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Traffic Impact Study

St. Marys Future Solid Waste Disposal Needs Environmental Assessment

Town of St. Marys

**R.J. Burnside & Associates Limited
332 Lorne Avenue East
Stratford ON N5A 6S4 CANADA**

**July 2021
300032339.0000**

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Revision	Date	Description
0	January 2016	Initial Draft Submission to Town
1	July 2021	Final Report Included with Environmental Assessment Report

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Executive Summary

Previous efforts completed for the St. Marys Future Solid Waste Disposal Needs Environmental Assessment have determined that expansion of the St. Marys Landfill is preferred over other waste disposal alternatives. On this basis, Burnside completed this Traffic Impact Study to review how continued landfill use will impact on traffic. The proposed expansion is forecast to generate total two-way traffic (by 2057) of about 86 vehicles per hour (vph) in the AM peak hour on Saturdays, 38 vph in the AM peak hour on weekdays, and 30 vph in the PM peak hour on weekdays. Impacts have been assessed at the Perth Road 123/St. Marys Landfill Access intersection, as well as along Perth Road 123 and Water Street South. Traffic impacts have been assessed for horizon years 2037 and 2057. Forecast traffic volumes have also included growth in background traffic in this area.

Based on the analysis completed, the following primary conclusions and recommendations are made in this study:

- A left-turn lane is not warranted at the Perth Road 123/St. Marys Landfill Access intersection through horizon year 2057.
- A right-turn lane or taper is not warranted at the Perth Road 123/St. Marys Landfill Access intersection through the horizon year 2057.
- The stopping sight distances and decision sight distances at the Perth Road 123/St. Marys Landfill Access intersection meets the MTO guidelines and is acceptable.
- The Perth Road 123/St. Marys Landfill Access intersection is forecast to operate with good Level of Service (LOS) and short delays through the horizon year 2057. Therefore, no operational improvements are required to accommodate the landfill expansion.
- It is forecast that the ultimate traffic demands (year 2057) on Perth Road 123 will be less than 25% of its link capacity. Therefore, no capacity improvements are required to the roads in the study area to accommodate the landfill expansion.

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1.0 Introduction

The Town of St. Marys has retained R.J. Burnside & Associates Limited (Burnside) to undertake an Individual Environmental Assessment (EA) study to identify a solution that addresses the Town's post-diversion municipal solid waste disposal needs. The preferred solution has been identified as an expansion to the existing landfill site. This Traffic Impact Study (TIS) identifies the transportation impacts associated with the proposed expansion and demonstrates how the subject lands can be serviced with transportation infrastructure to meet this expansion.

1.1 Site Description

The landfill location is shown on Figure A1 (St. Marys Landfill Site Location, Appendix A) and the Landfill Site Plan is shown on Figure A2 (Appendix A), showing the existing facility and the property boundary within which, the future expansion is to be accommodated. In 2016 the landfill was at its approved volume capacity of 380,000 m³. The Town of St. Marys proposes to expand the existing landfill to accommodate 708,000 m³ of landfill volume by ultimate development (i.e., horizon year 2057). The volumetric rate of fill at the site ranged from a low of 7,137 m³ (2020) to a high of 18,439 m³ (2013) in the period 2010 to 2020, inclusive. Based on projected population increases, it is forecasted that the landfill demand volume will increase by about 66% between horizon years 2016 and 2057.

There is presently one access to the landfill that is located on the east side of Perth Road 123.

To the north and to the east the property is bounded by Extractive Industrial lands (St. Marys Cement plant/operations). A short section of Water Street South also abuts the north part of the site.

To the south the property is bounded by farmland that is located within the adjacent Township of Perth South. The south boundary of the landfill is coincident with the south boundary of the Town.

To the west the property is bounded by Perth Road 123 and Water Street South. A small number of residential estate lots are located along the west side of Perth Road 123 in this area, within the Township of Perth South.

1.2 Background Information

The following reports have been reviewed as background for this TIS:

- Official Plan of the Town of St. Marys (Town of St. Marys, October 2007).
- Population Discussion Paper prepared to support the Official Plan Update.

Traffic Impact Study
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- Town of St. Marys 2011 Development Charge Background Study (Watson & Associates, September 29, 2017).
- Proposed Terms of Reference, St. Marys Future Solid Waste Disposal Needs Environmental Assessment (Amended), dated December 2013.
- St. Marys Engineering Design Guidelines and Supplemental Specifications for Municipal Services (Town of St. Marys, May 3, 2017).
- Town of St. Marys Road Assessment Study Asset Management Plan (R.J. Burnside & Associates Limited, October 2014).
- County of Perth Official Plan (County of Perth, consolidated April 2015).
- Public Information Centre (PIC) #1, Summary Report – St. Marys Future Solid Waste Disposal Needs Environmental Assessment (R.J. Burnside & Associates Limited, October 2015).
- Public Information Centre (PIC) #2 to consider *Alternative Methods to the Undertaking* (R.J. Burnside & Associates Limited, June 23, 2016).

2.0 Existing Conditions

2.1 Landfill Site Operations

The existing landfill property has an area of approximately 37 ha, of which approximately 8 ha are currently approved as a fill area (see Figure A2, Appendix A).

The existing landfill site has the following operations:

- Monday, Thursday, Sunday Closed
- Tuesday, Wednesday, Friday 8:00 a.m. to 4:30 p.m.
- Saturday 8:00 a.m. to 12:30 p.m.

The Bluewater Recycling Association provides curbside waste collection weekly on Tuesday and Friday, and recycling biweekly on the same days. Approximately half of the (mainly) residential waste and recycling is collected on each of the two collection days. For the purposes of this TIS it is assumed that this collection schedule will continue to apply throughout the life of the expanded landfill. While it is possible that the Town will decide to reduce the number of days that the landfill will be open, compressing the traffic over a short timeframe will not likely have a significant impact on the traffic operations, given the relatively low traffic generated at the site during the peak periods.

Waste and recyclables are also delivered to the landfill by private haulers and some residents during all operating days. The recyclable waste that is brought to the site is removed periodically by trucks (typically roll-off trucks). Recyclables that are collected at curbside (by BRA) are delivered elsewhere.

2.2 Site Area Road Network

The study area includes the transportation facilities linking the landfill to the adjacent arterial roads. The following intersection is included in this study:

- Perth Road 123/St. Marys Landfill Access.

The landfill access operates under stop control at its intersection with Perth Road 123.

The Terms of Reference (TOR) for the overall Environmental Assessment for the landfill site expansion listed roads within the broader study area including Perth Road 123, Water Street South, Third Line Road, Fifth Line Road and Thomas Street. Perth Road 123 and Water Street are the arterial roads that provide the primary access to the landfill site (i.e., the primary haul route for waste). The relatively small volume of traffic generated from the landfill site expansion will have a minimal impact on the other roads listed in the TOR, and therefore, no further consideration is made to impacts on those other roads in this TIS.

Perth Road 123 is a two-lane arterial road under the jurisdiction of the County of Perth. It has a posted speed of 80 km/h in the area of the landfill access.

Perth Road 123 becomes Water Street, a road under the jurisdiction of the Town of St. Marys, at a location about 470 m to the north of the landfill access. Water Street has a posted speed of 50 km/h.

St. Marys Landfill Access is a tar and chip driveway (i.e., upgraded from gravel in 2019), located on the east side of Perth Road 123. The landfill site access is stop-sign controlled and forms a T-intersection with Perth Road 123.

The existing traffic controls and lane configurations at the Perth Road 123 and St. Marys Landfill Access intersection are shown on Figure A3 (Appendix A).

2.3 Other Developments and Proposed Road Improvements

There are no new developments or planned road improvements in the study area that may impact traffic on Perth Road 123. Traffic from developments proposed in the broader area of St. Marys are accounted for in the overall background growth rate assumed, as discussed in a subsequent section of this report.

3.0 Background Traffic Forecasts

3.1 Study Horizon Periods

Considering the scope of the proposed landfill expansion, the following study horizons (cumulatively) are considered appropriate for consideration of traffic impacts:

- Horizon year 2015 –Traffic Conditions at Study Initiation:
 - Existing background conditions.
- Horizon year 2021 – Total Traffic Conditions (growth from 2016 to 2021):
 - Addition of background traffic growth to 2021.
 - Addition of partial development of the landfill (growth of landfill site traffic to 2021).
- Horizon year 2037 – Total Traffic Conditions – Twenty Year Horizon (i.e., 20 years after approved capacity reached in 2016):
 - Addition of background traffic growth to 2037.
 - Addition of partial development of the landfill (growth of landfill site traffic to 2037).
- Horizon year 2057 – Total Traffic Conditions – Forty Year Horizon (i.e., 40 years after approved capacity reached in 2016):
 - Addition of background traffic growth to 2057.
 - Addition of full development of the landfill (growth of landfill site traffic to 2057).

3.2 Road Connections and Phasing of Development

The landfill site reached its approved capacity in January 2016. To maintain operations during preparation of the Environmental Assessment, the Town applied for and received ECA Notices (Amended ECA's are now issued in place of Notices) allowing continued use. The current Amended ECA allows operation through September 30, 2021. The landfill site will continue to generate more traffic as the population of St. Marys grows. A full 40-year planning period has been considered (i.e., year 2057, commencing 2017), which is consistent with the Amended ECA being applied for, which will represent the worst-case condition for traffic impacts on the adjacent roadways (i.e., highest growth potential for both landfill traffic and background traffic).

3.3 Time Period for Traffic Analysis

The time periods selected for traffic analysis are based on the type of development proposed. The peak traffic periods considered in this study, for landfill site impacts, include the AM peak hour and the PM peak hour of the traffic on the adjacent roadways on weekdays and the peak hour of the landfill site generated traffic on Saturdays. The peak periods considered capture the variability of the operating conditions at the landfill.

3.4 Seasonal Fluctuations of Traffic Volumes

The Town of St. Marys provided the following landfill operational data for review:

- Weekly tonnage summaries from January 2, 2015 through December 5, 2015.
- Daily vehicular summaries from January 2, 2015 through March 3, 2015.
- Daily vehicular summaries from September 1, 2015 through December 9, 2015.

In addition, peak period traffic counts were undertaken by Ontario Traffic Inc. at the landfill access on Saturday, November 7, 2015 and on Tuesday, November 10, 2015.

A review of the traffic data provided by the Town indicates that the traffic counts taken by the consultant represent peak seasonal conditions and therefore these counts have been used for analysis purposes within this TIS.

3.5 Traffic Growth Factors

Traffic growth on Perth Road 123 and at the landfill site access will primarily be based on growth in St. Marys. There are no development plans within Perth County or within the Township of Perth South that will have any significant impact on traffic growth in the study area.

The Environmental Assessment Report (EAR) for the Environmental Assessment provides the following population growth forecasts, base on a review of various planning studies completed by the Town:

- Population growth of 1.5% per annum to year 2027.
- Population growth of 1.15% per annum for the 2028 to 2057 time period.

The growth in traffic volumes on Perth Road 123 has been based on the population growth rates noted above for the 2021, 2037, and 2057 horizons.

The growth in traffic volumes generated by the landfill have been based on the population growth rates noted above for the 2037 and 2057 horizons.

The growth in traffic volumes for the landfill for the 2021 horizon has been based on the growth in the traffic volumes consumed at the landfill, as set out in the EAR.

Based on the above, the growth rates assumed in this TIS are summarized as follows:

- 2016 to 2021 – Landfill traffic growth at 2.5% per annum (5 years).
- 2016 to 2021 – Perth Road 123 traffic growth at 1.5% per annum (5 years).
- 2016 to 2037 – Landfill traffic growth and Perth Road 123 growth at 1.35% per annum (21 years).

- 2016 to 2057 – Landfill traffic growth and Perth Road 123 growth at 1.24% per annum (41 years).

3.6 Forecast Background Traffic

As noted previously the turning movements at the landfill site access have been based on the traffic counts taken by the consultant. However, to be conservative, the peak hour of the landfill site operations was applied for the site traffic for the PM peak hour, rather than the site traffic experienced during the PM peak hour of the adjacent roadway (i.e., since the landfill closes prior to the peak hour of the adjacent roadway).

The existing background traffic volumes (weekday/Saturday AM and PM peak hours, horizon year 2015) are summarized on Figure A4 (Appendix A). The forecast future background traffic volumes, for horizon years 2021, 2037, and 2057, are summarized on Figures A5, A6, and A7 (Appendix A), respectively.

4.0 Development Traffic Forecasts and Total Traffic Forecasts

4.1 Development Traffic Generation

Site generated traffic volumes, from the proposed landfill operations, have been estimated based on the growth factors delineated in Section 3.5 of this report. The following table summarizes the trip generation results for the 2021, 2037, and 2057 horizons:

Table 4-1: Forecast of Trip Generation from Proposed Development

Annual Growth Rate % (Compounded) Base Year 2016	Horizon Year	AM Peak Hour (vph)		PM Peak Hour (vph)	
		In	Out	In	Out
Perth Road 123/St. Marys Landfill Access – WEEKDAY					
2.5%	2021	11	11	9	9
1.35%	2037	14	14	12	12
1.24%	2057	19	19	15	15
Perth Road 123/St. Marys Landfill Access – SATURDAY					
2.5%	2021	29	29	N/A	N/A
1.35%	2037	34	34	N/A	N/A
1.24%	2057	43	43	N/A	N/A

As shown in the table, the total trip generation (two-way) for the landfill expansion on a weekday in 2057 is forecast to be 38 vph in the AM peak hour, 30 vph in the PM peak hour, and 86 vph in the Saturday peak hour.

4.2 Trip Distribution

The forecast development traffic has been distributed over the road network, according to origin/destination considerations. The traffic entering and exiting the landfill has been distributed according to existing traffic patterns at the site (i.e., as per the November 2015 traffic counts).

The forecast development traffic volumes (Saturday AM peak hour, and weekday AM and PM peak hours) are summarized on Figures A8, A9, and A10 (Appendix A) for horizon years 2021, 2037, and 2057, respectively.

4.3 Forecast Total Traffic

The development traffic is added to the background traffic plus growth in background traffic to obtain the forecast total turning movement volumes. The forecast total traffic volumes (Saturday AM peak hour, and weekday AM and PM peak hours) are summarized on Figures A11, A12, and A13 for horizon years 2021, 2037, and 2057, respectively.

5.0 Traffic Impact Analysis

5.1 Analysis Criteria and Approach

The traffic operations at the landfill access have been assessed based on the following criteria:

- Turning lane requirements based on Ministry of Transportation (MTO) warrant nomographs and criteria.
- Level of Service (LOS), delay and volume-to-capacity (v/c) ratio. The LOS is based on criteria in the Highway Capacity Manual, analyzed using Synchro software.
- Geometric constraints (sight distances, intersection spacing, etc.).
- Link volume considerations.

5.2 Left-Turn Lane Warrant for Landfill Site Access

The warrant for a left-turn lane, at the unsignalized landfill site access, has been assessed based on MTO nomographs. The analysis is based on design speed of 20 km/h over the posted speed. The results of the left-turn lane warrant analysis for the Perth Road 123/St. Marys Landfill Access intersection, for Total Traffic conditions in horizon year 2057, is summarized below.

Table 5-1: Left-Turn Lane Warrant for Perth Road 123/St. Marys Landfill Access Unsignalized Intersection

Left-Turn Storage Lane Warrants			
Location: Perth Road 123/St. Marys Landfill Access			
Design Speed = 100 km/h		Time Period = 2057 Total Traffic	
Approach Day/Direction	Weekday/Southbound		Saturday/Southbound
Peak Hours	Morning	Afternoon	Morning
Advancing Traffic	156	172	208
Opposing Traffic	156	161	106
Left-Turning Traffic	17	13	41
Percentage of Left-Turning Traffic	10.9%	7.6%	19.7%
Figure Used (MTO Geometric Design Guidelines, June 2017)	EA-24	EA-23	EA-24
Storage Length Required	0 m		0 m

Based on the analysis, it is concluded that a left turn lane is not required on Perth Road 123 at the landfill site access through horizon year 2057.

5.3 Right-Turn Lane Requirements

MTO guidelines (Geometric Design Standards for Ontario Highways) note that right-turn lanes or tapers may be considered where right-turn volumes exceed 60 vph and where right-turning vehicles create a hazard or reduce capacity at the intersection. The forecast right-turn movements at the Perth Road 123/St. Marys Landfill Access intersection, are minimal (2 vph) through the life of the landfill. Therefore, a right-turn lane/taper is not warranted at the landfill site access.

5.4 Operational Level of Service

The intersections within the study area have been analyzed using Synchro software, which uses methodologies based on the Highway Capacity Manual. The Level of Service (LOS) and volume-to-capacity (v/c) ratio were determined for the egress movements from the St. Marys Landfill Access onto Perth Road 123 (unsignalized intersection). The LOS is a measure qualifying the amount of delay experienced by motorists. The delays associated with various LOS are summarized in the following table:

Table 5-2: Level of Service Delay Criteria

Level of Service (LOS)	Unsignalized Intersection Average Total Delay (seconds/vehicle)
A	0 to 10
B	>10 to 15
C	>15 to 25
D	>25 to 35
E	>35 to 50
F	>50

It is desirable that turning movements operate at LOS E, or better, and within their capacity.

The Synchro analysis for the subject intersection is included in Appendix B (background traffic conditions) and Appendix C (total traffic conditions), and the results are summarized in the following table.

Table 5-3: Intersection Operations

Intersection	Year	Traffic	Critical Movement	Level of Service (volume/capacity)		
				Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday AM Peak Hour
Perth Road 123/ St. Marys Landfill Access	2015	Background	Westbound Left/Right	A (0.01)	A (0.01)	A (0.03)
	2021	Total		A (0.01)	A (0.01)	A (0.03)
	2037	Total		A (0.02)	A (0.01)	A (0.04)
	2057	Total		A (0.02)	A (0.02)	A (0.05)

The above table shows that the existing intersection at Perth Road 123/St. Marys Landfill Access is forecast to continue to have acceptable traffic operations through horizon year 2057 and that the addition of the traffic from the landfill expansion will only have a minor effect on these operations.

5.5 Geometric Considerations

The available sight distances have been reviewed for the intersection of Perth Road 123/St. Marys Landfill Access. The analysis is based on a design speed of 20 km/h over the posted speed (i.e., design speed of 100 km/h on Perth Road 123).

The *Geometric Design Guidelines for Ontario Highways (GDG)* (Ministry of Transportation Ontario, June 2017) recommends the following sight distances for road with 100 km/h design speeds:

- A minimum stopping sight distance (SSD) of 185 m.
- Decision sight distances between 300 m (minimum) to 400 m (desirable) for turning movements.

The available sight distance provided at the existing Perth Road 123/St. Marys Landfill Access meets these recommendations, with over 400 m of sight distance in both the north and south directions.

5.6 Link Volume Considerations

Perth Road 123 and Water Street South are arterial roads that have an assumed capacity of 900 vehicles per hour per lane (vphpl) and are designed to accommodate the full range of traffic types. The forecast peak hour volumes on Perth Road 123 and Water Street South in the study area are 208 vphpl southbound (Saturday peak hour) and 161 vphpl northbound (PM peak hour) in 2057. These traffic volumes equate to a utilization of about 23% of the roadway capacity southbound and 18% of the roadway capacity northbound. Therefore, Perth Road 123 and Water Street South have sufficient reserve capacity to accommodate the proposed landfill expansion.

6.0 Conclusions and Recommendations

This Traffic Impact Study has reviewed the traffic impacts of expanding the existing St. Marys Landfill in the Town of St. Marys. The proposed expansion is forecast to generate total two-way traffic (by 2057) of about 86 vph in the AM peak hour on Saturdays, 38 vph in the AM peak hour on weekdays, and 30 vph in the PM peak hour on weekdays. Impacts have been assessed at the Perth Road 123/St. Marys Landfill Access intersection, as well as along Perth Road 123 and Water Street South. Traffic impacts have been assessed for horizon years 2021, 2037, and 2057. Forecast traffic volumes have also included growth in background traffic in this area.

Based on the analysis completed, the following primary conclusions and recommendations are made in this study:

- A left-turn lane is not warranted at the Perth Road 123/St. Marys Landfill Access intersection through horizon year 2057.
- A right-turn lane or taper is not warranted at the Perth Road 123/St. Marys Landfill Access intersection through the horizon year 2057.
- The stopping sight distances and decision sight distances at the Perth Road 123/St. Marys Landfill Access intersection meets the MTO guidelines and is acceptable.
- The Perth Road 123/St. Marys Landfill Access intersection is forecast to operate with good Level of Service (LOS) and short delays through the horizon year 2057. Therefore, no operational improvements are required to accommodate the landfill expansion.
- It is forecast that the ultimate traffic demands (year 2057) on Perth Road 123 will be less than 25% of its link capacity. Therefore, no capacity improvements are required to the roads in the study area to accommodate the landfill expansion.



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Appendix A

Figures

St. Marys Landfill Site Location	A1
Landfill Site Plan	A2
Existing Traffic Controls and Lane Configurations	A3
Existing Traffic Volumes (2015)	A4
2021 Background Traffic Volumes	A5
2037 Background Traffic Volumes	A6
2057 Background Traffic Volumes	A7
Traffic Generation (2021)	A8
Traffic Generation (2037)	A9
Traffic Generation (2057)	A10
2021 Total Traffic Volumes	A11
2037 Total Traffic Volumes	A12
2057 Total Traffic Volumes	A13



Map Data: Copyright 2015 Google


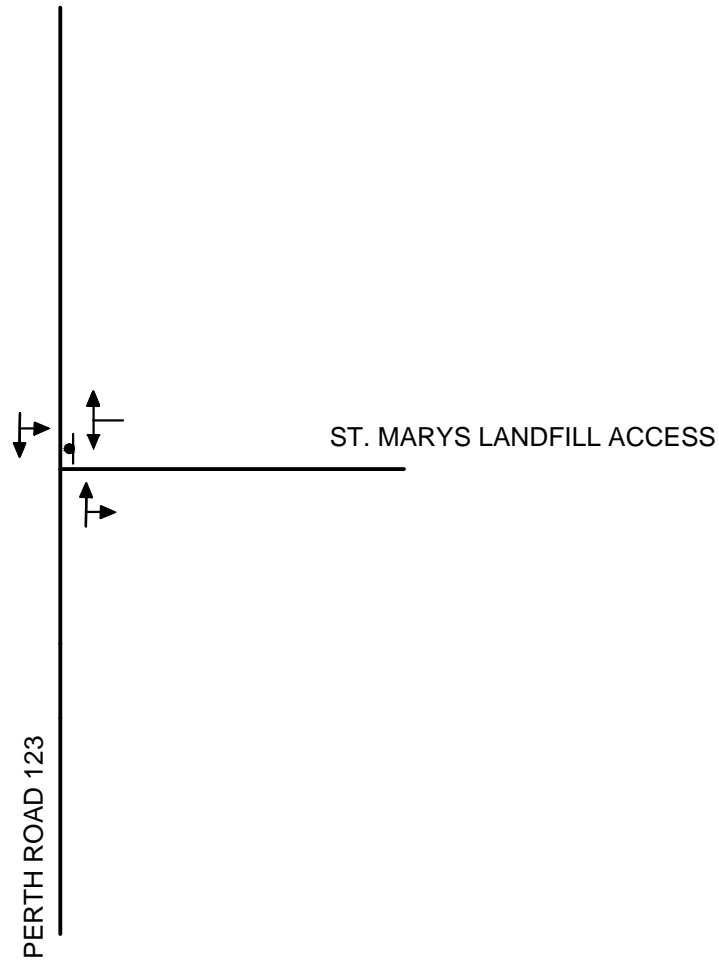



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Client	Drawn	Checked	Date	Figure No. A1
TOWN OF ST. MARYS	CJR	HC	NOVEMBER 2015	
	Scale NTS	Project No. 300032339		




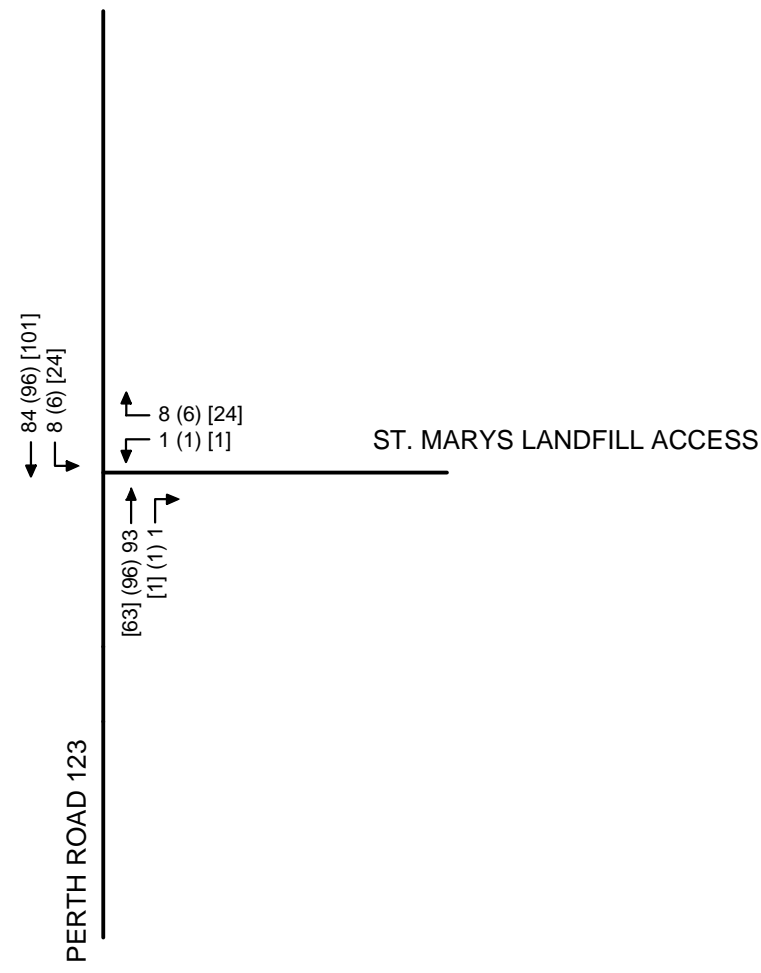
FIGURE A2



LEGEND


-  STOP SIGN CONTROL
-  TURN LANE
-  THROUGH LANE

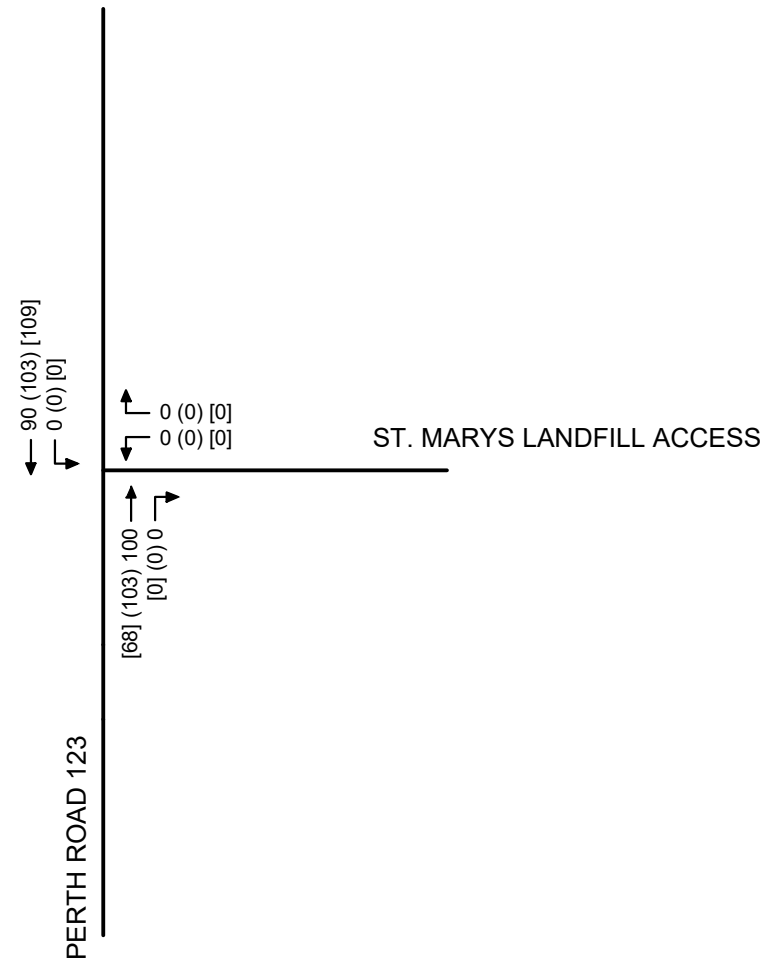
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Client TOWN OF ST. MARYS	Drawn CJR	Checked HC	Date NOVEMBER 2015	Figure No. A3
	Scale NTS		Project No. 300032339	



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

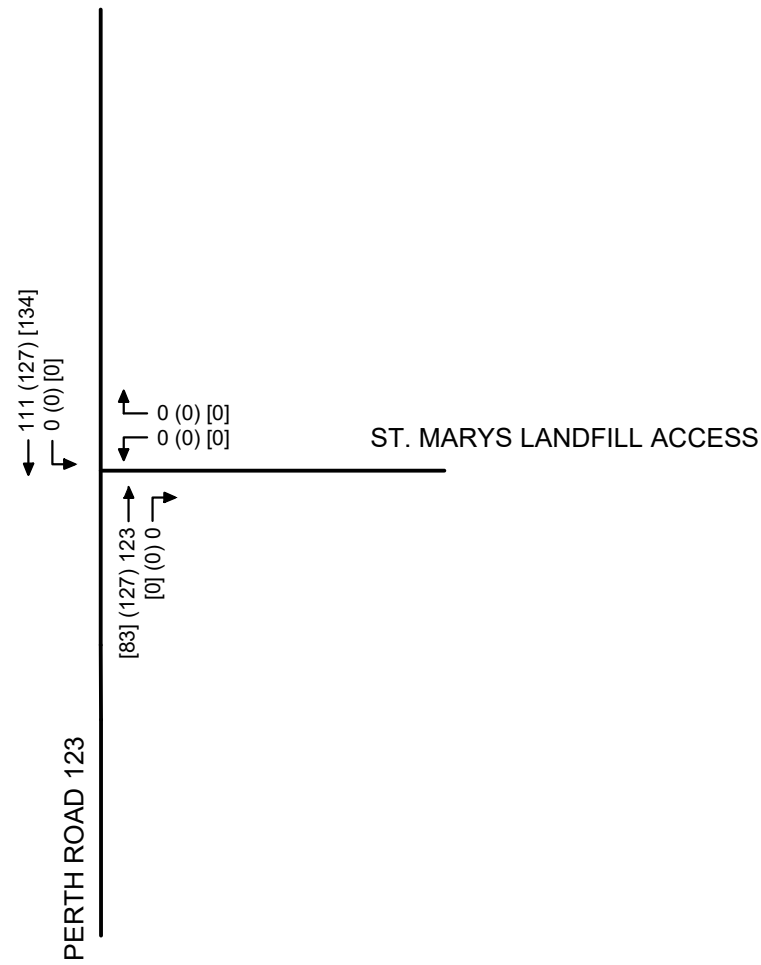
	ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION		ST. MARYS LANDFILL ACCESS EXISTING TRAFFIC VOLUMES (2015)
	TOWN OF ST. MARYS		
Client	Drawn CJR	Checked HC	Date NOVEMBER 2015
	Scale NTS		Project No. 300032339
			Figure No. A4



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

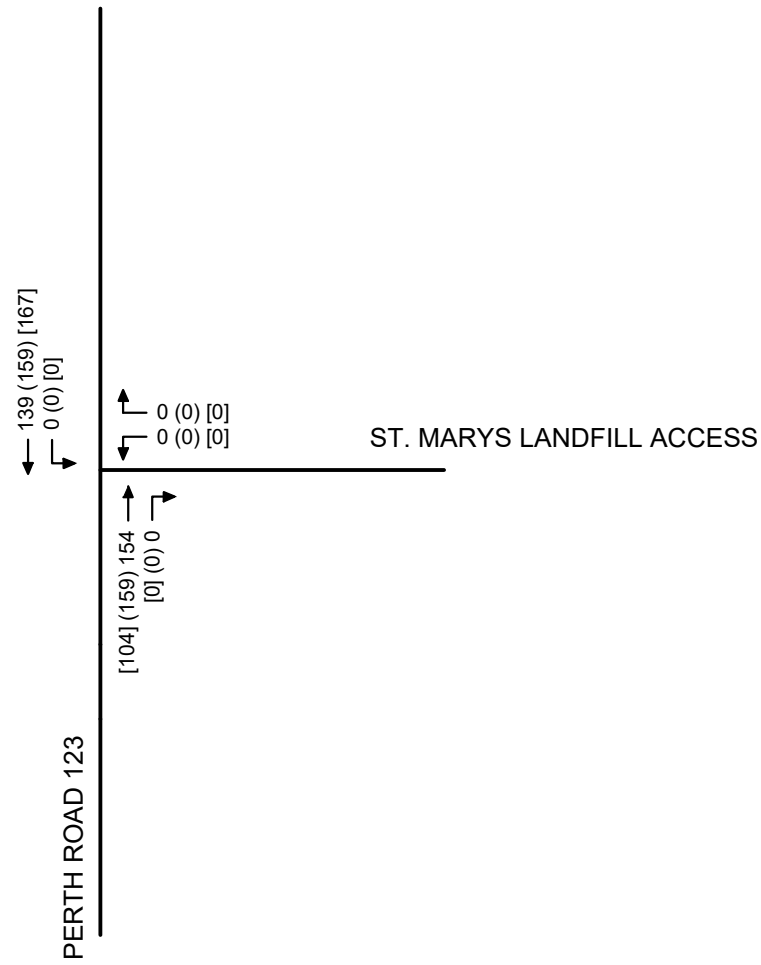
		Figure Title		ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION ST. MARYS LANDFILL ACCESS 2021 BACKGROUND TRAFFIC VOLUMES												
		Client	TOWN OF ST. MARYS		<table border="1"> <tr> <td>Drawn</td> <td>Checked</td> <td>Date</td> <td rowspan="2">Figure No.</td> </tr> <tr> <td>XT</td> <td>HC</td> <td>JULY 2021</td> </tr> <tr> <td>Scale</td> <td colspan="2">Project No.</td> <td rowspan="2">A5</td> </tr> <tr> <td>NTS</td> <td colspan="2">300032339</td> </tr> </table>	Drawn	Checked	Date	Figure No.	XT	HC	JULY 2021	Scale	Project No.		A5
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LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

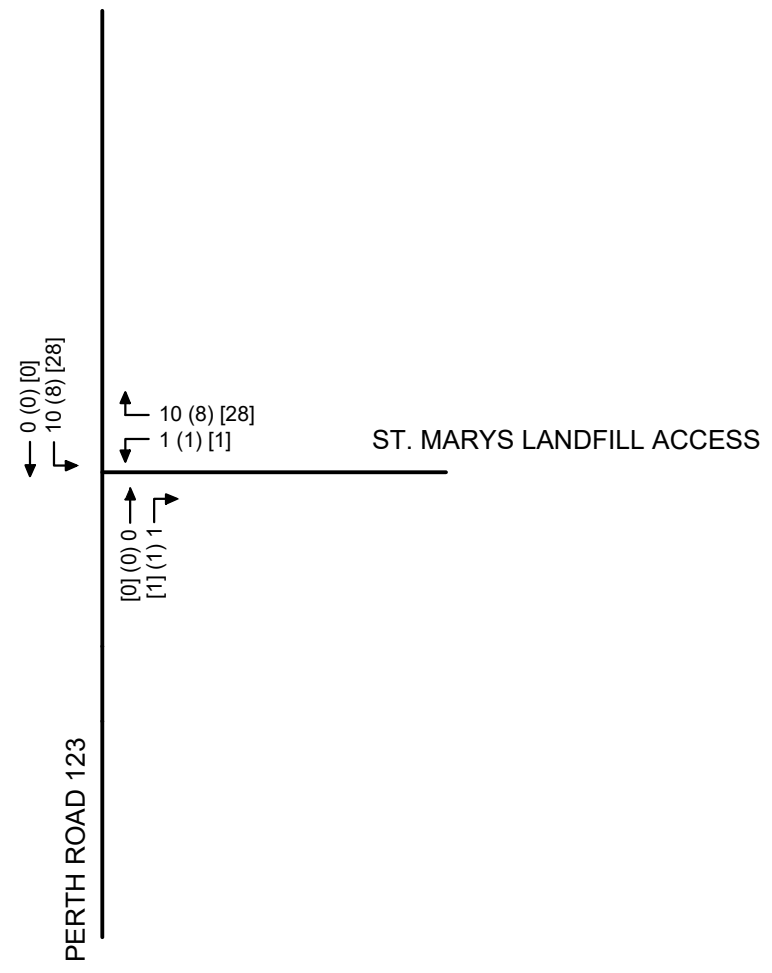
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<p>TOWN OF ST. MARYS</p>		XT	HC	JULY 2021	<p>A6</p>
		Scale	Project No.		
		NTS	300032339		



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

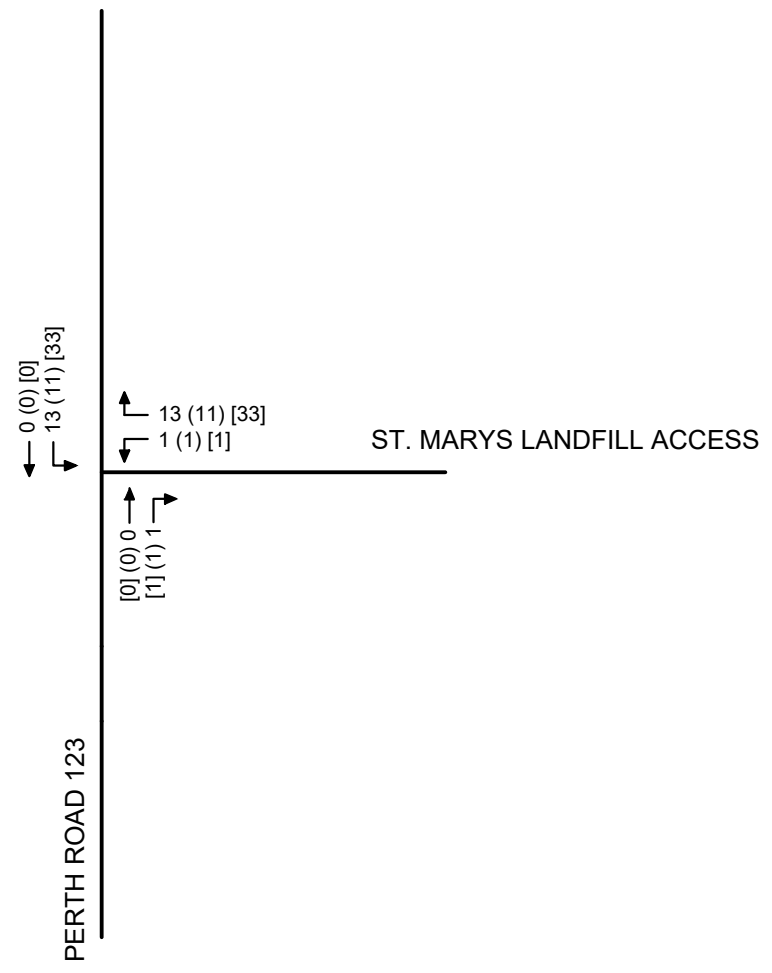
	ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION			ST. MARYS LANDFILL ACCESS 2057 BACKGROUND TRAFFIC VOLUMES
	TOWN OF ST. MARYS			
Client	Drawn XT	Checked HC	Date JULY 2021	Figure No. A7
	Scale NTS		Project No. 300032339	



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

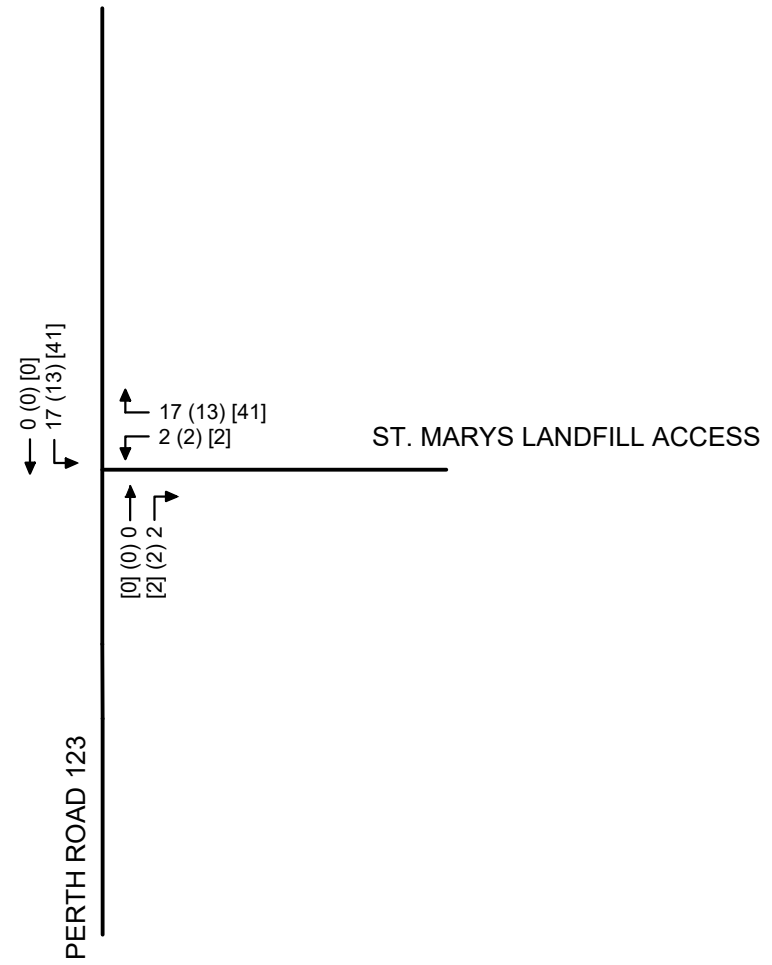
		Figure Title		<p>ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION</p> <p>ST. MARYS LANDFILL ACCESS TRAFFIC GENERATION (2021)</p>												
		Client	TOWN OF ST. MARYS		<table border="1"> <tr> <td>Drawn</td> <td>Checked</td> <td>Date</td> <td rowspan="2">Figure No.</td> </tr> <tr> <td>XT</td> <td>HC</td> <td>JULY 2021</td> </tr> <tr> <td>Scale</td> <td colspan="2">Project No.</td> <td rowspan="2">A8</td> </tr> <tr> <td>NTS</td> <td colspan="2">300032339</td> </tr> </table>	Drawn	Checked	Date	Figure No.	XT	HC	JULY 2021	Scale	Project No.		A8
Drawn	Checked	Date	Figure No.													
XT	HC	JULY 2021														
Scale	Project No.		A8													
NTS	300032339															



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

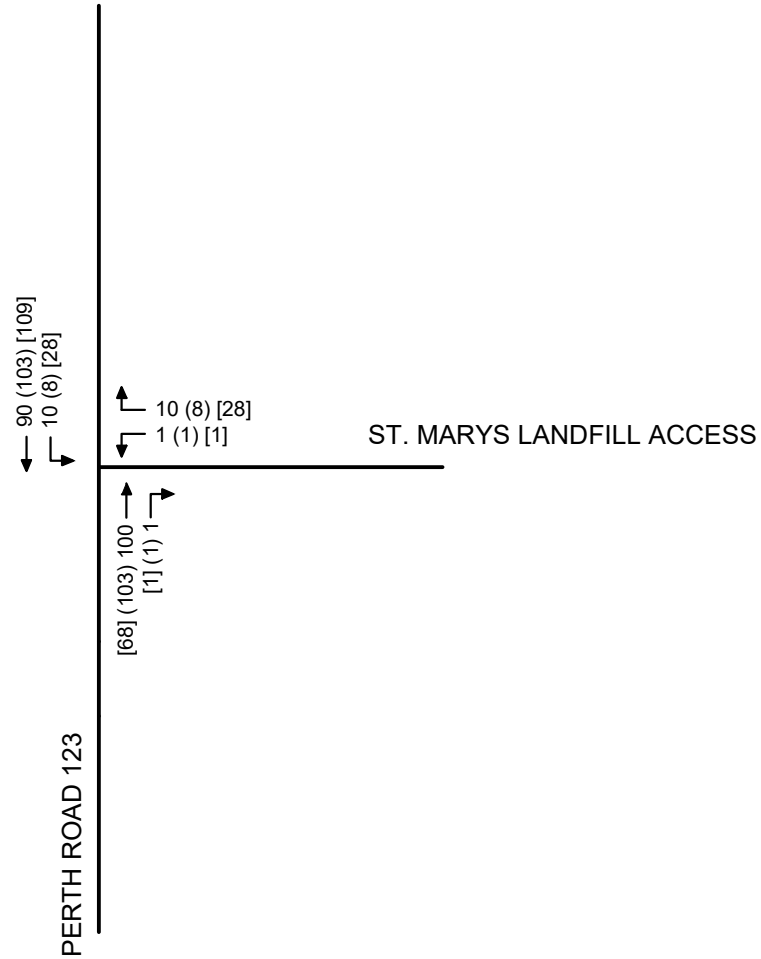
		Figure Title ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION ST. MARYS LANDFILL ACCESS TRAFFIC GENERATION (2037)	
Client TOWN OF ST. MARYS	Drawn XT	Checked HC	Date JULY 2021
	Scale NTS		Project No. 300032339
			Figure No. A9



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

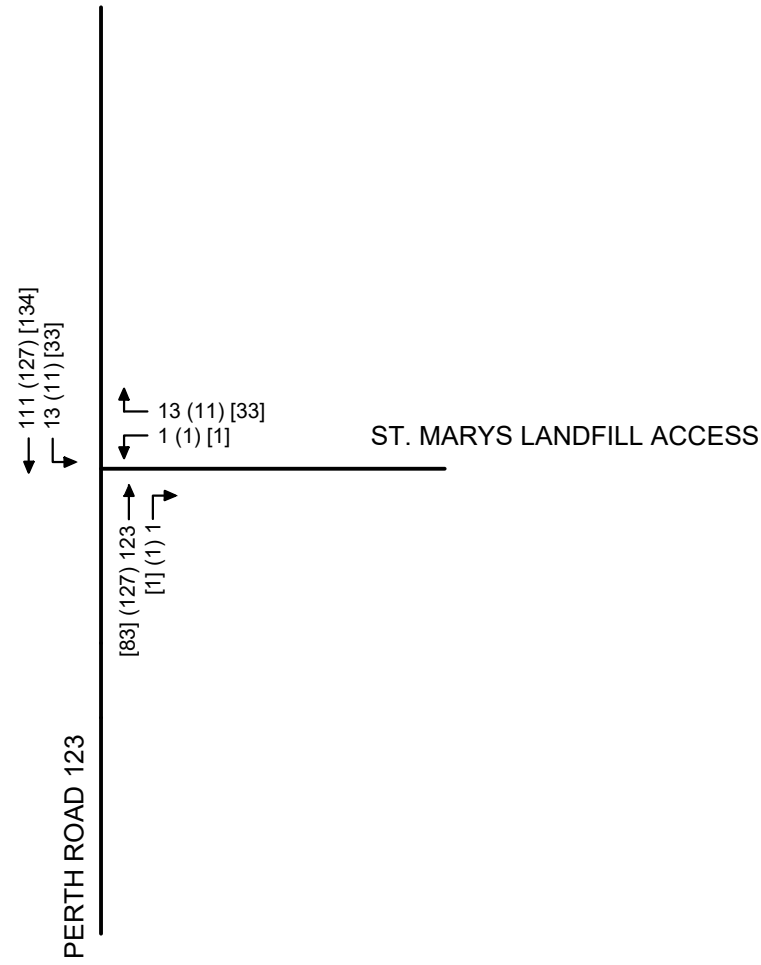
		Figure Title		ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION ST. MARYS LANDFILL ACCESS TRAFFIC GENERATION (2057)	
		Client	Drawn		Checked
TOWN OF ST. MARYS		XT	HC	JULY 2021	A10
		Scale	NTS	Project No.	



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

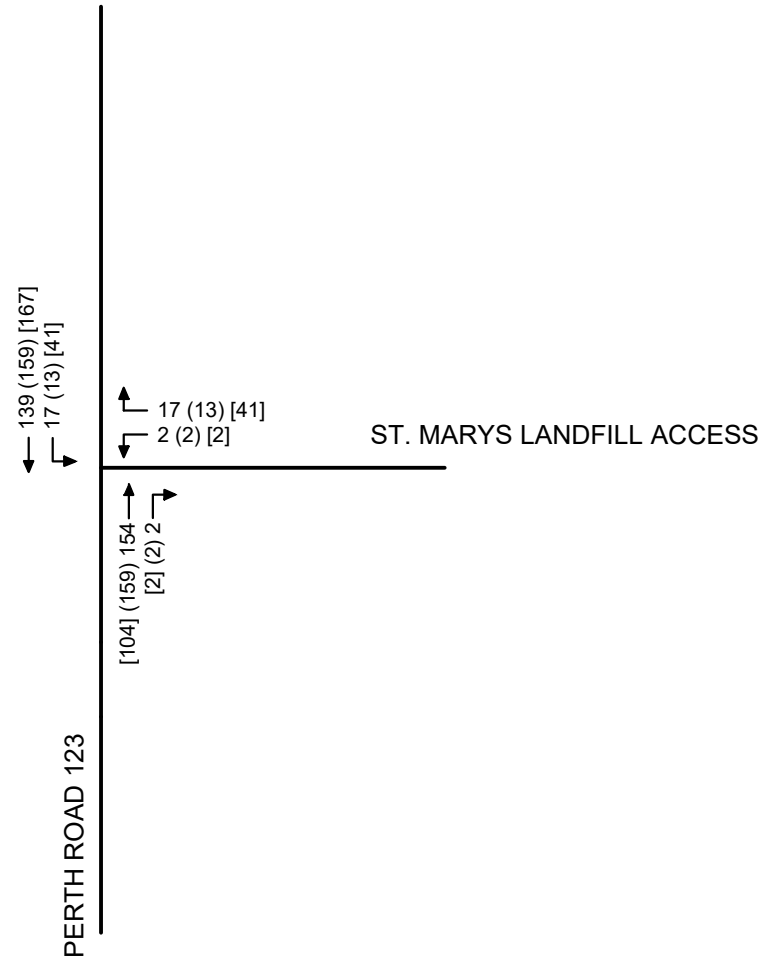
	Figure Title ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION ST. MARYS LANDFILL ACCESS 2021 TOTAL TRAFFIC VOLUMES			
	Client TOWN OF ST. MARYS	Drawn XT	Checked HC	Date JULY 2021
	Scale NTS	Project No. 300032339		Figure No. A11



LEGEND


- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

		Figure Title		<p>ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION</p> <p>ST. MARYS LANDFILL ACCESS 2037 TOTAL TRAFFIC VOLUMES</p>	
		Client	<p>TOWN OF ST. MARYS</p>		Figure No.
		Drawn	Checked	Date	<p>A12</p>
		XT	HC	JULY 2021	
		Scale	Project No.		
		NTS	300032339		



LEGEND

- 100 - WEEKDAY AM PEAK HOUR (vph)
- (100) - WEEKDAY PM PEAK HOUR (vph)
- [100] - SATURDAY AM PEAK HOUR (vph)

		Figure Title		<p>ST. MARYS WASTE MANAGEMENT LONG-TERM CAPACITY EXPANSION</p> <p>ST. MARYS LANDFILL ACCESS 2057 TOTAL TRAFFIC VOLUMES</p>	
		Client	Drawn		Checked
<p>TOWN OF ST. MARYS</p>		XT	HC	JULY 2021	<p>A13</p>
		Scale	Project No.		
		NTS	300032339		



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Appendix B

Background Traffic Operations (Synchro)

HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2015 WEEKDAY AM - EXISTING
 12/16/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	6	93	1	8	84
Future Volume (Veh/h)	1	6	93	1	8	84
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	7	101	1	9	91
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	210	102			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	210	102			102	
tC, single (s)	7.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	4.4	3.3			2.3	
p0 queue free %	100	99			99	
cM capacity (veh/h)	598	959			1430	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	102	100			
Volume Left	1	0	9			
Volume Right	7	1	0			
cSH	892	1700	1430			
Volume to Capacity	0.01	0.06	0.01			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	9.1	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization		21.1%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2015 WEEKDAY PM - EXISTING
 12/22/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	6	96	1	6	96
Future Volume (Veh/h)	1	6	96	1	6	96
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	7	104	1	7	104
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	224	106			106	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	224	106			106	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	765	953			1496	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	105	111			
Volume Left	1	0	7			
Volume Right	7	1	0			
cSH	925	1700	1496			
Volume to Capacity	0.01	0.06	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	8.9	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			20.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2015 SATURDAY AM - EXISTING
 12/16/2015



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	22	63	1	24	101
Future Volume (Veh/h)	1	22	63	1	24	101
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	24	68	1	26	110
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	68			69	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	68			69	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	100	98			98	
cM capacity (veh/h)	749	975			1495	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	25	69	136			
Volume Left	1	0	26			
Volume Right	24	1	0			
cSH	964	1700	1495			
Volume to Capacity	0.03	0.04	0.02			
Queue Length 95th (m)	0.6	0.0	0.4			
Control Delay (s)	8.8	0.0	1.5			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	1.5			
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		23.3%		ICU Level of Service		A
Analysis Period (min)			15			



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Appendix C

Total Traffic Operations (Synchro)










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2021 WEEKDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	10	100	1	10	90
Future Volume (Veh/h)	1	10	100	1	10	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	11	109	1	11	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	110			110	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	110			110	
tC, single (s)	7.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	4.4	3.3			2.3	
p0 queue free %	100	99			99	
cM capacity (veh/h)	581	950			1414	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	12	110	109			
Volume Left	1	0	11			
Volume Right	11	1	0			
cSH	902	1700	1414			
Volume to Capacity	0.01	0.06	0.01			
Queue Length 95th (m)	0.3	0.0	0.2			
Control Delay (s)	9.0	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			22.0%		ICU Level of Service	A
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2021 WEEKDAY PM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	8	103	1	8	103
Future Volume (Veh/h)	1	8	103	1	8	103
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	9	112	1	9	112
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	242	112			113	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	112			113	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	746	946			1489	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	113	121			
Volume Left	1	0	9			
Volume Right	9	1	0			
cSH	921	1700	1489			
Volume to Capacity	0.01	0.07	0.01			
Queue Length 95th (m)	0.3	0.0	0.1			
Control Delay (s)	9.0	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			22.0%	ICU Level of Service	A	
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2021 SATURDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	28	68	1	28	109
Future Volume (Veh/h)	1	28	68	1	28	109
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	30	74	1	30	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	252	74			75	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	74			75	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	100	97			98	
cM capacity (veh/h)	726	968			1487	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	31	75	148			
Volume Left	1	0	30			
Volume Right	30	1	0			
cSH	958	1700	1487			
Volume to Capacity	0.03	0.04	0.02			
Queue Length 95th (m)	0.8	0.0	0.5			
Control Delay (s)	8.9	0.0	1.6			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	1.6			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			24.0%		ICU Level of Service	A
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2037 WEEKDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	13	123	1	13	111
Future Volume (Veh/h)	1	13	123	1	13	111
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	14	134	1	14	121
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	284	134			135	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	134			135	
tC, single (s)	7.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	4.4	3.3			2.3	
p0 queue free %	100	98			99	
cM capacity (veh/h)	535	920			1384	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	135	135			
Volume Left	1	0	14			
Volume Right	14	1	0			
cSH	878	1700	1384			
Volume to Capacity	0.02	0.08	0.01			
Queue Length 95th (m)	0.4	0.0	0.2			
Control Delay (s)	9.2	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			26.4%		ICU Level of Service	A
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2037 WEEKDAY PM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	11	127	1	11	127
Future Volume (Veh/h)	1	11	127	1	11	127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	12	138	1	12	138
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	300	138			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300	138			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	689	915			1457	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	13	139	150			
Volume Left	1	0	12			
Volume Right	12	1	0			
cSH	893	1700	1457			
Volume to Capacity	0.01	0.08	0.01			
Queue Length 95th (m)	0.3	0.0	0.2			
Control Delay (s)	9.1	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			25.8%	ICU Level of Service	A	
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2037 SATURDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	33	83	1	33	144
Future Volume (Veh/h)	1	33	83	1	33	144
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	36	90	1	36	157
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	320	90			91	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	320	90			91	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	100	96			98	
cM capacity (veh/h)	661	948			1467	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	37	91	193			
Volume Left	1	0	36			
Volume Right	36	1	0			
cSH	937	1700	1467			
Volume to Capacity	0.04	0.05	0.02			
Queue Length 95th (m)	0.9	0.0	0.6			
Control Delay (s)	9.0	0.0	1.6			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	1.6			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			26.1%	ICU Level of Service		A
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2057 WEEKDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	17	154	2	17	149
Future Volume (Veh/h)	2	17	154	2	17	149
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	18	167	2	18	162
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	366	168			169	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	168			169	
tC, single (s)	7.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	4.4	3.3			2.3	
p0 queue free %	100	98			99	
cM capacity (veh/h)	472	881			1344	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	169	180			
Volume Left	2	0	18			
Volume Right	18	2	0			
cSH	811	1700	1344			
Volume to Capacity	0.02	0.10	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	9.6	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			30.3%	ICU Level of Service	A	
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2057 WEEKDAY PM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	13	159	2	13	171
Future Volume (Veh/h)	2	13	159	2	13	171
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	14	173	2	14	186
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	388	174			175	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	174			175	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	613	875			1414	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	175	200			
Volume Left	2	0	14			
Volume Right	14	2	0			
cSH	830	1700	1414			
Volume to Capacity	0.02	0.10	0.01			
Queue Length 95th (m)	0.4	0.0	0.2			
Control Delay (s)	9.4	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			29.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3: Perth County Road 123 & St. Mary's Landfill Access

2057 SATURDAY AM - TOTAL

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	41	104	2	41	167
Future Volume (Veh/h)	2	41	104	2	41	167
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	45	113	2	45	182
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	386	114			115	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	386	114			115	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	100	95			97	
cM capacity (veh/h)	602	920			1437	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	47	115	227			
Volume Left	2	0	45			
Volume Right	45	2	0			
cSH	900	1700	1437			
Volume to Capacity	0.05	0.07	0.03			
Queue Length 95th (m)	1.3	0.0	0.7			
Control Delay (s)	9.2	0.0	1.7			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	1.7			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			27.7%	ICU Level of Service	A	
Analysis Period (min)			15			