8b

Appendix E

2028 Background Traffic Operations Reports



Lanes, Volumes, T 2: 28th Avenue & 1	imings I6th Str	eet					20 (230	28 Bac 607) BGC	c kgrou DS 28th	nd AN Avenue,	1 Peak Owen Sou	Hour Ind TIS
	۶	-	$\mathbf{\hat{z}}$	4	+	•	•	Ť	۲	1	ŧ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	1	1	٦	¢Î		۲	4		۲	4Î	
Traffic Volume (vph)	41	159	10	164	284	58	21	46	59	44	17	16
Future Volume (vph)	41	159	10	164	284	58	21	46	59	44	17	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.916			0.927	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1720	0	1641	1670	0	1492	1537	0
Flt Permitted	0.540			0.570			0.734			0.684		
Satd. Flow (perm)	1026	1810	1468	1072	1720	0	1268	1670	0	1074	1537	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			64			17	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	45	173	11	178	309	63	23	50	64	48	18	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	173	11	178	372	0	23	114	0	48	35	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	_
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	_
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								_
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	_
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		1.0	1.0		1.0	7.0	
Pedestrian Calls (#/hr)	0	0	0	00.0	0		0	0		0	0	
Act Effect Green (s)	24.3	24.3	24.3	33.6	31.6		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.50	0.50	0.50	0.69	0.65		0.22	0.22		0.22	0.22	
V/C Katio	0.09	0.19	0.01	0.21	0.33		0.08	0.27		0.20	0.10	
Control Delay	11.9	12.4	0.0	4.4	6.8		19.1	12.2		21.2	13.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	11.9	12.4	0.0	4.4	6.8		19.1	12.2		21.2	13.6	
LOS	В	В	А	А	А		В	В		С	В	
Approach Delay		11.7			6.0			13.3			18.0	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	2.8	11.3	0.0	5.7	16.9		1.9	4.2		4.1	1.5	
Queue Length 95th (m)	8.8	24.5	0.0	11.6	31.4		7.1	15.8		12.2	7.8	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	927	1636	1333	882	1720		826	1110		699	1007	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.11	0.01	0.20	0.22		0.03	0.10		0.07	0.03	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 4	8.5											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.33												
Intersection Signal Delay:	9.3			In	tersectior	LOS: A						
Intersection Capacity Utili	zation 60.9%			IC	U Level o	of Service	В					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

√ Ø1	÷02	↓ Ø4
12 s	52 s	36 s
₹ø6		√ _{Ø8}
64 s		36 s

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2028 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	۶	-	$\mathbf{\hat{v}}$	4	+	•	•	Ť	۲	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	•	1	۲.	1.		٦	4Î		٦	4Î	
Traffic Volume (veh/h)	41	159	10	164	284	58	21	46	59	44	17	16
Future Volume (veh/h)	41	159	10	164	284	58	21	46	59	44	17	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Adj Flow Rate, veh/h	45	173	11	178	309	63	23	50	64	48	18	17
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
Percent Heavy Veh, %	0	5	10	1	4	26	10	7	2	21	19	10
Cap, veh/h	553	729	592	714	817	166	363	136	174	284	146	138
Arrive On Green	0.40	0.40	0.40	0.09	0.55	0.55	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1026	1826	1485	1795	1484	303	1286	716	916	1086	765	723
Grp Volume(v), veh/h	45	173	11	178	0	372	23	0	114	48	0	35
Grp Sat Flow(s).veh/h/ln	1026	1826	1485	1795	0	1786	1286	0	1631	1086	0	1488
Q Serve(q s), s	1.4	3.2	0.2	2.6	0.0	5.9	0.8	0.0	3.0	2.0	0.0	1.0
Cycle Q Clear(g c), s	1.4	3.2	0.2	2.6	0.0	5.9	1.7	0.0	3.0	5.1	0.0	1.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.56	1.00		0.49
Lane Grp Cap(c), veh/h	553	729	592	714	0	983	363	0	310	284	0	283
V/C Ratio(X)	0.08	0.24	0.02	0.25	0.00	0.38	0.06	0.00	0.37	0.17	0.00	0.12
Avail Cap(c a), veh/h	1065	1640	1333	873	0	2032	889	0	977	728	0	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.5	10.0	9.1	6.4	0.0	6.4	17.5	0.0	17.7	19.9	0.0	16.8
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.1	0.0	0.4	0.1	0.0	0.7	0.3	0.0	0.2
Initial Q Delav(d3).s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0
Unsig, Movement Delay, s/veh												
LnGrp Delav(d).s/veh	9.6	10.3	9.1	6.5	0.0	6.8	17.6	0.0	18.4	20.1	0.0	17.0
LnGrp LOS	A	В	A	A	A	A	В	A	В	С	A	В
Approach Vol. veh/h		229			550			137			83	
Approach Delay, s/veh		10.1			6.7			18.3			18.8	
Approach LOS		B			A			B			B	
Timer - Assigned Phs	1	2		4		6		- 8			_	
Pho Duration (C+V+Pa) a	76	27.0		15.5		24.6		15.5				
Change Boried (V Be)	2.0	27.0		10.0		34.0		10.0				
Max Croop Sotting (Cmax)	0.0	* 45		* 20		* 57		* 20				
Max O Clean Time (g. e. 11)	9.0	40		30 7 1		57		50				
Max Q Clear Time (g_C+Tr), s	4.0	5.2		7.1		7.9		5.0				
Green Ext Time (p_c), s	0.2	2.7		0.4		5.4		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			10.1									
HCM 6th LOS			В									
N1 /												

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 3

Lanes, Volumes, [·] 5: 28th Avenue &	Timings 8th Stree	et					2028 Background AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI-
	٦	*	•	1	ţ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	2	1		÷.	¢Î		
Traffic Volume (vph)	47	18	81	80	44	149	
Future Volume (vph)	47	18	81	80	44	149	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.896		
Flt Protected	0.950			0.975			
Satd, Flow (prot)	1805	1615	0	1740	1652	0	
Flt Permitted	0.950			0.975			
Satd. Flow (perm)	1805	1615	0	1740	1652	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	51	20	88	87	48	162	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	51	20	0	175	210	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	zation 33.5%			IC	CU Level of	of Service A	

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2028 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.2					
Manager			ND	NDT	007	000
iviovement	ERL	ERK	NRL	NRI	SBI	SBR
Lane Contigurations	្រ	1	•	୍ୟ	F	
Trattic Vol, veh/h	47	18	81	80	44	149
Future Vol, veh/h	47	18	81	80	44	149
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e,#0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mymt Flow	51	20	88	87	48	162
	•••	20	00	0.		
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	392	129	48	0	-	0
Stage 1	129	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.245	-	-	-
Pot Cap-1 Maneuver	616	926	1540	-	-	-
Stage 1	902					
Stage 2	786		-	-	-	-
Platoon blocked %	100		-	-	-	-
May Cap 1 Manauwar	570	026	1540	-	-	-
Mov Cap-1 Maneuver	579	920	1040	-	-	-
wov Cap-2 maneuver	5/9	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay s	11		3.8		0	
HCM LOS	B		0.0			
	U					
Minor Lane/Major Mvn	nt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)		1540	-	579	926	-
HCM Lane V/C Ratio		0.057	-	0.088	0.021	-
HCM Control Delay (s))	7.5	0	11.8	9	-
HCM Lane LOS		A	A	В	A	-
HCM 95th %tile Q(veh)	0.2	-	0.3	0.1	-
	/	0.2		0.0	0.1	

Paradigm Transportation Solutions Limited

Lanes, Volumes, T <u>2: 28th Avenue & 1</u>	imings 6th Str	eet					20 (230	28 Bac 607) BGC	c kgrou DS 28th	IND PN Avenue,	1 Peak Owen Sou	Hour und TIS
	٦	-	\mathbf{F}	*	+	•	1	1	1	1	Ļ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	ľ	¢Î		ľ	¢Î		ľ	ef.	
Traffic Volume (vph)	16	338	46	85	254	55	25	49	125	46	54	55
Future Volume (vph)	16	338	46	85	254	55	25	49	125	46	54	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.973			0.892			0.924	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	1863	1615	1719	1686	0	1736	1618	0	1687	1648	0
Flt Permitted	0.558			0.453			0.681			0.639		
Satd. Flow (perm)	955	1863	1615	820	1686	0	1244	1618	0	1135	1648	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		18			132			52	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adj. Flow (vph)	17	367	50	92	276	60	27	53	136	50	59	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	367	50	92	336	0	27	189	0	50	119	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	_
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	_
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	_
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	_
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	_
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	4 5		2.0	2.0		2.0	2.0	_
Venicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Kecall Mode	MIN 17.0	MIN	IVIIN	None	Min		None	None		None	None	
Vvaik Time (S)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
FidSR DORT Walk (S)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Peuestrian Calls (#/fif)	0	0	0	21.0	0		10.0	10.6		10.0	10.6	
Act LITCE Green (S)	21.0	21.0	21.0	31.9	21.9		10.6	0.01		10.6	0.01	
Actualeu g/C Katio	0.41	0.41	0.41	0.62	0.04		0.21	0.21		0.21	0.21	
V/C Rdtl0	0.04	0.48	0.07	0.15	0.3/		0.11	0.43		0.22	0.31	
Ouroue Delay	10.9	14.8	3.0	4.5	1.0		19.0	0.0		21.4	14.7	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	10.9	14.8	3.0	4.5	7.6		19.6	11.1		21.4	14.7	
LOS	В	В	А	А	А		В	В		С	В	
Approach Delay		13.3			6.9			12.2			16.7	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	1.0	26.0	0.0	2.8	14.9		2.2	4.7		4.1	5.5	
Queue Length 95th (m)	4.4	51.2	4.2	7.6	30.6		8.4	20.7		13.2	18.8	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	859	1675	1459	665	1667		731	1005		667	990	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.22	0.03	0.14	0.20		0.04	0.19		0.07	0.12	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 51.	.6											
Natural Cycle: 75												
Control Type: Semi Act-Un	coord											
Maximum v/c Ratio: 0.48												
Intersection Signal Delay: 1	11.4			In	tersection	LOS: B						
Intersection Capacity Utilization	ation 73.6%			IC	CU Level o	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2028 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	۶	-	\mathbf{r}	4	-	•	1	1	۲	1	Ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	1	1	۲	¢Î		٦	eî		۲	f,	
Traffic Volume (veh/h)	16	338	46	85	254	55	25	49	125	46	54	55
Future Volume (veh/h)	16	338	46	85	254	55	25	49	125	46	54	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adj Flow Rate, veh/h	17	367	50	92	276	60	27	53	136	50	59	60
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
Percent Heavy Veh, %	11	2	0	5	5	31	4	17	0	7	0	13
Cap, veh/h	527	741	638	502	766	167	340	88	226	256	186	189
Arrive On Green	0.40	0.40	0.40	0.07	0.53	0.53	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	970	1870	1610	1739	1453	316	1253	409	1050	1147	864	878
Grp Volume(v), veh/h	17	367	50	92	0	336	27	0	189	50	0	119
Grp Sat Flow(s),veh/h/ln	970	1870	1610	1739	0	1769	1253	0	1459	1147	0	1742
Q Serve(g_s), s	0.5	7.4	1.0	1.4	0.0	5.6	0.9	0.0	5.9	2.1	0.0	2.9
Cycle Q Clear(g_c), s	0.5	7.4	1.0	1.4	0.0	5.6	3.8	0.0	5.9	8.0	0.0	2.9
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.72	1.00		0.50
Lane Grp Cap(c), veh/h	527	741	638	502	0	932	340	0	314	256	0	375
V/C Ratio(X)	0.03	0.50	0.08	0.18	0.00	0.36	0.08	0.00	0.60	0.20	0.00	0.32
Avail Cap(c_a), veh/h	1007	1666	1434	688	0	1996	814	0	867	690	0	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	11.5	9.5	7.5	0.0	7.0	18.3	0.0	17.9	21.4	0.0	16.7
Incr Delay (d2), s/veh	0.0	0.9	0.1	0.1	0.0	0.4	0.1	0.0	1.8	0.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	12.3	9.6	7.5	0.0	7.4	18.4	0.0	19.7	21.8	0.0	17.2
LnGrp LOS	А	В	А	А	A	А	В	А	В	С	А	В
Approach Vol, veh/h		434			428			216			169	
Approach Delay, s/veh		11.9			7.4			19.5			18.5	
Approach LOS		В			А			В			В	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	27.0		16.9		33.6		16.9				
Change Period (Y+Rc), s	3.0	* 7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (g c+l1), s	3.4	9.4		10.0		7.6		7.9				
Green Ext Time (p_c), s	0.1	5.6		1.0		4.8		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			12.6									
HCM 6th LOS			В									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 3

Lanes, Volumes, 5: 28th Avenue &	Timings 8th Stree	et					2028 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	٦	*	<	1	ţ		
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1		ŧ	¢Î		
Traffic Volume (vph)	138	48	26	59	96	93	
Future Volume (vph)	138	48	26	59	96	93	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.933		
Flt Protected	0.950			0.985			
Satd. Flow (prot)	1805	1615	0	1705	1746	0	
Flt Permitted	0.950			0.985			
Satd. Flow (perm)	1805	1615	0	1705	1746	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Adj. Flow (vph)	150	52	28	64	104	101	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	150	52	0	92	205	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 32.9%			10	CU Level of	of Service A	

Paradigm Transportation Solutions Limited

HCM 6th TWSC 5: 28th Avenue & 8th Street

2028 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	4.8					
Movomont	EDI	EDD	ND	NDT	срт	CDD
Movement	EBL	EBR	INBL	INBI	SBI	SBK
Lane Configurations	<u></u>			्स्	ef _	
Traffic Vol, veh/h	138	48	26	59	96	93
Future Vol, veh/h	138	48	26	59	96	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	14	2	1
Mvmt Flow	150	52	28	64	104	101
Main (MAin an MA		_	Animat		4-1-0	_
iviajor/ivinor M		455	viajor'i		viajor2	
Conflicting Flow All	2/5	155	104	0	-	U
Stage 1	155	-	-	-	-	-
Stage 2	120	-	-	-	-	-
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	719	896	1500	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	705	896	1500	-	-	-
Mov Cap-2 Maneuver	705	-				
Stane 1	861		-		-	-
Stage 2	001	-	-	-	-	-
Slaye 2	310		-		-	
Approach	EB		NB		SB	
HCM Control Delay, s	10.9		2.3		0	
HCM LOS	В					
Minoral		NDI	NIDT			ODT
Minor Lane/Major Mvmt		NBL	NRI	EBLU1	EBLN2	SBI
Capacity (veh/h)		1500	-	705	896	-
HCM Lane V/C Ratio		0.019	-	0.213	0.058	-
HCM Control Delay (s)		7.4	0	11.5	9.3	-
HCM Lane LOS		Α	Α	В	Α	-
HCM 95th %tile Q(veh)		0.1	-	0.8	0.2	-

Paradigm Transportation Solutions Limited

Appendix F

2028 Total Traffic Operations Reports



Lanes, Volumes, Ti 2: 28th Avenue & 1	mings 6th Str	eet					(230	20 607) BGC	028 To DS 28th	otal AN Avenue,	I Peak Owen Soi	Hour und TIS
	۶	-	*	4	Ļ	×	<	1	1	×	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	1	4Î		ľ	4Î		٢	eî	
Traffic Volume (vph)	41	159	23	189	284	58	29	69	74	44	55	16
Future Volume (vph)	41	159	23	189	284	58	29	69	74	44	55	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.923			0.967	
Fit Protected	0.950	1010		0.950	(300	•	0.950	1070		0.950	4570	
Satd. Flow (prot)	1805	1810	1468	1/8/	1720	0	1641	1679	0	1492	1570	0
Fit Permitted	0.540	1010	4400	0.563	4700	0	0.707	4070	0	0.659	4570	0
Satd. Flow (perm)	1020	1810	1468	1059	1720	Vaa	1221	16/9	Vaa	1035	1570	Vee
Right Turn on Reu			res 65		17	res		55	res		15	res
Salu. Flow (RTOR)		E0	00		50			55			10	
Link Speed (k/ii)		405.7			174 4			204.1			222.0	
LINK DIStance (III)		405.7			24.2			12.7			200.9	
Peak Hour Factor	0.02	29.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heavy Vehicles (%)	0.92	0.92	10%	0.92	1%	26%	10%	0.92	0.92	0.92	10%	10%
Adi Flow (vph)	45	173	25	205	309	63	32	75	2 /0	48	60	10 /6
Shared Lane Traffic (%)	75	175	25	205	505	00	52	15	00	40	00	
Lane Group Flow (vph)	45	173	25	205	372	0	32	155	0	48	77	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Ŭ	Perm	NA	Ū	Perm	NA	Ŭ
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								_
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
VValk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Pident DONT Walk (S)	12.0	12.0	12.0		12.0		1.0	7.0		1.0	1.0	
Act Effet Croop (a)	20.0	20.0	20.0	24.4	20.4		10.4	10.4		10.4	10.4	
Actuated a/C Patio	20.0	20.0	20.0	0.64	0.56		0.10	0.10		0.10	0.4	
v/c Patio	0.37	0.37	0.07	0.04	0.00		0.19	0.19		0.19	0.13	
Control Delay	12.12	13.4	1.04	5.0	7 7		10.14	17.0		22.4	18.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0,0	0.0	

Paradigm Transportation Solutions Limited

Lanes, Volumes, 2: 28th Avenue &	Timings 16th Stre	eet					(230	20 607) BGC)28 To DS 28th /	tal AN Avenue,	1 Peak Owen Sou	Hour und TIS
	٨	-	\mathbf{F}	•	←	•	•	Ť	1	1	ŧ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	12.8	13.4	1.0	5.0	7.7		19.9	17.0		22.1	18.0	
LOS	В	В	А	А	А		В	В		С	В	
Approach Delay		12.0			6.7			17.5			19.6	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	2.8	11.4	0.0	6.7	16.9		2.7	8.7		4.1	5.3	
Queue Length 95th (m)	9.4	25.9	1.1	14.7	33.8		8.9	23.3		12.3	15.2	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	863	1523	1246	797	1720		685	966		580	887	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.11	0.02	0.26	0.22		0.05	0.16		0.08	0.09	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	3.5											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.42												
Intersection Signal Delay:	11.1			In	itersection	n LOS: B						
Intersection Capacity Utili	zation 73.5%			IC	CU Level of	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized 2: 28th Avenue & 16	Interse th Stre	ection eet	Summ	ary			(2306	20 607) BGC	028 To	tal AM	Peak Owen So	Hour und TIS
	≯	-	\mathbf{r}	4	+	•	•	Ť	*	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	†	1	ľ	ef 🕯		٦	et e		٦ ۲	4Î	
Traffic Volume (veh/h)	41	159	23	189	284	58	29	69	74	44	55	16
Future Volume (veh/h)	41	159	23	189	284	58	29	69	74	44	55	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	1000	NO	4750	4005	NO	4545	4750	NO	4070	4500	NO	4750
Adj Sat Flow, ven/n/in	1900	1826	1/52	1885	1841	1515	1/52	1/96	1870	1589	1618	1/52
Adj Flow Rate, ven/n	45	1/3	25	205	309	63	32	/5	0.00	48	60	17
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
Cop yoh/b	545	0 710	594	711	916	20	220	154	165	21	226	67
Arrivo On Croon	0.20	/ 10	0.20	0.10	010	0.55	0.10	0.10	0.10	257	230	0 10
Sat Flow, yeb/b	1026	1826	1/85	1705	1/8/	303	1238	705	8/8	10/6	1213	344
	1020	1020	1400	205	0	303	1200	135	155	1040	1213	77
Grp Volume(V), Ven/m	40	1026	1/95	205	0	1796	1020	0	1644	40	0	1557
	1020	3.2	0.5	3 1	0.0	60	1230	0.0	/ 3	2.2	0.0	2 1
Q Serve(Q_3), s	1.4	3.2	0.5	3.1	0.0	6.0	33	0.0	4.3	6.4	0.0	2.1
Prop In Lane	1.00	0.2	1.00	1.00	0.0	0.0	1.00	0.0	0.52	1.00	0.0	0.22
Lane Grp Cap(c) veh/h	545	718	584	711	0	983	330	0	319	257	0	302
V/C Ratio(X)	0.08	0.24	0.04	0.29	0.00	0.38	0.10	0.00	0.49	0.19	0.00	0.25
Avail Cap(c, a) veh/h	1050	1616	1314	853	0	2002	820	0	970	671	0	918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.8	10.3	9.5	6.7	0.0	6.5	18.8	0.0	18.2	21.1	0.0	17.4
Incr Delay (d2), s/veh	0.1	0.3	0.1	0.1	0.0	0.4	0.1	0.0	1.1	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1
Unsig. Movement Delay, s/veh	ı											
LnGrp Delay(d),s/veh	9.9	10.6	9.6	6.7	0.0	6.9	18.9	0.0	19.4	21.4	0.0	17.8
LnGrp LOS	А	В	А	А	Α	А	В	А	В	С	А	В
Approach Vol, veh/h		243			577			187			125	
Approach Delay, s/veh		10.4			6.9			19.3			19.2	
Approach LOS		В			А			В			В	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.0	27.0		15.9		35.0		15.9				
Change Period (Y+Rc), s	3.0	* 7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (g_c+I1), s	5.1	5.2		8.4		8.0		6.3				
Green Ext Time (p_c), s	0.2	2.9		0.7		5.4		1.2				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			В									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Synchro 11 Report Page 3

			4	*	1	,	
		•		T	÷	*	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1	ľ	1	1	1	
Traffic Volume (vph)	46	108	178	127	193	76	
Future Volume (vph)	46	108	178	127	193	76	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	50	117	193	138	210	83	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	50	117	193	138	210	83	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 33.4%			IC	U Level	of Service A	

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HCM 6th TWSC

3: 28th Avenue & Future Road (North)

2028 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/yeh	47					
in Delay, Siven	4.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1	٦	↑	↑	1
Traffic Vol, veh/h	46	108	178	127	193	76
Future Vol, veh/h	46	108	178	127	193	76
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	0	40	-	-	15
Veh in Median Storage	e. # 0	-	-	0	0	-
Grade. %	0	-		0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	2	2	2	2	2	2
Mymt Flow	50	117	102	138	210	83
	50	117	190	100	210	00
Major/Minor I	Minor2		Major1		Major2	
Conflicting Flow All	734	210	293	0	-	0
Stage 1	210	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Sto 1	5 42	-				
Critical Hdwy Sto 2	5.42	-	-		-	-
Follow-up Hdwy	3 5 1 8	3 318	2 218		_	
Pot Can-1 Maneuvor	3.010	830	1260			-
Stage 1	825	000	1209		-	-
Stage 2	504	-			-	-
Slaye 2	394	-	-	-	-	-
Platoon blocked, %	200	000	1000	-	-	-
Mov Cap-1 Maneuver	328	830	1269	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Annroach	FB		NR		SB	
HCM Control Dolour	12.4				00	
HCM LOS	12.4		4.9		0	
	В					
Minor Lane/Major Mvm	nt	NBL	NBT I	EBLn1	EBLn2	SBT
Capacity (veh/h)		1269		328	830	-
HCM Lane V/C Ratio		0 152		0 152	0 141	
HCM Control Delay (s)		83	-	17 0	10 1	-
HCM Lane LOS		0.0		11.3 C	-10.1 P	_
HCM 05th %tile O(uch))	0.5		0.5	0.5	-
HOW 95th %tile Q(Ven)	0.5	-	0.5	0.5	-

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Synchro 11 Report Page 5

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	501	•	1	I	▼ 0DT	-	
Lane Group	EBL	EBR	NBL	NBI	SB1	SBR	
Lane Configurations	107	r 10	04	4	•	004	
Traffic Volume (vpn)	187	18	81	118	67	234	
Future Volume (vph)	187	18	81	118	67	234	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.895		
Flt Protected	0.950			0.980			
Satd. Flow (prot)	1805	1615	0	1744	1651	0	
Flt Permitted	0.950			0.980			
Satd. Flow (perm)	1805	1615	0	1744	1651	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	203	20	88	128	73	254	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	203	20	0	216	327	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	d						
Intersection Capacity Utiliz	ation 49.0%			IC	CU Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

HCM 6th TWSC 5: 28th Avenue & 8th Street

2028 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1		4	f,	
Traffic Vol, veh/h	187	18	81	118	67	234
Future Vol, veh/h	187	18	81	118	67	234
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e,#0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	203	20	88	128	73	254
Major/Minor	Minor2	Ν	/lajor1	Ν	/lajor2	
Conflicting Flow All	504	200	73	0	-	0
Stage 1	200	-	-	-	-	-

Connicting Flow An	504	200	10	0	-	0		
Stage 1	200	-	-	-	-	-		
Stage 2	304	-	-	-	-	-		
Critical Hdwy	6.4	6.2	4.15	-	-	-		
Critical Hdwy Stg 1	5.4	-	-	-	-	-		
Critical Hdwy Stg 2	5.4	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.245	-	-	-		
Pot Cap-1 Maneuver	531	846	1508	-	-	-		
Stage 1	838	-	-	-	-	-		
Stage 2	753	-	-	-	-	-		
Platoon blocked, %				-	-	-		
Mov Cap-1 Maneuver	498	846	1508	-	-	-		
Mov Cap-2 Maneuver	498	-	-	-	-	-		
Stage 1	785	-	-	-	-	-		
Stage 2	753	-	-	-	-	-		
Approach	EB		NB		SB			
HCM Control Delay, s	16.4		3.1		0			
HCM LOS	С				-			
Mineral and Maine Manak		NDI	NDT			ODT	000	
winor Lane/wajor wvmt		INBL	INBI	EBLUI	EBLNZ	SBI	SBR	
Capacity (veh/h)		1508	-	498	846	-	-	
HCM Lane V/C Ratio		0.058	-	0.408	0.023	-	-	
HCM Control Delay (s)		7.5	0	17.1	9.4	-	-	
HCM Lane LOS		A	A	С	Α	-	-	
LICM OFth 0/ tile O(uch)		0.0		0	0.4			

Paradigm Transportation Solutions Limited

HCM 95th %tile Q(veh)

Synchro 11 Report Page 7

Lanes, Volumes, 7: Driveway A & F	Timings ⁻ uture Ro	ad (No	orth)				2028 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS
	+	*	4	ł	≺	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	el el			ŧ	Y		
Traffic Volume (vph)	0	0	165	Ő	0	54	
Future Volume (vph)	0	0	165	0	0	54	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.950			
Satd. Flow (prot)	1863	0	0	1770	1611	0	
Flt Permitted				0.950			
Satd. Flow (perm)	1863	0	0	1770	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	150.6			119.9	110.4		
Travel Time (s)	10.8			8.6	7.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	179	0	0	59	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	0	179	59	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 19.2%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC

7: Driveway A & Future Road (North)

2028 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	7.7					
Movement	EBT	ERP	W/RI	W/RT	NRI	NRP
		EDR	WDL	VVD1		NDR
Lane Conligurations	4	٥	165	•	T .	E A
rame vol, ven/n	0	0	105	0	0	54
Future Vol, veh/h	0	0	165	0	0	54
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
Mymt Flow	0	0	179	0	0	59
	v	v	.10	v	Ū	00
Major/Minor M	lajor1	1	Major2		Minor1	
Conflicting Flow All	0	0	1	0	359	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	358	-
Critical Hdwv	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-		-	-	5.42	-
Critical Hdwy Stg ?	-	-	-	-	5.42	-
Follow-up Hdwy			2 218		3 518	3 318
Pot Con 1 Manaurer	-	-	1622	-	640	100/
Pot Cap-1 IvianeuVer	-	-	1022	-	1020	1004
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1622	-	570	1084
Mov Cap-2 Maneuver	-	-	-	-	570	-
Stage 1	-	-	-	-	1022	-
Stage 2	-			-	629	
otago 1					020	
Approach	EB		WB		NB	
HCM Control Delay, s	0		7.5		8.5	
HCM LOS					Α	
Minor Lane/Major Mvmt		VBLn1	EBL	EBR	WBL	WBT
Capacity (veh/h)		1084	-	-	1622	-
HCM Lane V/C Ratio		0.054	-	-	0.111	-
HCM Control Delay (s)		8.5	-	-	7.5	0
HCM Lane LOS		А	-	-	А	А
HCM 95th %tile Q(veh)		0.2	-	-	0.4	-
		0.2			0.4	

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Synchro 11 Report Page 9

Lanes, Volumes, 8 [.] Driveway B & F	Timings Future Ro	ad (No	orth)				2028 Total AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	-	7	1	+	•	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4Î			ا	Y		
Traffic Volume (vph)	54	0	89	165	0	100	
Future Volume (vph)	54	0	89	165	0	100	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.983			
Satd. Flow (prot)	1863	0	0	1831	1611	0	
Flt Permitted				0.983			
Satd. Flow (perm)	1863	0	0	1831	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	59	0	97	179	0	109	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	59	0	0	276	109	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 33.1%			IC	CU Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

HCM 6th TWSC 8: Driveway B & Future Road (North)

2028 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.8					
Movement	EDT	EDD	W/DI		ND	
	EDI	EDR	VVDL	VVDI	INDL	INDR
Lane Configurations	િ		•-	्रभ	Y	100
Traffic Vol, veh/h	54	0	89	165	0	100
Future Vol, veh/h	54	0	89	165	0	100
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
Mymt Flow	59	0	97	179	0	109
		-	•••		-	
Major/Minor Ma	ajor1		Major2		Minor1	
Conflicting Flow All	0	0	59	0	432	59
Stage 1	-	-	-	-	59	-
Stage 2	-	-	-	-	373	-
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	-	-	1545	-	581	1007
Stage 1		-	-	-	964	-
Stage 2	-	-	-	-	696	-
Platoon blocked %						
Mov Cap-1 Maneuver	-	-	1545	-	540	1007
Mov Cap-7 Maneuver					540	-1007
Stage 1	-	-	-	-	040	-
Stage 2	-	-	-	-	904	-
Stage 2	-	-	-	-	047	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.6		9	
HCM LOS					A	
Minor Lane/Major Mvmt	1	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		1007	-	-	1545	-
HCM Lane V/C Ratio		0.108	-	-	0.063	-
HCM Control Delay (s)		9	-	-	7.5	0
HCM Lane LOS		А	-	-	A	А
HCM 95th %tile Q(veh)		0.4	-	-	0.2	-
		0.1			0.2	

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2: 28th Avenue & 1	6th Stre	eet					(230	607) BGC	DS 28th	Avenue,	Owen Sou	und TIS
	٨	+	*	4	Ļ	•	•	1	*	*	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	ľ	4Î		ľ	el el		٢	¢Î	
Traffic Volume (vph)	16	338	54	100	254	55	38	87	150	46	77	55
Future Volume (vph)	16	338	54	100	254	55	38	87	150	46	77	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.973			0.905			0.937	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	1863	1615	1719	1686	0	1736	1618	0	1687	1689	0
Flt Permitted	0.558			0.442			0.665			0.544		
Satd. Flow (perm)	955	1863	1615	800	1686	0	1215	1618	0	966	1689	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		18			88			37	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	_
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adj. Flow (vph)	17	367	59	109	276	60	41	95	163	50	84	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	367	59	109	336	0	41	258	0	50	144	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	0	2	0	1	6		0	8			4	_
Permitted Phases	2	0	2	6	<u> </u>		8	0		4		
Detector Phase	2	2	2	1	0		8	ð		4	4	_
Switch Phase	00.0	00.0	00.0	F 0	00.0		10.0	10.0		40.0	10.0	
Minimum Initial (S)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0	30.0	8.0	30.0		29.0	29.0		29.0	29.0	
Total Split (S)	52.0	52.0	52.0	12.0	64.0%		30.0	30.0		30.0	30.0	
Total Split (%) Maximum Croon (a)	52.0% 45.0	52.0%	52.0%	12.0%	67.0		20.0%	20.0%		20.0%	30.0%	
Vellow Time (s)	45.0	45.0	45.0	3.0	57.0		30.0	30.0		30.0	30.0	
All Dod Time (s)	1.4	1.6	1.6	0.0	1.6		4.1	4.1		4.1	4.1	
All-Red Time (S)	0.0	1.0	0.0	0.0	0.0		1.9	1.9		1.9	1.9	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		0.0	6.0		0.0	6.0	
	1.0	1.0	1.0	J.o.d	1.0		0.0	0.0		0.0	0.0	
Lead-Lag Optimize?	Lay Yes	Ves	Ves	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	45		3.0	3.0		3.0	3.0	
Recall Mode	4.0 Min	Hin	Hin	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0	NONE	17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/br)	12.0	12.0	12.0		0		0	0		0	0	
Act Effct Green (s)	22.0	22.0	22.0	33.5	29.4		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.40	0.40	0.40	0.60	0.53		0.23	0.23		0.23	0.23	
v/c Ratio	0.04	0.50	0.09	0.19	0.37		0.15	0.59		0.23	0.35	
Control Delay	13.1	16.9	4 2	5.9	8.9		20.1	19.5		21.8	17.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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Lanes, Volumes, 2: 28th Avenue &	Timings 16th Str	eet		2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS								
	۶	-	\mathbf{F}	4	+	•	•	1	*	1	ţ	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	13.1	16.9	4.2	5.9	8.9		20.1	19.5		21.8	17.6	
LOS	В	В	А	А	А		С	В		С	В	
Approach Delay		15.1			8.1			19.6			18.7	
Approach LOS		В			А			В			В	
Queue Length 50th (m)	1.1	27.8	0.0	3.7	16.0		3.4	15.2		4.2	9.2	
Queue Length 95th (m)	5.3	62.3	6.0	11.7	39.1		11.8	41.6		14.0	26.1	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	787	1535	1342	635	1611		675	938		536	955	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.24	0.04	0.17	0.21		0.06	0.28		0.09	0.15	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	5.5											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.59												
Intersection Signal Delay:	14.3			In	ntersection	n LOS: B						
Intersection Capacity Utili	zation 77.2%			IC	CU Level	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1		↓ Ø4	
12 s	52 s	36 s	
₹ø6		1 Ø8	
64 s		36 s	

Paradigm Transportation Solutions Limited

HCM 6th Signalized I 2: 28th Avenue & 16t	Inters	2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS										
	۶	-	*	4	ł	*	<	Ť	1	*	Ŧ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	•	1	ň	1.		5	1.		5	1.	
Traffic Volume (veh/h)	16	338	54	100	254	55	38	87	150	46	77	55
Future Volume (veh/h)	16	338	54	100	254	55	38	87	150	46	77	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adi(A pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adj Flow Rate, veh/h	17	367	59	109	276	60	41	95	163	50	84	60
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
Percent Heavy Veh, %	11	2	0	5	5	31	4	17	0	7	0	13
Cap, veh/h	493	694	597	467	728	158	368	140	241	242	266	190
Arrive On Green	0.37	0.37	0.37	0.07	0.50	0.50	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	970	1870	1610	1739	1453	316	1224	545	935	1077	1031	736
Grp Volume(v), veh/h	17	367	59	109	0	336	41	0	258	50	0	144
Grp Sat Flow(s),veh/h/ln	970	1870	1610	1739	0	1769	1224	0	1480	1077	0	1767
Q Serve(g s), s	0.6	8.3	1.3	1.9	0.0	6.3	1.5	0.0	8.5	2.4	0.0	3.6
Cycle Q Clear(g_c), s	0.6	8.3	1.3	1.9	0.0	6.3	5.1	0.0	8.5	10.8	0.0	3.6
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.63	1.00		0.42
Lane Grp Cap(c), veh/h	493	694	597	467	0	887	368	0	381	242	0	455
V/C Ratio(X)	0.03	0.53	0.10	0.23	0.00	0.38	0.11	0.00	0.68	0.21	0.00	0.32
Avail Cap(c_a), veh/h	943	1561	1344	628	0	1870	734	0	823	564	0	983
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.9	13.3	11.1	8.8	0.0	8.3	18.2	0.0	18.0	22.9	0.0	16.2
Incr Delay (d2), s/veh	0.0	1.1	0.1	0.1	0.0	0.5	0.1	0.0	2.1	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	14.3	11.2	8.9	0.0	8.7	18.3	0.0	20.1	23.3	0.0	16.6
LnGrp LOS	В	В	В	Α	А	А	В	Α	С	С	А	В
Approach Vol, veh/h		443			445			299			194	
Approach Delay, s/veh		13.8			8.8			19.9			18.3	
Approach LOS		В			Α			В			В	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	7.0	27.0		19.9		34.0		19.9				
Change Period (Y+Rc), s	3.0	*7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (g_c+I1), s	3.9	10.3		12.8		8.3		10.5				
Green Ext Time (p_c), s	0.1	5.7		1.1		4.8		2.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			В									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 3

Lanes, Volumes, T 3: 28th Avenue & F	'imings ⁻uture R	oad (N	lorth)			2028 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI	
	۶	*	•	1	ţ	1	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	۲	1	1	1	
Traffic Volume (vph)	76	178	108	198	188	46	
Future Volume (vph)	76	178	108	198	188	46	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
FIt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	83	193	117	215	204	50	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	83	193	117	215	204	50	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 30.1%			IC	CU Level	of Service A	\
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

HCM 6th TWSC

3: 28th Avenue & Future Road (North)

2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	5					
Movement	FBI	FRR	NBI	NBT	SBT	SBR
Lane Configurations			NDL K			0 0K
	76	179	109	109	189	16
Future Vol, ven/n	70	170	100	190	100	40
Future vol, ven/n	/6	1/8	108	198	100	40
Connicting Peas, #/hr	0	0	- 0	- 0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RI Channelized	-	None	-	None	-	None
Storage Length	0	0	40	-	-	15
Veh in Median Storage	e, #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	83	193	117	215	204	50
Major/Minor	Minor?		Maior1		Major?	
	652	204	254	0	wajuz	0
Connicting Flow All	003	204	254	0	-	U
Stage 1	204	-	-	-	-	-
Stage 2	449	-	-	-	-	-
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	432	837	1311	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	394	837	1311	-	-	-
Mov Cap-2 Maneuver	394	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	643			-		-
Oldgo 2	010					
Approach	EB		NB		SB	
HCM Control Delay, s	12.4		2.8		0	
HCM LOS	В					
Minor Lane/Major Mum	nt	NRI	NRTI	EBI n1	EBI nº	SBT
	n –	INDL 4044				SDI
Capacity (ven/n)		1311	-	394	83/	-
HUM Lane V/C Ratio		0.09	-	0.21	0.231	-
HCM Control Delay (s)		8	-	16.5	10.6	-
HCM Lane LOS		A	-	С	В	-
HCM 95th %tile Q(veh)	0.3	-	0.8	0.9	-

Paradiam	Transportation	Solutions	Limited

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5: 28th Avenue & 8	Sth Stree	et					(230007) BGCDS 2011 Avenue, Owen Sound
	≯	\rightarrow	•	T.	Ŧ	<	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	<u>۲</u>	1		र्स	ef 👘		
Traffic Volume (vph)	223	48	26	82	134	233	
Future Volume (vph)	223	48	26	82	134	233	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.914		
Flt Protected	0.950			0.988			
Satd. Flow (prot)	1805	1615	0	1697	1713	0	
Flt Permitted	0.950			0.988			
Satd. Flow (perm)	1805	1615	0	1697	1713	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Adj. Flow (vph)	242	52	28	89	146	253	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	242	52	0	117	399	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utilization	ation 46.0%			IC	CU Level o	of Service A	1
Analysis Period (min) 15							
, , ,							

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	1	1		ŧ	et P	
Traffic Vol, veh/h	223	48	26	82	134	233
Future Vol, veh/h	223	48	26	82	134	233
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	14	2	1
Mvmt Flow	242	52	28	89	146	253

Major/Minor	Minor2		viajor'i		viajor2							
Conflicting Flow All	418	273	146	0	-	0						
Stage 1	273	-	-	-	-	-						
Stage 2	145	-	-	-	-	-						
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	595	771	1448	-	-	-						
Stage 1	778	-	-	-	-	-						
Stage 2	887	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	583	771	1448	-	-	-						
Mov Cap-2 Maneuver	583	-	-	-	-	-						
Stage 1	762	-	-	-	-	-						
Stage 2	887	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	5 14.5		1.8		0							
HCM LOS	В											
Minor Lane/Major Mv	mt	NBL	NBT I	EBLn1	EBLn2	SBT	SBR					
Capacity (veh/h)		1448	-	583	771	-	-					
HCM Lane V/C Ratio		0.02	-	0.416	0.068	-	-					
HCM Control Delay (s	5)	7.5	0	15.5	10	-	-					
HCM Lane LOS		Α	Α	С	В	-	-					
HCM 95th %tile Q(ve	h)	0.1	-	2	0.2	-	-					

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HCM 95th %tile Q(veh)

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Lanes, Volumes, 7: Driveway A & F	Timings ⁻ uture Ro	2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS					
	+	*	1	ł	<	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4			ર્સ	Y		
Traffic Volume (vph)	0	0	100	Ő	0	102	
Future Volume (vph)	0	0	100	0	0	102	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.950			
Satd. Flow (prot)	1863	0	0	1770	1611	0	
Flt Permitted				0.950			
Satd. Flow (perm)	1863	0	0	1770	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	150.6			119.9	110.4		
Travel Time (s)	10.8			8.6	7.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	109	0	0	111	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	0	109	111	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 18.5%			10	CU Level of	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC

7: Driveway A & Future Road (North)

2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ef 👘			÷.	۰Y	
Traffic Vol, veh/h	0	0	100	0	0	102
Future Vol, veh/h	0	0	100	0	0	102
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	0	0	109	0	0	111

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1	0	219	1
Stage 1	-		-	-	1	-
Stage 2	-	-	-	-	218	-
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	-	-	1622	-	769	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-		-	-	818	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	• -		1622	-	717	1084
Mov Cap-2 Maneuver	· -		-	-	717	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	763	-
Annroach	FB		WR		NB	
HCM Control Delay	. 0		7.4		8.7	
HCMIOS	5 0		1.4		0.7	
					~	
Minor Lane/Major Mvr	mt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		1084	-	-	1622	-
HCM Lane V/C Ratio		0.102	-	-	0.067	-
HCM Control Delay (s	5)	8.7	-	-	7.4	0
HCM Lane LOS		A	-	-	Α	А
HCM 95th %tile Q(veh	h)	0.3	-	-	0.2	-

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Lanes, Volumes, ⊺ 8: Drivewav B & F	Γimings uture Ro	ad (No	orth)				2028 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	-	~	-	+	•	*	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	¢Î			ę	Y		
Traffic Volume (vph)	102	0	54	100	0	152	
Future Volume (vph)	102	0	54	100	0	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.983			
Satd. Flow (prot)	1863	0	0	1831	1611	0	
Flt Permitted				0.983			
Satd. Flow (perm)	1863	0	0	1831	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	111	0	59	109	0	165	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	111	0	0	168	165	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	ł						
Intersection Capacity Utiliz	ation 31.0%			IC	U Level o	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC 8: Driveway B & Future Road (North)

2028 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	4.6					
Movement	EDT	EDD	\//DI		ND	
	EBI	EBK	WBL	WBI	INBL	INDR
Lane Configurations	₩ F	•	= 4	- (۲.	150
Traffic Vol, veh/h	102	0	54	100	0	152
Future Vol, veh/h	102	0	54	100	0	152
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
Mymt Flow	111	0	50	100	0	165
WWW		0	55	105	U	105
Major/Minor M	ajor1	Ν	Aajor2	1	Minor1	
Conflicting Flow All	0	0	111	0	338	111
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	-	-	4 12	-	6.42	6 22
Critical Hdwy Sta 1					5.42	0.22
Critical Hduny Stg 1					5.42	
Eollow up Udway	-	-	2 210	-	2 5 1 0	2 210
	-	-	2.210	-	3.510	3.310
Pot Cap-1 Maneuver	-	-	1479	-	658	942
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1479	-	630	942
Mov Cap-2 Maneuver	-	-	-	-	630	-
Stage 1	-	-	-	-	914	-
Stage 2	-				777	-
Oldgo 2						
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.6		9.6	
HCM LOS					А	
Minor Lane/Major Mvmt	1	VBLn1	EBL	EBR	WBL	WBL
Capacity (veh/h)		942	-	-	1479	-
HCM Lane V/C Ratio		0.175	-	-	0.04	-
HCM Control Delay (s)		9.6	-	-	7.5	0
HCM Lane LOS		А	-	-	А	А
HCM 95th %tile Q(veh)		0.6	-	-	0.1	-
		0.0			0.1	

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Appendix G

2033 Background Traffic Operations Reports


Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{r}	1	-	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4Î			1		1
Traffic Volume (vph)	231	11	0	386	0	12
Future Volume (vph)	231	11	0	386	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994					0.865
Fit Protected						
Satd. Flow (prot)	1852	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1852	0	0	1863	0	1611
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.3			405.7	303.8	
Travel Time (s)	14.2			29.2	21.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	12	0	420	0	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	263	0	0	420	0	13
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalize	ed					
Intersection Capacity Utili	ization 23.6%			IC	CU Level	of Service
Analysis Period (min) 15						

.

HCM 6th TWSC 1: Future Road & 16th Street 2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	0.2					
Movement	FRT	FRR	WRI	WRT	NBI	NRR
Lane Configurations	1		TTDL		NDL	1101
Traffic Vol. veh/h	231	11	0	386	0	12
Future Vol. veh/h	231	11	0	386	0	12
Conflicting Peds #/hr	201	0	0	000	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
Mymt Flow	251	12	0	420	0	13
WWWIICTIOW	201	12	0	720	U	10
Major/Minor I	Major1	I	Major2	I	Minor1	
Conflicting Flow All	0	0	-	-	-	257
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	782
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	782
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
			14/5		NIE	
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9.7	
HCM LOS					A	
Minor Lane/Maior Mym	nt t	VBLn1	EBT	EBR	WBT	
Capacity (veh/h)		782				
HCM Lane V/C Ratio		0.017			_	
HCM Control Delay (s)		9.7	-	-	-	
HCM Lane LOS		Δ	_	_	_	
HCM 95th %tile O(veh))	0.1	-	-	-	
now sour whe Q(ven)	/	0.1	-	-	-	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, T 2: 28th Avenue & 1	imings 6th Stre	eet					20 (230	33 Bac 607) BGC	c kgrou DS 28th	nd AN Avenue,	1 Peak Owen Sou	Hour Ind TIS
	۲	-	\mathbf{r}	4	+	•	1	Ť	1	1	Ļ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	<u>۲</u>	↑	1	ሻ	f		٦	4Î		ሻ	eî	
Traffic Volume (vph)	42	178	23	253	297	60	72	107	69	46	71	17
Future Volume (vph)	42	178	23	253	297	60	72	107	69	46	71	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.941			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1720	0	1641	1702	0	1492	1574	0
Flt Permitted	0.532			0.553			0.695			0.637		
Satd. Flow (perm)	1011	1810	1468	1040	1720	0	1200	1702	0	1000	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			33			12	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	46	193	25	275	323	65	78	116	75	50	77	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	193	25	275	388	0	78	191	0	50	95	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	20.1	20.1	20.1	35.1	31.0		11.3	11.3		11.3	11.3	
Actuated g/C Ratio	0.36	0.36	0.36	0.63	0.56		0.20	0.20		0.20	0.20	
v/c Ratio	0.13	0.29	0.04	0.36	0.40		0.32	0.51		0.25	0.29	
Control Delay	14.0	14.9	1.0	6.2	8.4		22.9	21.6		22.0	19.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	14.0	14.9	1.0	6.2	8.4		22.9	21.6		22.0	19.3	
LOS	В	В	А	А	А		С	С		С	В	
Approach Delay		13.5			7.4			21.9			20.3	
Approach LOS		В			А			С			С	
Queue Length 50th (m)	3.1	13.9	0.0	9.7	18.4		7.1	14.9		4.5	7.5	
Queue Length 95th (m)	10.1	30.4	1.1	22.5	39.6		17.4	31.5		12.6	18.3	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	823	1474	1207	779	1706		651	939		543	860	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.13	0.02	0.35	0.23		0.12	0.20		0.09	0.11	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	5.4											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.51												
Intersection Signal Delay:	12.9			In	tersectior	LOS: B						
Intersection Capacity Utili	zation 75.8%			IC	U Level of	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	<i>↓ø</i> 2	↓ Ø4	
12 s	52 s	36 s	
₹ø6		1 Ø8	
64 s		36 s	

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	ľ	ĥ		ľ	ę		ľ	ĥ	
Traffic Volume (veh/h)	42	178	23	253	297	60	72	107	69	46	71	17
Future Volume (veh/h)	42	178	23	253	297	60	72	107	69	46	71	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Adj Flow Rate, veh/h	46	193	25	275	323	65	78	116	75	50	77	18
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
Percent Heavy Veh, %	0	5	10	1	4	26	10	7	2	21	19	10
Cap, veh/h	514	684	557	709	824	166	319	206	133	236	257	60
Arrive On Green	0.37	0.37	0.37	0.12	0.55	0.55	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1011	1826	1485	1795	1487	299	1218	1019	659	1013	1269	297
Grp Volume(v), veh/h	46	193	25	275	0	388	78	0	191	50	0	95
Grp Sat Flow(s),veh/h/ln	1011	1826	1485	1795	0	1787	1218	0	1678	1013	0	1565
Q Serve(a s), s	1.6	3.9	0.6	4.5	0.0	6.6	3.1	0.0	5.5	2.5	0.0	2.8
Cycle Q Clear(g c), s	1.6	3.9	0.6	4.5	0.0	6.6	5.9	0.0	5.5	8.0	0.0	2.8
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.39	1.00		0.19
Lane Grp Cap(c), veh/h	514	684	557	709	0	990	319	0	339	236	0	317
V/C Ratio(X)	0.09	0.28	0.04	0.39	0.00	0.39	0.24	0.00	0.56	0.21	0.00	0.30
Avail Cap(c a), veh/h	988	1540	1252	791	0	1909	757	0	943	601	0	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.9	11.7	10.6	7.2	0.0	6.8	20.6	0.0	19.2	22.7	0.0	18.1
Incr Delay (d2), s/veh	0.1	0.4	0.1	0.1	0.0	0.4	0.4	0.0	1.5	0.4	0.0	0.5
Initial Q Delav(d3).s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.2
Unsig, Movement Delay, s/veh					•••							
LnGrp Delav(d).s/veh	11.0	12.0	10.7	7.4	0.0	7.2	21.0	0.0	20.6	23.2	0.0	18.6
LnGrp LOS	В	В	В	A	A	A	C	A	C	C	A	B
Approach Vol. veh/h		264			663			269			145	
Approach Delay s/veh		11.7			7.3			20.7			20.2	
Approach LOS		В			A			C			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc) s	9.6	27.0		16.8		36.6		16.8				
Change Period (Y+Rc) s	3.0	* 7		* 6		* 7		* 6				
Max Green Setting (Gmax) s	9.0	* 45		* 30		* 57		* 30				
Max O Clear Time $(q, c+11)$ s	6.5	5.9		10.0		86		7 9				
Green Ext Time (n. c) s	0.0	3.2		0.9		5.7		1.0				
5.55. Ext mile (p_0), 6	0.2	0.2		0.0		0.1						
Intersection Summary												
HCM 6th Ctrl Delay			12.2									
HCM 6th LOS			В									
Nistes												

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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3: 28th Avenue & F	imings Future R	load (N	lorth)				2033 Background AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	≯	*	•	1	ţ	1	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	7	٦	↑	1	1	
Traffic Volume (vph)	15	12	101	234	236	112	
Future Volume (vph)	15	12	101	234	236	112	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	16	13	110	254	257	122	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	16	13	110	254	257	122	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 31.3%			IC	CU Level	of Service A	A
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

3: 28th Avenue & Future Road (North)

2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection				_	_		
Int Delay, s/veh	1.7						
Movement	EBI	FRP	NRI	NRT	SBT	SRP	
		EDR			301	JDR	
Lane Configurations	า		101	T	1	110	
Traffic Vol, veh/h	15	12	101	234	236	112	
Future Vol, veh/h	15	12	101	234	236	112	
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	0	40	-	-	15	
Veh in Median Storage	e,#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	16	13	110	254	257	122	
Major/Minor	Minor2		major1		major2		
Conflicting Flow All	731	257	379	0	-	0	
Stage 1	257	-	-	-	-	-	
Stage 2	474	-	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	-	
Critical Hdwy Sto 2	5.42	-	-	-	-	-	
Follow-up Hdwy	3.518	3.318	2.218	-	-	-	
Pot Cap-1 Maneuver	389	782	1179	-	-	-	
Stage 1	786					-	
Stage 2	626		-	-		-	
Platoon blocked %	020						
May Cap 1 Manauyar	252	700	1170	-	-	-	
Mov Cap-1 Maneuver	353	102	11/9	-	-	-	
wov Cap-2 waneuver	303	-	-	-	-	-	
Stage 1	/13	-	-	-	-	-	
Stage 2	626	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay, s	13		2.5		0		
HCM LOS	В						
Minor Lane/Major Myr	nt	NBI	NBT	FBI n1	FBI n2	SBT	
Capacity (yeb/b)		1170		352	780	001	
		0.002	-	0.046	0.017	-	
HOM Captrol Delay (a)	`	0.093	-	15.7	0.01/	-	
HCM Long LOS)	0.4	-	10.7	9.1	-	
HOW Lane LOS	,	A	-	C of	A	-	
HCM 95th %tile Q(veh	1)	0.3	-	0.1	0.1	-	

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R	oad (S	South)				2033 Background AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	۶	*	<	1	Ŧ		
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y			ŧ	¢Î		
Traffic Volume (vph)	81	3	1	254	214	34	
Future Volume (vph)	81	3	1	254	214	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.996				0.981		
Flt Protected	0.954						
Satd. Flow (prot)	1770	0	0	1863	1827	0	
Flt Permitted	0.954						
Satd. Flow (perm)	1770	0	0	1863	1827	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	88	3	1	276	233	37	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	91	0	0	277	270	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 25.5%			IC	U Level o	of Service A	
Analysis Period (min) 15							

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4: 28th Avenue & Future Road (South)

2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection			_		_	
Int Delay, s/yeb	10					
in Delay, Siven	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	- ¥			- କୀ	1+	
Traffic Vol, veh/h	81	3	1	254	214	34
Future Vol, veh/h	81	3	1	254	214	34
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	e,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	88	3	1	276	233	37
	00	v		2/0	200	01
Major/Minor	Minor2		Major1	Ν	/lajor2	
Conflicting Flow All	530	252	270	0	-	0
Stage 1	252	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Sto 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	510	787	1293	-	-	-
Stage 1	790	-		-		
Stage 2	760		-	-	-	-
Platoon blocked %	103					_
Mov Can-1 Maneuver	500	787	1203	-	-	-
Mov Cap-1 Maneuver	509	101	1293	-	-	-
Nov Cap-2 Marieuver	309		-	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	/69	-	-	-	-	-
Approach	EB		NB		SB	_
HCM Control Delay	13.5		0		0	_
HCM LOS	-10.0 R		0		0	
	٥					
Minor Lane/Major Mvn	nt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)		1293	-	516	-	-
HCM Lane V/C Ratio		0.001	-	0.177	-	-
HCM Control Delay (s		7.8	0	13.5	-	-
HCM Lane LOS		A	A	В	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-
	/					

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		~					(230007) BGCDS 28th Avenue, Owen Sound Th
	≯	\mathbf{F}	•	t	Ŧ	-	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	5	1		ب اً	ĥ		
Traffic Volume (vph)	125	23	86	130	53	164	
Future Volume (vph)	125	23	86	130	53	164	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.898		
Flt Protected	0.950			0.981			
Satd. Flow (prot)	1805	1615	0	1745	1653	0	
Flt Permitted	0.950			0.981			
Satd. Flow (perm)	1805	1615	0	1745	1653	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	136	25	93	141	58	178	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	136	25	0	234	236	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	1						
Intersection Capacity Utiliz	ation 41.4%			10	CU Level o	of Service A	
Analysia Dariad (min) 15							

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/yeb	4.6					
in Delay, Siven	4.0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	<u>۲</u>	1		- କୀ	1.	
Traffic Vol, veh/h	125	23	86	130	53	164
Future Vol, veh/h	125	23	86	130	53	164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	136	25	93	141	58	178
Major/Minor	Minor2	1	Major1	Ν	Major2	
Conflicting Flow All	474	147	58	0	-	0
Stage 1	147	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.245	-	-	-
Pot Cap-1 Maneuver	553	905	1527	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-

Mov Cap-2 Maneuver	517	-	-	-	-	-					
Stage 1	827	-	-	-	-	-					
Stage 2	735	-	-	-	-	-					
Approach	EB		NB		SB						
HCM Control Delay, s	13.6		3		0						
HCM LOS	В										
Minor Lane/Major Mvmt		NBL	NBT	EBLn1	EBLn2	SBT	SBR				
Capacity (veh/h)		1527	-	517	905	-	-				
LION LANA MIC DAKA											
HUM Lane V/C Ratio		0.061	-	0.263	0.028	-	-				
HCM Control Delay (s)		0.061 7.5	-0	0.263 14.4	0.028 9.1	-	-				
HCM Lane V/C Ratio HCM Control Delay (s) HCM Lane LOS		0.061 7.5 A	- 0 A	0.263 14.4 B	0.028 9.1 A	-	-				

Mov Cap-1 Maneuver 517 905 1527 - - -

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	٭	-	+	•	1	<	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		با	f,		Y		
Traffic Volume (vph)	12	124	250	1	24	36	
Future Volume (vph)	12	124	250	1	24	36	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.919		
Flt Protected		0.996			0.980		
Satd. Flow (prot)	0	1855	1863	0	1678	0	
Flt Permitted		0.996			0.980		
Satd. Flow (perm)	0	1855	1863	0	1678	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	13	135	272	1	26	39	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	148	273	0	65	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	zation 26.7%			IC	U Level o	of Service A	

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HCM 6th TWSC 6: 8th Street & Future Road

2033 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	202	4	1		M	00.1
Traffic Vol. veh/h	12	124	250	1	24	36
Future Vol. veh/h	12	124	250	1	24	36
Conflicting Peds #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Ston	Stop
RT Channelized	-	None	-	None		None
Storage Length	-	-	-	-	0	-
Veh in Median Storage	e.# -	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	2	2	2	2	2	2
Mymt Flow	13	135	272	1	26	39
	10	100	212		20	00
Major/Minor	Major1	N	Aajor2		Minor2	
Conflicting Flow All	273	0	-	0	434	273
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	161	-
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	1290	-	-	-	579	766
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	868	-
Platoon blocked. %		-	-	-		
Mov Cap-1 Maneuver	1290	-	-	-	573	766
Mov Cap-2 Maneuver	-	-	-	-	573	-
Stage 1	-	-	-	-	764	-
Stage 2		-			868	
Oldgo 2					000	
Approach	EB		WB		SB	
HCM Control Delay, s	0.7		0		10.9	
HCM LOS					В	
Minor Lane/Major Myn	nt	FBI	FBT	WBT	WBR	SBI n1
Canacity (veh/h)		1290			1101(675
HCM Lane V/C Patio		0.01	-	-	-	0/5
HCM Control Dolay (c)		7.8	0	-	-	10.007
HCM Lane LOS		7.0			-	10.9 P
LCM 05th 9/ tilo O/ush		A	A	-	-	0.0
nuivi yotn %tile Q(ven)	U	-	-	-	0.3

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Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{F}	1	-	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	et A			1		1	
Traffic Volume (vph)	470	25	0	401	0	84	
Future Volume (vph)	470	25	0	401	0	84	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.993					0.865	
Fit Protected							
Satd. Flow (prot)	1850	0	0	1863	0	1611	
Flt Permitted							
Satd. Flow (perm)	1850	0	0	1863	0	1611	
Link Speed (k/h)	50			50	50		
Link Distance (m)	197.3			405.7	303.8		
Travel Time (s)	14.2			29.2	21.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	511	27	0	436	0	91	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	538	0	0	436	0	91	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	Intersection Capacity Utilization 38.1%					of Service A	А
Analysis Period (min) 15							

HCM 6th TWSC 1: Future Road & 16th Street 2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	f,			†		1
Traffic Vol, veh/h	470	25	0	401	0	84
Future Vol. veh/h	470	25	0	401	0	84
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
Mymt Flow	511	27	0	436	0	91
			-		-	
Major/Minor M	lajor1	1	Major2	1	Minor1	
Conflicting Flow All	0	0	-	-	-	525
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	552
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	552
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		12.8	
HCM LOS					В	
Minor Lane/Major Mymt	1	VBI n1	FRT	FBR	WBT	
Canacity (veh/h)		552				_
HCM Lane V/C Ratio		0 165				
HCM Control Delay (c)		12.8	-	-	-	
HCM Lane LOS		12.0 P	-	-	-	
HOM 05th 9/ tile O(ush)		0.6	-	-	-	
HOW Sour Whe Q(Ven)		0.0	-	-	-	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, T <u>2: 28th Avenue & 1</u>	imings 6th Str	eet					20 (230	33 Bac 607) BGC	Ckgrou DS 28th	nd PN Avenue,	1 Peak Owen Sou	Hour and TIS
	٦	-	7	4	Ļ	×.	<	1	1	×	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	1	1	٦	¢Î		۲	eî		٦	4Î	
Traffic Volume (vph)	32	439	83	118	285	58	59	102	136	48	117	57
Future Volume (vph)	32	439	83	118	285	58	59	102	136	48	117	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.914			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	1863	1615	1719	1693	0	1736	1619	0	1687	1733	0
Flt Permitted	0.540			0.338			0.639			0.521		
Satd. Flow (perm)	924	1863	1615	612	1693	0	1167	1619	0	925	1733	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90		17			69			25	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adj. Flow (vph)	35	477	90	128	310	63	64	111	148	52	127	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	477	90	128	373	0	64	259	0	52	189	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	25.5	25.5	25.5	37.4	33.1		14.3	14.3		14.3	14.3	
Actuated g/C Ratio	0.42	0.42	0.42	0.61	0.54		0.23	0.23		0.23	0.23	
v/c Ratio	0.09	0.61	0.12	0.26	0.40		0.24	0.60		0.24	0.45	
Control Delay	13.6	19.4	3.9	6.7	9.4		24.1	23.3		25.0	23.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Total Delay	13.6	19.4	3.9	6.7	9.4		24.1	23.3		25.0	23.0		
LOS	В	В	А	Α	А		С	С		С	С		
Approach Delay		16.7			8.7			23.4			23.4		
Approach LOS		В			А			С			С		
Queue Length 50th (m)	2.4	41.9	0.0	4.9	20.1		5.8	18.5		4.8	15.6		
Queue Length 95th (m)	9.0	90.4	8.1	14.7	47.9		19.1	51.2		16.6	41.6		
Internal Link Dist (m)		381.7			450.4			280.1			209.9		
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0			
Base Capacity (vph)	734	1480	1301	546	1525		604	871		478	909		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.05	0.32	0.07	0.23	0.24		0.11	0.30		0.11	0.21		
Intersection Summary													
Area Type:	Other												
Cycle Length: 100													
Actuated Cycle Length: 6	1.1												
Natural Cycle: 75													
Control Type: Semi Act-U	ncoord												
Maximum v/c Ratio: 0.61													
Intersection Signal Delay:	16.6			In	Intersection LOS: B								
Intersection Capacity Utili	zation 78.9%			ICU Level of Service D									
Analysis Period (min) 15													

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	۶	-	\mathbf{r}	4	-	•	1	1	1	1	Ŧ	∢
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	•	1	<u> </u>	ĥ		٦	f,		5	1.	
Traffic Volume (veh/h)	32	439	83	118	285	58	59	102	136	48	117	57
Future Volume (veh/h)	32	439	83	118	285	58	59	102	136	48	117	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adj Flow Rate, veh/h	35	477	90	128	310	63	64	111	148	52	127	62
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
Percent Heavy Veh, %	11	2	0	5	5	31	4	17	0	7	0	13
Cap, veh/h	485	718	618	401	755	153	329	166	222	239	313	153
Arrive On Green	0.38	0.38	0.38	0.08	0.51	0.51	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	937	1870	1610	1739	1473	299	1175	640	854	1076	1206	589
Grp Volume(v), veh/h	35	477	90	128	0	373	64	0	259	52	0	189
Grp Sat Flow(s),veh/h/ln	937	1870	1610	1739	0	1772	1175	0	1494	1076	0	1794
Q Serve(g_s), s	1.4	12.1	2.1	2.3	0.0	7.4	2.7	0.0	8.9	2.6	0.0	5.0
Cycle Q Clear(g_c), s	1.5	12.1	2.1	2.3	0.0	7.4	7.7	0.0	8.9	11.5	0.0	5.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.57	1.00		0.33
Lane Grp Cap(c), veh/h	485	718	618	401	0	908	329	0	388	239	0	466
V/C Ratio(X)	0.07	0.66	0.15	0.32	0.00	0.41	0.19	0.00	0.67	0.22	0.00	0.41
Avail Cap(c_a), veh/h	863	1472	1268	543	0	1767	640	0	784	524	0	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	14.6	11.5	9.9	0.0	8.6	20.7	0.0	18.9	24.1	0.0	17.5
Incr Delay (d2), s/veh	0.1	1.8	0.2	0.2	0.0	0.5	0.3	0.0	2.0	0.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.0	0.4	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	16.4	11.7	10.1	0.0	9.1	21.0	0.0	20.9	24.5	0.0	18.1
LnGrp LOS	В	В	В	В	А	А	С	А	С	С	А	В
Approach Vol, veh/h		602			501			323			241	
Approach Delay, s/veh		15.4			9.4			20.9			19.5	
Approach LOS		В			А			С			В	
Timer - Assianed Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc) s	7.3	29.0		20.9		36.3		20.9				
Change Period (Y+Rc) s	3.0	* 7		* 6		* 7		* 6				
Max Green Setting (Gmax) s	9.0	* 45		* 30		* 57		* 30				
Max O Clear Time $(q, c+11)$ s	4.3	14.1		13.5		94		10.9				
Green Ext Time (n. c) s	0.1	79		14		5.4		2.1				
	0.1	1.5		1.4		0.4		2.1				
Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			В									
Madaa												

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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3: 28th Avenue & F	imings Future R	2033 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI					
	≯	*	<	1	Ŧ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1	٦	↑	↑	1	
Traffic Volume (vph)	25	90	21	272	297	24	
Future Volume (vph)	25	90	21	272	297	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	27	98	23	296	323	26	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	27	98	23	296	323	26	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utilization	ation 27.9%			IC	U Level	of Service A	
Analysis Period (min) 15							

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3: 28th Avenue & Future Road (North)

2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	2.1					
Movement	EDI	EDD	ND	NDT	срт	CDD
					301	SDR
Lane Configurations)	^	1	T	T	^
Traffic Vol, ven/n	25	90	21	272	297	24
Future Vol, veh/h	25	90	21	272	297	24
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	0	40	-	-	15
Veh in Median Storage	e,#0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	27	98	23	296	323	26
			- 20	200	020	20
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	665	323	349	0	-	0
Stage 1	323	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42			-	-	-
Critical Hdwy Sto 2	5.42	-	-	-	-	-
Follow-up Hdwy	3 518	3 3 1 8	2 218			
Pot Cap 1 Manouver	125	718	1210	-	-	-
Stope 1	724	110	1210	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	/19	-	-	-	-	-
Platoon blocked, %		- 10	101-	-	-	-
Mov Cap-1 Maneuver	417	718	1210	-	-	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Ŭ						
Approach	ED.		ND		0D	
Approach	EB		INB		58	
HCM Control Delay, s	11.5		0.6		0	
HCM LOS	В					
Minor Lane/Major Mym	nt	NBI	NBT	FBI n1	EBI n2	SBT
	n	1010		447	710	001
		1210	-	417	/ 10	-
HCIVI Lane V/C Ratio		0.019	-	0.065	0.136	-
HCM Control Delay (s)		8	-	14.2	10.8	-
HCM Lane LOS		A	-	В	В	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.5	-

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R	oad (S	South)				2033 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	٨	7	1	t	ŧ		
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y			ર્સ	4Î		
Traffic Volume (vph)	51	2	3	242	288	99	
Future Volume (vph)	51	2	3	242	288	99	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.995				0.965		
Fit Protected	0.954			0.999			
Satd. Flow (prot)	1768	0	0	1861	1798	0	
Flt Permitted	0.954			0.999			
Satd. Flow (perm)	1768	0	0	1861	1798	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	55	2	3	263	313	108	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	57	0	0	266	421	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Util	ization 31.2%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

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4: 28th Avenue & Future Road (South)

2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Intersection	11					
int Delay, S/Vell	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	۰Y			र्च	f,	
Traffic Vol, veh/h	51	2	3	242	288	99
Future Vol, veh/h	51	2	3	242	288	99
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Ston	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-		-
Veh in Median Storage	e # 0	-	-	0	0	-
Grade %	0			0	0	
Deak Hour Factor	0	02	02	02	0	02
	32	32	32	32	92	32
meavy venicies, %	2	2	2	2	212	100
wivint Flow	55	2	3	263	313	108
Major/Minor	Minor2		Major1	I	Major2	_
Conflicting Flow All	636	367	421	0		0
Stane 1	367	001	761	J	-	J
Stage 2	260		-	-	-	-
Critical Liduar	6.40	6 22	4 10	-	-	-
Critical Howy	0.42	0.22	4.1Z	-	-	-
Critical Howy Stg 1	5.42	-	-	-	-	-
Critical Howy Stg 2	5.42	-	-	-	-	-
Follow-up Hawy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	442	678	1138	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	441	678	1138	-	-	-
Mov Cap-2 Maneuver	441	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	776				-	
Oldyo 2	110					
Approach	EB		NB		SB	
HCM Control Delay, s	14.2		0.1		0	
HCM LOS	В					
	_					
					0.0.5	0.05
Minor Lane/Major Mvn	nt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)		1138	-	447	-	-
HCM Lane V/C Ratio		0.003	-	0.129	-	-
HCM Control Delay (s))	8.2	0	14.2	-	-
HCM Lane LOS		A	Α	В	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-
	,					

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Synchro 11 Report Page 9

EBR NBL 53 31 53 31 900 1900 20.0 0.0 1 0 7.5 1.00 850 615 615 0 615 0 0.92 0.92	↑ NBT 72 72 1900 1.00 0.985 1705 0.985 1705 60 265.1 15.9 0.925	↓ SBT 142 142 142 1900 0.931 1743 1743 80 256.5 11.5	SBR 147 147 1900 0.0 0 1.00 0 0 0	
EBR NBL 53 31 53 31 900 1900 20.0 0.0 1 0 7.5 1.00 850 615 615 0 615 0 0.92 0.92	NBT 72 72 1900 1.00 0.985 1705 0.985 1705 60 265.1 15.9	SBT 142 142 1900 1.00 0.931 1743 1743 80 256.5 11.5	SBR 147 147 1900 0.0 0 1.00 0 0 0 0	
7 53 31 53 31 900 1900 20.0 0.0 1 0 7.5 1.00 850 615 615 0 615 0 0.92 0.92	 ↓ 72 72	142 142 1900 .931 1743 1743 80 256.5 11.5	147 147 1900 0.0 0 1.00 1.00 0	
53 31 53 31 900 1900 20.0 0.0 1 0 7.5 1.00 850 615 615 0 615 0 0.92 0.92	72 72 1900 1.00 0.985 1705 0.985 1705 60 265.1 15.9	142 142 1900 0.931 1743 1743 80 256.5 11.5	147 147 1900 0.0 0 1.00 0 0	
53 31 900 1900 20.0 0.0 1 0 7.5 1.00 1.00 1.00 615 0 615 0 0.92 0.92	72 1900 1.00 0.985 1705 0.985 1705 60 265.1 15.9	142 1900 1.00 0.931 1743 1743 80 256.5 11.5	147 1900 0.0 0 1.00 0 0	
900 1900 20.0 0.0 1 0 7.5 1.00 1.00 850 615 0 615 0	1900 1.00 0.985 1705 60 265.1 15.9	1900 1.00 0.931 1743 1743 80 256.5 11.5	1900 0.0 0 1.00 0 0	
20.0 0.0 1 0 7.5 1.00 1.00 850 615 0 615 0 0.92 0.92	1.00 0.985 1705 0.985 1705 60 265.1 15.9	1.00 0.931 1743 1743 80 256.5 11.5	0.0 0 1.00 0 0	
1 0 7.5 1.00 1.00 850 615 0 615 0 0.92 0.92	1.00 0.985 1705 0.985 1705 60 265.1 15.9	1.00 0.931 1743 1743 80 256.5 11.5	0 1.00 0 0	
7.5 1.00 1.00 850 615 0 615 0 0.92 0.92	1.00 0.985 1705 0.985 1705 60 265.1 15.9	1.00 0.931 1743 1743 80 256.5 11.5	1.00 0 0	
1.00 1.00 .850 615 0 615 0 0 0.92 0.92 0.92	1.00 0.985 1705 0.985 1705 60 265.1 15.9	1.00 0.931 1743 1743 80 256.5 11.5	1.00 0 0	
.850 615 0 615 0 0.92 0.92	0.985 1705 0.985 1705 60 265.1 15.9	0.931 1743 1743 80 256.5 11.5	0	
615 0 615 0 0.92 0.92	0.985 1705 0.985 1705 60 265.1 15.9	1743 1743 80 256.5 11.5	0	
615 0 615 0 0.92 0.92	1705 0.985 1705 60 265.1 15.9	1743 1743 80 256.5 11.5	0	
615 0 0.92 0.92	0.985 1705 60 265.1 15.9	1743 80 256.5 11.5	0	
615 0 0.92 0.92	1705 60 265.1 15.9	1743 80 256.5 11.5	0	
0.92 0.92	60 265.1 15.9	80 256.5 11.5		
0.92 0.92	265.1 15.9	256.5 11.5		
0.92 0.92	15.9	11.5		
0.92 0.92	0.02			
	0.92	0.92	0.92	
0% 0%	14%	2%	1%	
58 34	78	154	160	
58 0	112	314	0	
	Free	Free		
	10	CU Level	of Service A	
		Free I	ICU Level of	ICU Level of Service A

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HCM 6th TWSC 5: 28th Avenue & 8th Street

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2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1		- 4	f	
Traffic Vol, veh/h	172	53	31	72	142	147
Future Vol, veh/h	172	53	31	72	142	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	14	2	1
Mvmt Flow	187	58	34	78	154	160

wajor/winor	IVIII IOI Z		viajor i		wajorz						
Conflicting Flow All	380	234	154	0	-	0					
Stage 1	234	-	-	-	-	-					
Stage 2	146	-	-	-	-	-					
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	626	810	1439	-	-	-					
Stage 1	810	-	-	-	-	-					
Stage 2	886	-	-	-	-	-					
Platoon blocked, %				-	-	-					
Mov Cap-1 Maneuver	610	810	1439	-	-	-					
Mov Cap-2 Maneuver	610	-	-	-	-	-					
Stage 1	790	-	-	-	-	-					
Stage 2	886	-	-	-	-	-					
Approach	EB		NB		SB						
HCM Control Delay, s	12.6		2.3		0						
HCM LOS	В										
Minor Lane/Major Mvn	nt	NBL	NBT	EBLn1	EBLn2	SBT	SBR				
Capacity (veh/h)		1439	-	610	810	-	-				
HCM Lane V/C Ratio		0.023	-	0.306	0.071	-	-				
HCM Control Delay (s)	7.6	0	13.5	9.8	-	-				
HCM Lane LOS		A	A	В	Α	-	-				
HCM 95th %tile Q(veh	I)	0.1	-	1.3	0.2	-	-				

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Synchro 11 Report Page 11

Lanes, Volumes, 6: 8th Street & Fut	l'imings ture Roa	d					2033 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	٨	+	ţ	•	*		
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ŧ	ĥ		Y		
Traffic Volume (vph)	35	210	175	4	16	22	
Future Volume (vph)	35	210	175	4	16	22	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.997		0.921		
Flt Protected		0.993			0.980		
Satd. Flow (prot)	0	1850	1857	0	1681	0	
Flt Permitted		0.993			0.980		
Satd. Flow (perm)	0	1850	1857	0	1681	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	38	228	190	4	17	24	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	266	194	0	41	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	d						
Intersection Capacity Utiliz	ation 35.8%			IC	U Level	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC 6: 8th Street & Future Road

2033 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

-						
Intersection						
Int Delay, s/veh	1.5					
Mayamart	EDI	ED.T	MOT	14/00	001	000
wovement	ERL	ERI	VVBI	WBR	SBL	SBR
Lane Configurations	~-	•	ef _		Ý	~~
Traffic Vol, veh/h	35	210	175	4	16	22
Future Vol, veh/h	35	210	175	4	16	22
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	e, # -	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	38	228	190	4	17	24
Major/Minor	Major1	N	viajor2		viinor2	
Conflicting Flow All	194	0	-	0	496	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	304	-
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	1379	-	-	-	533	850
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1379	-	-	-	516	850
Mov Cap-2 Maneuver					516	-
Stage 1	-	-	_	_	81/	-
Stage 2	-	-	-	-	7/19	-
Slaye z	-	-	-	-	140	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.1		0		10.7	
HCM LOS					В	
		EDI	EDT	MOT		001 (
Minor Lane/Major Mvn	nt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)		1379	-	-	-	668
HCM Lane V/C Ratio		0.028	-	-	-	0.062
HCM Control Delay (s))	7.7	0	-	-	10.7
HCM Lane LOS		Α	Α	-	-	В
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

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Appendix H

2033 Total Traffic Operations Reports



Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{r}	1	-	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4Î			1		1
Traffic Volume (vph)	231	24	0	394	0	12
Future Volume (vph)	231	24	0	394	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987					0.865
Flt Protected						
Satd. Flow (prot)	1839	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1839	0	0	1863	0	1611
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.3			405.7	303.8	
Travel Time (s)	14.2			29.2	21.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	26	0	428	0	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	428	0	13
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalize	ed					
Intersection Capacity Utili	zation 24.1%			IC	CU Level	of Service
Analysis Period (min) 15						

HCM 6th TWSC 1: Future Road & 16th Street 2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4			A		1
Traffic Vol, veh/h	231	24	0	394	0	12
Future Vol, veh/h	231	24	0	394	0	12
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	251	26	0	428	0	13
Major/Minor	laior1	h	Maior?	A	linor1	
		I	viajorz	N		264
Connicting Flow All	U	U	-	-	-	204
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Howy	-	-	-	-	-	6.22
Critical Howy Stg 1	-	-	-	-	-	-
Critical Howy Stg 2	-	-	-	-	-	-
Follow-up Hawy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	115
Stage I	-	-	0	-	0	-
Stage 2	-	-	U	-	U	-
Platoon blocked, %	-	-		-		775
May Cap-1 Maneuver	-	-	-	-	-	115
Nov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9.7	
HCM LOS					А	
Miner Lene/Maier Maret			EDT			
Minor Lane/Major MVm		VBLN1	ERI	EBR	WBI	
Capacity (veh/h)		//5	-	-	-	
HUM Lane V/C Ratio		0.017	-	-	-	
HCIVI Control Delay (s)		9.7	-	-	-	
HUM Lane LOS		A	-	-	-	
HCM 95th %tile Q(veh)		0.1	-	-	-	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings 2033 Total AM Peak Hou 2: 28th Avenue & 16th Street (230607) BGCDS 28th Avenue, Owen Sound TI												
	۶	+	*	4	Ļ	×	<	1	1	1	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	1	4Î		ľ	4Î		ľ	eî	
Traffic Volume (vph)	42	178	23	278	297	60	80	130	84	46	109	17
Future Volume (vph)	42	178	23	278	297	60	80	130	84	46	109	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.941			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1720	0	1641	1702	0	1492	1581	0
Flt Permitted	0.532			0.554			0.670			0.587		
Satd. Flow (perm)	1011	1810	1468	1042	1720	0	1157	1702	0	922	1581	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			33			8	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	46	193	25	302	323	65	87	141	91	50	118	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	193	25	302	388	0	87	232	0	50	136	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	0	2	0	1	6		0	8			4	
Permitted Phases	2	0	2	6	0		8	0		4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase	00.0	00.0	00.0	F 0	00.0		40.0	40.0		40.0	40.0	
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0	30.0	8.0	30.0		29.0	29.0		29.0	29.0	
Total Split (S)	52.0	52.0	52.0	12.0	64.0%		30.0	30.0		30.0	30.0	
Maximum Croon (a)	52.0%	52.0%	5Z.0%	12.0%	64.0%		30.0%	30.0%		30.0%	30.0%	
Vallow Time (c)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
All Ded Time (s)	1.6	1.6	1.6	0.0	1.6		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		1.9	1.9		1.9	1.9	
Total Lost Time (c)	7.0	7.0	7.0	2.0	7.0		0.0	0.0		6.0	6.0	
Load/Log	1.0	7.0	7.0	J.ood	7.0		0.0	0.0		0.0	0.0	
Leau/Lay	Lay	Lay	Lay	Voc								
Vehicle Extension (s)	165	165	165	2.0	15		3.0	3.0		3.0	3.0	
Peopli Mede	4.0 Min	4.0 Min	4.0 Min	Z.U	4.0 Min		J.U Nono	J.U Nono		J.U Nono	J.U Nono	
Walk Time (s)	17.0	17.0	17.0	NUTE	17.0		12.0	12.0		12.0	12.0	
Flash Dopt Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/br)	12.0	۱ <u>۲</u> .0	۱ <u>۲</u> .0		12.0		1.0	1.0		1.0	1.0	
Act Effet Green (s)	20.1	20.1	20.1	35.3	31.3		12.4	12.4		12 4	12.4	
Actuated g/C Ratio	0.35	0.35	0.35	0.62	0.55		0.22	0.22		0.22	0.22	
v/c Ratio	0.00	0.00	0.00	0.02	0.00		0.22	0.52		0.22	0.22	
Control Delay	15.0	15 9	1.04	7.0	9.0		23.0	23.5		21.8	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Paradigm Transportation Solutions Limited

Lanes, Volumes, 2: 28th Avenue &	anes, Volumes, Timings 2033 Total AM Peak Hour 230607) BGCDS 28th Avenue, Owen Sound TIS											
	٦	-	\mathbf{F}	4	←	•	•	Ť	1	1	Ŧ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	15.0	15.9	1.0	7.0	9.0		23.0	23.5		21.8	21.4	
LOS	В	В	А	А	А		С	С		С	С	
Approach Delay		14.3			8.2			23.4			21.5	
Approach LOS		В			А			С			С	
Queue Length 50th (m)	3.3	14.9	0.0	12.1	19.9		8.2	19.5		4.6	12.1	
Queue Length 95th (m)	10.5	32.0	1.1	27.7	43.1		19.0	38.4		12.6	25.4	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	804	1440	1181	767	1685		614	918		489	842	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.13	0.02	0.39	0.23		0.14	0.25		0.10	0.16	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	6.7											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.59												
Intersection Signal Delay:	14.3			In	itersection	n LOS: B						
Intersection Capacity Utili	zation 77.9%			IC	CU Level of	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized 2: 28th Avenue & 16t	Inters th Stre	ection eet		(2306	20 607) BGC)33 To DS 28th /	tal AM Avenue, (Peak Owen Sor	Hour und TIS			
	۶	-	\mathbf{r}	4	+	•	•	Ť	1	1	Ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	•	1	ň	1.		5	1.		5	1.	
Traffic Volume (veh/h)	42	178	23	278	297	60	80	130	84	46	109	17
Future Volume (veh/h)	42	178	23	278	297	60	80	130	84	46	109	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adi(A pbT)	1.00	-	1.00	1.00	-	1.00	1.00		1.00	1.00	-	1.00
Parking Bus, Adi	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adi Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Adi Flow Rate, veh/h	46	193	25	302	323	65	87	141	91	50	118	18
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
Percent Heavy Veh %	0.02	5	10	1	4	26	10	7	2	21	19	10
Cap veh/h	487	648	527	694	805	162	310	232	150	229	312	48
Arrive On Green	0.36	0.36	0.36	0.13	0.54	0.54	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow veh/h	1011	1826	1485	1795	1487	299	1174	1020	658	976	1372	209
	16	1020	25	202	0	200	07	0	222	50	0	126
Crp Set Elew(c) veh/h/lp	40	190	1/05	1705	0	1707	117/	0	1679	076	0	1501
	17	1020	1400	F 4	0.0	7.0	2.0	0.0	7.0	27	0.0	1001
Q Serve(\underline{y}_{s}), s	1.7	4.5	0.0	5.4	0.0	7.2	7.0	0.0	7.0	2.7	0.0	4.1
Cycle Q Clear (g_c), s	1.7	4.5	1.00	5.4	0.0	0.17	1.9	0.0	0.20	9.7	0.0	4.1
	1.00	619	527	604	٥	0.17	210	٥	202	220	٥	260
Lane Gip Cap(c), ven/m	407	040	527 0.0F	0.44	0 00	900	0.00	0.00	0.61	229	0.00	0.00
V/C Rallo(A)	0.09	0.50	0.05	0.44	0.00	0.40	0.20	0.00	0.01	0.22	0.00	0.30
Avail Cap(c_a), ven/n	930	1459	1 00	142	1 00	1808	008	1.00	894	520	1.00	842
HUM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/ven	12.3	13.1	11.9	8.Z	0.0	7.0	21.7	0.0	19.5	23.8	0.0	18.4
Incr Delay (d2), s/ven	0.1	0.4	0.1	0.2	0.0	0.5	0.5	0.0	1.6	0.5	0.0	0.7
Initial Q Delay(03),s/ven	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/in	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.4	0.2	0.0	0.3
Unsig. Movement Delay, s/veh	1	10 5	10.0						04.4			40.0
LnGrp Delay(d),s/veh	12.4	13.5	12.0	8.3	0.0	8.0	22.2	0.0	21.1	24.3	0.0	19.0
LnGrp LOS	В	B	В	A	A	A	C	A	C	C	A	В
Approach Vol, veh/h		264			690			319			186	
Approach Delay, s/veh		13.2			8.2			21.4			20.5	
Approach LOS		В			A			С			С	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.5	27.0		18.8		37.5		18.8				
Change Period (Y+Rc), s	3.0	* 7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (q c+l1). s	7.4	6.3		11.7		9.2		9.9				
Green Ext Time (p_c), s	0.1	3.2		1.1		5.6		2.0				
Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			В									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Lanes, Volumes, T 3: 28th Avenue & F	⁻imings ⁻uture R	oad (N	North)				2033 Total AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	7	1	t	ţ	4	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	٦	1	1	1	
Traffic Volume (vph)	61	120	279	234	236	175	
Future Volume (vph)	61	120	279	234	236	175	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	66	130	303	254	257	190	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	66	130	303	254	257	190	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 41.3%			IC	CU Level	of Service A	
Analysis Period (min) 15							

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3: 28th Avenue & Future Road (North)

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection							
Int Delay, s/veh	5.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1	٦	•	•	1	
Traffic Vol, veh/h	61	120	279	234	236	175	
Future Vol, veh/h	61	120	279	234	236	175	
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	0	40	-	-	15	
Veh in Median Storage	e,# 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	66	130	303	254	257	190	
Major/Minor	Minor2	Ν	Major1	Ν	/lajor2		

Conflicting Flow All	1117	257	447	0	-	0						
Stage 1	257	-	-	-	-	-						
Stage 2	860	-	-	-	-	-						
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	229	782	1113	-	-	-						
Stage 1	786	-	-	-	-	-						
Stage 2	414	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	167	782	1113	-	-	-						
Mov Cap-2 Maneuver	167	-	-	-	-	-						
Stage 1	572	-	-	-	-	-						
Stage 2	414	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	20.5		5.1		0							
HCM LOS	С											
Minor Lane/Major Mvm	ıt	NBL	NBT E	EBLn1 I	EBLn2	SBT	SBR					
Capacity (veh/h)		1113	-	167	782	-	-					
HCM Lane V/C Ratio		0.272	-	0.397	0.167	-	-					
HCM Control Delay (s)		9.4	-	40.1	10.5	-	-					
HCM Lane LOS		А	-	E	В	-	-					
HCM 95th %tile Q(veh)	1.1	-	1.7	0.6	-	-					

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4: 28th Avenue &	Future R	oad (S	South)				(230607) BGCDS 28th Avenue, Owen Sound TI
	۶	\mathbf{F}	•	1	Ŧ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y			ا	¢Î		
Traffic Volume (vph)	81	3	1	432	322	34	
Future Volume (vph)	81	3	1	432	322	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.996				0.987		
Flt Protected	0.954						
Satd. Flow (prot)	1770	0	0	1863	1839	0	
Flt Permitted	0.954						
Satd. Flow (perm)	1770	0	0	1863	1839	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	88	3	1	470	350	37	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	91	0	0	471	387	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 34.9%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

4: 28th Avenue & Future Road (South)

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Intersection	1.0					
int Delay, s/ven	1.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			t,	1	
Traffic Vol, veh/h	81	3	1	432	322	34
Future Vol. veh/h	81	3	1	432	322	34
Conflicting Peds. #/hr	0	ñ	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	0.00	None		None		None
Storage Length	0	NUNC		NUNC		None
Veh in Median Storage	0 4 0	-	-	0	0	-
Grade %	ο, π Ο	-	-	0	0	-
Deak Hour Faster	0	- 00	-	00	00	-
reak Hour Factor	92	92	92	92	92	92
neavy venicies, %	2	2	2	2	2	2
MVMt Flow	88	3	1	470	350	37
Maior/Minor	Minor2		Maior1	1	Maior2	
Conflicting Flow All	841	360	387	0		0
Stane 1	360	003	001	0	-	J
Stage 2	470	-	-	-	-	-
Stage 2	412	6.00	4 10	-	-	-
Critical Howy	0.42	0.22	4.12	-	-	-
Critical Howy Stg 1	5.42	-	-	-	-	-
Critical Howy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	335	677	1171	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	677	1171	-	-	-
Mov Cap-2 Maneuver	335	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	628		-		_	
Slage 2	020	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	19.4		0		0	
HCM LOS	C					
	5					
Minor Lane/Major Mvn	nt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)		1171	-	341	-	-
HCM Lane V/C Ratio		0.001	-	0.268	-	-
HCM Control Delay (s)		8.1	0	19.4	-	-
HCM Lana LOS						
ILGIVI LAITE LUS		A	A	С	-	-

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5: 28th Avenue & 8	3th Stree	et					(230607) BGCDS 28th Avenue, Owen Sound
	٦	$\mathbf{\hat{z}}$	1	t	Ŧ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲.	1		र्भ	4Î		
Traffic Volume (vph)	265	23	86	168	76	249	
Future Volume (vph)	265	23	86	168	76	249	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.897		
Flt Protected	0.950			0.983			
Satd. Flow (prot)	1805	1615	0	1746	1653	0	
Flt Permitted	0.950			0.983			
Satd. Flow (perm)	1805	1615	0	1746	1653	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	288	25	93	183	83	271	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	288	25	0	276	354	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	9.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	۲	1		÷.	¢Î,	
Traffic Vol, veh/h	265	23	86	168	76	249
Future Vol, veh/h	265	23	86	168	76	249
Conflicting Peds, #/h	r O	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Stora	ge,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	288	25	93	183	83	271
Major/Minor	Minor2	I	Major1	Ν	Major2	
Conflicting Flow All	588	219	83	0	-	0
Stage 1	219	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	33	2 245			

Critical Hdwy	6.4	6.2	4.15	-	-	-					
Critical Hdwy Stg 1	5.4	-	-	-	-	-					
Critical Hdwy Stg 2	5.4	-	-	-	-	-					
Follow-up Hdwy	3.5	3.3	2.245	-	-	-					
Pot Cap-1 Maneuver	475	826	1495	-	-	-					
Stage 1	822	-	-	-	-	-					
Stage 2	704	-	-	-	-	-					
Platoon blocked, %				-	-	-					
Mov Cap-1 Maneuver	442	826	1495	-	-	-					
Mov Cap-2 Maneuver	442	-	-	-	-	-					
Stage 1	765	-	-	-	-	-					
Stage 2	704	-	-	-	-	-					
Approach	EB		NB		SB						
HCM Control Delay, s	25.7		2.6		0			 	 	 	
HCM LOS	D		-								
		NIDI	NDT			ODT	000				
Minor Lane/Major Mvm	t	NBL	NBI	EBLn1 E	-BLn2	SB1	SBR		 	 	
Capacity (veh/h)		1495	-	442	826	-	-				
HCM Lane V/C Ratio		0.063	-	0.652	0.03	-	-				
HCM Control Delay (s)		7.6	0	27.1	9.5	-	-				
HCM Lane LOS		A	Α	D	Α	-	-				
HCM 95th %tile Q(veh)		0.2	-	4.5	0.1	-	-				

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6: 8th Street & Fu	ture Roa	a					(230607) BGCDS 26th Avenue, Owen Sound Th
	≯	→	+	×	1	∢	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ا	ĥ		Y		
Traffic Volume (vph)	12	264	335	1	24	36	
Future Volume (vph)	12	264	335	1	24	36	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.919		
Flt Protected		0.998			0.980		
Satd. Flow (prot)	0	1859	1863	0	1678	0	
Flt Permitted		0.998			0.980		
Satd. Flow (perm)	0	1859	1863	0	1678	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	13	287	364	1	26	39	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	300	365	0	65	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	zation 33.9%			IC	CU Level o	of Service A	l l
Analysis Period (min) 15							

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HCM 6th TWSC 6: 8th Street & Future Road

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	ef 👘		۰Y	
Traffic Vol, veh/h	12	264	335	1	24	36
Future Vol, veh/h	12	264	335	1	24	36
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	287	364	1	26	39

Major/Minor	Major1	N	/lajor2		Minor2		
Conflicting Flow All	365	0	-	0	678	365	
Stage 1	-	-	-	-	365	-	
Stage 2	-	-	-	-	313	-	
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	1194	-	-	-	418	680	
Stage 1	-	-	-	-	702	-	
Stage 2	-	-	-	-	741	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	r 1194	-	-	-	413	680	
Mov Cap-2 Maneuver	r -	-	-	-	413	-	
Stage 1	-	-	-	-	693	-	
Stage 2	-	-	-	-	741	-	
Approach	EB		WB		SB		
HCM Control Delay, s	s 0.3		0		12.6		
HCM LOS					В		
N (in an I and () (a in a N ()		EDI	EDT	MDT		001-4	
Minor Lane/Major MV	mt	EBL	EBI	WBI	WBR	SBEUT	
Capacity (veh/h)		1194	-	-	-	540	
HCM Lane V/C Ratio		0.011	-	-	-	0.121	
HCM Control Delay (s	5)	8	0	-	-	12.6	
HCM Lane LOS		A	A	-	-	B	
HCM 95th %tile Q(ve	h)	0	-	-	-	0.4	

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Lanes, Volumes, 7: Driveway A & F	Timings ⁻ uture Ro	ad (No		2033 Total AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS			
	→	~	4	+	•	۲	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4Î			ا	Y		
Traffic Volume (vph)	27	13	157	213	0	54	
Future Volume (vph)	27	13	157	213	0	54	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.956				0.865		
Flt Protected				0.979			
Satd. Flow (prot)	1781	0	0	1824	1611	0	
Flt Permitted				0.979			
Satd. Flow (perm)	1781	0	0	1824	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	150.6			119.9	110.4		
Travel Time (s)	10.8			8.6	7.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	29	14	171	232	0	59	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	43	0	0	403	59	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 36.6%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

7: Driveway A & Future Road (North)

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1.			1	V	
Traffic Vol. veh/h	27	13	157	213	0	54
Future Vol. veh/h	27	13	157	213	0	54
Conflicting Peds #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Ston	Ston
RT Channelized	1100	None	1100	None	otop	None
Storage Length	_	None	_	None	0	None
Veh in Median Storage	×# 0	-	-	0	0	-
Grade %	,π 0 Λ		-	0	0	-
Book Hour Footor	02	- 02	02	02	02	02
	92	92	92	92	92	92
Mumt Flow	2	14	171	2	2	2 50
	29	14	17.1	232	0	09
Major/Minor	Major1	1	Major2	1	Minor1	
Conflicting Flow All	0	0	43	0	610	36
Stage 1	-	-	-	-	36	-
Stage 2	-	-	-	-	574	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwv	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1566	-	458	1037
Stage 1					986	
Stage 2	-	-	-	-	563	-
Platoon blocked %					000	
Mov Cap-1 Maneuver	-	-	1566	-	401	1037
Mov Cap-2 Maneuver			-		401	-
Stage 1	-		-		986	-
Stage 2					493	
Oldge Z					400	
Approach	EB		WB		NB	
HCM Control Delay, s	0		3.2		8.7	

			A		
NBLn1	EBT	EBR	WBL	WBT	
1037	-	-	1566	-	
0.057	-	-	0.109	-	
8.7	-	-	7.6	0	
A	-	-	Α	А	
0.2	-	-	0.4	-	
	NBLn1 1037 0.057 8.7 A 0.2	NBLn1 EBT 1037 - 0.057 - 8.7 - A - 0.2 -	NBLn1 EBT EBR 1037 - - 0.057 - - 8.7 - - A - - 0.2 - -	NBLn1 EBT EBR WBL 1037 - - 1566 0.057 - - 0.109 8.7 - - 7.66 A - - A 0.2 - - 0.4	NBLn1 EBT EBR WBL WBT 1037 - 1566 - 0.057 - 0.109 - 8.7 - 7.6 0 A - - A 0.2 - 0.4 -

Paradiam	Transportation	Solutions	Limited

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8: Driveway B & F	Future Ro	ad (No	orth)				(230607) BGCDS 28th Avenue, Owen Sound TIS
	-	\mathbf{r}	4	+	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	۹			ŧ	Y		
Traffic Volume (vph)	81	0	84	370	0	100	
Future Volume (vph)	81	0	84	370	0	100	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Fit Protected				0.991			
Satd. Flow (prot)	1863	0	0	1846	1611	0	
Flt Permitted				0.991			
Satd. Flow (perm)	1863	0	0	1846	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	88	0	91	402	0	109	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	88	0	0	493	109	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	ization 43.6%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings

Synchro 11 Report Page 16

2033 Total AM Peak Hour

HCM 6th TWSC 8: Driveway B & Future Road (North)

2033 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection	_					
Int Delay, s/veh	2.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ĥ			- 4	۰Y	
Traffic Vol, veh/h	81	0	84	370	0	100
Future Vol, veh/h	81	0	84	370	0	100
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
Mymt Flow	88	0	Q1	402	<u>د</u>	100
WIVING LIOW	00	0	31	402	0	109
Major/Minor M	ajor1	Ν	Major2		Minor1	
Conflicting Flow All	0	0	88	0	672	88
Stage 1	-	-	-	-	88	-
Stage 2		-	-	-	584	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1			-		5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy			2 2 1 8		3 518	3 318
Pot Can-1 Maneuver			1508		421	970
Stane 1			1000		921	510
Stage 2	-	-	-	-	557	-
Diateon blocked %		-	-	-	007	-
FialoUII DIOCKEU, %	-	-	1500	-	200	070
Mov Cap-1 Maneuver	-	-	1508	-	388	970
Mov Cap-2 Maneuver	-	-	-	-	388	-
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	514	-
Annroach	FB		WR		NB	
HCM Control Delay	0	_	1.4	_	0.2	_
HOM LOS	0		1.4		9.Z	
					A	
Minor Lane/Major Mvmt	1	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		970	-	-	1508	-
HCM Lane V/C Ratio		0.112	-		0.061	-
HCM Control Delay (s)		9.2	-		7.5	0
HCM Lane LOS		Δ			Δ	Δ
HCM 05th %tile O(uch)		0.4	-		0.0	А
HOW SOUL WILL O(VEL)		0.4	-	-	0.2	-

Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings 1: Future Road & 16th Street 2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{r}	1	+	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4Î			↑		1
Traffic Volume (vph)	454	33	0	394	0	84
Future Volume (vph)	454	33	0	394	0	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991					0.865
Fit Protected						
Satd. Flow (prot)	1846	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1846	0	0	1863	0	1611
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.3			405.7	303.8	
Travel Time (s)	14.2			29.2	21.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	493	36	0	428	0	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	529	0	0	428	0	91
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalize	ed					
Intersection Capacity Utili	zation 37.8%			IC	CU Level	of Service /
Analysis Period (min) 15						

HCM 6th TWSC 1: Future Road & 16th Street 2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	đ,			•		1
Traffic Vol, veh/h	454	33	0	394	0	84
Future Vol, veh/h	454	33	0	394	0	84
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	e, # 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	493	36	0	428	0	91
Maior/Minor	Maior1	N	Maior2	N	/linor1	
Conflicting Flow All	0	0			_	511
Stane 1	-	-				-
Stage 2					-	
Critical Hdwy	-	-	-	-	_	6 22
Critical Hdwy Stg 1						0.22
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-		-		3 3 18
Pot Cap-1 Maneuver	-	-	0	-	0	563
Stage 1			0		0	-
Stage 2	-	-	Ő	-	Ő	-
Platoon blocked %			v		v	
Mov Cap-1 Maneuver	-	-	-	-	-	563
Mov Cap-2 Maneuver		-	-	-	-	
Stage 1	-	-	-	-	-	-
Stage 2						
Oldyo 2	-	-		-	-	-
	_					
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		12.6	
HCM LOS					В	
Minor Lane/Maior Mym	nt I	VRI n1	FBT	FBR	WBT	
Capacity (yeh/h)		563		LDIX		
HCM Lane V/C Patio		0.162	-	-	-	
HCM Control Delay (s)		12.6		-		
HCM Lane LOS		12.0 R			_	
HCM 95th %tile O(veh)	90	-	_	-	
now sour whe Q(ver	/	0.0	_	_	_	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, T 2: 28th Avenue & 1	imings 6th Str	eet					(230	20 607) BGC	033 Tc DS 28th	otal PN Avenue,	l Peak Owen Sou	Hour und TIS
	۶	-	\mathbf{r}	4	+	•	•	Ť	1	1	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	ľ	¢Î		ľ	¢Î		ľ	el el	
Traffic Volume (vph)	32	423	83	133	265	58	72	140	161	48	140	57
Future Volume (vph)	32	423	83	133	265	58	72	140	161	48	140	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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	0.050		0.850	0.050	0.973		0.050	0.920		0.050	0.957	
Fit Protected	0.950	4000	4045	0.950	1000	0	0.950	4000	•	0.950	4750	0
Sato. Flow (prot)	1626	1863	1615	1/19	1686	0	1/36	1620	0	1687	1752	0
Fit Permitted	0.001	1060	1615	0.330	1696	0	1006	1600	٥	0.401	1750	0
Salu. Flow (perm) Dight Turp on Pod	945	1003	Vec	597	1000	Voc	1096	1620	Voc	712	1752	Voo
Sate Flow (PTOP)			00		18	165		50	165		21	165
Link Speed (k/h)		50	30		50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.0	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adi, Flow (vph)	35	460	90	145	288	63	78	152	175	52	152	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	460	90	145	351	0	78	327	0	52	214	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
	7.0	1.0	1.0	0.C	7.0		0.0	0.0		0.0	0.0	
Leau/Lay	Lay Yos	Lay Yes	Lay Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	45		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	4.5 Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0	Tiono	17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	26.1	26.1	26.1	40.7	36.5		17.3	17.3		17.3	17.3	
Actuated g/C Ratio	0.39	0.39	0.39	0.60	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.10	0.64	0.13	0.30	0.38		0.28	0.71		0.29	0.46	
Control Delay	15.8	22.5	4.4	8.5	10.6		24.4	28.7		26.4	23.4	
Queue Delav	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Paradigm Transportation Solutions Limited

Lanes, Volumes, ⁻ <u>2: 28th Avenue &</u>	.anes, Volumes, Timings 2033 Total PM Peak Hour 1: 28th Avenue & 16th Street (230607) BGCDS 28th Avenue, Owen Sound TIS											
	٦	-	\mathbf{F}	4	+	۰.	•	Ť	۲	1	ŧ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	15.8	22.5	4.4	8.5	10.6		24.4	28.7		26.4	23.4	
LOS	В	С	А	А	В		С	С		С	С	
Approach Delay		19.3			10.0			27.9			23.9	
Approach LOS		В			А			С			С	
Queue Length 50th (m)	2.7	45.8	0.0	6.9	21.7		7.6	29.3		5.1	19.6	
Queue Length 95th (m)	10.1	97.0	8.7	19.9	52.6		22.6	71.4		17.3	48.3	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	659	1302	1156	517	1445		510	786		331	827	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.35	0.08	0.28	0.24		0.15	0.42		0.16	0.26	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 67	7.4											
Natural Cycle: 75												
Control Type: Semi Act-Ur	ncoord											
Maximum v/c Ratio: 0.71												
Intersection Signal Delay:	19.4			In	ntersection	n LOS: B						
Intersection Capacity Utiliz	zation 81.4%			IC	CU Level	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

Paradigm Transportation Solutions Limited

HCM 6th Signalized I 2: 28th Avenue & 16t	Inters th Stre	2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS										
	۶	-	\mathbf{r}	4	+	•	٠	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	•	1	5	ĥ		5	ĥ		5	ĥ	
Traffic Volume (veh/h)	32	423	83	133	265	58	72	140	161	48	140	57
Future Volume (veh/h)	32	423	83	133	265	58	72	140	161	48	140	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adi Flow Rate, veh/h	35	460	90	145	288	63	78	152	175	52	152	62
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
Percent Heavy Veh. %	11	2	0	5	5	31	4	17	0	7	0	13
Cap, veh/h	464	680	585	380	709	155	353	209	241	223	384	157
Arrive On Green	0.36	0.36	0.36	0.08	0.49	0.49	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	957	1870	1610	1739	1451	317	1149	699	804	1011	1283	523
Grn Volume(v) veh/h	35	460	90	145	0	351	78	0	327	52	0	214
Gro Sat Flow(s) veh/h/ln	957	1870	1610	1739	Ő	1769	1149	Ő	1503	1011	Ő	1806
Q Serve(q , s), s	1.5	12.7	2.3	2.9	0.0	77	3.5	0.0	11.9	3.0	0.0	5.8
Cvcle Q Clear(q, c) s	1.6	12.7	2.3	2.9	0.0	77	9.3	0.0	11.9	14.9	0.0	5.8
Prop In Lane	1 00		1.00	1.00	0.0	0.18	1 00	0.0	0.54	1 00	0.0	0.29
Lane Grp Cap(c), veh/h	464	680	585	380	0	864	353	0	450	223	0	540
V/C Ratio(X)	0.08	0.68	0.15	0.38	0.00	0.41	0.22	0.00	0.73	0.23	0.00	0.40
Avail Cap(c, a) veh/h	820	1376	1185	504	0	1648	573	0	737	417	0	886
HCM Platoon Ratio	1 00	1.00	1 00	1 00	1 00	1.00	1.00	1 00	1 00	1.00	1 00	1 00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	16.4	13.1	11.4	0.0	10.0	20.7	0.0	19.2	25.9	0.0	17.0
Incr Delay (d2) s/veh	0.1	2.0	0.2	0.2	0.0	0.5	0.3	0.0	2.3	0.5	0.0	0.5
Initial Q Delav(d3) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfO(50%) veh/ln	0.0	0.5	0.1	0.0	0.0	0.1	0.2	0.0	0.5	0.3	0.0	0.4
Unsig. Movement Delay, s/veh	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1
LnGro Delav(d).s/veh	13.1	18.4	13.3	11.7	0.0	10.5	21.0	0.0	21.5	26.4	0.0	17.5
LnGrp LOS	В	В	В	В	A	В	С	A	C	С	A	B
Approach Vol. veh/h		585			496			405			266	
Approach Delay, s/yeh		17.3			10.9			21.4			19.2	
Approach LOS		B			B			C			B	
Timer Assigned Phs	1	2		1		6		8				
Pha Duration (C+V+Pa)	7.6	20.2		24.2		26.0		24.2				
Change Boried (V Bo)	2.0	29.2		24.5		\$ 7		24.5				
Max Green Setting (Greev)	0.0	* / F		* 30		* 57		* 30				
Max O Clear Time (a. c. 11) c	9.0	40		16.0		0.7		13.0				
Croon Ext Time (n. e)	4.9	14./ 7.F		10.9		5.7		13.9				
Green Ext Time (p_c), s	0.1	1.5		1.4		5.0		2.0				
Intersection Summary			10 5									
HCM 6th Ctrl Delay			16.7									
HUM 6th LOS			В									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Synchro 11 Report Page 5

Lanes, Volumes, T 3: 28th Avenue & F	⊺imings Future R	load (N	lorth)				2033 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	*	<	1	ţ	1	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	۲	1	1	1	
Traffic Volume (vph)	101	268	129	272	297	62	
Future Volume (vph)	101	268	129	272	297	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	110	291	140	296	323	67	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	110	291	140	296	323	67	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 38.9%			IC	U Level	of Service A	
Analysis Period (min) 15							

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3: 28th Avenue & Future Road (North)

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	6.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	1	1	1	1	1	1
Traffic Vol, veh/h	101	268	129	272	297	62
Future Vol, veh/h	101	268	129	272	297	62
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	0	40	-	-	15
Veh in Median Storage	e, # 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	110	291	140	296	323	67

Conflicting Flow All 899 323 390 0 0 Stage 1 323 - - - - - Stage 1 323 - - - - - Critical Hdwy 642 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 309 718 1169 - - - Stage 1 734 - - - - - Stage 2 562 - - - - - Mov Cap-1 Maneuver 272 718 1169 - - - Mov Cap-2 Maneuver 272 718 1169 - - - Stage 1 646 - - - - - - Stage 2 562	Major/Minor	Minor2		Major1		Major2						
Stage 1 323 -	Conflicting Flow All	899	323	390	0	-	0					
Stage 2 576 -	Stage 1	323	-	-	-	-	-					
Critical Hdwy 6.42 6.22 4.12 - - - Critical Hdwy Stg 1 5.42 - - - - - Follow-up Hdwy 3.518 3.318 2.218 - - - Follow-up Hdwy 3.518 3.318 2.218 - - - Pot Cap-1 Maneuver 309 718 1169 - - - Stage 1 734 - - - - - Stage 2 562 - - - - - Mov Cap-1 Maneuver 272 718 1169 - - - Mov Cap-2 Maneuver 272 718 1169 - - - Stage 1 646 - - - - - - Stage 2 562 - - - - - - Stage 1 646 - - - - - - Stage 2 562 - - - -	Stage 2	576	-	-	-	-	-					
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 309 718 1169 - - Stage 1 734 - - - - Stage 2 562 - - - - Nov Cap-1 Maneuver 272 718 1169 - - Mov Cap-2 Maneuver 272 718 1169 - - Mov Cap-2 Maneuver 272 - - - - Stage 1 646 - - - - - Stage 2 562 - - - - - Stage 1 646 - - - - - Stage 2 562 - - - - - HCM Control Delay, s 17.1 2.7 0 - - HCM LooS C - <td< td=""><td>Critical Hdwy</td><td>6.42</td><td>6.22</td><td>4.12</td><td>-</td><td>-</td><td>-</td><td></td><td></td><td></td><td></td><td></td></td<>	Critical Hdwy	6.42	6.22	4.12	-	-	-					
Critical Hdwy Sig 2 5.42 - - - - Follow-up Hdwy 3.518 3.318 2.218 - - - Pot Cap-1 Maneuver 309 718 1169 - - - Stage 1 734 - - - - - Stage 2 562 - - - - - Platoon blocked, % - - - - - Mov Cap-1 Maneuver 272 718 1169 - - Mov Cap-2 Maneuver 272 718 1169 - - Stage 1 646 - - - - Stage 2 562 - - - - Stage 2 562 - - - - Stage 2 562 - - - - Mor Cantrol Delay, s 17.1 2.7 0 - HCM Loos C - - - - Minor Lane/Major Mvmt NBL	Critical Hdwy Stg 1	5.42	-	-	-	-	-					
Follow-up Hdwy 3.518 3.318 2.218	Critical Hdwy Stg 2	5.42	-	-	-	-	-					
Pot Cap-1 Maneuver 309 718 1169 - - Stage 1 734 - - - Stage 2 562 - - - Platon blocked, % - - - Mov Cap-1 Maneuver 272 718 1169 - Mov Cap-2 Maneuver 272 718 1169 - Mov Cap-2 Maneuver 272 - - - Stage 1 646 - - - Stage 2 562 - - - Stage 2 562 - - - HCM Control Delay, s 17.1 2.7 0 HCM LOS C - - Minor Lane/Major Mvmt NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 HCM Lane V/C Ratio 0.12 - 0.404 0.406 HCM Control Delay (s) 8.5 - 26.9 13.4	Follow-up Hdwy	3.518	3.318	2.218	-	-	-					
Stage 1 734 -	Pot Cap-1 Maneuver	309	718	1169	-	-	-					
Stage 2 562 - - - Platon blocked, % - - - Mov Cap-1 Maneuver 272 718 1169 - Mov Cap-2 Maneuver 272 - - - Stage 1 646 - - - Stage 2 562 - - - Approach EB NB SB HCM Control Delay, s 17.1 2.7 0 HCM LOS C - - Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - HCM Control Delay (s) 8.5 - 26.9 13.4 -	Stage 1	734	-	-	-	-	-					
Platon blocked, % Mov Cap-1 Maneuver 272 718 1169 Stage 1 646 Stage 2 562 Stage 2 562 Approach EB NB SB HCM Control Delay, s 17.1 2.7 0 HCM LOS C Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 HCM LOS 0.12 - 0.404 0.406 HCM Control Delay (s) 8.5 - 26.9 13.4	Stage 2	562	-	-	-	-	-					
Mov Cap-1 Maneuver 272 718 1169 - <td>Platoon blocked, %</td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Platoon blocked, %				-	-	-					
Mov Cap-2 Maneuver 272 -	Mov Cap-1 Maneuver	272	718	1169	-	-	-					
Stage 1 646 - -	Mov Cap-2 Maneuver	272	-	-	-	-	-					
Stage 2 562 - - -	Stage 1	646	-	-	-	-	-					
Approach EB NB SB HCM Control Delay, s 17.1 2.7 0 HCM LOS C Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBT Capacity (veh/h) 1169 - 272 HCM Lane V/C Ratio 0.12 - 0.404 0.406 - HCM Control Delay (s) 8.5 - 269 13.4 - -	Stage 2	562	-	-	-	-	-					
Approach EB NB SB HCM Control Delay, s 17.1 2.7 0 HCM LOS C Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBC Capacity (veh/h) 1169 - 272 HCM Lane V/C Ratio 0.12 0.404 0.406 - HCM Control Delay (s) 8.5 - 269 13.4 -												
HCM Control Delay, s 17.1 2.7 0 HCM LOS C C Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Gapacity (veh/h) 1169 - 272 718 - - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - - HCM Control Delay (s) 8.5 - 26.9 13.4 - -	Approach	EB		NB		SB						
HCM LOS C Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - HCM Control Delay (s) 8.5 - 26.9 13.4 -	HCM Control Delay, s	17.1		2.7		0						
Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 - - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - - HCM Control Delay (s) 8.5 - 26.9 13.4 - -	HCM LOS	С				-						
Minor Lane/Major Mvmt NBL NBT EBLn1 EBLn2 SBT SBR Capacity (veh/h) 1169 - 272 718 - - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - - HCM Control Delay (s) 8.5 - 26.9 13.4 - -												
Capacity (veh/h) 1169 - 272 718 - - HCM Lane V/C Ratio 0.12 - 0.404 0.406 - - HCM Control Delay (s) 8.5 - 26.9 13.4 - -	Minor Lane/Major Mvi	nt	NBL	NBT	EBLn1	EBLn2	SBT	SBR				
HCM Lane V/C Ratio 0.12 - 0.404 0.406 HCM Control Delay (s) 8.5 - 26.9 13.4	Capacity (veh/h)		1169	-	272	718	-	-			 	
HCM Control Delay (s) 8.5 - 26.9 13.4	HCM Lane V/C Ratio		0.12	-	0.404	0.406	-	-				
	HCM Control Delay (s	;)	8.5	-	26.9	13.4	-	-				
HCM Lane LOS A - D B	HCM Lane LOS	,	A	-	D	В	-					
HCM 95th %tile Q(veh) 0.4 - 1.9 2	HCM 95th %tile Q(vel	n)	0.4	-	1.9	2	-	-				

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R		2033 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS				
	۶	*	<	1	Ŧ		
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y			ŧ	¢Î		
Traffic Volume (vph)	51	2	3	350	466	99	
Future Volume (vph)	51	2	3	350	466	99	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.995				0.976		
Flt Protected	0.954						
Satd. Flow (prot)	1768	0	0	1863	1818	0	
Flt Permitted	0.954						
Satd. Flow (perm)	1768	0	0	1863	1818	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	55	2	3	380	507	108	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	57	0	0	383	615	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	zation 40.5%			IC	U Level o	of Service A	
Analysis Period (min) 15							

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4: 28th Avenue & Future Road (South)

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection	_		_			
Int Delay, s/veh	1.1					
Management				NDT	ODT	000
wovement	ERL	ERK	NRL	NRI	SBI	SBK
Lane Configurations	Y.			र्भ	ન	
Traffic Vol, veh/h	51	2	3	350	466	99
Future Vol, veh/h	51	2	3	350	466	99
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	e,#0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	55	2	3	380	507	108
		-			001	
Major/Minor	Minor2		Major1	N	Major2	
Conflicting Flow All	947	561	615	0	-	0
Stage 1	561	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Sto 1	5.42			-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-		-
Pot Can-1 Maneuver	290	527	965	-	-	-
Stane 1	571	521	- 505			
Stage 2	687	-	-	-	-	-
Slaye 2	00/	-	-	-	-	-
May Cap 1 Mancours	200	E07	065	-	-	-
Mov Cap-1 Maneuver	289	527	965	-	-	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Approach	EP		NP		S.P.	
	00.0				30	_
HCM Control Delay, s	20.2		0.1		0	
HCM LOS	С					
Minor Lane/Maior Mym	nt	NBI	NBT	EBLn1	SBT	SBR
Canacity (yeh/h)		065	ne i	20/	001	0011
UCM Long V/C Datio		0.000	-	234	-	-
HCM Centrel Delay (a)		0.003	-	0.150	-	-
HOM Lang LOO		8.7	0	20.2	-	-
HUM Lane LUS		A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

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5: 28th Avenue & 8	8th Stree	et					(230607) BGCDS 28th Avenue, Owen Sound Th
	٦	\mathbf{F}	1	Ť	ŧ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1		ا	4Î		
Traffic Volume (vph)	257	53	31	95	180	287	
Future Volume (vph)	257	53	31	95	180	287	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.917		
Flt Protected	0.950			0.988			
Satd. Flow (prot)	1805	1615	0	1698	1718	0	
Flt Permitted	0.950			0.988			
Satd. Flow (perm)	1805	1615	0	1698	1718	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Adi, Flow (vph)	279	58	34	103	196	312	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	279	58	0	137	508	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utilization	ation 53.0%			IC	CU Level of	of Service A	
Analysis Period (min) 15							
Analysis Fenod (min) 15							

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	6.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	1	1		र्भ	4Î	
Traffic Vol, veh/h	257	53	31	95	180	287
Future Vol, veh/h	257	53	31	95	180	287
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storag	je,#0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	14	2	1
Mvmt Flow	279	58	34	103	196	312
Major/Minor	Minard		Antone		1-:0	

Major/Minior	IVIII IOI Z		viajor i		viajorz						1	_	
Conflicting Flow All	523	352	196	0	-	0							
Stage 1	352	-	-	-	-	-							
Stage 2	171	-	-	-	-	-							
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	518	696	1389	-	-	-							
Stage 1	716	-	-	-	-	-							
Stage 2	864	-	-	-	-	-							
Platoon blocked, %				-	-	-							
Mov Cap-1 Maneuver	505	696	1389	-	-	-							
Mov Cap-2 Maneuver	505	-	-	-	-	-							
Stage 1	697	-	-	-	-	-							
Stage 2	864	-	-	-	-	-							
Approach	EB		NB		SB								
HCM Control Delay	18.9		1.9		0			 	 	 			
HCM LOS	C				v								
200	Ŭ												
Minor Lane/Major Mvi	nt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	 	 	 			
Capacity (veh/h)		1389	-	505	696	-	-						
HCM Lane V/C Ratio		0.024	-	0.553	0.083	-	-						
HCM Control Delay (s	5)	7.7	0	20.6	10.6	-	-						
HCM Lane LOS		A	A	С	В	-	-						
HCM 95th %tile Q(vel	n)	0.1	-	3.3	0.3	-	-						

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		ŧ	¢Î		Y			
Traffic Volume (vph)	35	295	315	4	16	22		
Future Volume (vph)	35	295	315	4	16	22		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Frt			0.998		0.921			
Flt Protected		0.995			0.980			
Satd. Flow (prot)	0	1853	1859	0	1681	0		
Flt Permitted		0.995			0.980			
Satd. Flow (perm)	0	1853	1859	0	1681	0		
Link Speed (k/h)		80	80		50			
Link Distance (m)		166.5	310.5		252.9			
Travel Time (s)		7.5	14.0		18.2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	38	321	342	4	17	24		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	359	346	0	41	0		
Sign Control		Free	Free		Stop			
Intersection Summary								
Area Type:	Other							
Control Type: Unsignalized								
Intersection Capacity Utiliza	ation 47.6%			IC	U Level o	of Service A		

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HCM 6th TWSC 6: 8th Street & Future Road

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

1.1						
EBL	EBT	WBT	WBR	SBL	SBR	ł
	÷.	ef 👘		۰Y		
35	295	315	4	16	22	
35	295	315	4	16	22	
0	0	0	0	0	0	
Free	Free	Free	Free	Stop	Stop)
-	None	-	None	-	None	•
-	-	-	-	0	-	
e, # -	0	0	-	0	-	
-	0	0	-	0	-	
92	92	92	92	92	92	
2	2	2	2	2	2	
38	321	342	4	17	24	
	1.1 EBL 35 35 0 Free - - - - - - - - - - - - - - - - - -	1.1 EBL EBT 35 295 0 0 Free Free - None - None - 0 9, # - 0 - 0 92 92 2 38 321	1.1 EBL EBT WBT ↓ 1 35 295 315 0 0 0 0 Free Free Free None - 0 0 0 - 0 0 0 0 2 92 92 2 2 2 38 321 342	1.1 EBL EBT WBT WBR 4 1 1 1 35 295 315 4 35 295 315 4 0 0 0 0 Free Free Free Free - - - None - 0 0 - - - - - None - None - - 0 0 - - - 0 9 92 92 92 92 2 2 2 2 2 2 2 2 2 2 38 321 342 4	1.1 EBL EBT WBR WBR SBL • • • • • 35 295 315 4 16 35 295 315 4 16 0 0 0 0 0 Free Free Free Free Stop - - - None - - - 0 0 - 0 0 0 0 - 0 0 0 0 0 0 - 0 0 0 0 0 0 - 0 <td>1.1 EBL EBT WBT WBR SBL SBR 35 295 315 4 16 22 35 295 315 4 16 22 35 295 315 4 16 22 0 0 0 0 0 0 Free Free Free Free Stop Stop - - 0 0 - 0 - - - 0 0 - 0 - 0 - - 0 0 - 2</td>	1.1 EBL EBT WBT WBR SBL SBR 35 295 315 4 16 22 35 295 315 4 16 22 35 295 315 4 16 22 0 0 0 0 0 0 Free Free Free Free Stop Stop - - 0 0 - 0 - - - 0 0 - 0 - 0 - - 0 0 - 2

Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	346	0	-	0	741	344	
Stage 1	-	-	-	-	344	-	
Stage 2	-	-	-	-	397	-	
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	1213	-	-	-	384	699	
Stage 1	-	-	-	-	718	-	
Stage 2	-	-	-	-	679	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1213	-	-	-	369	699	
Mov Cap-2 Maneuver	-	-	-	-	369	-	
Stage 1	-	-	-	-	691	-	
Stage 2	-	-	-	-	679	-	
Approach	EB		WB		SB		
HCM Control Delay, s	0.9		0		12.7		
HCM LOS					В		
Minor Lane/Maior Mvr	nt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)		1213	-	-	-	508	
HCM Lane V/C Ratio		0.031		-	-	0.081	
HCM Control Delay (s)	8.1	0	-	-	12.7	
HCM Lane LOS	/	A	Ă	-	-	В	
HCM 95th %tile Q(veh	ı)	0.1	-	-	-	0.3	
	.,	3.1				0.0	

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Lanes, Volumes, 7: Driveway A & F	Timings ⁻ uture Ro	ad (No	orth)				2033 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	-	7	4	+	•	۲	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	۹î ا			ا	Y		
Traffic Volume (vph)	115	8	95	45	0	102	
Future Volume (vph)	115	8	95	45	0	102	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.991				0.865		
Flt Protected				0.967			
Satd. Flow (prot)	1846	0	0	1801	1611	0	
Flt Permitted				0.967			
Satd. Flow (perm)	1846	0	0	1801	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	150.6			119.9	110.4		
Travel Time (s)	10.8			8.6	7.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	125	9	103	49	0	111	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	134	0	0	152	111	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	ization 30.5%			IC	U Level	of Service A	
Analysis Period (min) 15							

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7: Driveway A & Future Road (North)

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	4.6					
Movement	EBT	ERP	W/RI	W/RT	NRI	
		EDR	WDL	VVD1		NDR
Lane Configurations	115	0	07	4	۳	100
Traffic Vol, ven/n	115	8	95	45	0	102
Future Vol, veh/h	115	8	95	45	0	102
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
Mymt Flow	125	9	103	49	0	111
					Ū	
Major/Minor N	lajor1		Major2		Minor1	
Conflicting Flow All	0	0	134	0	385	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	255	-
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 Can-1 Maneuver	-	-	1451	-	618	920
Stane 1	_		1-01		808	520
Stage 2	-	-	-	-	780	-
Sidge 2	-	-	-	-	100	-
Platoon blocked, %	-	-	4454	-	570	000
Mov Cap-1 Maneuver	-	-	1451	-	5/3	920
Mov Cap-2 Maneuver	-	-	-	-	573	-
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	730	-
Approach	EP		W/P		NP	
	EB		VVB			
HCM Control Delay, s	0		5.2		9.4	
HCM LOS					A	
Minor Lane/Major Mymt		VBI n1	FBT	FBR	WBI	WBT
Capacity (yoh/h)		020	LDT	LDIX	1454	
		920	-	-	1401	-
HOM ON A LONG RATIO		0.121	-	-	0.071	-
HUM Control Delay (s)		9.4	-	-	1.1	0
HCM Lane LOS		A	-	-	A	A
HCM 95th %tile Q(veh)		0.4	-	-	0.2	-

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8: Driveway B & F	uture Ro	ad (No	orth)				(230607) BGCDS 28th Avenue, Owen Sound TI
	→	\mathbf{F}	∢	←	1	۲	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	el el			ŧ	Y		
Traffic Volume (vph)	217	0	51	140	0	152	
Future Volume (vph)	217	0	51	140	0	152	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.987			
Satd. Flow (prot)	1863	0	0	1839	1611	0	
Flt Permitted				0.987			
Satd. Flow (perm)	1863	0	0	1839	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	236	0	55	152	0	165	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	236	0	0	207	165	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 41.0%			IC	CU Level o	of Service /	4
Analysis Period (min) 15							

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Lanes, Volumes, Timings

Synchro 11 Report Page 16

2033 Total PM Peak Hour

HCM 6th TWSC 8: Driveway B & Future Road (North)

2033 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.6					
Movement	ERT	ERP	W/RI	W/RT	NR	
	EDI	EDR	WDL	VVDI		NDR
Lane Configurations	047	0	F 4	4	۳,	450
Traffic Vol, ven/n	217	0	51	140	0	152
Future Vol, veh/h	217	0	51	140	0	152
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	236	0	55	152	0	165
Major/Minor M	ajor1	N	Major2		Minor1	
Conflicting Flow All	0	0	236	0	498	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	262	-
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	-	-	1331	-	532	803
Stage 1		-	-	-	803	-
Stage 2	-	-	-	-	782	-
Platoon blocked %					. 02	
Mov Can-1 Maneuver	-	-	1331		508	803
Mov Cap-1 Maneuver			1001		508	000
	-	-	-	-	000	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	/4/	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.1		10.6	
HCMLOS	, v				B	
					5	
Minor Lane/Major Mvmt	1	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		803	-	-	1331	-
HCM Lane V/C Ratio		0.206	-	-	0.042	-
HCM Control Delay (s)		10.6	-	-	7.8	0
HCM Lane LOS		В	-	-	Α	Α
HCM 95th %tile Q(veh)		0.8	-	-	0.1	-

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Appendix I

2038 Background Traffic Operations Reports



Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{r}	1	-	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ĥ			↑		1	
Traffic Volume (vph)	250	21	0	446	0	25	
Future Volume (vph)	250	21	0	446	0	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.989					0.865	
Flt Protected							
Satd. Flow (prot)	1842	0	0	1863	0	1611	
Flt Permitted							
Satd. Flow (perm)	1842	0	0	1863	0	1611	
Link Speed (k/h)	50			50	50		
Link Distance (m)	197.3			405.7	303.8		
Travel Time (s)	14.2			29.2	21.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	272	23	0	485	0	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	295	0	0	485	0	27	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 26.8%			IC	CU Level	of Service /	A
Analysis Period (min) 15							

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HCM 6th TWSC 1: Future Road & 16th Street 2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection	_		_		_	_
Int Delay, s/veh	0.3					
Movement	FBT	FBR	WBI	WBT	NBI	NBR
Lane Configurations	1			*		1
Traffic Vol. veh/h	250	21	0	446	0	25
Future Vol. veh/h	250	21	0	446	0	25
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	272	23	0	485	0	27
Major/Minor	Anior1	h	Major?	h	linor1	
			viajulz	ľ		204
Conflicting Flow All	U	U	-	-	-	2ŏ4
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	6 00
Critical Howy	-	-	-	-	-	0.22
Critical Howy Stg 1	-	-	-	-	-	-
Critical Howy Stg 2	-	-	-	-	-	2 240
Follow-up Hawy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	/ 55
Stage 1	-	-	0	-	0	-
Stage 2	-	-	U	-	U	-
Platoon blocked, %	-	-		-		755
Mov Cap-1 Maneuver	-	-	-	-	-	/ 55
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		9.9	
HCM LOS					А	
Min			EDT		WDT	
Operative (web/b)	L I		ERI	EBK	WBI	
Capacity (ven/n)		/55	-	-	-	
HCIVI Lane V/C Ratio		0.036	-	-	-	
HCM Long LOS		9.9	-	-	-	
HOM OF A O(112 O(122)		A	-	-	-	
HUN YOTH WILL ()(Veh)		0.1	-	-	-	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, Ti 2: 28th Avenue & 1	imings 6th Str	eet					20 (230	38 Bac 607) BGC	c kgrou DS 28th	Ind AN Avenue,	1 Peak Owen Sou	Hour and TIS
	۶	-	7	4	Ļ	•	1	1	1	1	ŧ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	ľ	¢Î		ľ	¢Î		ľ	ef.	
Traffic Volume (vph)	44	197	33	337	311	62	117	160	80	48	118	17
Future Volume (vph)	44	197	33	337	311	62	117	160	80	48	118	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.950			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1721	0	1641	1714	0	1492	1583	0
Flt Permitted	0.524			0.543			0.664			0.528		
Satd. Flow (perm)	996	1810	1468	1021	1721	0	1147	1714	0	829	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			26			7	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	48	214	36	366	338	67	127	174	87	52	128	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	214	36	366	405	0	127	261	0	52	146	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	_
Act Effct Green (s)	20.1	20.1	20.1	35.7	31.7		13.5	13.5		13.5	13.5	
Actuated g/C Ratio	0.35	0.35	0.35	0.61	0.54		0.23	0.23		0.23	0.23	
v/c Ratio	0.14	0.34	0.07	0.49	0.43		0.48	0.63		0.27	0.39	
Control Delay	15.9	17.1	2.4	8.7	9,9		25.9	25.3		22.1	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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	٦	-	\mathbf{i}	•	-	•	1	Ť	1	1	Ŧ	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	15.9	17.1	2.4	8.7	9.9		25.9	25.3		22.1	21.2	
LOS	В	В	А	А	А		С	С		С	С	
Approach Delay		15.1			9.3			25.5			21.5	
Approach LOS		В			А			С			С	
Queue Length 50th (m)	3.6	17.3	0.0	16.5	22.4		12.4	23.6		4.8	13.2	
Queue Length 95th (m)	11.5	36.8	2.9	37.2	48.7		26.3	44.0		13.0	26.9	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	772	1403	1153	745	1662		593	898		428	821	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.15	0.03	0.49	0.24		0.21	0.29		0.12	0.18	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 5	8.2											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.63												
Intersection Signal Delay:	15.6			In	tersectior	LOS: B						
Intersection Capacity Utili	zation 80.1%			IC	U Level of	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	₩Ø4	
12 s	52 s	36 s	
₹ø6		≪ ¶ø8	
64 s		36 s	

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	۶	-	$\mathbf{\hat{z}}$	4	+	•	٠	Ť	۲	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	1	1	۲	f,		۲	eî 👘		۲	4Î	
Traffic Volume (veh/h)	44	197	33	337	311	62	117	160	80	48	118	17
Future Volume (veh/h)	44	197	33	337	311	62	117	160	80	48	118	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Adj Flow Rate, veh/h	48	214	36	366	338	67	127	174	87	52	128	18
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
Percent Heavy Veh, %	0	5	10	1	4	26	10	7	2	21	19	10
Cap, veh/h	452	609	495	668	796	158	322	282	141	228	347	49
Arrive On Green	0.33	0.33	0.33	0.15	0.53	0.53	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	996	1826	1485	1795	1492	296	1163	1130	565	950	1388	195
Grp Volume(v), veh/h	48	214	36	366	0	405	127	0	261	52	0	146
Grp Sat Flow(s),veh/h/ln	996	1826	1485	1795	0	1787	1163	0	1695	950	0	1583
Q Serve(q s), s	2.0	5.3	1.0	7.4	0.0	8.2	6.1	0.0	8.2	3.1	0.0	4.6
Cycle Q Clear(q c), s	2.0	5.3	1.0	7.4	0.0	8.2	10.6	0.0	8.2	11.3	0.0	4.6
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.33	1.00		0.12
Lane Grp Cap(c), veh/h	452	609	495	668	0	954	322	0	423	228	0	395
V/C Ratio(X)	0.11	0.35	0.07	0.55	0.00	0.42	0.39	0.00	0.62	0.23	0.00	0.37
Avail Cap(c a), veh/h	867	1370	1114	668	0	1699	613	0	848	465	0	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	15.1	13.7	9.4	0.0	8.4	23.0	0.0	20.0	25.0	0.0	18.6
Incr Delay (d2), s/veh	0.2	0.6	0.1	0.5	0.0	0.5	0.8	0.0	1.5	0.5	0.0	0.6
Initial Q Delav(d3).s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.1	0.0	0.1	0.4	0.0	0.5	0.3	0.0	0.4
Unsig, Movement Delay, s/veh												•••
LnGrp Delav(d).s/veh	14.2	15.7	13.8	10.0	0.0	9.0	23.8	0.0	21.4	25.5	0.0	19.2
LnGrp LOS	В	В	В	A	A	A	С	A	С	С	A	В
Approach Vol. veh/h		298			771			388			198	
Approach Delay, s/yeh		15.2			9.4			22.2			20.8	
Approach LOS		B			A			С			C	
Timer - Assigned Phs	1	2		4		6		8			-	
Pho Duration (C V Pa)	12.0	27.0		21.0		20.0		21.0				
Change Period (V+Pc), s	3.0	21.0		21.0		39.0		21.0				
Max Green Setting (Gmax) s	0.0	* 15		* 30		* 57		* 30				
Max O Clear Time (g. e. 11) a	9.0	40		12.2		10.2		12.6				
Croop Ext Time (n c) c	9.4	1.5		10.0		10.Z		12.0				
Green Ext Time (p_c), S	0.0	3.0		1.2		5.9		2.3				
Intersection Summary												
HCM 6th Ctrl Delay			14.8									
HCM 6th LOS			В									
Niste -												

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Paradigm Transportation Solutions Limited

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Lanes, Volumes, T 3: 28th Avenue & F	imings Future R	load (N	North)				2038 Background AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	>	•	1	ţ	<	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1	٦	1	1	1	
Traffic Volume (vph)	29	22	193	329	276	214	
Future Volume (vph)	29	22	193	329	276	214	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	32	24	210	358	300	233	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	32	24	210	358	300	233	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 38.6%			IC	CU Level	of Service A	4
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

3: 28th Avenue & Future Road (North)

2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection			_			
Int Delay, s/veh	2.7					
Movement			NDI	NDT	CDT	0DD
wovement	EBL	EBR	INBL		281	SBR
Lane Configurations		^	100	100	1	7
Traffic Vol, veh/h	29	22	193	329	276	214
Future Vol, veh/h	29	22	193	329	276	214
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	0	40	-	-	15
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	32	24	210	358	300	233
Maine/Minner A	£		Antone		4-:0	
		000	viajor1		viajor2	
Conflicting Flow All	1078	300	533	0	-	0
Stage 1	300	-	-	-	-	-
Stage 2	778	-	-	-	-	-
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	242	740	1035	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	193	740	1035	-	-	-
Mov Cap-2 Maneuver	193	-	-		-	-
Stage 1	599	-	-	-	-	-
Stage 2	453		_		_	_
Oldyo 2	-00					
Approach	EB		NB		SB	
HCM Control Delay, s	19.8		3.5		0	
HCM LOS	С					
			NDT			ODT
Minor Lane/Major Mvm	t	NBL	NBL	EBEN1	EBLN2	SBI
Capacity (veh/h)		1035	-	193	740	-
HCM Lane V/C Ratio		0.203	-	0.163	0.032	-
HCM Control Delay (s)		9.4	-	27.3	10	-
HCM Lane LOS		A	-	D	В	-
HCM 95th %tile Q(veh)		0.8	-	0.6	0.1	-

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R	oad (S	South)				2038 Background AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	۶	*	<	Ť	Ŧ	<	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1		ŧ	¢Î		
Traffic Volume (vph)	151	7	2	371	235	63	
Future Volume (vph)	151	7	2	371	235	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.972		
Flt Protected	0.950						
Satd. Flow (prot)	1770	1583	0	1863	1811	0	
Flt Permitted	0.950						
Satd. Flow (perm)	1770	1583	0	1863	1811	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	164	8	2	403	255	68	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	164	8	0	405	323	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	zation 36.1%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

4: 28th Avenue & Future Road (South)

2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.7					
Manager			ND	NDT	ODT	000
Movement	EBL	EBR	NBL	NBL	SBL	SBR
Lane Configurations	<u> </u>	<u> </u>	•	र्भ	دا	
Traffic Vol, veh/h	151	7	2	371	235	63
Future Vol, veh/h	151	7	2	371	235	63
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	0	-	-	-	-
Veh in Median Storag	e,#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	164	8	2	403	255	68
Major/Minor	Minor?		Major1	,	Jaior?	
	000	000			viajulz	0
Conflicting Flow All	696	289	323	0	-	U
Stage 1	289	-	-	-	-	-
Stage 2	407	-	-	-	-	-
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	408	750	1237	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	407	750	1237	-	-	-
Mov Cap-2 Maneuver	407	-	-	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	672	-	-	-	-	-
			NE		05	
Approach	EB		NB		SB	
HCM Control Delay, s	19.3		0		0	
HCM LOS	С					
Minor Lane/Major Myr	nt	NRI	NRT	FRI n1 I	ERI n2	SBT
Capacity (yeh/h)		1237		///7	750	001
UCM Long V/C Datio		0.002	-	407	750	-
HCM Control Delay (a	1	0.002	-	10.7	0.01	-
HCM Long LOS	9	1.9	0	19.7	9.6	-
HOM OF the Office Office	-)	A	A	10	A	-
HUM 95th %tile Q(ver	1)	0	-	1.9	0	-

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	≯	\mathbf{r}	•	Ť	Ŧ	-	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1		ર્સ	ĥ		
Traffic Volume (vph)	197	27	92	176	62	179	
Future Volume (vph)	197	27	92	176	62	179	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.900		
Flt Protected	0.950			0.983			
Satd. Flow (prot)	1805	1615	0	1746	1655	0	
Flt Permitted	0.950			0.983			
Satd. Flow (perm)	1805	1615	0	1746	1655	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	214	29	100	191	67	195	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	214	29	0	291	262	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utilization	ation 49.5%			IC	U Level o	of Service A	

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5: 28th Avenue & 8th Street

2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	6.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	ľ	1		ا	et P	
Traffic Vol, veh/h	197	27	92	176	62	179
Future Vol, veh/h	197	27	92	176	62	179
Conflicting Peds, #/h	r O	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Stora	ge, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	214	29	100	191	67	195
Maior/Minor	Minor2	Ν	Maior1	Ν	Aaior2	

majonninion	THIN TOTE		majori		majorz						_	
Conflicting Flow All	556	165	67	0	-	0						
Stage 1	165	-	-	-	-	-						
Stage 2	391	-	-	-	-	-						
Critical Hdwy	6.4	6.2	4.15	-	-	-						
Critical Hdwy Stg 1	5.4	-	-	-	-	-						
Critical Hdwy Stg 2	5.4	-	-	-	-	-						
Follow-up Hdwy	3.5	3.3	2.245	-	-	-						
Pot Cap-1 Maneuver	496	885	1516	-	-	-						
Stage 1	869	-	-	-	-	-						
Stage 2	688	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	• 459	885	1516	-	-	-						
Mov Cap-2 Maneuver	• 459	-	-	-	-	-						
Stage 1	805	-	-	-	-	-						
Stage 2	688	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	18.3		2.6		0						 	
HCM LOS	С											
Minor Lane/Major My	mt	NBI	NBT	FBI n1 I	EBI n2	SBT	SBR					
Canacity (veh/h)		1516		459	885			 	 	 		
HCM Lane V/C Ratio		0.066	_	0.467	0.033	_	_					
HCM Control Delay (s	-)	7.5	0	19.5	9.000							
HCM Lane LOS	/	7.5 A	Δ	13.0 C	Δ		-					
HCM 95th %tile O(vel	h)	0.2	-	24	0.1							
now sour while Q(ver	")	0.2	-	2.4	0.1	-	-					

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Lanes, Volumes, 6: 8th Street & Fu	Timings ture Roa	d					2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS
	٦	+	ł	•	*	∢	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ŧ	ĥ		Y		
Traffic Volume (vph)	23	178	269	2	45	68	
Future Volume (vph)	23	178	269	2	45	68	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.999		0.919		
Flt Protected		0.994			0.980		
Satd. Flow (prot)	0	1852	1861	0	1678	0	
Flt Permitted		0.994			0.980		
Satd. Flow (perm)	0	1852	1861	0	1678	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	25	193	292	2	49	74	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	218	294	0	123	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 41.6%			IC	U Level o	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC 6: 8th Street & Future Road

2038 Background AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

-						
Intersection						
Int Delay, s/veh	2.7					
Movement	EDI	EDT	W/DT		CDI	CDD
	ERL	EBI	VVBI	WRR	SBL	SBR
Lane Configurations		र्भ	₽	-	Ý	
rattic Vol, veh/h	23	178	269	2	45	68
Future Vol, veh/h	23	178	269	2	45	68
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	e, # -	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	25	193	292	2	49	74
				_		
Maria	M-1 - 1		4-: 0		A	
Major/Minor	Major1	Ν	vlajor2		viinor2	
Conflicting Flow All	294	0	-	0	536	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	243	-
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	1268	-	-	-	505	746
Stage 1			-	-	757	-
Stage 2	-	-	-	-	797	-
Platoon blocked %			-	-		
Mov Can-1 Maneuver	1268	-	-	-	ДQЛ	746
Mov Can-2 Maneuwer	1200	-	-	-	/0/	740
Storo 1	-		-	-	7/0	-
Stage I	-	-	-	-	740	-
Stage 2	-	-	-	-	191	-
Approach	EB		WB		SB	
HCM Control Delay	0.9		0		12.2	
HCM LOS	0.5		0		12.2 R	
					U	
Minor Lane/Major Mvn	nt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)		1268	-	-	-	620
HCM Lane V/C Ratio		0.02	-	-	-	0.198
HCM Control Delay (s))	7.9	0	-	-	12.2
HCM Lane LOS		A	A	-	-	В
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7
	,					

Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\rightarrow	1	-	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4			↑		1	
Traffic Volume (vph)	505	45	0	425	0	155	
Future Volume (vph)	505	45	0	425	0	155	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.989					0.865	
Fit Protected							
Satd. Flow (prot)	1842	0	0	1863	0	1611	
Flt Permitted							
Satd. Flow (perm)	1842	0	0	1863	0	1611	
Link Speed (k/h)	50			50	50		
Link Distance (m)	197.3			405.7	303.8		
Travel Time (s)	14.2			29.2	21.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	549	49	0	462	0	168	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	598	0	0	462	0	168	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 45.6%			IC	CU Level	of Service	A
Analysis Period (min) 15							

HCM 6th TWSC 1: Future Road & 16th Street 2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						_
Int Delay, s/veh	2.1					
Movement	FRT	FRR	WRI	WRT	NRI	NRR
Lane Configurations	1	LDI	TYDL		NDL	
Traffic Vol. veh/h	505	45	٥	425	٥	155
Future Vol. veh/h	505	45	0	425	0	155
Conflicting Peds #/hr	000 0	40 0	0	42J	0	100
Sign Control	Free	Free	Free	Free	Ston	Ston
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
Mymt Flow	5/19	19	0	462	0	168
WWWIIICTIOW	040	75	0	402	0	100
Major/Minor N	Major1		Major2	1	Minor1	
Conflicting Flow All	0	0	-	-	-	574
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	518
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	518
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EP		W/P		NP	
	ED	_	VVD	_	15.0	_
HCIVI Control Delay, s	0		U		15.3	
HCM LUS					U	
Minor Lane/Major Mvm	nt I	NBLn1	EBT	EBR	WBT	_
Capacity (veh/h)		518	-	-	-	
HCM Lane V/C Ratio		0.325	-		-	
HCM Control Delay (s)		15.3	-	-	-	
HCM Lane LOS		С	-		-	
HCM 95th %tile Q(veh))	1.4	-	-	-	
	,					

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lane Group EBL EBT EBR WBL WBT WBR NBT NBT NBT SBL SBT SBR Lane Configurations 1 0 1 0 100 1900 </th <th>Lanes, Volumes, T 2: 28th Avenue & 1</th> <th>imings 6th Str</th> <th>eet</th> <th colspan="8">2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS</th>	Lanes, Volumes, T 2: 28th Avenue & 1	imings 6th Str	eet	2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS									
Lane Configurations T EBT EBR WBL WBT WBR NBL NBT NBR SBL SBR		٦	-	*	4	Ļ	×	<	1	1	×	ţ	~
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph) 44 499 118 145 277 60 90 151 147 50 173 59 Ideal Flow (vphp) 1900	Lane Configurations	۲	1	1	٦	¢Î		٦	eî		۲	4Î	
Future Volume (vph) 44 499 118 145 277 60 90 151 147 50 173 59 Gleal Flow (vphp) 1900 1000 100	Traffic Volume (vph)	44	499	118	145	277	60	90	151	147	50	173	59
Ideal Flow (vphpl) 1900 <td>Future Volume (vph)</td> <td>44</td> <td>499</td> <td>118</td> <td>145</td> <td>277</td> <td>60</td> <td>90</td> <td>151</td> <td>147</td> <td>50</td> <td>173</td> <td>59</td>	Future Volume (vph)	44	499	118	145	277	60	90	151	147	50	173	59
Storage Length (m) 70.0 70.0 120.0 0.0 55.0 0.0 55.0 0.0 Storage Lanes 1 1 1 0 0	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Lanes 1 1 0 1 1 1 1 1 1 1 1 1 1 0 1 1 1 0 1 1 1 1 1 1 1 <	Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Taper Length (m) 100.0	Storage Lanes	1		1	1		0	1		0	1		0
Lane Ulii Factor 1.00	Taper Length (m)	100.0			100.0			100.0			100.0		
Fri 0.850 0.973 0.926 0.950 0.950 FI Protected 0.950 0.950 0.950 0.950 0.950 Stat. Flow (prot) 1626 1863 1615 1719 1687 0 1736 1620 0 0.869 1769 0 Stat. Flow (perm) 929 1863 1615 481 1687 0 339 1620 0 689 1769 0 Right Turn on Red Yes Yes Yes Yes Yes Yes Yes Yes Yes Stat. Flow (RTOR) 18 50 18 18 50 18 18 50 18 18 50 18 165 92 0.92 <td< td=""><td>Lane Util. Factor</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td><td>1.00</td></td<>	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
Fit Protected 0.960 0.960 0.960 0.960 Satd. Flow (prot) 1626 1863 1615 1719 1687 0 1736 1620 0 1687 1769 0 Satd. Flow (perm) 929 1863 1615 481 1687 0 939 1620 0 689 1769 0 Satd. Flow (perm) 929 1863 1615 481 1687 0 939 1620 0 689 1769 0 Satd. Flow (RTOR) 128 18 50 18 160 18 1789 0 18 18 50 18 160 18 161 100 18 161 100 168 160 168 160 168 160 18 161 160 18 168 160 18 161 160 54 188 64 180 164 160 54 188 64 120 18 54 128 158 366 98 324 0 54 252 0	Frt			0.850		0.973			0.926			0.962	
Satd. Flow (prot) 1626 1863 1615 1719 1687 0 1736 1620 0 1687 1769 0 Flt Permitted 0.543 0.266 0.514 0.388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 388 0 50 188 1615 474 3041 233.9 17avel Time (S) 29.2 34.2 13.7 168 1992 0.92	Fit Protected	0.950			0.950			0.950			0.950		
FIP Permitted 0.543 0.266 0.514 0.388 Satd. Flow (perm) 929 1863 1615 481 1687 0 939 1620 0 689 1769 0 Satd. Flow (RTOR) 128 18 50 18 Yes <	Satd. Flow (prot)	1626	1863	1615	1719	1687	0	1736	1620	0	1687	1769	0
Satd. Flow (perm) 929 1863 1615 481 1687 0 939 1620 0 689 1769 0 Right Turn on Red Yes	Flt Permitted	0.543			0.266			0.514			0.388		
Right Turn on Red Yes Yes Yes Yes Yes Satd. Flow (RTOR) 128 18 50 18 18 Link Speed (kh) 50 50 80 50 18 Link Distance (m) 405.7 474.4 304.1 233.9 1 Preak Hour Factor 0.92	Satd. Flow (perm)	929	1863	1615	481	1687	0	939	1620	0	689	1769	0
Satd. Flow (RTOR) 128 18 50 18 Link Speed (kh) 50 50 80 50 Link Distance (m) 405.7 474.4 304.1 233.9 Travel Time (s) 29.2 34.2 13.7 16.8 Peak Hour Factor 0.92 0.90 Toti Tothothohos	Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h) 50 50 80 50 Link Distance (m) 405.7 474.4 304.1 233.9 Travel Time (s) 29.2 34.2 13.7 16.8 Peak Hour Factor 0.92 0 70 0.92 0 50 0 0 0.50 50 0.10	Satd. Flow (RTOR)			128		18			50			18	
Link Distance (m) 405.7 474.4 304.1 233.9 Travel Time (s) 29.2 34.2 13.7 16.8 Peak Hour Factor 0.92 </td <td>Link Speed (k/h)</td> <td></td> <td>50</td> <td></td> <td></td> <td>50</td> <td></td> <td></td> <td>80</td> <td></td> <td></td> <td>50</td> <td></td>	Link Speed (k/h)		50			50			80			50	
Travel Time (s) 29.2 34.2 13.7 16.8 Peak Hour Factor 0.92 0.90 5.0 0.01 0.0 0.0 0.0 0.0 0.0 0.0 <td>Link Distance (m)</td> <td></td> <td>405.7</td> <td></td> <td></td> <td>474.4</td> <td></td> <td></td> <td>304.1</td> <td></td> <td></td> <td>233.9</td> <td></td>	Link Distance (m)		405.7			474.4			304.1			233.9	
Peak Hour Factor 0.92	Travel Time (s)		29.2			34.2			13.7			16.8	
Heavy Vehicles (%)11%2%0%5%5%31%4%17%0%7%0%7%0%13%Adj. Flow (vph)4854212815830165981641605418864Shared Lane Traffic (%)1281583660983240542520Tum TypePermNAPerm $pm + pt$ NAPermNAPermNAProtected Phases22684Detector Phase222168844Switch Phase222168844Switch Phase222168844Switch Phase2205.020.010.010.010.010.0Minimum Split (s)36.036.036.036.036.036.036.036.0Total Split (%)52.0%52.0%52.0%12.0%64.0%36.0%36.0%36.0%Maximum Green (s)45.045.09.057.030.030.030.030.0Yellow Time (s)1.61.61.60.01.61.91.91.91.9Lost Time Adjust (s)0.00.00.00.00.00.00.00.01.0Lost Time Adjust (s)17.017.017.01	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
Adj. Flow (vph) 48 542 128 158 301 65 98 164 160 54 188 64 Shared Lane Traffic (%) 54 158 366 0 98 324 0 54 252 0 54 252 0 54 252 0 54 52 52 52 52 52 52 52 52 52 52 52 52 52 52 52	Heavy Vehicles (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Shared Lane Traffic (%) Lane Group Flow (vph) 48 542 128 158 366 0 98 324 0 54 252 0 Jum Type Perm NA Perm NA Perm NA Perm NA Perm NA Perm NA Protected Phases 2 2 6 8 4 4 Detector Phase 2 2 6 8 8 4 4 Switch Phase 2 2 0 50 20.0 10.0 10.0 10.0 10.0 Minimum Initial (s) 20.0 20.0 50 20.0 10.0 10.0 10.0 Mainmum Split (s) 36.0 36.0 36.0 28.0 28.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0 29.0	Adj. Flow (vph)	48	542	128	158	301	65	98	164	160	54	188	64
Lane Group Flow (vph) 48 542 128 158 366 0 98 324 0 54 252 0 Tum Type Perm NA Perm PM NA Perm Perm NA Detector Phase 2 2 2 0 0.0 0.0 0.0 0.0 0.0 0.0	Shared Lane Traffic (%)												
Turn Type Perm NA Perm Perm Perm NA Perm Perm <th< td=""><td>Lane Group Flow (vph)</td><td>48</td><td>542</td><td>128</td><td>158</td><td>366</td><td>0</td><td>98</td><td>324</td><td>0</td><td>54</td><td>252</td><td>0</td></th<>	Lane Group Flow (vph)	48	542	128	158	366	0	98	324	0	54	252	0
Protected Phases 2 1 6 8 4 Permitted Phases 2 2 6 8 4 Detector Phase 2 2 6 8 4 Switch Phase 2 2 1 6 8 8 4 4 Switch Phase 2 2 2 1 6 8 8 4 4 Switch Phase 2 2 0 5.0 20.0 10.0	Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Permitted Phases 2 2 6 8 4 Detector Phase 2 2 1 6 8 8 4 Detector Phase 2 2 1 6 8 8 4 4 Minimum Initial (s) 20.0 20.0 5.0 20.0 10.0 10.0 10.0 10.0 Minimum Split (s) 36.0 36.0 36.0 28.0 29.0 29.0 29.0 29.0 Total Split (s) 52.0 52.0 52.0 12.0 64.0 36.0 36.0 36.0 36.0 Maximum Green (s) 45.0 45.0 9.0 57.0 30.0 30.0 30.0 30.0 Yellow Time (s) 1.6 1.6 1.6 0.0 1.6 1.9 1.9 1.9 1.9 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.1 1.1 1.1	Protected Phases		2		1	6			8			4	
Detector Phase 2 2 2 1 6 8 8 4 4 Switch Phase 5 20.0 20.0 5.0 20.0 10.0 10.0 10.0 10.0 10.0 Minimum Initial (s) 20.0 20.0 5.0 20.0 12.0 64.0 36.0	Permitted Phases	2		2	6			8			4		
Switch Phase Minimum Initial (s) 20.0 20.0 50.0 20.0 10.0 10.0 10.0 Minimum Split (s) 36.0 36.0 36.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 10.0	Detector Phase	2	2	2	1	6		8	8		4	4	
Minimum Initial (s) 20.0 20.0 20.0 5.0 20.0 10.0 10.0 10.0 Minimum Split (s) 36.0 36.0 36.0 36.0 20.0 29.0 36.0 36.0 <	Switch Phase												
Minimum Split (s) 36.0 36.0 36.0 36.0 29.0 36.0 30.0 30.0 30.0 <td>Minimum Initial (s)</td> <td>20.0</td> <td>20.0</td> <td>20.0</td> <td>5.0</td> <td>20.0</td> <td></td> <td>10.0</td> <td>10.0</td> <td></td> <td>10.0</td> <td>10.0</td> <td>_</td>	Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	_
Total Split (s) 52.0 52.0 52.0 12.0 64.0 36.0 36.0 36.0 36.0 Total Split (%) 52.0% 52.0% 52.0% 12.0% 64.0% 36.0% 30.0 <td< td=""><td>Minimum Split (s)</td><td>36.0</td><td>36.0</td><td>36.0</td><td>8.0</td><td>36.0</td><td></td><td>29.0</td><td>29.0</td><td></td><td>29.0</td><td>29.0</td><td></td></td<>	Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
India Split (%) 52.0% 52.0% 52.0% 52.0% 64.0% 36.0% 30.0	Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Maximum Green (s) 45.0 45.0 45.0 9.0 57.0 30.0 30.0 30.0 30.0 Yellow Time (s) 5.4 5.4 5.4 5.4 5.4 4.1	Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Yellow Imme (s) 5.4 5.4 5.4 5.4 3.0 5.4 4.1	Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	_
All-Ked Irme (s) 1.6 1.6 1.6 0.0 1.6 1.9 1.9 1.9 1.9 1.9 Lost Time Adjust (s) 0.0 0	Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
Lost Ime Adjust (s) 0.0	All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Iotal Lost lime (s) 7.0 7.0 7.0 7.0 7.0 6.0 6.0 6.0 6.0 6.0 Lead/Lag Lag Lag Lag Lag Lead Lag	Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Lead/Lag Lag Lag <thlag< th=""> Lag <thlag< th=""> <thlag< <="" td=""><td>Lotal Lost Time (s)</td><td>7.0</td><td>7.0</td><td>7.0</td><td>3.0</td><td>7.0</td><td></td><td>6.0</td><td>6.0</td><td></td><td>6.0</td><td>6.0</td><td>_</td></thlag<></thlag<></thlag<>	Lotal Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	_
Lead-Lag Optimize? Yes Yes Yes Vehicle Extension (s) 4.5 4.5 2.0 4.5 3.0 3.0 3.0 Recall Mode Min Min Min None Min None Non	Lead/Lag	Lag	Lag	Lag	Lead								
Vencioe Excall Mode Min Min None	Lead-Lag Optimize?	Yes	Yes	Yes	Yes	4.5		2.0	2.0		2.0	2.0	_
Recail Mode Min Min Min Min Mone Min None <	venicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
wark time (s) 17.0	Kecall Mode	MIN	MIN	Min	None	Min		None	None		None	None	_
Flash Dom Wark (s) 12.0 <th12.0< th=""> <th12.0< th=""> 12.0<td>vvaik Time (S)</td><td>17.0</td><td>17.0</td><td>17.0</td><td></td><td>17.0</td><td></td><td>12.0</td><td>12.0</td><td></td><td>12.0</td><td>12.0</td><td></td></th12.0<></th12.0<>	vvaik Time (S)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Pedesurari Cans (#rin) 0	Fidsh Dont Walk (S)	12.0	12.0	12.0		12.0		1.0	7.0		1.0	1.0	
Act Elicit Green (s) 23.9 23.9 23.9 44.6 40.3 16.4 16.4 18.4 18.4 Actuated g/C Ratio 0.41 0.41 0.41 0.62 0.56 0.25	Peuestrian Calls (#/fif)	20.0	20.0	20.0	44.0	10 5		10 4	10 4		10 4	10 4	
Actuate gro ratio 0.41 0.41 0.41 0.02 0.30 0.23 0.23 0.23 0.25 <td>Actuated a/C Patio</td> <td>29.9</td> <td>29.9</td> <td>29.9</td> <td>44.0</td> <td>40.5</td> <td></td> <td>10.4</td> <td>10.4 0.2F</td> <td></td> <td>10.4</td> <td>10.4 0.2F</td> <td></td>	Actuated a/C Patio	29.9	29.9	29.9	44.0	40.5		10.4	10.4 0.2F		10.4	10.4 0.2F	
V/C R0800 U.13 U.71 U.17 U.37 U.39 U.41 U.72 U.31 U.55 Control Delay 15.8 24.5 3.8 9.5 10.6 30.7 32.3 20.8 27.0	Actuated g/C Ratio	0.41	0.41	0.41	0.02	0.00		0.25	0.20		0.25	0.23	
	V/U RdIIU Control Dolov	15.9	0.71	0.17	0.37	10.59		20.7	0.72		0.01	0.00	
		10.0	24.5	0.0	9.5	0.0		0.0	32.3		29.0	21.9	

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Lane Group Total Delav	EDI		•	-	•	 	٦.	Т		۰.	÷	*
Total Delay	EDL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	15.8	24.5	3.8	9.5	10.6		30.7	32.3		29.8	27.9	
LOS	В	С	А	A	В		С	С		С	С	
Approach Delay		20.2			10.3			31.9			28.3	
Approach LOS		С			В			С			С	
Queue Length 50th (m)	4.0	60.4	0.0	8.1	24.4		11.2	34.2		6.0	27.6	
Queue Length 95th (m)	12.7	120.9	10.1	21.9	56.0		30.8	78.4		19.4	62.6	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	608	1220	1102	458	1365		410	735		300	782	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.44	0.12	0.34	0.27		0.24	0.44		0.18	0.32	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 72.7	7											
Natural Cycle: 75												
Control Type: Semi Act-Unc	coord											
Maximum v/c Ratio: 0.72												
Intersection Signal Delay: 2	1.3			In	tersectior	LOS: C						
Intersection Capacity Utiliza	tion 81.8%			IC	U Level o	of Service	D					

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized Intersection Summary 2: 28th Avenue & 16th Street 2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	•	1	ň	ĥ		۲	ĥ		5	î,	
Traffic Volume (veh/h)	44	499	118	145	277	60	90	151	147	50	173	59
Future Volume (veh/h)	44	499	118	145	277	60	90	151	147	50	173	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adi(A pbT)	1.00		1.00	1.00	-	1.00	1.00		1.00	1.00		1.00
Parking Bus, Adi	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adi Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adi Flow Rate, veh/h	48	542	128	158	301	65	98	164	160	54	188	64
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
Percent Heavy Veh. %	11	2	0	5	5	31	4	17	0	7	0	13
Cap. veh/h	476	751	647	353	757	164	302	225	219	205	398	135
Arrive On Green	0.40	0.40	0.40	0.08	0.52	0.52	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	943	1870	1610	1739	1455	314	1110	766	747	1014	1355	461
Grn Volume(v) veh/h	48	542	128	158	0	366	98	0	324	54	0	252
Grp Sat Flow(s), veh/h/ln	943	1870	1610	1739	0	1769	1110	0	1514	1014	0	1817
Q Serve(q, s) s	2.3	17.1	3.6	3.4	0.0	87	5.6	0.0	13.4	3.5	0.0	8.0
Cycle Q Clear(g_c), s	2.7	17.1	3.6	3.4	0.0	8.7	13.5	0.0	13.4	17.0	0.0	8.0
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.49	1 00		0.25
Lane Grp Cap(c), veh/h	476	751	647	353	0	921	302	0	444	205	0	533
V/C Ratio(X)	0.10	0.72	0.20	0.45	0.00	0.40	0.32	0.00	0.73	0.26	0.00	0.47
Avail Cap(c, a) veh/h	705	1205	1037	445	0	1443	453	0	650	343	0	780
HCM Platoon Ratio	1 00	1.00	1.00	1.00	1 00	1.00	1.00	1 00	1 00	1 00	1 00	1 00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d) s/veh	13.5	17.6	13.6	12.7	0.0	10.1	25.8	0.0	22.2	29.8	0.0	20.3
Incr Delay (d2) s/yeh	0.2	2.3	0.3	0.3	0.0	0.5	0.6	0.0	2.3	0.7	0.0	0.7
Initial Q Delay(d3) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfO(50%) veh/ln	0.1	1.3	0.2	0.0	0.0	0.1	0.5	0.0	1.3	0.4	0.0	1.0
Unsig Movement Delay s/veh	0.1	1.0	0.2	0.0	0.0	0.1	0.0	0.0	1.0	0.1	0.0	1.0
InGro Delay(d) s/veh	13.6	199	13.8	13.0	0.0	10.6	26.4	0.0	24.5	30.5	0.0	20.9
InGro LOS	10.0 B	10.0 B	10.0 B	10.0 B	0.0 A	10.0 B	C	0.0 A	C 21.0	C.00	0.0 A	20.0 C
Approach Vol. veh/h		718			524			422			306	
Approach Delay, s/yeh		18.4			11 3			25.0			22.6	
Approach LOS		B			B			20.0 C			C.	
Approach 200					U			Ū			Ŭ	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	8.3	35.1		26.5		43.4		26.5				
Change Period (Y+Rc), s	3.0	*7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (g_c+I1), s	5.4	19.1		19.0		10.7		15.5				
Green Ext Time (p_c), s	0.1	9.0		1.5		5.2		2.6				
Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			В									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Synchro 11 Report Page 5

Lanes, Volumes, T 3: 28th Avenue & I	⁻imings Future R	load (N	North)				2038 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	*	<	1	Ŧ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1	ľ	•	1	1	
Traffic Volume (vph)	46	165	39	340	396	44	
Future Volume (vph)	46	165	39	340	396	44	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	50	179	42	370	430	48	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	50	179	42	370	430	48	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utilization	ation 37.7%			IC	U Level	of Service A	
Analysis Period (min) 15							

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3: 28th Avenue & Future Road (North)

2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

3.3					
EBI	ERD	NRI	NRT	CRT	SBD
		INDL			
1	165	20	240	206	r
40	105	39	340	390	44
46	165	39	340	396	44
0	0	_ 0	_ 0	- 0	- 0
Stop	Stop	Free	Free	Free	Free
-	None	-	None	-	None
0	0	40	-	-	15
,# 0	-	-	0	0	-
0	-	-	0	0	-
92	92	92	92	92	92
2	2	2	2	2	2
50	179	42	370	430	48
			_		
viinor2		major1		viajor2	
884	430	478	0	-	0
430	-	-	-	-	-
454	-	-	-	-	-
6.42	6.22	4.12	-	-	-
5.42	-	-	-	-	-
5.42	-	-	-	-	-
3.518	3.318	2.218	-		-
316	625	1084	-	-	-
656			-		
640	-		_		_
040	-	-	-	-	-
204	625	109/	-	-	-
204	025	1004	-	-	-
304	-	-	-	-	-
630	-	-	-	-	-
640	-	-	-	-	-
EB		NB		SB	
14.4		0.9		0	
17.7		0.9		0	
	3.3 BEBL 46 46 46 0 0 0 0 92 2 50 0 92 2 50 92 2 50 92 2 50 92 2 50 92 884 430 454 6.42 5.42 5.42 5.42 3.518 656 656 640 304 304 881 4 656 656 657 884 4 6 40 884 4 6 884 4 6 884 4 6 884 4 6 884 4 80 9 80 9	3.3 EBL EBR 46 165 46 165 0 0 50p Stop 50p Stop 92 92 2 2 50 179 Vinor2 884 884 430 430 - 454 - 6.42 6.22 5.42 - 5.42 - 5.42 - 5.42 - 656 - 640 - 304 625 304 - 630 - 640 - EB 14.4	3.3 EBL EBR NBL 46 165 39 46 165 39 0 0 0 0 Stop Stop Free None - - 0 0 40 # 0 - - 92 92 92 92 2 2 2 2 50 179 42 Vinor2 Major1 884 430 - 884 430 - - 5.42 - - - 5.42 - - - 5.42 - - - 5.42 - - - 3.318 2.218 - - 316 625 1084 - 630 - - - 640 - - - 640 <	3.3 EBL EBR NBL NBT I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I <thi< th=""> <thi< th=""> I</thi<></thi<>	3.3 EBL EBR NBL NBT SBT 46 165 39 340 396 46 165 39 340 396 0 0 0 0 0 0 Stop Stop Free Free Free Free None - 0 0 0 0 0 0 40 - - 0 0 0 0 - 0 0 0 0 0 0 0 0 40 - - 0

Minor Lane/Major Mvmt	NBL	NBT EBL	_n1 E	-BLn2	SBT	SBR	
Capacity (veh/h)	1084	- 3	304	625	-	-	
HCM Lane V/C Ratio	0.039	- 0.1	164	0.287	-	-	
HCM Control Delay (s)	8.5	- 1	9.2	13.1	-	-	
HCM Lane LOS	A	-	С	В	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.6	1.2	-	-	

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R	oad (S	South)				2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS					
	٦	*	<	1	Ŧ	∢						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR						
Lane Configurations	ľ	1		ا	¢Î							
Traffic Volume (vph)	98	4	6	281	373	188						
Future Volume (vph)	98	4	6	281	373	188						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900						
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00						
Frt		0.850			0.955							
Flt Protected	0.950			0.999								
Satd. Flow (prot)	1770	1583	0	1861	1779	0						
Flt Permitted	0.950			0.999								
Satd. Flow (perm)	1770	1583	0	1861	1779	0						
Link Speed (k/h)	50			80	80							
Link Distance (m)	308.0			256.5	298.9							
Travel Time (s)	22.2			11.5	13.5							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Adj. Flow (vph)	107	4	7	305	405	204						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	4	0	312	609	0						
Sign Control	Stop			Free	Free							
Intersection Summary												
Area Type:	Other											
Control Type: Unsignalize	ed											
Intersection Capacity Utili	zation 43.2%			IC	U Level o	of Service A						
Analysis Period (min) 15												

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4: 28th Avenue & Future Road (South)

2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection							
Int Delay, s/veh	2.2						
Movement	FRI	FRP	NRI	NRT	SBT	SRP	
Lane Configurations	T DL	1	NDL		100	ODI	
Traffic Vol. veh/h	98	4	6	281	373	188	
Future Vol. veh/h	98	4	6	281	373	188	
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	0	-	-	-	-	
Veh in Median Storage	e,#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	107	4	7	305	405	204	
Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	826	507	609	0	-	0	
Stage 1	507	-	-	-	-	-	
Stage 2	319	-	-	-	-	-	
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	342	566	970	-	-	-	
Stage 1	605	-	-	-	-	-	
Stage 2	737	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	339	566	970	-	-	-	
Mov Cap-2 Maneuver	339	-	-	-	-	-	
Stage 1	600	-	-	-	-	-	
Stage 2	737	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay, s	20		0.2		0		
HCM LOS	C						
Miner Long/Main Mar		ND	NDT			CDT	CDD
Ninor Lane/Major MVn	n	INBL	INBI			SBI	SBR
Capacity (ven/n)		9/0	-	339	0.000	-	-
HCM Control Dolou (a)		0.007	-	20.4	11.4	-	
HCM Lane LOS		0.7	0	20.4	-11.4 P	-	-
HCM 05th %tile O(uch)	۸ ٥	А	12	0	-	
HUM 95th %tile Q(ven)	0	-	1.3	0	-	-

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Lanes, Volumes, T 5: 28th Avenue & 8	imings 3th Stree	et					2038 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	*	<	1	Ŧ		
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1		ب ا	ĥ		
Traffic Volume (vph)	203	58	36	85	182	194	
Future Volume (vph)	203	58	36	85	182	194	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.930		
Flt Protected	0.950			0.985			
Satd. Flow (prot)	1805	1615	0	1704	1741	0	
Flt Permitted	0.950			0.985			
Satd. Flow (perm)	1805	1615	0	1704	1741	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Adj. Flow (vph)	221	63	39	92	198	211	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	221	63	0	131	409	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 49.2%			IC	CU Level o	of Service A	
Analysis Period (min) 15							

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5: 28th Avenue & 8th Street

2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	5	1		÷.	1	
Traffic Vol, veh/h	203	58	36	85	182	194
Future Vol, veh/h	203	58	36	85	182	194
Conflicting Peds, #/h	r 0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Stora	ge,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	14	2	1
Mvmt Flow	221	63	39	92	198	211
Major/Minor	Minor2	Ν	Major1	Ν	Major2	
Conflicting Flow All	474	304	198	0	-	0
Change 1	204					

Stage 1	304	-	-	-	-	-						
Stage 2	170	-	-	-	-	-						
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	553	740	1387	-	-	-						
Stage 1	753	-	-	-	-	-						
Stage 2	865	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	536	740	1387	-	-	-						
Mov Cap-2 Maneuver	536	-	-	-	-	-						
Stage 1	730	-	-	-	-	-						
Stage 2	865	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	15		2.3		0							
HCM LOS	С											
Minor Lane/Major Mvmt		NBL	NBT	EBLn1	EBLn2	SBT	SBR					
Capacity (veh/h)		1387	-	536	740	-	-					
HCM Lane V/C Ratio		0.028	-	0.412	0.085	-	-					
HCM Control Delay (s)		7.7	0	16.3	10.3	-	-					
HCM Lane LOS		А	Α	С	В	-	-					
HCM 95th %tile Q(veh)		0.1	-	2	0.3	-	-					
(/												

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Lanes, Volumes, 6: 8th Street & Fu	Timings ture Roa	b					2038 Background PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	۶	-	+	•	1		
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ર્સ	4Î		Y		
Traffic Volume (vph)	67	232	223	7	29	43	
Future Volume (vph)	67	232	223	7	29	43	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.996		0.920		
Flt Protected		0.989			0.980		
Satd. Flow (prot)	0	1842	1855	0	1679	0	
Flt Permitted		0.989			0.980		
Satd. Flow (perm)	0	1842	1855	0	1679	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	73	252	242	8	32	47	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	325	250	0	79	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 42.3%			IC	U Level	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC 6: 8th Street & Future Road

2038 Background PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	2.4					
Movement	EDI	EDT	W/DT		CDI	CDD
	EDL		VVDI	VVDR	ODL	SDR
Lane Configurations	07	6	6	-	۲	40
Tramic Vol, ven/n	6/	232	223	1	29	43
Future Vol, veh/h	67	232	223	7	29	43
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	e, # -	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	73	252	242	8	32	47
			2.2	0		
Major/Minor	Major1	Ν	Major2		Minor2	
Conflicting Flow All	250	0	-	0	644	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	398	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1		-			5 42	
Critical Hdwy Stg 7		-			5.42	-
Follow-up Hdwy	2 218				3 518	3 318
Pot Con 1 Manager	1216	-	-	-	127	702
Fut Gap-1 Ivianeuver	1310	-	-	-	437	193
Stage I	-	-	-	-	/95	-
Stage 2	-	-	-	-	678	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1316	-	-	-	409	793
Mov Cap-2 Maneuver	-	-	-	-	409	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	678	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.8		0		12.2	
HCM LOS					В	
		501	EDT	MOT	WDD	001 (
winor Lane/Major Mvn	It	EBL	EBL	WBT	WBR	SBLn1
Capacity (veh/h)		1316	-	-	-	575
HCM Lane V/C Ratio		0.055	-	-	-	0.136
HCM Control Delay (s)		7.9	0	-	-	12.2
HCM Lane LOS		А	А	-	-	В
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5
	/					

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Appendix J

2038 Total Traffic Operations Reports



Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\mathbf{r}	1	+	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4Î			1		1	
Traffic Volume (vph)	250	34	0	454	0	25	
Future Volume (vph)	250	34	0	454	0	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.984					0.865	
Flt Protected							
Satd. Flow (prot)	1833	0	0	1863	0	1611	
Flt Permitted							
Satd. Flow (perm)	1833	0	0	1863	0	1611	
Link Speed (k/h)	50			50	50		
Link Distance (m)	197.3			405.7	303.8		
Travel Time (s)	14.2			29.2	21.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	272	37	0	493	0	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	309	0	0	493	0	27	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	zation 27.2%			IC	CU Level	of Service /	А
Analysis Period (min) 15							

HCM 6th TWSC 1: Future Road & 16th Street 2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	¢,			A		1
Traffic Vol, veh/h	250	34	0	454	0	25
Future Vol, veh/h	250	34	0	454	0	25
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	272	37	0	493	0	27
Major/Minor N	laior1	M	Agior?	N	/linor1	
Conflicting Flow All		0	najoiz			201
Store 1	0	0	-	-	-	291
Stage 2	-	-	-	-	-	-
Critical Lidway	-	-	-	-	-	6.22
Critical Howy Sta 1	-	-	-	-	-	0.22
Critical Howy Stg 1	-	-	-	-	-	-
Eollow up Udwy	-	-	-	-	-	2 2 1 0
Pot Con 1 Manauvor	-	-	-	-	-	7/9
Pot Cap-1 Maneuver	-	-	0	-	0	/40
Stage 1	-	-	0	-	0	-
Slage Z	-	-	U	-	U	-
May Cap 1 Manager	-	-		-		740
Mov Cap-1 Maneuver	-	-	-	-	-	740
Nov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10	
HCM LOS					В	
A. 1 (5.4 1 1.4 1.			EDT	500	MOT	
Minor Lane/Major Mvm	t ľ	VBLD1	EBI	EBK	WBI	
Capacity (veh/h)		748	-	-	-	
HCM Lane V/C Ratio		0.036	-	-	-	
HCM Control Delay (s)		10	-	-	-	
HCM Lane LOS		В	-	-	-	
HCM 95th %tile Q(veh)		0.1	-	-	-	

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Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, Ti 2: 28th Avenue & 1	imings 6th Str	eet					(230	20 607) BGC	038 To DS 28th	o tal AN Avenue,	l Peak Owen Sou	Hour und TIS
	۶	-	*	4	Ļ	×	<	1	1	×	Ŧ	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ኘ	1	1	٦	¢Î		۲	eî		۲	ĥ	
Traffic Volume (vph)	44	197	33	362	311	62	125	183	95	48	156	17
Future Volume (vph)	44	197	33	362	311	62	125	183	95	48	156	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.975			0.949			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1810	1468	1787	1721	0	1641	1712	0	1492	1586	0
Flt Permitted	0.524			0.543			0.639			0.457		
Satd. Flow (perm)	996	1810	1468	1021	1721	0	1104	1712	0	718	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		17			27			5	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	0%	5%	10%	1%	4%	26%	10%	7%	2%	21%	19%	10%
Adj. Flow (vph)	48	214	36	393	338	67	136	199	103	52	170	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	_ 48	214	- 36	393	405	0	136	302	0	52	188	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	0	2	0	1	6		0	8			4	_
Permitted Phases	2	0	2	6	0		8	0		4		
Detector Phase	2	2	2	1	6		8	8		4	4	_
Switch Phase	00.0	00.0	00.0	F 0	00.0		40.0	40.0		40.0	40.0	
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	30.0	30.0	30.0	8.0	30.0		29.0	29.0		29.0	29.0	
Total Split (S)	52.0	52.0	52.0	12.0	64.0%		30.0	30.0		30.0	30.0	
Total Spiit (%) Movimum Croon (c)	52.0%	52.0%	52.0%	12.0%	67.0		20.0%	20.0%		20.0%	30.0%	
Vollow Time (c)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
All Red Time (s)	1.6	1.4	1.6	0.0	1.6		4.1	4.1		4.1	4.1	
All-Red Time (S)	1.0	0.0	0.0	0.0	0.0		1.9	1.9		1.9	1.9	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		0.0	6.0		0.0	6.0	
	1.0	1.0	1.0	0.0	1.0		0.0	0.0		0.0	0.0	
Lead Lag Optimize?	Vac	Vos	Vos	Voc								
Vehicle Extension (s)	4.5	4.5	4.5	2.0	45		3.0	3.0		3.0	3.0	
Pecall Mode	4.5 Min	4.J Min	4.5 Min	None	4.5 Min		None	None		None	None	
Walk Time (s)	17.0	17.0	17.0	none	17.0		12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	12.0	12.0	12.0		12.0		7.0	7.0		7.0	7.0	
Pedestrian Calls (#/br)	12.0	12.0	۰2.0 ۵		12.0		1.0	1.0		1.0	1.0	
Act Effet Green (s)	20.1	20.1	20.1	35.0	31 9		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.34	0.34	0.34	0.60	0.53		0.25	0.25		0.25	0.25	
v/c Ratio	0.04	0.35	0.07	0.54	0.44		0.50	0.68		0.20	0.47	
Control Delay	16.9	18 1	2.5	10.3	10.8		25.9	26.7		22.6	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

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Lanes, Volumes, [*] <u>2: 28th Avenue &</u>	Timings 16th Stre	eet					(230	20 607) BGC)38 To DS 28th /	tal AN Avenue,	1 Peak Owen Sou	Hour
	٦	+	*	4	+	•	1	Ť	1	*	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	16.9	18.1	2.5	10.3	10.8		25.9	26.7		22.6	22.7	
LOS	В	В	А	В	В		С	С		С	С	
Approach Delay		16.1			10.5			26.4			22.6	
Approach LOS		В			В			С			С	
Queue Length 50th (m)	3.8	18.2	0.0	19.8	24.2		13.5	28.5		4.9	17.9	
Queue Length 95th (m)	12.0	38.8	3.0	44.5	52.9		28.1	51.6		13.2	34.3	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	752	1367	1125	729	1627		556	875		361	801	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.16	0.03	0.54	0.25		0.24	0.35		0.14	0.23	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 59	9.8											
Natural Cycle: 75												
Control Type: Semi Act-U	ncoord											
Maximum v/c Ratio: 0.68												
Intersection Signal Delay:	17.0			In	tersection	n LOS: B						
Intersection Capacity Utiliz	zation 82.2%			IC	CU Level of	of Service	E					
Analysis Period (min) 15												

Splits and Phases: 2: 28th Avenue & 16th Street

Ø1	↓ Ø2	Ø4	
12 s	52 s	36 s	
₹ø6		¶ø8	
64 s		36 s	

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HCM 6th Signalized I 2: 28th Avenue & 16t	nters h Stre	ection eet	Summ	ary			(2306	20 607) BGC)38 To DS 28th	tal AM	Peak Owen Sou	Hour und TIS
	۶	-	$\mathbf{\hat{v}}$	4	+	•	٠	Ť	۲	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	•	1	٦	1.		٦	4Î		<u> </u>	4Î	
Traffic Volume (veh/h)	44	197	33	362	311	62	125	183	95	48	156	17
Future Volume (veh/h)	44	197	33	362	311	62	125	183	95	48	156	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1826	1752	1885	1841	1515	1752	1796	1870	1589	1618	1752
Adj Flow Rate, veh/h	48	214	36	393	338	67	136	199	103	52	170	18
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
Percent Heavy Veh, %	0	5	10	1	4	26	10	7	2	21	19	10
Cap, veh/h	433	583	474	633	762	151	323	314	163	230	405	43
Arrive On Green	0.32	0.32	0.32	0.14	0.51	0.51	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	996	1826	1485	1795	1492	296	1120	1115	577	915	1439	152
Grp Volume(v), veh/h	48	214	36	393	0	405	136	0	302	52	0	188
Grp Sat Flow(s),veh/h/ln	996	1826	1485	1795	0	1787	1120	0	1692	915	0	1591
Q Serve(g_s), s	2.2	5.7	1.1	8.9	0.0	9.0	7.1	0.0	9.8	3.3	0.0	6.0
Cycle Q Clear(g_c), s	2.2	5.7	1.1	8.9	0.0	9.0	13.1	0.0	9.8	13.1	0.0	6.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.34	1.00		0.10
Lane Grp Cap(c), veh/h	433	583	474	633	0	913	323	0	477	230	0	448
V/C Ratio(X)	0.11	0.37	0.08	0.62	0.00	0.44	0.42	0.00	0.63	0.23	0.00	0.42
Avail Cap(c_a), veh/h	830	1312	1066	633	0	1626	543	0	810	410	0	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.3	16.4	14.9	10.9	0.0	9.7	23.7	0.0	19.7	25.4	0.0	18.3
Incr Delay (d2), s/veh	0.2	0.7	0.1	1.4	0.0	0.6	0.9	0.0	1.4	0.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.1	0.4	0.1	0.2	0.0	0.1	0.5	0.0	0.6	0.3	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	17.1	15.0	12.3	0.0	10.3	24.5	0.0	21.1	25.9	0.0	19.0
LnGrp LOS	В	В	В	В	A	В	C	A	C	C	A	<u> </u>
Approach Vol, veh/h		298			798			438			240	
Approach Delay, s/veh		16.6			11.3			22.1			20.5	
Approach LOS		В			В			С			С	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	12.0	27.0		23.6		39.0		23.6				
Change Period (Y+Rc), s	3.0	* 7		* 6		*7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (q c+I1). s	10.9	7.7		15.1		11.0		15.1				
Green Ext Time (p c), s	0.0	3.6		1.4		5.9		2.6				
Intersection Summary												
HCM 6th Ctrl Delay			16.1									
HCM 6th LOS			P									
			D									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Lanes, Volumes, 7 3: 28th Avenue & I	⊺imings Future R	oad (N	lorth)				2038 Total AM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	٨	*	•	1	ţ	1	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲	1	٦	1	1	1	
Traffic Volume (vph)	75	130	371	329	276	277	
Future Volume (vph)	75	130	371	329	276	277	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	82	141	403	358	300	301	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	82	141	403	358	300	301	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	1						
Intersection Capacity Utiliz	ation 49.2%			IC	CU Level	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

3: 28th Avenue & Future Road (North)

2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	13.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1	٦	↑	•	1
Traffic Vol, veh/h	75	130	371	329	276	277
Future Vol, veh/h	75	130	371	329	276	277
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	0	40	-	-	15
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	82	141	403	358	300	301

Major/Minor	Minor ₂		Major1		Major2							
Conflicting Flow All	1464	300	601	0	-	0						
Stage 1	300	-	-	-	-	-						
Stage 2	1164	-	-	-	-	-						
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	141	740	976	-	-	-						
Stage 1	752	-	-	-	-	-						
Stage 2	297	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	83	740	976	-	-	-						
Mov Cap-2 Maneuver	83	-	-	-	-	-						
Stage 1	441	-	-	-	-	-						
Stage 2	297	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	73.9		6		0							
HCM LOS	F											
Minor Lane/Major Mvr	nt	NBL	NBT	EBLn1	EBLn2	SBT	SBR					
Capacity (veh/h)		976	-	83	740	-	-					
HCM Lane V/C Ratio		0.413	-	0.982	0.191	-	-					
HCM Control Delay (s	5)	11.3	-	182.9	11	-	-					
HCM Lane LOS		В	-	F	В	-	-					
HCM 95th %tile Q(vel	ר)	2.1	-	5.4	0.7	-	-					

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Lanes, Volumes, ⁻ 4: 28th Avenue &	Timings Future R	oad (S	South)				2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS
	۶	7	1	Ť	ţ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1		ę	ĥ		
Traffic Volume (vph)	151	7	2	549	343	63	
Future Volume (vph)	151	7	2	549	343	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.979		
Flt Protected	0.950						
Satd. Flow (prot)	1770	1583	0	1863	1824	0	
Flt Permitted	0.950						
Satd. Flow (perm)	1770	1583	0	1863	1824	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	164	8	2	597	373	68	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	164	8	0	599	441	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utiliz	ation 45.5%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

4: 28th Avenue & Future Road (South)

2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection									
Int Delay, s/veh	5.2								
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	5	1		ર્સ	¢,				
Traffic Vol, veh/h	151	7	2	549	343	63			
Future Vol, veh/h	151	7	2	549	343	63			
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	0	-	-	-	-			
Veh in Median Storage	e,#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	164	8	2	597	373	68			
Major/Minor	Minor		Majort		Majaro				
	4000	407		0	wajorz	0			
Conflicting Flow All	8001	407	441	U	-	0			
Stage 1	407	-	-	-	-	-			
Stage 2	601	-	-	-	-	-			
Critical Howy	6.42	6.22	4.12	-	-	-			
Critical Howy Stg 1	5.42	-	-	-	-	-			
Critical Howy Stg 2	5.4Z	-	-	-	-	-			
Follow-up Hawy	3.518	3.318	2.218	-	-	-			
Pot Cap-1 Maneuver	267	644	1119	-	-	-			
Stage 1	6/2	-	-	-	-	-			
Stage 2	547	-	-	-	-	-			
Platoon blocked, %	000	0.1.4	4440	-	-	-			
Mov Cap-1 Maneuver	266	644	1119	-	-	-			
Mov Cap-2 Maneuver	266	-	-	-		-			
Stage 1	670	-	-	-	-	-			
Stage 2	547	-	-	-	-	-			
Approach	EB		NB		SB			 _	
HCM Control Delay, s	36.9		0		0				
HCM LOS	E		Ū						
	-								
						0.0.7			
Minor Lane/Major Mvn	nt	NBL	NRL	EBLn1	EBLn2	SBL	SBR	 	
Capacity (veh/h)		1119	-	266	644	-	-		
HCM Lane V/C Ratio		0.002	-	0.617	0.012	-	-		
HCM Control Delay (s)	8.2	0	38.1	10.7	-	-		
HCM Lane LOS		A	A	E	В	-	-		
HCM 95th %tile Q(veh)	0	-	3.7	0	-	-		

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ľ	1		ا	¢Î		
Traffic Volume (vph)	337	27	92	214	85	264	
Future Volume (vph)	337	27	92	214	85	264	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	20.0	0.0			0.0	
Storage Lanes	1	1	0			0	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.898		
Flt Protected	0.950			0.985			
Satd. Flow (prot)	1805	1615	0	1747	1654	0	
Flt Permitted	0.950			0.985			
Satd. Flow (perm)	1805	1615	0	1747	1654	0	
Link Speed (k/h)	80			60	80		
Link Distance (m)	310.5			265.1	256.5		
Travel Time (s)	14.0			15.9	11.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	5%	8%	10%	1%	
Adj. Flow (vph)	366	29	100	233	92	287	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	366	29	0	333	379	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 65.7%			10	CU Level o	of Service C	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

HCM 6th TWSC 5: 28th Avenue & 8th Street

2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	21.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1		र्भ	ef 👘	
Traffic Vol, veh/h	337	27	92	214	85	264
Future Vol, veh/h	337	27	92	214	85	264
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	20	-	-	-	-
Veh in Median Storage	e, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	8	10	1
Mvmt Flow	366	29	100	233	92	287

iviajor/iviinor	IVIINOF2		iviajor i		majorz							
Conflicting Flow All	669	236	92	0	-	0					 	
Stage 1	236	-	-	-	-	-						
Stage 2	433	-	-	-	-	-						
Critical Hdwy	6.4	6.2	4.15	-	-	-						
Critical Hdwy Stg 1	5.4	-	-	-	-	-						
Critical Hdwy Stg 2	5.4	-	-	-	-	-						
Follow-up Hdwy	3.5	3.3	2.245	-	-	-						
Pot Cap-1 Maneuver	426	808	1484	-	-	-						
Stage 1	808	-	-	-	-	-						
Stage 2	658	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	393	808	1484	-	-	-						
Mov Cap-2 Maneuver	393	-	-	-	-	-						
Stage 1	746	-	-	-	-	-						
Stage 2	658	-	-	-	-	-						
Approach	ED		ND		CD							
	ED				30			 	 	 	 	
HCM Control Delay, s	58.8		2.3		0							
HCM LOS	F											
Minor Lane/Major Mvi	nt	NBL	NBT	EBLn1	EBLn2	SBT	SBR					
Capacity (veh/h)		1484	-	393	808	-	-					
HCM Lane V/C Ratio		0.067	-	0.932	0.036	-	-					
HCM Control Delay (s	5)	7.6	0	62.7	9.6	-	-					
HCM Lane LOS		A	A	F	А	-	-					
HCM 95th %tile Q(vel	ר)	0.2	-	10.2	0.1	-	-					

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 11

6: 8th Street & Fu	ture Roa	d					(230607) BGCDS 28th Avenue, Owen Sound TI
	٦	-	+	×	1	∢	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ا	ĥ		Y		
Traffic Volume (vph)	23	318	354	2	45	68	
Future Volume (vph)	23	318	354	2	45	68	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.999		0.919		
Flt Protected		0.997			0.980		
Satd. Flow (prot)	0	1857	1861	0	1678	0	
Flt Permitted		0.997			0.980		
Satd. Flow (perm)	0	1857	1861	0	1678	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	25	346	385	2	49	74	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	371	387	0	123	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 49.0%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

HCM 6th TWSC 6: 8th Street & Future Road

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2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection							
Int Delay, s/veh	2.3						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	ł
Lane Configurations		4	ef 👘		۰Y		
Traffic Vol, veh/h	23	318	354	2	45	68	5
Future Vol, veh/h	23	318	354	2	45	68	;
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	2
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	25	346	385	2	49	74	

iviajor/iviinor	iviajor i	IV	lajorz		VIINOLZ		
Conflicting Flow All	387	0	-	0	782	386	
Stage 1	-	-	-	-	386	-	
Stage 2	-	-	-	-	396	-	
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	1171	-	-	-	363	662	
Stage 1	-	-	-	-	687	-	
Stage 2	-	-	-	-	680	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1171	-	-	-	354	662	
Mov Cap-2 Maneuver	· -	-	-	-	354	-	
Stage 1	-	-	-	-	669	-	
Stage 2	-	-	-	-	680	-	
Approach	EB		WB		SB		
HCM Control Delay, s	0.5		0		14.7	_	
HCM LOS	0.0		· ·		В		
Minor Lane/Major Mvi	mt	EBL	EBT	WBT	WBR	SBLn1	

minor Euro/major mmint	LDL	LDI	1101	TIDICO	DEITI
Capacity (veh/h)	1171	-	-	-	492
HCM Lane V/C Ratio	0.021	-	-	-	0.25
HCM Control Delay (s)	8.1	0	-	-	14.7
HCM Lane LOS	A	Α	-	-	В
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 13

Lanes, Volumes, 7 7: Driveway A & F	Гimings uture Ro	ad (No	orth)				2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS
	-	~	-	+	1	*	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ĥ			ا	Y		
Traffic Volume (vph)	51	13	157	407	0	54	
Future Volume (vph)	51	13	157	407	0	54	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.973				0.865		
Flt Protected				0.986			
Satd. Flow (prot)	1812	0	0	1837	1611	0	
Flt Permitted				0.986			
Satd. Flow (perm)	1812	0	0	1837	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	150.6			119.9	110.4		
Travel Time (s)	10.8			8.6	7.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	55	14	171	442	0	59	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	69	0	0	613	59	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	ł						
Intersection Capacity Utiliz	ation 46.8%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

7: Driveway A & Future Road (North)

2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	2.4					
Movement	FRT	FRR	WBI	WBT	NRI	NBR
Lane Configurations	1	LDIX	TIDE	101	M	HDI
Traffic Vol. veh/h	51	13	157	407	1	54
Future Vol. veh/h	51	10	157	407	0	54
Conflicting Dode #/br	51	13	157	407	0	54
Conflicting Peds, #/nr	0	0	0	0	0 Chan	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage	e,#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	55	14	171	442	0	59
Major/Minor	Major1	I	Major2		Minor1	
Conflicting Flow All	0	0	69	0	846	62
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	784	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-		-		5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy			2 2 1 8		3 518	3 318
Pot Can-1 Maneuver	-		1532	-	333	1003
Stane 1			1002		961	1000
Stare 2			-		450	
Platoon blocked %	-		-	-	400	-
Mov Cap 1 Mancusor	-	-	1530	-	284	1002
wov Cap-1 waneuver			1002	-	204	1003
May Cap 2 Manaunar	-				201	
Mov Cap-2 Maneuver	-	-	•	-	284	-
Mov Cap-2 Maneuver Stage 1	-	-	-	-	284 961	-
Mov Cap-2 Maneuver Stage 1 Stage 2	-	-	-	-	284 961 383	-
Mov Cap-2 Maneuver Stage 1 Stage 2	-	- - -	-	-	284 961 383	-

Approach	ED	VVD	IND	
HCM Control Delay, s	0	2.1	8.8	
HCM LOS			A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1003	-	-	1532	-	
HCM Lane V/C Ratio	0.059	-	-	0.111	-	
HCM Control Delay (s)	8.8	-	-	7.6	0	
HCM Lane LOS	A	-	-	Α	А	
HCM 95th %tile Q(veh)	0.2	-	-	0.4	-	

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8: Driveway B & F	-uture Ro	ad (No	orth)				(230607) BGCDS 28th Avenue, Owen Sound TIS
	-	\mathbf{r}	4	+	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ĥ			ŧ	Y		
Traffic Volume (vph)	105	0	84	564	0	100	
Future Volume (vph)	105	0	84	564	0	100	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.994			
Satd. Flow (prot)	1863	0	0	1852	1611	0	
Flt Permitted				0.994			
Satd. Flow (perm)	1863	0	0	1852	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	114	0	91	613	0	109	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	114	0	0	704	109	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	ed						
Intersection Capacity Utili	ization 53.9%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings

Synchro 11 Report Page 16

2038 Total AM Peak Hour

HCM 6th TWSC 8: Driveway B & Future Road (North)

2038 Total AM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

-						
Intersection	_		_			
Int Delay, s/veh	1.8					
			14/10/	11/85		LIDE
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	- î>			- କି	Y	
Traffic Vol, veh/h	105	0	84	564	0	100
Future Vol, veh/h	105	0	84	564	0	100
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
Mymt Flow	114	0	91	613	0	109
www.criow	114	v	01	010	v	100
Major/Minor M	lajor1	1	Major2		Minor1	
Conflicting Flow All	0	0	114	0	909	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	795	-
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 Can-1 Maneuver	-	-	1475	-	305	939
Stane 1					911	
Stage 2	-	-	-	-	445	-
Diage 2 Diatoon blocked ^{0/}	-	-	-	-	440	-
May Cap 1 Mapauvar	-	-	1/75	-	276	020
Mov Cap-1 Maneuver	-	-	1475	-	210	909
wov Cap-2 waneuver	-	-	-	-	2/0	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	403	-
Approach	EB		WB		NB	
HCM Control Delay s	0	_	1	_	9.3	_
HCM LOS	0				Δ	
					~	
Minor Lane/Major Mvmt	N	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		939	-	-	1475	-
HCM Lane V/C Ratio		0.116	-	-	0.062	-
HCM Control Delay (s)		9.3	-	-	7.6	0
HCM Lane LOS		A	-	-	A	A
HCM 95th %tile Q(veh)		0.4	-	-	0.2	-
		0.4	-		0.2	

Paradigm Transportation Solutions Limited

Lanes, Volumes, Timings <u>1: Future Road & 16th Street</u> 2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

	-	\rightarrow	1	+	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	et A			1		1
Traffic Volume (vph)	505	53	0	438	0	155
Future Volume (vph)	505	53	0	438	0	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987					0.865
Flt Protected						
Satd. Flow (prot)	1839	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1839	0	0	1863	0	1611
Link Speed (k/h)	50			50	50	
Link Distance (m)	197.3			405.7	303.8	
Travel Time (s)	14.2			29.2	21.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	58	0	476	0	168
Shared Lane Traffic (%)						
Lane Group Flow (vph)	607	0	0	476	0	168
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalize	d					
Intersection Capacity Utili	zation 46.1%			IC	CU Level	of Service /
Analysis Period (min) 15						

HCM 6th TWSC 1: Future Road & 16th Street 2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	2.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ef 👘			1		1
Traffic Vol, veh/h	505	53	0	438	0	155
Future Vol, veh/h	505	53	0	438	0	155
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	549	58	0	476	0	168
Major/Minor	Major1	ľ	Major2	ľ	Minor1	
Conflicting Flow All	0	0	-	-	-	578
Stage 1	-	-	-	-	-	-
Stage 2						
Critical Hdwy	-	-	-	-	-	6 22
Critical Hdwy Stg 1	-	-		-		-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-		-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	516
Stage 1			0		0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	-	-	-	516
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2		-	-		-	
Stage 2						
A						
Approach	EB	_	WB	_	NB	_
HCM Control Delay, s	0		0		15.3	
HCM LOS					С	
Minor Lane/Major Mvm	it l	VBLn1	EBT	EBR	WBT	
Capacity (veh/h)		516	-	-	-	
HCM Lane V/C Ratio		0.327	-	-	-	
HCM Control Delay (s)		15.3	-	-	-	
HCM Lane LOS		С	-	-	-	
HCM 95th %tile Q(veh)	1.4	-	-	-	
alton						

Paradigm Transportation Solutions Limited

Synchro 11 Report Page 1 Paradigm Transportation Solutions Limited

Lanes, Volumes, Ti 2: 28th Avenue & 1	imings <u>6th S</u> tr	eet					(230	20 607) BGC	038 To DS 28th	tal PN Avenue,	I Peak Owen Sou	Hour und TIS
	٦	-	\mathbf{F}	4	+	•	1	1	1	1	Ļ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	1	1	ľ	¢Î		ľ	¢Î		ľ	el el	
Traffic Volume (vph)	44	499	118	160	277	60	103	189	172	50	196	59
Future Volume (vph)	44	499	118	160	277	60	103	189	172	50	196	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	120.0		0.0	55.0		0.0	55.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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			0.850		0.973			0.928			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1626	1863	1615	1719	1687	0	1736	1619	0	1687	1780	0
Flt Permitted	0.543			0.251			0.480			0.303		
Satd. Flow (perm)	929	1863	1615	454	1687	0	877	1619	0	538	1780	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128		18			47			15	
Link Speed (k/h)		50			50			80			50	
Link Distance (m)		405.7			474.4			304.1			233.9	
Travel Time (s)		29.2			34.2			13.7			16.8	
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 (%)	11%	2%	0%	5%	5%	31%	4%	17%	0%	7%	0%	13%
Adj. Flow (vph)	48	542	128	174	301	65	112	205	187	54	213	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	542	128	174	366	0	112	392	0	54	277	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0		10.0	10.0		10.0	10.0	_
Minimum Split (s)	36.0	36.0	36.0	8.0	36.0		29.0	29.0		29.0	29.0	
Total Split (s)	52.0	52.0	52.0	12.0	64.0		36.0	36.0		36.0	36.0	
Total Split (%)	52.0%	52.0%	52.0%	12.0%	64.0%		36.0%	36.0%		36.0%	36.0%	
Maximum Green (s)	45.0	45.0	45.0	9.0	57.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.4	5.4	5.4	3.0	5.4		4.1	4.1		4.1	4.1	
All-Red Time (s)	1.6	1.6	1.6	0.0	1.6		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	4 5		2.0	2.0		2.0	2.0	
Venicle Extension (s)	4.5	4.5	4.5	2.0	4.5		3.0	3.0		3.0	3.0	
Recall Mode	IVIIN	MIN	IVIIN	None	Min		None	None		None	None	
vvalk Time (s)	17.0	17.0	17.0		17.0		12.0	12.0		12.0	12.0	
Fidsh Dont Walk (S)	12.0	12.0	12.0		12.0		1.0	1.0		1.0	1.0	
Act Effet Croce (a)	21.0	21.0	21.0	AG A	40.0		21.0	21.0		21.0	21.0	
Activited a/C Patio	0.40	0.40	0.40	40.4	42.2		21.9	21.9		21.9	21.9	
Actualed g/C Ratio	0.40	0.40	0.40	0.00	0.54		0.28	0.20		0.28	0.20	
V/C Rdtl0	0.13	0.73	0.18	0.44	0.40		0.40	0.80		0.30	0.54	
	17.0	20.9	3.9	11.4	11.8		32.2	31.1		32.7	20.1	

Paradigm Transportation Solutions Limited

Lanes, Volumes, T 2: 28th Avenue & 1	imings 6th Stre	eet					(230	20 (607) BGC	038 To DS 28th /	tal PN ^{Avenue,}	l Peak Owen Sou	Hour und TIS
-	۶	-	*	4	ł	×	•	1	1	*	Ŧ	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	17.0	26.9	3.9	11.4	11.8		32.2	37.7		32.7	28.1	
LOS	В	С	А	В	В		С	D		С	С	
Approach Delay		22.1			11.7			36.4			28.9	
Approach LOS		С			В			D			С	
Queue Length 50th (m)	4.7	70.0	0.0	11.1	29.2		14.1	49.2		6.6	33.8	
Queue Length 95th (m)	12.7	120.9	10.1	23.9	56.0		35.4	#103.7		20.6	69.7	
Internal Link Dist (m)		381.7			450.4			280.1			209.9	
Turn Bay Length (m)	70.0		70.0	120.0			55.0			55.0		
Base Capacity (vph)	565	1133	1032	424	1285		356	684		218	731	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.48	0.12	0.41	0.28		0.31	0.57		0.25	0.38	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 77.8	8											
Natural Cycle: 75												
Control Type: Semi Act-Uno	coord											
Maximum v/c Ratio: 0.80												
Intersection Signal Delay: 2	3.9			In	tersectior	n LOS: C						
Intersection Capacity Utiliza	ation 85.4%			IC	CU Level o	of Service	E					
Analysis Period (min) 15												
# 95th percentile volume	exceeds ca	pacity, qu	eue may	be longe	r.							
Queue shown is maximu	im after two	cycles.										

Splits and Phases: 2: 28th Avenue & 16th Street

√ Ø1	- 102	Ø4
12 s	52 s	36 s
₹ø6		≪¶ø8
64 s		36 s

Paradigm Transportation Solutions Limited

HCM 6th Signalized I 2: 28th Avenue & 16t	Interso h Stre	ection eet	Summ	ary			(2306	20 507) BGC)38 To DS 28th	tal PM Avenue, (Peak Owen Sou	Hour und TIS
	۶	-	\mathbf{r}	4	+	•	•	Ť	1	1	ţ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	*	1	<u> </u>	1.		5	î.		5	ĥ	
Traffic Volume (veh/h)	44	499	118	160	277	60	103	189	172	50	196	59
Future Volume (veh/h)	44	499	118	160	277	60	103	189	172	50	196	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adi(A pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adi	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1870	1900	1826	1826	1441	1841	1648	1900	1796	1900	1707
Adi Flow Rate, veh/h	48	542	128	174	301	65	112	205	187	54	213	64
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
Percent Heavy Veh, %	11	2	0	5	5	31	4	17	0	7	0	13
Cap, veh/h	448	722	622	335	736	159	317	260	237	181	459	138
Arrive On Green	0.39	0.39	0.39	0.08	0.51	0.51	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	943	1870	1610	1739	1455	314	1085	794	724	953	1403	421
Grp Volume(v), veh/h	48	542	128	174	0	366	112	0	392	54	0	277
Grp Sat Flow(s),veh/h/ln	943	1870	1610	1739	0	1769	1085	0	1518	953	0	1824
Q Serve(q s), s	2.6	19.6	4.1	4.4	0.0	10.1	7.1	0.0	18.3	4.3	0.0	9.4
Cycle Q Clear(q c), s	3.3	19.6	4.1	4.4	0.0	10.1	16.5	0.0	18.3	22.5	0.0	9.4
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.48	1.00		0.23
Lane Grp Cap(c), veh/h	448	722	622	335	0	895	317	0	497	181	0	597
V/C Ratio(X)	0.11	0.75	0.21	0.52	0.00	0.41	0.35	0.00	0.79	0.30	0.00	0.46
Avail Cap(c_a), veh/h	628	1078	928	394	0	1292	378	0	583	235	0	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.0	20.7	16.0	15.0	0.0	12.0	27.4	0.0	23.8	34.0	0.0	20.8
Incr Delay (d2), s/veh	0.2	2.7	0.3	0.5	0.0	0.5	0.7	0.0	6.2	0.9	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.2	2.7	0.4	0.1	0.0	0.2	0.8	0.0	2.6	0.6	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	23.4	16.3	15.5	0.0	12.5	28.0	0.0	30.0	34.9	0.0	21.4
LnGrp LOS	В	С	В	В	А	В	С	А	С	С	А	С
Approach Vol, veh/h		718			540			504			331	
Approach Delay, s/veh		21.7			13.5			29.5			23.6	
Approach LOS		С			В			С			С	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	37.1		31.6		46.5		31.6				
Change Period (Y+Rc), s	3.0	* 7		* 6		* 7		* 6				
Max Green Setting (Gmax), s	9.0	* 45		* 30		* 57		* 30				
Max Q Clear Time (g_c+I1), s	6.4	21.6		24.5		12.1		20.3				
Green Ext Time (p_c), s	0.1	8.6		1.0		5.2		2.5				
Intersection Summary												
HCM 6th Ctrl Delay			21.8									
HCM 6th LOS			С									

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Synchro 11 Report Page 5

Lanes, Volumes, T 3: 28th Avenue & F	ïmings ⁻uture R	oad (N	lorth)				2038 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	۶	$\mathbf{\tilde{\mathbf{v}}}$	1	1	Ŧ	1	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	۲.	1	۲	1		1	
Traffic Volume (vph)	122	343	147	340	396	82	
Future Volume (vph)	122	343	147	340	396	82	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	0.0	0.0	40.0			15.0	
Storage Lanes	1	1	1			1	
Taper Length (m)	7.5		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850				0.850	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1770	1583	1770	1863	1863	1583	
Link Speed (k/h)	50			80	80		
Link Distance (m)	127.6			298.9	304.1		
Travel Time (s)	9.2			13.5	13.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	133	373	160	370	430	89	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	133	373	160	370	430	89	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized							
Intersection Capacity Utiliza	ation 48.7%			IC	U Level	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

3: 28th Avenue & Future Road (North)

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	10.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	٦	1	1	↑	↑	1
Traffic Vol, veh/h	122	343	147	340	396	82
Future Vol, veh/h	122	343	147	340	396	82
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	0	40	-	-	15
Veh in Median Storag	e,# 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	133	373	160	370	430	89
Major/Minor	Minor2		Major1	Ν	Major2	
Conflicting Flow All	1120	430	519	0	-	0
Stage 1	430	-	-	-	-	-
Stage 2	690	-	-	-	-	-
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	228	625	1047	-	-	-	
Stage 1	656	-	-	-	-	-	
Stage 2	498	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	193	625	1047	-	-	-	
Mov Cap-2 Maneuver	193	-	-	-	-	-	
Stage 1	556	-	-	-	-	-	
Stage 2	498	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay, s	28.8		2.7		0		
HCM LOS	D						
Minor Lane/Major Mymt		NRI	NRT	-BL n1	EBI n2	SBT	SBR
Canacity (veh/h)	_	1047		103	625		
HCM Lane V/C Ratio		0 153		0.687	0 597	-	-
HCM Control Delay (s)		9.1	-	56.8	18.9	-	-
HCM Lane LOS		A	-	F	C	-	-
HCM 95th %tile Q(veh)		0.5	-	4.2	3.9	-	-

Paradigm Transportation Solutions Limited

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Lanes, Volumes, 4: 28th Avenue &	Timings Future R	oad (S	South)				2038 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TIS
	٨	7	1	t	ţ	∢	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1		ર્સ	ĥ		
Traffic Volume (vph)	98	4	6	389	551	188	
Future Volume (vph)	98	4	6	389	551	188	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.966		
Flt Protected	0.950			0.999			
Satd. Flow (prot)	1770	1583	0	1861	1799	0	
Flt Permitted	0.950			0.999			
Satd. Flow (perm)	1770	1583	0	1861	1799	0	
Link Speed (k/h)	50			80	80		
Link Distance (m)	308.0			256.5	298.9		
Travel Time (s)	22.2			11.5	13.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	107	4	7	423	599	204	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	107	4	0	430	803	0	
Sign Control	Stop			Free	Free		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	d						
Intersection Capacity Utiliz	ation 52.5%			IC	U Level o	of Service A	
Analysis Period (min) 15							

Paradigm Transportation Solutions Limited

4: 28th Avenue & Future Road (South)

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Int Delay, s/veh						
	2.9					
Manager			ND	NDT	ODT	000
Movement	ERL	EBR	NBL	NRL	SBL	SBR
Lane Configurations		7		, 4	ef _	
Traffic Vol, veh/h	98	4	6	389	551	188
Future Vol, veh/h	98	4	6	389	551	188
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	0	-	-	-	-
Veh in Median Storag	e,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mymt Flow	107	4	7	423	599	204
Major/Minor	Minor2		Major1		Najor2	
Conflicting Flow All	1138	701	803	0	-	0
Stage 1	701	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Sto 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	223	439	821	-	-	-
Stage 1	492		-			
Stage 2	651	-	-	-	-	-
Platoon blocked %	551			_	_	_
Mov Can-1 Maneuver	221	130	821		-	
Mov Cap 2 Maneuver	221	409	021	-	-	-
wov Cap-2 waneuver	221	-	-	-	-	-
Stage 1	487	-	-	-	-	-
Stage 2	651	-	-	-	-	-
	EB		NB		SB	
Approach		_		_	0	_
Approach HCM Control Delay	34.7		() 1			
Approach HCM Control Delay, s HCM LOS	34.7		0.1		0	
Approach HCM Control Delay, s HCM LOS	34.7 D		0.1		U	
Approach HCM Control Delay, s HCM LOS	34.7 D		0.1		U	
Approach HCM Control Delay, s HCM LOS Minor Lane/Major Mvr	34.7 D	NBL	0.1 <u>NB</u> T	EBLn <u>1</u> E	EBLn2	SBT
Approach HCM Control Delay, s HCM LOS Minor Lane/Major Mvr Capacity (veh/h)	34.7 D	NBL 821	0.1 <u>NBT</u>	<u>EBLn1 E</u> 221	EBLn2 439	SBT
Approach HCM Control Delay, s HCM LOS Minor Lane/Major Mvi Capacity (veh/h) HCM Lane V/C Ratio	: 34.7 D mt	NBL 821 0.008	0.1 NBT	<u>EBLn1 F</u> 221 0.482	EBLn2 439 0.01	SBT
Approach HCM Control Delay, s HCM LOS Minor Lane/Major Mvi Capacity (veh/h) HCM Lane V/C Ratio HCM Control Delay (s	34.7 D mt	NBL 821 0.008 9.4	0.1 <u>NBT</u> - - 0	EBLn1 E 221 0.482 35.6	EBLn2 439 0.01 13.3	SBT - -
Approach HCM Control Delay, s HCM LOS Minor Lane/Major Mvi Capacity (veh/h) HCM Lane V/C Ratio HCM Control Delay (s HCM Lane LOS	: 34.7 D mt	NBL 821 0.008 9.4 A	0.1 <u>NBT</u> - - 0 A	EBLn1 E 221 0.482 35.6 E	EBLn2 439 0.01 13.3 B	SBT - - -

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Lane Group EBL EBR NBL NBT SBT SBR Lane Configurations 1							,	
Lane Group EBL EBR NBL NBT SBT SBR Lane Configurations 1 1 2 334 Traffic Volume (vph) 288 58 36 108 220 334 Iduar Flow (vphp) 1900 1900 1900 1900 1900 1900 Storage Length (m) 0.0 20.0 0.0 0.0 0.0 Storage Lanes 1 0 0 0 0 Taper Length (m) 7.5 7.5		1	\mathbf{r}	1	T	÷	*	
Lane Configurations Image: Configurations <	Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Traffic Volume (vph) 288 58 36 108 220 334 Future Volume (vph) 288 58 36 108 220 334 Future Volume (vph) 1900 1900 1900 1900 1900 1900 Storage Length (m) 0.0 20.0 0.0 0.0 0.0 Storage Length (m) 7.5 7.5	Lane Configurations	ľ	1		÷.	el el		
Future Volume (vph) 288 58 36 108 220 334 ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 Storage Length (m) 0.0 20.0 0.0 0.0 0.0 Storage Length (m) 7.5 7.5 0 0 Taper Length (m) 7.5 7.5 0 0 Fit Protected 0.950 0.919 0 0 Fit Protected 0.950 0.988 0 0 0 Satd. Flow (prot) 1805 1615 0 1699 1722 0 Fit Permitted 0.950 0.988 0 0 0 0 Satd. Flow (prot) 1805 1615 0 1699 1722 0 Link Speed (kh) 80 60 80 0 115 0 Link Speed (kh) 80 60 80 0 140 15.9 11.5 Peak Hour Factor 0.92 <td>Traffic Volume (vph)</td> <td>288</td> <td>58</td> <td>36</td> <td>108</td> <td>220</td> <td>334</td> <td></td>	Traffic Volume (vph)	288	58	36	108	220	334	
Ideal Flow (vphpl) 1900 1900 1900 1900 1900 Storage Length (m) 0.0 0.0 0.0 Storage Lanes 1 1 0 0 Taper Length (m) 7.5 7.5 0 Lane Util. Factor 1.00 1.00 1.00 1.00 1.00 Fit Protected 0.950 0.988 5 5 Satd. Flow (port) 1805 1615 0 1699 1722 0 Fit Permitted 0.950 0.988 5 5 5 5 Satd. Flow (perm) 1805 1615 0 1699 1722 0 1 1 1 5	Future Volume (vph)	288	58	36	108	220	334	
Storage Length (m) 0.0 20.0 0.0 0.0 Storage Lanes 1 1 0 0 Taper Length (m) 7.5 7.5	deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Lanes 1 1 0 0 Taper Length (m) 7.5 7.5 7.5 Lane Util. Factor 1.00 1.00 1.00 1.00 Frt 0.850 0.919 Filt Protected 0.950 0.988 Satd. Flow (port) 1805 1615 0 1699 1722 0 Filt Permitted 0.950 0.988 5 5 5 5 Satd. Flow (perm) 1805 1615 0 1699 1722 0 Link Speed (k/h) 80 60 80 5 5 5 Travel Time (s) 14.0 15.9 11.5 5 5 5 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 1.92 1.6 Heavy Vehicles (%) 0% 0% 0% 1.7 239 363 Shared Lane Traffic (%) 131 63 0 156 602 0 Sign Control<	Storage Length (m)	0.0	20.0	0.0			0.0	
Taper Length (m) 7.5 7.5 Lane Util, Factor 1.00 1.00 1.00 1.00 1.00 Frt 0.850 0.919 0.919 0.919 0.919 0.919 Stat. Flow (prot) 1805 1615 0 1699 1722 0 Flt Permitted 0.950 0.988	Storage Lanes	1	1	0			0	
Lane Util. Factor 1.00 1.00 1.00 1.00 1.00 1.00 Frt 0.850 0.919 0.919 0.919 0.919 0.919 0.919 0.919 0.919 0.919 0.919 0.919 0.920 0.920 0.920 0.920 0.920 0.920 0.920 0.920 0.920 0.920 0.92	Taper Length (m)	7.5		7.5				
Frt 0.850 0.919 FIP Protected 0.950 0.988 Satd. Flow (prot) 1805 1615 0 1722 0 FIP Permitted 0.950 0.988 5 5 Satd. Flow (perm) 1805 1615 0 1699 1722 0 Fir Permitted 0.950 0.988 60 80 1 Link Spaced (k/h) 80 60 80 1	Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fit Protected 0.950 0.988 Satd. Flow (prot) 1805 1615 0 1699 1722 0 Fit Permitted 0.950 0.988 5 5 5 Satd. Flow (perm) 1805 1615 0 1699 1722 0 Link Speed (k/h) 80 60 80 60 16 Link Distance (m) 310.5 265.1 256.5 256.5 Travel Time (s) 14.0 15.9 11.5 Peak Hour Factor 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 0% 0% 0% 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%) U 156 602 0 0 Lane Group Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Intersection Summary	Frt		0.850			0.919		
Satd. Flow (prot) 1805 1615 0 1699 1722 0 FIL Permitted 0.950 0.988 0.988 0 10 11 0 11 0 11 0 11 0 11 0 11 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 11 11 11 0 15 9 11 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 16 16 0 16 0 16 0 16 0 16 0 16 0 16 0 0	Fit Protected	0.950			0.988			
Fit Permitted 0.950 0.988 Satd. Flow (perm) 1805 1615 0 1699 1722 0 Link Speed (k/h) 80 60 80 111 1	Satd. Flow (prot)	1805	1615	0	1699	1722	0	
Satd. Flow (perm) 1805 1615 0 1699 1722 0 Link Speed (k/h) 80 60 80 <td>Flt Permitted</td> <td>0.950</td> <td></td> <td></td> <td>0.988</td> <td></td> <td></td> <td></td>	Flt Permitted	0.950			0.988			
Link Speed (k/h) 80 60 80 Link Distance (m) 310.5 265.1 256.5 Travel Time (s) 14.0 15.9 11.5 Peak Hour Factor 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 0% 0% 14.0 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%) Lane Group Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Intersection Summary Zarea Type: Other	Satd. Flow (perm)	1805	1615	0	1699	1722	0	
Link Distance (m) 310.5 265.1 256.5 Travel Time (s) 14.0 15.9 11.5 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 0% 0% 0% 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%) Energy Specific Colspan="2">Energy Specific Colspan="2">Intersection Summary Intersection Summary Area Type: Other Other Specific Colspan="2">Specific Colspan="2">Specific Colspan="2">Specific Colspan="2">Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colsp	Link Speed (k/h)	80			60	80		
Travel Time (s) 14.0 15.9 11.5 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 0% 0% 0% 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%) Lane Group Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Intersection Summary Area Type: Other Other Other Other	Link Distance (m)	310.5			265.1	256.5		
Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 0% 0% 0% 14% 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%) Image: Comp Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Image: Comp Flow (vph) 117 239 363 Area Type: Other Other Comp Flow (vph) 313 63 0 156 602 0	Travel Time (s)	14.0			15.9	11.5		
Heavy Vehicles (%) 0% 0% 0% 14% 2% 1% Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%)	Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph) 313 63 39 117 239 363 Shared Lane Traffic (%)	Heavy Vehicles (%)	0%	0%	0%	14%	2%	1%	
Shared Lane Traffic (%) Lane Group Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Intersection Summary Area Type: Other	Adj. Flow (vph)	313	63	39	117	239	363	
Lane Group Flow (vph) 313 63 0 156 602 0 Sign Control Stop Free Free Intersection Summary Area Type: Other	Shared Lane Traffic (%)							
Sign Control Stop Free Free Intersection Summary Area Type: Other	Lane Group Flow (vph)	313	63	0	156	602	0	
Intersection Summary Area Type: Other	Sign Control	Stop			Free	Free		
Area Type: Other	Intersection Summary							
	Area Type:	Other						
Control Type: Unsignalized	Control Type: Unsignalized							
Intersection Capacity Utilization 59.7% ICU Level of Service B	ntersection Capacity Utiliza	tion 59.7%			10	CU Level o	of Service B	}
Analysis Period (min) 15	Analysis Period (min) 15							

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HCM 6th TWSC 5: 28th Avenue & 8th Street

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection							
Int Delay, s/veh	9.3						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	٦	1		- 4	f		
Traffic Vol, veh/h	288	58	36	108	220	334	
Future Vol, veh/h	288	58	36	108	220	334	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	Yield	
Storage Length	0	20	-	-	-	-	
Veh in Median Storag	e,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	0	0	0	14	2	1	
Mvmt Flow	313	63	39	117	239	363	
Major/Minor	Minor2	Ν	Major1	Ν	Major2		

Conflicting Flow All	616	421	239	0	-	0						
Stage 1	421	-	-	-	-	-						
Stage 2	195	-	-	-	-	-						
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	457	637	1340	-	-	-						
Stage 1	667	-	-	-	-	-						
Stage 2	843	-	-	-	-	-						
Platoon blocked, %				-	-	-						
Mov Cap-1 Maneuver	443	637	1340	-	-	-						
Mov Cap-2 Maneuver	443	-	-	-	-	-						
Stage 1	646	-	-	-	-	-						
Stage 2	843	-	-	-	-	-						
Approach	EB		NB		SB							
HCM Control Delay, s	27.2		1.9		0							
HCM LOS	D											
Minor Lane/Major Mvmt		NBL	NBT E	EBLn1 I	EBLn2	SBT	SBR					
Capacity (veh/h)		1340	-	443	637	-	-					
HCM Lane V/C Ratio		0.029	-	0.707	0.099	-	-					
HCM Control Delay (s)		7.8	0	30.4	11.3	-	-					
HCM Lane LOS		Α	Α	D	В	-	-					
HCM 95th %tile Q(veh)		0.1	-	5.4	0.3	-	-					

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	≯	-	+	•	1	<	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ب ا	f,		۰Y		
Traffic Volume (vph)	67	317	363	7	29	43	
Future Volume (vph)	67	317	363	7	29	43	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.997		0.920		
Flt Protected		0.991			0.980		
Satd. Flow (prot)	0	1846	1857	0	1679	0	
Flt Permitted		0.991			0.980		
Satd. Flow (perm)	0	1846	1857	0	1679	0	
Link Speed (k/h)		80	80		50		
Link Distance (m)		166.5	310.5		252.9		
Travel Time (s)		7.5	14.0		18.2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	73	345	395	8	32	47	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	418	403	0	79	0	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalized	d						
Intersection Capacity Utiliz	ation 54.2%			IC	U Level o	of Service A	l l

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HCM 6th TWSC 6: 8th Street & Future Road

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection							
Int Delay, s/veh	2						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	ef 👘		۰Y		
Traffic Vol, veh/h	67	317	363	7	29	43	
Future Vol, veh/h	67	317	363	7	29	43	
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	73	345	395	8	32	47	

Major/Minor	Major1	Ν	/lajor2		Minor2		
Conflicting Flow All	403	0	-	0	890	399	
Stage 1	-	-	-	-	399	-	
Stage 2	-	-	-	-	491	-	
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	1156	-	-	-	313	651	
Stage 1	-	-	-	-	678	-	
Stage 2	-	-	-	-	615	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1156	-	-	-	289	651	
Mov Cap-2 Maneuver	-	-	-	-	289	-	
Stage 1	-	-	-	-	625	-	
Stage 2	-	-	-	-	615	-	
Approach	EB		WB		SB		
HCM Control Delay, s	1.5		0		15.1		
HCM LOS					С		
Minor Lane/Major Mvi	nt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)		1156	-	-	-	433	
HCM Lane V/C Ratio		0.063	-	-	-	0.181	
HCM Control Delay (s	5)	8.3	0	-	-	15.1	
HCM Lane LOS		Α	Α	-	-	С	
HCM 95th %tile Q(vel	ר)	0.2	-	-	-	0.7	

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Lanes, Volumes, 7 7: Driveway A & F	īimings uture Ro	ad (No	orth)				2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS	
i	-	~	-	+	•	*		
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	¢Î			ę	Y			
Traffic Volume (vph)	211	8	95	83	0	102		
Future Volume (vph)	211	8	95	83	0	102		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	0.995				0.865			
Flt Protected				0.974				
Satd. Flow (prot)	1853	0	0	1814	1611	0		
Flt Permitted				0.974				
Satd. Flow (perm)	1853	0	0	1814	1611	0		
Link Speed (k/h)	50			50	50			
Link Distance (m)	150.6			119.9	110.4			
Travel Time (s)	10.8			8.6	7.9			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	229	9	103	90	0	111		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	238	0	0	193	111	0		
Sign Control	Free			Free	Stop			
Intersection Summary								
Area Type:	Other							
Control Type: Unsignalized								
Intersection Capacity Utiliz	ation 37.5%			IC	U Level o	of Service A		
Analysis Period (min) 15								

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7: Driveway A & Future Road (North)

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.6					
Movement	FRT	FRR	WRI	WRT	NRI	NRR
		LDIX	TTDL		NDE	NDIX
Lane Configurations	4	•	0.5		<u>۲</u>	100
I raffic Vol, veh/h	211	8	95	83	0	102
Future Vol, veh/h	211	8	95	83	0	102
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 Storag	e,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	229	9	103	90	0	111
					Ū	
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	238	0	530	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	296	-
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	-	-	1329	-	510	805
Stage 1		-	.020		805	-
Stage 2	_	-	_	-	755	-
Platoon blocked %	_	-	-	_	100	-
Mov Cap 1 Manculor	-	-	1320	-	169	805
Mov Cap-1 Maneuver	-	-	1529	-	400	003
wov Cap-2 Maneuver	-	-	-	-	400	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	693	-
Approach	EB		WB		NB	
HCM Control Delay	0		4.2		10.2	
HCM LOS	Ū				B	
					5	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	805	-	-	1329	-	
HCM Lane V/C Ratio	0.138	-	-	0.078	-	
HCM Control Delay (s)	10.2	-	-	7.9	0	
HCM Lane LOS	В	-	-	Α	Α	
HCM 95th %tile Q(veh)	0.5	-	-	0.3	-	

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Lanes, Volumes, 8: Drivewav B & F	Timings ⁻ uture Ro	ad (No	orth)				2038 Total PM Peak Hou (230607) BGCDS 28th Avenue, Owen Sound TI
	-	~	-	+	•	*	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ĥ			ا	Y		
Traffic Volume (vph)	313	0	51	178	0	152	
Future Volume (vph)	313	0	51	178	0	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt					0.865		
Flt Protected				0.989			
Satd. Flow (prot)	1863	0	0	1842	1611	0	
Flt Permitted				0.989			
Satd. Flow (perm)	1863	0	0	1842	1611	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	119.9			127.6	107.7		
Travel Time (s)	8.6			9.2	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	340	0	55	193	0	165	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	340	0	0	248	165	0	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type:	Other						
Control Type: Unsignalize	d						
Intersection Capacity Utili	zation 48.1%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

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HCM 6th TWSC 8: Driveway B & Future Road (North)

2038 Total PM Peak Hour (230607) BGCDS 28th Avenue, Owen Sound TIS

Intersection						
Int Delay, s/veh	3.2					
Mayamant	EDT	EDD	W/DI	W/DT	NDL	NDD
wovernent	EDI	EDK	VVDL	VVDI	INDL	INDK
Lane Configurations	•	•	- 1		Ϋ́.	150
Traffic Vol, veh/h	313	0	51	178	0	152
Future Vol, veh/h	313	0	51	178	0	152
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
Mymt Flow	340	0	55	103	0	165
WWWW	040	0		100	0	100
Major/Minor M	ajor1	1	Major2	I	Minor1	
Conflicting Flow All	0	0	340	0	643	340
Stage 1	-	-	-	-	340	-
Stage 2		-	-	-	303	
Critical Hdwy	-	-	4 12	-	6.42	6 22
Critical Hdwy Sta 1			1.12	-	5.42	0.22
Critical Hdury Stg 1					5.42	
Childar Huwy Sig Z	-	-	0.040	-	3.42	2 240
Follow-up Hawy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1219	-	438	702
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	749	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1219	-	416	702
Mov Cap-2 Maneuver	-	-	-	-	416	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	711	-
ciago 2						
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.8		11.7	
HCM LOS					В	
Minnel			EDT			MDT
Minor Lane/Major Mvmt	1	VBLn1	EBI	EBR	WBL	WBI
Capacity (veh/h)		702	-	-	1219	-
HCM Lane V/C Ratio		0.235	-	-	0.045	-
HCM Control Delay (s)		11.7	-	-	8.1	0
HCM Lane LOS		В	-	-	A	Α
HCM 95th %tile Q(veh)		0.9	-	-	0.1	-

Paradigm Transportation Solutions Limited

Appendix K

2038 Maximum Yield Scenario Total Traffic Operations Reports







28th Avenue and Future Road (North) Northbound Left-Turn Lane, 2038 Total Traffic Conditions – AM Peak Hour

Bruce-Grey Catholic District School Board TIA 230607





Bruce-Grey CDSB, New School at 16^{th} Street and 28^{th} Avenue, Owen Sound TIS 230607



Bruce-Grey CDSB, New School at 16th Street and 28th Avenue, Owen Sound TIS 230607
Appendix L

Left-Turn Lane Warrant Nomographs







PM Forecast Only? N

Major Street						Minor Street						I	
			28th A	venue			Future Road (North)						
	Northbound Southbound			Eastbound			Westbound		Peds Crossing				
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	371	329			276	277	75		130				0
PM Peak Hour	147	340			396	82	122		343				0
Average Hourly Volume	130	167			168	90	49		118				0

Warrant	AHV
1A - All	722
1B - Minor	168
2A - Major	555
2B - Cross	49

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	more	Average
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
1A	1A	Х				Volume
	All Approaches	480	720	600	900	722
	All Approaches				% Fulfilled	150.4%
	Approach Lanes		1	2 or	Average	
	Flow Conditions	Free	Restricted	Free	Restricted	Hourly

	Flow Conditions	⊢ree	Restricted	⊢ree	Restricted	Houriy
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	168
	Approaches				% Fulfilled	93.1%

	Approach Lanes		1	2 or	Average	
2A	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	555
	Approaches				% Fulfilled	115.5%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	49
	Street				% Fulfilled	98.5%





PM Forecast Only? N

Major Street						Minor Street						ĺ	
			28th A	venue			8th Street						
		Northbound			Southbound			Eastbound			Westbound		Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	92	214	0	0	85	264	337	0	27	0	0	0	0
PM Peak Hour	36	108	0	0	220	334	288	0	58	0	0	0	0
Average Hourly Volume	32	81			76	150	156		21				0

Warrant	AHV
1A - All	516
1B - Minor	178
2A - Major	338
2B - Cross	156

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	more	Average
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
1A	1A	Х				Volume
	All Approaches	480	720	600	900	516
	All Approaches				% Fulfilled	107.4%
		-				
	Approach Lanes		1	2 or	Average	
ſ	Elow Conditions	Free	Restricted	Free	Restricted	Hourly

	Elow Conditions		1100110104		rtootriotou	
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	178
	Approaches				% Fulfilled	98.6%

	Approach Lanes		1	2 or	Average	
2A	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	338
	Approaches				% Fulfilled	70.5%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	156
	Street				% Fulfilled	312.5%





PM Forecast Only? N

Major Street						Minor Street							
		28th Avenue					Future Road (North)						
Northbound				Southbound			Eastbound			Westbound			
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	371	557			352	277	75		130				0
PM Peak Hour	147	484			605	82	122		343				0
Average Hourly Volume	130	260			239	90	49		118				0

AHV
886
168
719
49

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	more	Average
1A Flow Condition	Elow Conditiona	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	All Approaches	480	720	600	900	886
	All Approaches				% Fulfilled	184.6%
	Approach Lanes	1		2 or	Average	
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly

	Elow Conditions	Free	Resincled	Free	Resincted	поину
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	168
	Approaches				% Fulfilled	93.1%

2A	Approach Lanes		1	2 or	Average	
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	719
	Approaches				% Fulfilled	149.7%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	49
	Street				% Fulfilled	98.5%

Appendix M

OTM Signal Warrant







PM Forecast Only? N

Major Street						Minor Street						I	
		28th Avenue					Future Road (North)						
Northbound				Southbound			Eastbound			Westbound			
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	371	329			276	277	75		130				0
PM Peak Hour	147	340			396	82	122		343				0
Average Hourly Volume	130	167			168	90	49		118				0

Warrant	AHV
1A - All	722
1B - Minor	168
2A - Major	555
2B - Cross	49

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	Average	
1A	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	All Approaches	480	720	600	900	722
	All Approaches				% Fulfilled	150.4%
	Approach Lanes		1	2 or	Average	
	Flow Conditions	Free	Restricted	Free	Restricted	Hourly

	Flow Conditions	⊢ree	Restricted	⊢ree	Restricted	Houriy
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	168
	Approaches				% Fulfilled	93.1%

2A	Approach Lanes		1	2 or	Average	
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	555
	Approaches				% Fulfilled	115.5%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	49
	Street				% Fulfilled	98.5%





PM Forecast Only? N

	Major Street						Minor Street						ĺ
			28th A	venue			8th Street						
		Northbound	d Southbound			Eastbound			Westbound		Peds Crossing		
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	92	214	0	0	85	264	337	0	27	0	0	0	0
PM Peak Hour	36	108	0	0	220	334	288	0	58	0	0	0	0
Average Hourly Volume	32	81			76	150	156		21				0

Warrant	AHV
1A - All	516
1B - Minor	178
2A - Major	338
2B - Cross	156

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	more	Average
1A Flow Conditions	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	Х				Volume	
	All Approaches	480	720	600	900	516
	All Approaches				% Fulfilled	107.4%
		-				
	Approach Lanes		1	2 or	Average	
I	Elow Conditions	Free	Restricted	Free	Restricted	Hourly

Flow Conditions			1100110104		rtootriotou	
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	178
	Approaches				% Fulfilled	98.6%

	Approach Lanes		1	2 or	Average	
2A	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	338
	Approaches				% Fulfilled	70.5%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	156
	Street				% Fulfilled	312.5%





PM Forecast Only? N

Major Street								Minor	Street				
			28th A	venue			Future Road (North)						
Northbound				Southbound			Eastbound		Westbound			Peds Crossing	
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	371	557			352	277	75		130				0
PM Peak Hour	147	484			605	82	122		343				0
Average Hourly Volume	130	260			239	90	49		118				0

AHV
886
168
719
49

Warrant 1 - Minimum Vehicular Volume

	Approach Lanes		1	2 or	more	Average
	Elow Conditiona	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	All Approaches	480	720	600	900	886
	All Approaches				% Fulfilled	184.6%
	Approach Lanes	1		2 or	Average	
	Elow Conditions	Free	Restricted	Free	Restricted	Hourly

	Elow Conditions	Free	Resincled	Free	Resincted	поину
1B	TIOW COnditions	Х				Volume
	Minor Street	180	255	180	255	168
	Approaches				% Fulfilled	93.1%

	Approach Lanes		1	2 or	Average	
2A	Elow Conditions	Free	Restricted	Free	Restricted	Hourly
	TIOW COnditions	Х				Volume
	Major Street	480	720	600	900	719
	Approaches				% Fulfilled	149.7%

	Approach Lanes		1	2 or	Average	
2B	Elow Conditiono	Free	Restricted	Free	Restricted	Hourly
	Flow Conditions	Х				Volume
	Traffic Crossing Major	50	75	50	75	49
	Street				% Fulfilled	98.5%