Traffic Impact Study
In Support of Draft Plan Approval
(Phases 2 & 3)

Township of Centre Wellington
North West Fergus Secondary Plan

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Record of Revisions

Revision	Date	Description
0	December 14, 2016	Initial Submission for Draft Plan Approval (Phases 2 and 3)
1	February 28, 2018	Revised Report for Draft Plan Approval (Phase 2 and 3)

R.J. Burnside & Associates Limited

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Executive Summary

This study has considered the traffic impact of the development of the Phase 2 and 3 Draft Plans of the North-West Fergus Secondary Plan (NWFSP) lands, along with other development within the study area.

Forecasts have been made of future traffic volumes for horizon years 2018, 2023 and 2028, including the traffic generated by the developments within the study area plus growth in background traffic.

It is estimated that the proposed NWFSP development (Phases 1, 2 and 3) will generate about 1,012 vehicles per hour (vph) two-way traffic during the a.m. peak hour and about 1,184 vph two-way traffic during the p.m. peak hour. In addition, other developments within the study area are estimated to generate about 1,086 vph two-way traffic during the a.m. peak hour and about 1,228 vph two-way traffic during the p.m. peak hour.

A growth allowance has also been added to the traffic generated to account for growth beyond the study area.

The Township and County have identified various road improvements in the study area, including improvements to Beatty Line, Garafraxa Street, Sideroad 18, Wellington Road 18 and Colborne Street. These improvements will facilitate traffic movement for the ongoing development within the study area.

Based on the analysis completed in this Traffic Impact Study (TIS), road and traffic control improvements have been identified within the horizon periods considered, to accommodate traffic from the NWFSP area, from other planned developments and from growth in background traffic.

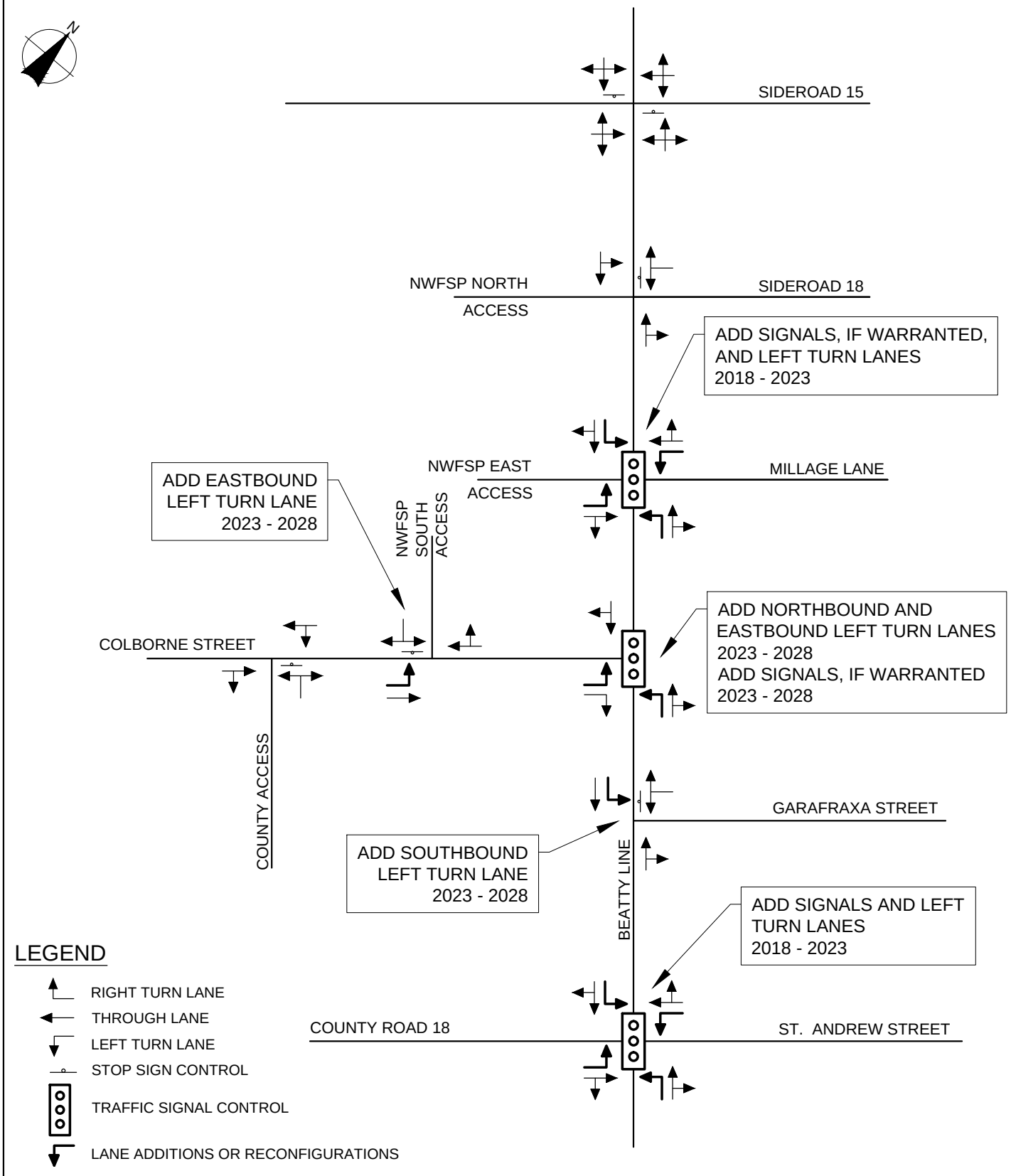
Based on the analysis completed, the recommended improvements to the roads within the study area are shown on Figure 1 and summarized in the following table.

Table 1 – Recommended Road Improvements

Location	Horizon Period	Planning Status	Proposed Improvement
Intersection of Beatty Line/ St. Andrew Street (Wellington Road 18)	2018 to 2023	Existing Development Charge Project	Traffic signals, including exclusive left turn lanes, where required. It is noted that the County's Development Charges Study identifies Wellington Road 18 to be widened to four lanes, between Gerrie Road and St. David Street, in 2017.
Intersection of Beatty Line/ Colborne Street	2023 to 2028	Future Development Charge Project	Eastbound left turn lane and northbound left turn lane at unsignalized intersection. In addition, signalization may be considered if warrants are met (monitor to confirm), or to respond to poor traffic operations. It is noted that the Township's Development Charges Study identifies Beatty Line to be reconstructed in the 2018 to 2026 time period.
Intersection of Beatty Line/ Garafraxa Street	2023 to 2028	Future Development Charge Project	Southbound left turn lane at unsignalized intersection. It is noted that the Township's Development Charges Study identifies Beatty Line to be reconstructed in the 2018 to 2026 time period.
Intersection of Beatty Line/ NWFSP East Access/ Millage Lane	2018 to 2023	Development Access	Northbound left turn lane at unsignalized intersection. In addition, signalization may be considered if warrants are met (monitor to confirm), or to respond to poor traffic operations. Signalization would include exclusive left turn lanes, where required.
Intersection of Colborne Street / NWFSP South Access	2023 to 2028	Development Access	Eastbound left turn lane at unsignalized intersection.

Assuming the implementation of the above noted improvements, including traffic signals where warranted, the Level of Service for all intersections is forecast to be good through horizon year 2028.

In addition to the analysis of traffic operations, this TIS has also provided recommendations for cross sections to accommodate the transportation requirements (car, bicycle, pedestrian, parking) along Colborne Street, Beatty Line and within the NWFSPA.



BURNSIDE

Figure Title

DRAFT PLAN - NWFSP

RECOMMENDED IMPROVEMENTS TO ROADS WITHIN THE STUDY AREA

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	1
Scale		Project No.	
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1.0 Introduction

1.1 General

R.J. Burnside & Associates Limited (Burnside) has been retained by Nigus Fergus Joint Venture Inc. (Nigus) to prepare the Traffic Impact Study (TIS) in support of the Draft Plan of Subdivision Application (Phases 2 and 3) for the North-West Fergus Secondary Plan Area (NWFSPA) in the Community of Fergus, Township of Centre Wellington. This TIS was originally issued in December 2016, but has now been revised to respond to the comments provided by the Township's Review Consultant (Triton Engineering, memorandum dated August 22, 2017) and to subsequent changes in the Draft Plan.

1.2 Study Area

The NWFSPA encompasses approximately 99 ha within the Township of Centre Wellington. The legal description is part of Lots 18, 19 and 20, Concession 14 in the former Nichol Township, and includes Parts 1 and 2 of Plan 61R-11272. The location of the subject lands is illustrated on Figure A1 (Appendix A).

The area is bounded by Colborne Street to the south and west, Beatty Line to the east and an abandoned railway line to the north and east, with open space areas to the west marked by lot lines.

Agricultural and rural residential estate properties surround the subject property. A subdivision development, within the Fergus Urban Centre, encompasses some of the lands to the east of Beatty Line. The Keating Church property is currently being developed for residential purposes and is located on the other side of the former rail corridor, along the northeast boundary of the site. To the south of the subject property is a Wellington County Planning Policy Area (Wellington Place) that includes the existing Wellington County Museum and Archives and the site for the Groves Memorial Hospital and Wellington Place Institutional Campus.

1.3 Previous Studies and Scope of Present Study

This TIS is a continuation of traffic studies that have been previously completed for Phase 1 of the NWFSP, as outlined in the Traffic Impact Study for Town of Centre Wellington North West Fergus Secondary Plan (Burnside, July 2014) and the Traffic Impact Study in Support of Draft Plan Approval (Phase 1) (Burnside, July 2015). The purpose of this TIS is to provide a detailed review of the traffic impacts associated with Phases 2 and 3 of the NWFSP, as well as taking into consideration comments received in the peer reviews of the prior TIS reports (i.e., for the NWFSP and Phase 1), as required. Reference should be made to the previous TIS reports for matters that relate

specifically to the NWFSP and to Phase 1 of this project, and which are not reiterated in this present study, unless required to reflect the updated Draft Plans for Phases 2 and 3.

This TIS will demonstrate how the subject lands can be serviced with transportation connections, in accordance with Township of Centre Wellington standards. It will also address transportation matters internal to the subdivision plans.

1.4 Draft Plans of Subdivision

It is proposed that the NWFSPA be developed in three phases under three Plans of Subdivision, as shown in Figure A2 (Appendix A). As noted previously, approvals are presently being sought for the Phases 2 and 3 Draft Plans of Subdivision. This TIS has also considered comments provided in the peer review of the two prior TIS submissions by Burnside (in September 2013 and July 2015) for the NWFSP and for Phase 1 of the Draft Plan.

1.5 Planning Context

The proposed Land Use Concepts for the Phases 2 and 3 Draft Plans identifies a combination of low, medium, and high density residential uses, in addition to parks, green space areas, and a mixed-use neighborhood commercial block (see Figure A2, Appendix A).

The TIS for the NWFSP (Burnside, July 2014) was based on 935 low density units, 465 medium density units, a school site and a neighborhood commercial block. The TIS for the Phase 1 Draft Plan (Burnside, July 2015) was based on 907 low density units, 272 medium density units, a school site and a neighborhood commercial block (i.e., which included all three phases). The preliminary Draft Plans for Phases 2 and 3, together with the approved Phase 1 Draft Plan, now propose the development of 931 low density units, 334 medium density units, a school site and a mixed use block (i.e., neighborhood commercial and 40 high density units).

Traffic forecasts for the proposed school site, within the NWFSP, have been based on information provided by the School Board.

The traffic forecasts for the development of the adjacent Hospital/County lands are based on trip generation and distribution provided by the consultant for that project (CIMA).

Other developments within the immediate area of the NWFSP have also been considered, as described in a subsequent section to this report (Section 3.0). The traffic forecasts for other external developments, in the immediate study area, have been based on land use information provided by the Township.

The time horizons considered (i.e., 2015, 2018, 2023 and 2028) have been chosen to be reasonably consistent with the timeframes reviewed in the TIS prepared for the development of the Hospital and County lands and for the previous TIS reports prepared for the NWFSP and for the Phase 1 Draft Plan. Since background traffic data was updated as part of the Phase 1 Draft Plan TIS, 2015 was chosen as the base reference year that is representative of existing conditions. For the purposes of this study it is assumed that both the NWFSP and the other developments considered will be completed in the 2028 timeframe, however, build-out may vary from this timeframe. Such variation is not expected to significantly impact the conclusions of this study. Development in the broader study area has also been accounted for by the application of a general growth factor applied to the background traffic.

2.0 Road Connections

2.1 Existing Road Network

The existing lane configurations and traffic controls, for the road network in the vicinity of the NWFSP, is shown on Figure A3 (Appendix A), with the roads described as follows:

Colborne Street

Colborne Street runs east-west and is a designated future collector road. It connects to Beatty Line (future collector road) to the east and to Geddes Street (north-south arterial road) to the west.

Adjacent to the NWFSPA, Colborne Street is a two lane road (asphalt width of about 6.5 m), under the jurisdiction of the Township of Centre Wellington, with a rural (open ditch) cross section. The posted speed on Colborne Street is 50 km/h, with warning signs of 40 km/h in the area of two sharp horizontal curves, located adjacent to the northwest corner of the NWFSPA. Is it proposed that Colborne Street be realigned in this area to improve this horizontal alignment, in accordance with a previously approved Class EA.

Colborne Street is under stop control at its intersection with Beatty Line.

Beatty Line

Beatty Line runs north-south and is a designated future collector road. Beatty Line connects to St. Andrew Street (Wellington Road 18) to the south, an east-west arterial road under the jurisdiction of the County of Wellington, and to Sideroad 15 to the north, designated as a future east-west arterial road, under the jurisdiction of the Township of Centre Wellington.

Beatty Line is a two lane road, under the jurisdiction of the Township of Centre Wellington, with the following characteristics:

- A rural cross section (i.e., open ditches), with an asphalt width of about 7.0 metres, in areas that do not yet have abutting residential development.
- An urban cross section (i.e., curb and gutter), with an asphalt width of 10.0 metres, in areas that have adjacent residential development.
- A posted speed of 50 km/h.
- Stop controls at St. Andrew Street (Wellington Road 18) and at Sideroad 15.

2.2 Planned Road Network Enhancements

Beyond the designation of Colborne Street and Beatty Line as future collector roads, no additional collector roads have been identified in the Township's Official Plan as being required to service the lands that are presently included in the "urban centre" designation

in the study area. However, the approved Class EA for the NWFSPA includes the designation of a proposed collector road within this plan, connecting between Colborne Street and Beatty Line, designated as Farley Road on Figure A2 (Appendix A).

Based on the Township of Centre Wellington's Development Charges Background Study (August 2013) and the County of Wellington's Development Charges Background study (February 2017), a number of potential future road improvements have been identified in the area being considered in this TIS, as summarized in the following table:

Table 2 – Planned Road Improvements (Development Charge Projects) Affecting the Study Area

Road	Location of Work	Description of Work	Preliminary Program Year
Beatty Line	Sideroad 18 to just north of Collie Court	Reconstruction	2013 to 2017
Garafraxa Street	Maiden Lane to Beatty Line	Reconstruction from rural to urban standard	2013 to 2017
Sideroad 18	Beatty Line to Highway 6	Reconstruction east and west sections	2013 to 2017
Wellington Road 18	Fergus to Elora	Widening to a four-lane cross section	2026 to 2031
Sideroad 18	Beatty Line to Highway 6	Reconstruction central section	2018 to 2026
Beatty Line	South of Garafraxa Street to Millage Lane	Reconstruction	2018 to 2026
Colborne Street	Gerrie Road to Beatty Line	Reconstruction and realignment	2018 to 2026

As noted in the table, there are a number of improvements proposed to the local, collector and arterial roads, that affect the study area and that will facilitate traffic movements to and from the NWFSPA.

2.3 Linkages for Pedestrians, Cyclists and Transit

The development of the NWFSP lands will result in increased pedestrian and cyclist movements within the study area. The Centre Wellington Official Plan sets out an objective of encouraging cycling as an alternative mode of transportation, with dedicated bicycle lanes on arterial or collector roads with no parking.

The pedestrian and cyclist network within the NWFSP lands will connect with the road network to provide multiple routing opportunities for users. On local roads (18 metre or

20 metre right-of-way (ROW), a sidewalk is proposed along one side of the road, with bicycle travel safely accommodated on the road, due to the low traffic volumes and low traffic speeds. Bicycle route signage or sharrow markings can be considered on local roads where increased traffic volumes or bicycle demands may be anticipated. In the area of the proposed school, sidewalks are proposed on both sides of the road, to accommodate the higher pedestrian demands.

Colborne Street will accommodate a range of travel modes, including passenger vehicles, cyclists, pedestrians and future potential transit services, although there are no transit services presently available in the study area. The proposed cross section for Colborne Street will include provision for sidewalks on both sides of the road, as well as accommodating bicycle lanes on the roadway. The existing north-south section of Colborne Street, following realignment, may be developed as a wildlife/pedestrian connection between various environmental and pedestrian facilities in this area.

Farley Road is a proposed north-south collector road within the NWFSPA. The parking requirements along this street are expected to be greater than along Colborne Street, since Colborne is largely side-lotting, whereas Farley Road has direct driveway access.

The preliminary cross-sections to support the pedestrian and cyclist requirements are reviewed in a subsequent section to this report, and will be further developed as part of the detailed designs for the plans of subdivision.

A trail system will be provided along Nichol Drain No. 1 and will connect to key neighborhood elements such as the school, parks and the Elora Cataract Trailway, which runs just south of the NWFSP lands. This multi-use trail (Spine off-road route) is located immediately south of the NWFSP lands, and is part of the Trans Canada Trail route in Wellington County, connecting several villages along its 47 km long route. The *County of Wellington Active Transportation Plan, Final Report (MMM Group, September 2012)*, also identifies proposed signed bicycle routes on Millage Lane and on Sideroad 19 (east-west) and on Beatty Line (north-south).

The NWFSP will provide sidewalk connections to meet the existing, and proposed external sidewalks in the study area, including:

- Existing east-west sidewalks on Side Road 19 and Millage Lane and a proposed sidewalk on Side Road 18.
- Existing sidewalk on Beatty Line, which runs from Millage Lane to about 250 metres south of Side Road 18.
- Future sidewalks on Beatty Line, in conjunction with the urbanization of the cross section along this road.

- Future sidewalks on Colborne Street, in conjunction with the urbanization of the cross section along this road. For the section of Colborne Street, located to the west of the NWFSP lands, it is not expected that sidewalks will be provided until additional lands are brought into the urban boundary. In the interim the Elora Cataract Trailway provides for a pedestrian connection in this area.
- Future sidewalks and bike lanes proposed as part of the Wellington Plan Institutional Campus (WPIC), to the south of the NWFSP. The traffic study prepared for that development (*Groves Memorial Community Hospital, Traffic and Parking Study, CIMA Consultants, September 2012*) proposes that sidewalks be provided on all roadways within the WPIC, and that bicycle lanes be implemented along each of the major streets within the WPIC.

3.0 Proposed Developments and Phasing

Lotting concepts for the NWFSPA range from 535 to 568 low and medium density units in Phase 2 and from 552 to 601 low and medium density units in Phase 3, as shown in Figure A2 (Appendix A). In both Phases, the lower number of units of the two lot ranges (i.e., 535 lots and 552 lots in Phases 2 and 3, respectively) govern from a traffic generation perspective since they result in higher traffic volumes being generated due to there being more single-family homes than townhomes in the unit mix. Therefore, for the purposes of this study, the more conservative lot ranges have been used to calculate the trip generation.

The traffic analysis in this TIS is based on the following proposed land uses in the NWFSPA:

- Total 1305 residential units (931 low density units, 374 medium density units, and 40 high density units) in the following time horizons:
  - Phase 1 - 2016 to 2018 – 172 low density units, 46 medium density units
  - Phase 2 - 2018 to 2023 – 351 low density units, 184 medium density units
  - Phase 3 - 2023 to 2028 – 408 low density units, 144 medium density units, and 40 high density units (i.e., on Mixed Use Block).
- Neighborhood Commercial (on Mixed Use Block) – 32,300 sq. ft. (maximum Official Plan density) in the 2023 to 2028 time horizon (Phase 3).
- Elementary School – 400 students, 25 staff – in the 2015 to 2018 time horizon (Phase 1).

Traffic generation from external developments were also included in the background traffic forecast in this TIS, as summarized in the following table:

Table 3 – Other Developments Included In Background Traffic

Development	Location	Details	Assumed Time Horizon
Keating Subdivision	West of Sideroad 18	143 units (48 low density, 46 medium density, 49 high density)	2015 to 2018
Bonaire Highlands Subdivision	North of Sideroad 18	223 units (172 low density, 51 medium density)	2015 to 2018
Mod-Aire / Orsite Subdivision	East of Millage Lane	15 units (low density)	2015 to 2018
Keating	Millage Lane	6 units (low density)	2015 to 2018
Keating	Beatty Line	12 units (low density)	2015 to 2018

Hospital/ Institutional Campus	South of Colborne Street, west of Beatty Line	New Groves Hospital, 80,000 sq.ft. medical offices	2015 to 2018
County Institutional Campus	South of Colborne Street, west of Beatty Line	150 units supportive housing (44 medium density, 131 high density) Community College – 250 students Government Office – 150 employees	2018 to 2028
Richardson Farm	East of Beatty Line, south of Colborne	144 units (low density)	2023 to 2028

The forecasted growth in traffic in the study area is based on the development of the NWFSP lands as well as the other developments noted above, which may reasonably be expected to develop within the time frame being considered in this TIS. In addition, a growth factor of 1% per annum has been applied to the background traffic to account for growth from areas external to the study area. The application of this growth factor to the background traffic is expected to be sufficient to accommodate any traffic growth from external areas, recognizing that the roads under review are collector roads, primarily servicing traffic from the immediate local area.

In the longer term, it is expected that an additional north-south collector road may be considered to accommodate growth that is beyond the urban boundary presently, but such growth is beyond the time period presently under consideration.

4.0 Traffic Volumes

4.1 Existing (2015) Background Traffic Volumes

Existing (2015) traffic volumes, at the intersections in the study area, were based on a.m. and p.m. peak period turning movement counts. The dates of these counts, as well as adjustments applied to update them to current conditions, where required, are summarized in the following table:

Table 4 – Origin of Existing (2015) Turning Movement Traffic Counts

Intersection	Origin	Date	Count Adjustment
Beatty Line/ St. Andrew	Wellington County	Wednesday June 5, 2013	Increased by 1% per annum between 2013 and 2015
Beatty Line/ Garafraxa	Burnside	Wednesday May 27, 2015	
Beatty Line/ Colborne	Burnside	Wednesday May 27, 2015	
Beatty Line/ Millage	Burnside	Wednesday May 27, 2015	
Beatty Line/ Sideroad 18	Burnside	Thursday August 9, 2007	Balanced by count taken at Millage Lane in 2015.
Beatty Line/ Sideroad 15	Burnside	Thursday August 9, 2007	Balanced by count taken at Millage Lane in 2015.
Colborne/ Wellington Terrace Access	Hospital Consultant (CIMA)	Tuesday June 12, 2012	Balanced by count taken at Beatty Line in 2015.

4.2 Forecast Traffic Volumes

4.2.1 Development Trip Generation and Phasing

The time horizons chosen for analysis have been based on a review of historical development rates within the Municipality, as well as phasing forecasts for the adjacent major developments (e.g., County/Hospital Lands). Horizon periods of 2016 to 2018 (Phase 1), 2018 to 2023 (Phase 2) and 2023 to 2028 (Phase 3) have been considered for analysis.

For the horizon periods analyzed, the phasing of development has been based on a consideration of historical development rates. The historical uptake of units in Elora and Fergus has been in the order of 200 units per year. Therefore, the phasing assumed is considered to be sufficient to assess the traffic impacts and phasing for road improvements in the study area.

Trip generation/distribution for the Hospital/County project has been provided by the hospital consultant (CIMA), while the trip generation for the NWFSP and other area developments has been based on trip rates provided in the Trip Generation Manual, Ninth Edition (Institute of Transportation Engineers).

The resulting trip generation from the forecast development, within the immediate study area, is summarized in the following tables:

Table 5 – Forecast of Trip Generation from Development within the Immediate Study Area – Horizon Period – 2015 to 2018

Land Use	ITE Code	a.m. Peak Hour (vph)		p.m. Peak Hour (vph)	
		In	Out	In	Out
NWFSP Lands (Phase 1)					
Low Density (172 units)	210	33	98	108	64
Medium Density (46 units)	230	5	23	21	11
Elementary School (400 students)		38 external 45 internal	18 external 40 internal	10 external 10 internal	10 external 10 internal
County / Hospital Lands					
Groves Hospital		135	39	37	91
Medical Arts Offices (80,000 sq. ft.)	720	145	39	63	169
Other Developments					
Keating Subdivision					
Low Density (48 units)	210	11	33	35	21
Medium Density (46 units)	230	5	23	21	11
High Density (49 units)	220	6	22	29	16
Bonaire Subdivision					
Low Density (172 units)	210	33	97	108	63
Medium Density (51 units)	230	5	25	23	12
Mod-Aire / Orsite Subdivision					
Low Density (15 units vacant)	210	4	13	12	7
Keating (Millage Lane)					
Low Density (6 units)	210	2	5	4	3
Keating (Beatty Line)					
Low Density (12 units)	210	5	13	10	5

Land Use	ITE Code	a.m. Peak Hour (vph)		p.m. Peak Hour (vph)	
		In	Out	In	Out
Total – 2015 to 2018	**Primary**	**427**	**448**	**481**	**483**
	Internal	**45**	**40**	**10**	**10**

Table 6 – Forecast of Trip Generation from Development within the Immediate Study Area – Horizon Period 2018 to 2023

Land Use	ITE Code	a.m. Peak Hour (vph)		p.m. Peak Hour (vph)	
		In	Out	In	Out
NWFSP Lands (Phase 2)					
Low Density (351 units)	210	66	197	221	130
Medium Density (184 units)	230	14	70	66	33
County/Hospital Lands					
Medium Density (22 units supportive housing)	230	2	11	10	5
High Density (66 units supportive housing)	220	7	27	6	3
Government Offices (75 employees)	710	42	6	10	48
Community College (125 students)	540	52	11	57	32
Total 2018 to 2023	**Primary**	**183**	**322**	**370**	**251**

Table 7 - Forecast of Trip Generation from Development within the Immediate Study Area – Horizon Period 2023 to 2028 (Phase 3)

Land Use	ITE Code	a.m. Peak Hour (vph)		p.m. Peak Hour (vph)	
		In	Out	In	Out
NWFSP Lands					
Low Density (408 units)	210	77	230	257	151
Medium Density (104 units)	230	9	44	42	20
High Density (40 units)	220	5	18	26	14
Mixed Use (Commercial – 32,300 sq. ft.)	814	12 primary 7 passby	8 primary 4 passby	38 primary 20 passby	41 primary 21 passby
County Lands					

Land Use	ITE Code	a.m. Peak Hour (vph)		p.m. Peak Hour (vph)	
		In	Out	In	Out
Medium Density (22 units supportive housing)	230	2	11	10	5
High Density (66 units supportive housing)	220	7	27	6	3
Government Offices (75 employees)	710	42	6	10	48
Community College (125 students)	540	52	11	57	32
Richardson Farm					
Low Density (144 units)	210	28	82	92	54
Total 2023 to 2028	**Primary** **Passby**	**234** **7**	**437** **4**	**538** **20**	**368** **21**

As shown in the above tables, the two-way trip generation (primary traffic), from development in the study area, during the a.m. peak hour and p.m. peak hour is forecast to be as follows:

- Phase 1 - 2015 to 2018 time period - 875 vph during the a.m. peak hour and 964 vph during the p.m. peak hour.
- Phase 2 - 2018 to 2023 time period – 505 vph during the a.m. peak hour and 621 vph during the p.m. peak hour.
- Phase 3 – 2023 to 2028 time period – 671 vph during the a.m. peak hour and 906 vph during the p.m. peak hour.
- Total in 2015 to 2028 time period – 2,051 vph during the a.m. peak hour and 2,491 vph during the p.m. peak hour.

The forecast traffic generated from development has been distributed over the road network according to logical routing to adjacent arterial roads and based on the existing directional distribution of traffic in the study area, with consideration of employment areas and service areas or other trip destinations. The assumed distribution of traffic from the NWFSP lands is summarized as follows:

- 10% to/from the northwest along Beatty Line
- 10% to/from the northeast along Beatty Line
- 25% to/from the west along Colborne Street
- 55% to/from the south along Beatty Line.

The assignment of traffic from the NWFSP lands to the various access points onto Colborne Street and Beatty Line have been based on the phasing of the development and the location of the internal subdivision lots relative to these access points. In this respect, there is expected to be some redistribution of traffic from Phase 1 and 2 of the

NWFSPA, away from the east access and towards the south access, once Phase 3 develops.

The traffic forecasts/distribution have been based on the Draft Plan that was proposed at the time of the initial submission of this TIS (December 2016). The revised Draft Plan (Figure A2, Appendix A) is substantially the same configuration as the previous Draft Plan, with small reductions in the unit counts, with the two Draft Plans compared as follows:

- 2016 Draft Plan (Phases 2 and 3) – 1083 to 1178 units
- 2018 Draft Plan (Phases 2 and 3) – 1092 to 1190 units.

The differences in the unit counts between the previous Draft Plan and the current Draft Plan are not significant enough to impact the results of the traffic modelling/impact assessment in this TIS.

4.2.2 Growth in Background Traffic Originating in the Broader Study Area

Additional growth in traffic on area arterial roads, and to a lesser extent on collector roads, will result from growth in traffic originating in the broader study area. Most of this additional growth would be from development in other areas of Fergus, Elora, Salem or the broader County of Wellington. The Official Plan for the County of Wellington forecasts the following growth in households between 2007 and 2022:

- Average of about 1.3% per year in the County of Wellington as a whole
- Average of about 2.3% per year in Fergus
- Average of about 3.1% per year in Elora and Salem.

The above growth rates include the developments that have been specifically accounted for in the study area.

The locations of the additional developments in Fergus, Elora and Salem were reviewed, and it is concluded that the growth in the broader areas will primarily use other collector roads and arterial roads, thereby not contributing to increases in traffic on the collector roads under consideration in this TIS. Therefore, traffic growth from the broader area has been accounted for by assuming 1% per annum (compounded) growth applied to all existing traffic volumes, for the full period of the time horizons considered.

5.0 Lane Configuration and Traffic Controls

Considerations have been made for the implementation of left or right turn lanes at unsignalized intersections. Such auxiliary lanes are typically provided in areas where maintaining traffic mobility is a concern and/or where turning movements are high.

5.1 Left Turn Lane Warrants

The left turn warrants have been reviewed, using warrant charts developed by the Ministry of Transportation and assuming a 60 km/h design speed (50 km/h posted speed). The detailed warrant tables are included in Appendix B, with the results summarized in the following table:

Table 8 – Left Turn Lane Warrants (Unsignalized Intersections)

Intersection	Horizon Year/ Traffic (Select Scenarios)	AM Peak Hour Left Turn Lane Warrants*	PM Peak Hour Left Turn Lane Warrants*
Colborne/Beatty Line	2023 / Total	Not required	NB – 15 metres
	2028 / Total	NB – 15 metres	NB – 40 metres
Beatty/Garafraxa	2023 / Total	SB – 15 metres	SB – 15 metres
	2028 / Total	SB – 25 metres	SB – 25 metres
Beatty/Sideroad 15	2028 / Total	Not required	Not required
Beatty/Sideroad 18 / North access to NWFSP	2028 / Total	Not required	Not required
Beatty Line/ St. Andrew / Wellington Road 18	2015	Not required	EB – 15 metres
	2018 / Background	Not required	EB – 15 metres
	2018 / Total	Not required	EB – 15 metres
	2023 / Background	Not required	EB – 25 metres
	2023 / Total	EB – 15 metres	EB – 25 metres
	2028 / Background	EB – 15 metres	EB – 25 metres
	2028 / Total	EB – 15 metres	EB – 30 metres
Beatty Line/NWFSP East Access/Millage Lane	2018 / Total	Not required	NB – 15 metres
	2023 / Total	Not required	NB – 30 metres
	2028 / Total	Not required	NB – 25 metres
Colborne/NWFSP South Access	2028 / Total	Not required	EB – 15 metres
Colborne/County Access	2028 / Total	Not required	Not required

*NB=northbound, SB=southbound, EB=eastbound, WB=westbound.

As noted in the above table, there are a number of intersections that may benefit from the implementation of a left turn lane. However, while the implementation of a left turn lane will improve traffic mobility on the uncontrolled approaches, it will not improve the Level of Service (LOS) for the turning movements from the stop controlled approaches. Therefore, where it is anticipated that the LOS may result in signalization being preferred, the implementation of auxiliary lanes in the short term should take this into consideration.

For signalized intersections (existing or proposed), consideration is given to the relative turning volumes, in the assessment of whether a dedicated left turn lane may be beneficial, as well as the need to optimize the capacities at these intersections and/or address queuing constraints. The traffic modelling for future conditions has assumed that left turn lanes are implemented on all approaches to signalized intersections, to maximize the efficiency of the intersection. However, where left turn movements are low, or where opposing left turn movements are not required to maintain lane balance through intersections, some of these exclusive left turn lanes may be eliminated. As a minimum, it is recommended that left turn lanes be included in any future signalization at the intersections of Wellington Road 18/St. Andrew Street /Beatty Line (eastbound and southbound), Beatty Line/Colborne Street (northbound and eastbound), and Beatty Line / NWFSP East Access/Millage Lane (northbound). A southbound left turn lane should be considered for the unsignalized intersection at Beatty Line/Garafraxa Street, as well as a potential eastbound left turn lane at Colborne Street / NWFSP South Access (unsignalized).

5.2 Right Turn Lane Requirements

For unsignalized intersections, MTO guidelines (Geometric Design Standards for Ontario Highways) indicate that right turn lanes may be considered where right turn volumes exceed 60 vph and where the volume of the right turning vehicles creates a hazard or reduces capacity at the intersection. Where left turn egress movements, from stop controlled approaches, are very poor operationally (i.e., poor LOS and long delays), the separation of the right turns and left turns is also recommended.

For signalized intersections, the Highway Capacity Manual (HCM) indicates that an exclusive right turn lane may be considered if right turn movements exceed 300 vph and the adjacent mainline volume exceeds 300 vph.

A review of the forecast right turn movements at the intersections in the study area (year 2028 Total Traffic conditions) indicates that there are a number of locations where right turn volumes exceed 60 vph. However, where these locations will continue to operate under unsignalized conditions, they are forecast to have good traffic operations (i.e., acceptable Level of Service and acceptable capacities). Therefore, no exclusive right turn lanes are proposed at these intersections. At the locations where an upgrade to signalized controls are being proposed, the right turn volumes do not justify the inclusion

of an exclusive right turn lane, considering that these intersections are also forecast to have good traffic operations under such controls.

It was suggested in the peer review of the previous TIS reports that right turn lanes be considered at signalized intersections where operations are significantly improved, and particularly for the southbound movement at the Beatty Line/Colborne Street intersection. Under 2028 Total Traffic conditions it is forecasted that this intersection will operate with a LOS B and volume/capacity (v/c) ratio of 0.50. The southbound through/right turn movement is forecast to operate with a LOS A and v/c of less than 0.50. Therefore, it is concluded that a southbound right turn lane is not warranted at this intersection through horizon year 2028.

5.3 Traffic Signal Warrants

Traffic signal warrants have been reviewed for all unsignalized intersections in the study area.

The analysis of traffic signal warrants is based on the methodologies set out in Book 12 of the Ontario Traffic Manual (OTM). Traffic signals may be justified once traffic volumes meet warrant volumes, based on actual counts (i.e., 4 hour or 8 hour counts). For the intersection of Beatty Line/St. Andrew Street (Wellington Road 18), the signal warrants were based on the available 8 hour traffic count. For all other intersections in the study area, the warrants were based on the Average Hourly Volume (AHV) methodology (Projected Volumes, Justification 7, Book 12, Ontario Traffic Manual). The AHV methodology typically under-estimates the need for signals, to offset the uncertainty of forecasting 8-hour traffic volumes from future development.

Note that for “T” intersections, all warrant volumes within Justification 7 are to be increased by 50%, as per Book 12 (OTM, March 2012). The combination warrant (both Warrant 1 and Warrant 2 over 80%) does not apply under Justification 7. Also, the warrant thresholds are raised, for signals to be considered within Justification 7, to require a 20% increase over the required volumes for an existing intersection and a 50% increase for a future intersection or roadway.

The signal warrants have been based on free flow criteria, considering the small size of the Municipality and the use of the AHV methodology.

The preliminary signal warrant calculations are included in Appendix C and summarized in the following table:

Table 9 – Summary of Traffic Signal Warrant Requirements

Intersection	Year	Warrant 1 - Minimum Volume Warrant	Warrant 2 - Delay to Cross Traffic Warrant	Combination Warrant (both Warrant 1 and Warrant 2 over 80%)	Signals Warranted
Beatty Line / St. Andrew Street (Wellington Road 18)	2015	90%	86%	Yes	Yes
Beatty Line / Colborne Street	2023	51%	35%	n/a	No
	2028	86%	63%	n/a	No
Beatty Line / Garafraxa Street	2028	58%	62%	n/a	No
Colborne Street / NWFSP South Access	2028	53%	39%	n/a	No
Colborne Street / County Access	2028	11%	18%	n/a	No
Beatty Line / NWFSP East Access / Millage Lane	2018	68%	48%	No	No
	2023	109%	68%	No	No
	2028	104%	71%	No	No
Beatty Line / NWFSP North Access / Sideroad 18	2028	75%	46%	No	No
Beatty Line / Sideroad 15	2028	63%	34%	No	No

As shown in the summary table, it is forecast that traffic signals may be warranted at the following intersection:

- Beatty Line/St. Andrew Street (Wellington Road 18) – under existing conditions. The County's Development Charges background study identifies the widening of Wellington Road 18 to four lanes between Fergus and Elora in the 2026 to 2031 time period, and it is assumed that signalization of this intersection would be included, since warrants are met currently.

While the analysis does not show signals to be warranted at the intersections of Beatty Line/Colborne Street or Beatty Line/NWFSP East Access/Millage Lane through horizon year 2028, it is likely that signals may be considered for one, or both, of these locations in the long term, based on the following:

- Beatty Line/NWFSP East Access/Millage Lane – Warrant 1 is met 104% by 2028, which is less than the required 150% (i.e., Justification 7 criteria). Considering the conservative criteria applied (Justification 7), traffic operations may be poor at this intersection (i.e., significant delays for traffic exiting from the side streets), requiring left turn lanes on the side streets, or signalization to address such delays. The previous peer review comments have noted that signalization is desirable for intersections with left turn lanes on the side streets, to remove the potential for sight lines to be blocked by side-by-side queuing. It is recommended, as a minimum, that undergrounds be placed to accommodate future signalization, as part of any works at this intersection. In addition, it is recommended that traffic monitoring continue at this intersection to confirm whether signals should be installed, based on either signalization warrants being met or to address operational issues.
- Beatty Line/Colborne Street – Since this is a "T" intersection it is difficult to achieve the Justification 7 criteria to warrant signalization. However, the traffic volumes on Colborne Street at ultimate development do justify the implementation of two egress lanes (i.e., exclusive left turn lane and exclusive right turn lane) to maintain acceptable delays, with a high incidence of side-by-side queuing potential. Therefore, it is recommended that undergrounds for potential signalization be installed as part of any improvements at this intersection. It is recommended that traffic monitoring continue at this intersection to confirm the timing for improvements to this intersection to address the operational issues noted.

5.4 Considerations for Alternate Traffic Controls at Intersections

Based on the analysis provided in the preceding sections, a number of intersections have been identified, which may benefit from improved traffic controls (i.e., signals or roundabouts), including the following:

- Beatty Line/St. Andrew Street (Wellington Road 18)
- Beatty Line/Colborne Street
- Beatty Line/NWFSP East Access / Millage Lane.

At the traffic volumes forecast, all of these intersections can operate at acceptable Levels of Service (LOS) (i.e., delays) and capacities (i.e., v/c ratios), through horizon year 2028, under either signal control or under roundabout control.

The implementation of roundabouts may be considered at intersections to address the following:

- Poor Level of Service (LOS) and long delays for overall intersection or for specific turning movements
- In lieu of signalization
- In lieu of exclusive turning lanes
- To reduce traffic speeds.

Typically, roundabout controls will require additional lands at intersections for their implementation. In addition, roundabouts will cost significantly more initially than either stop controls, with turning lanes, or signalization controls. However, as a result of the higher maintenance costs associated with traffic signals, some studies show that roundabouts may cost less than traffic signals in the long-term[1].

The provision of roundabout control may serve to moderate traffic speeds in this area, which would assist in mitigating the impacts of collector traffic through the residential neighborhood, and generally encourage other modes of travel along the corridor (i.e., pedestrians and cyclists).

Ultimately the decision on whether to implement roundabout control, versus stop-control (with turning lanes) or signalization control will be determined at the time of detailed designs, taking into account the site specific opportunities and constraints, including:

- Traffic volumes
- Pedestrian volumes
- Proximity to schools and parks
- Land availability
- Proximity of driveways and adjacent access points
- Compatibility with adjacent two-way left turn lanes
- Construction costs
- Maintenance costs.

However, considering the preliminary site-specific constraints and opportunities identified at the subject intersections, it is recommended that traffic signals be considered the preferred traffic control improvement, in lieu of roundabouts, assuming signal warrants are met.

[1] Washington State Department of Transportation. https://www.wsdot.wa.gov/Safety/roundabouts/benefits.htm

6.0 Traffic Operations

6.1 Operations Under Existing (2015) Traffic Conditions

The existing (2015) turning movement volumes (a.m. and p.m. peak hours) at the intersections studied are shown in Figure A4 (Appendix A). A Level of Service (LOS) analysis was completed for the subject intersections, using Synchro 9 computer software, and the results are summarized in Table D1 (Appendix D). The detailed Synchro output is included in Appendix E for the existing (2015) conditions.

Based on the analysis, it is concluded that there are no critical intersections/movements currently in the study area, assuming existing traffic volumes, existing lane configuration and existing traffic controls.

6.2 Operations Under Future Background Traffic Conditions – Horizon Years 2018, 2023 and 2028

The background traffic volumes, at the intersections in the study area, have been forecast based on the following:

- Existing traffic forecasts, based on traffic counts, adjusted where required to reflect 2015 conditions; plus
- Increased background traffic from the broader area, assuming 1% per annum growth between 2015 and 2028; plus
- Trip generation forecasts for external developments in the study area (excluding the NWFSP).

The forecast background traffic turning movement volumes (a.m. and p.m. peak hours), at the intersections studied, are shown in Figures A5, A6 and A7 (Appendix A) for horizon years 2018, 2023 and 2028, respectively.

A LOS analysis was completed for the subject intersections, using Synchro 9 computer software, and the results are summarized in Table D2 (Appendix D). The detailed Synchro output is included in Appendix F for the Background Traffic scenarios.

Based on the above analysis, assuming existing lane configurations and existing traffic controls, no critical intersections/movements have been identified for the time periods considered under the background traffic scenarios.

6.3 Operations Under Future Total Traffic Conditions – Horizon Years 2018, 2023 and 2028

The total traffic volumes, at the intersections in the study area, have been forecast based on the following:

- Background traffic forecasts, as described previously; plus
- Trip generation forecasts for the phased development of the NWFSPA.

The forecast total traffic turning movement volumes (a.m. and p.m. peak hours), at the intersections studied, are shown in Figures A8, A9 and A10 (Appendix A) for horizon years 2018, 2023 and 2028, respectively.

A LOS analysis was completed for the subject intersections, using Synchro 9 computer software, and the results are summarized in Table D3 (Appendix D). The detailed Synchro output is included in Appendix G for the Total Traffic scenarios.

Based on the above analysis, assuming existing lane configurations and existing traffic controls, the following critical intersections/movements have been identified:

Beatty Line/St. Andrew Street (Wellington Road 18)

- Under unsignalized, 2018 Total Traffic conditions, the southbound left/through/right movements at this intersection are forecast to have a LOS F, delay of 54.8 seconds and v/c ratio of 0.86.
- As shown in a previous section to this TIS, an eastbound left turn lane is warranted (unsignalized condition) and signals are warranted (combination warrant) under 2015 Total Traffic Conditions. Therefore, the modeling of the 2023 and 2028 scenarios have assumed that this intersection is signalized, including the addition of left turn lanes on the approaches. Under signalized conditions, this intersection is forecast to operate with no critical movements to beyond horizon year 2028.

Beatty Line/NWFSP East Access/Millage Lane

- Under unsignalized, 2023 Total Traffic conditions, the westbound left/through/right movements at this intersection are forecast to have a LOS F, delay of 236.8 seconds and v/c ratio of 1.28.
- Once Phase 3 of the NWFSPA is developed (2023 to 2028), the traffic distribution is expected to adjust to reflect the additional access point to these lands. Therefore, under the 2028 Total Traffic (unsignalized) scenario, the westbound left/through/right movements at this intersection are forecast to have a LOS F, delay of 162.5 seconds and v/c ratio of 1.13.
- As shown in a previous section to this TIS, a northbound left turn lane is warranted (unsignalized condition) by 2018 at this intersection. In addition, the undergrounds for signals are warranted (AHV warrant) under 2023 Total Traffic Conditions, and remain warranted after the addition of the third access point to the NWFSPA (2023 to

2028). Therefore, the modeling of the 2023 and 2028 scenarios have assumed that this intersection is signalized, including the addition of left turn lanes on the approaches. Under signalized conditions, this intersection is forecast to operate with no critical movements to beyond horizon year 2028.

Beatty Line/Colborne Street

- As shown in a previous section to this TIS, it is forecast that a northbound left turn lane will be warranted at this intersection (unsignalized condition) by 2023. However, traffic signal warrants (AHV warrant) are not met by 2028 at this intersection. Therefore, the modeling for the 2023 and 2028 scenarios have assumed unsignalized conditions, with the addition of an exclusive northbound left turn lane under the 2028 scenario. Under the 2023 scenario (i.e., Phase 1 and 2 of the NWFSP developed), the eastbound right/left turn lane is forecast to operate with a LOS E and v/c ratio of 0.78, which is acceptable for urban conditions. Under the 2028 scenario (i.e., ultimate development), the eastbound right/left turn lane is forecast to operate with a LOS F, delay of 248.5 seconds and v/c ratio of 1.42 in horizon year 2028. Given the poor operations for this movement, it is expected that traffic signals may be implemented (including left turn lanes) in this time period at this location. Under signalized conditions, this intersection is forecast to operate with no critical movements to beyond horizon year 2028.

Beatty Line/Garafraxa Street

- As shown in a previous section to this TIS, it is forecast that a southbound left turn lane will be warranted at this intersection (unsignalized condition) by 2023. No turning movements are forecast to be critical in this time period and therefore the implementation of the left turn lane is to maintain traffic mobility on Beatty Line.

Colborne Street / NWFSP South Access

- As shown in a previous section to this TIS, it is forecast that an eastbound left turn lane will be warranted at this intersection (unsignalized condition) by 2028. No turning movements are forecast to be critical in this time period and therefore the implementation of the left turn lane is to maintain traffic mobility on Colborne Street.

It is recommended that traffic monitoring work continue at these intersections, as development occurs, to confirm the basis for future detailed designs. The ultimate decision on the preferred designs for these improvements, and their timing, will rest with the road authorities having jurisdiction of these intersections (i.e., County and Township).

6.4 Queuing Analysis at Intersections

The Synchro analysis (Appendices E, F and G) show the 95th percentile queues for the turning movements at the intersections that have been modelled. The turning movements that are forecast to have queues exceeding one car are summarized in the following table, for the various scenarios modelled:

Table 10 – Summary of Queuing At Intersections

Intersection	Time Period / Traffic	Traffic Controls	Movement*	95th Percentile Queue	
				AM Peak Hour (m)	PM Peak Hour (m)
Beatty Line / St. Andrew Street (Wellington Road 18)	2028 Total	Signals	EB L	17.8	53.2
			SB L	63.0	77.1
Beatty Line / Garafraxa Street	2028 Total	Stop	WB L/R	24.7	46.1
Beatty Line / Colborne Street	2023 Total	Stop	EB L/R	11.0	47.5
Beatty Line / Colborne Street	2028 Total	Stop	EB L/R	58.3	150.0
		Signal	EB L	20.8	28.8
			EB R	14.7	12.3
			NB L	12.8	28.7
Beatty Line / NWFSP East Access / Millage Lane	2023 Total	Stop	EB L/T/R	25.6	21.0
			WB L/T/R	19.5	79.6
	2028 Total	Stop	EB L/T/R	14.4	12.0
			WB L/T/R	15.5	77.8
	2023 Total	Signals	WB L	10.2	13.5
			NB L	11.4	30.2
	2028 Total	Signals	WB L	12.3	18.5
			NB L	6.6	19.0
Beatty Line / NWFSP North Access / Sideroad 18	2028 Total	Stop	EB L/T/R	13.5	12.2
			WB L/T/R	5.8	12.9
Beatty Line / Sideroad 15	2028 Total	Stop	NB L/T/R	11.8	18.6
Colborne Street / NWFSP South Access	2028 Total	Stop	SB L/R	15.0	15.4

*NB=northbound, SB=southbound, EB=eastbound, WB=westbound. L/T/R = Left/Through/Right

Based on the above results, no queuing conflicts have been identified at the intersections in the study area.

7.0 Road Network and Cross-Section Considerations

7.1 Road Network Capacities

The Annual Average Daily Traffic (AADT) volumes for the arterial and collector roads in the study area are estimated based on the peak traffic forecast at the intersections. The forecast peak hour traffic volume in the peak direction (design hour volume) and the estimated AADT are summarized in the following table:

Table 11 – Forecast Annual Average Daily Traffic and Design Hour Traffic Volume

Road	Functional Classification	Location	Design Hour Traffic Volume - 2028 (vph/lane in peak direction)	AADT 2028 (vpd)
Wellington Road 18 (St. Andrew Street	Arterial	West of Beatty Line	442	6,200
		East of Beatty Line	654	9,000
Beatty Line	Collector	North of St. Andrew Street (Wellington Road 18)	564	7,300
		North of Garafraxa Street	627	7,300
		North of Colborne Street	574	7,100
Colborne Street	Collector	West of Beatty Line	346	4,800
Street G – NWFSP	Collector	North of Colborne Street	277	3,100
		North of Street A	170	2,100

Urban arterial road capacities are typically 900 vph/lane, while collector road capacities are in the range of 600 vph/lane (minor collector) to 800 vph/lane (major collector). From a corridor viewpoint, the traffic volumes on the arterial and collector roads are forecast to operate within typical capacities for two lane facilities (i.e., one travel lane in each direction). Congestion is likely to occur on sections that have volumes that exceed 90% of their typical road capacity. On this basis all of the road corridors within the study area are forecast to continue to operate acceptably to beyond horizon year 2028.

7.2 Intersection Spacing on Colborne Street

The peer reviews for the previous TIS reports had noted potential concerns regarding the spacing of the 9 additional side street intersections proposed on Colborne Street as part of Phase 3 of the NWFSP. Since Colborne Street is classified as a collector road, the proposed spacing of the side street intersections has been compared against criteria in the *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, June 2017). The *Geometric Design Guide for Canadian Roads* specifies that the typical minimum spacing between adjacent intersections along a collector road is 60 metres. Upon review of the Draft Plan (Figure A2, Appendix A), the spacing between the proposed 9 intersections on Colborne Street range from approximately 84 to 316 metres (centre-to-centre). Therefore, since the spacing between each of the adjacent proposed intersections on Colborne Street is at least 84 metres, the spacing requirement of 60 metres between intersections is met, and the proposed intersections on Colborne Street are spaced adequately.

The peer reviews for the previous TIS reports also requested further consideration of the proposed Street N access location on Colborne Street in relation to Beatty Line. The proposed Street N access on Colborne Street is located approximately 180 metres west of Beatty Line (centre-to-centre), which is a sufficient amount of space to accommodate an eastbound left turn lane at the Beatty Line / Colborne Street intersection. The proposed mixed use development at the northwest quadrant of the Beatty Line / Colborne Street intersection will likely contain an access on Colborne Street that will be spaced at a location that will not interfere with eastbound left turning traffic at Beatty Line.

7.3 Sight Distances at Street N/Colborne Street Intersection

It has been requested that sight distance requirements at the proposed Street N/ Colborne Street intersection be reviewed to ensure that they are met. As noted previously, the Street N/Colborne Street intersection is located approximately 180 metres west of Beatty Line.

Colborne Street has a posted speed of 50 km/h in the study area; a conservative design speed of 60 km/h (urban conditions) will be used to assess sight distances at the Colborne Street /Street N intersection.

The minimum stopping sight distance required along the area of Colborne Street studied is 85 metres, based on the *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, June 2017). There is a slight vertical curve west of the proposed Street N access on Colborne Street; however, it is not steep enough to significantly restrict the view to/from the location of the proposed Street N access. It has been determined that the stopping sight distance requirement of 85 metres has been met under existing conditions at the proposed Colborne Street/Street N intersection.

Based on TAC criteria, a safe turning sight distance of approximately 130 metres is required. This requirement has also been met at the Colborne Street /Street N intersection.

7.4 Street G and Wellington Place Access

The offset between the proposed Farley Road and the Wellington Place Access on Colborne Street is approximately 81.4 metres (centerline-to-centerline). Colborne Street is a collector road, thus a spacing of 81.4 metres exceeds the required 60 metres (as per the *Geometric Design Guide for Canadian Roads, TAC, June 2017*).

The peer review comments for the previous TIS reports requested confirmation on how the proposed eastbound left-turn lane at Farley Road would fit within the space available between this access and the Wellington Place Access. It was identified that the taper lengths previously recommended did not meet the taper lengths in the *Geometric Design Standards for Ontario Highways* (Ministry of Transportation Ontario, 1994); however, it should be noted that Colborne Street will operate as an urban collector road after build-out, rather than a rural collector road. Thus, since the taper lengths specified in the *Geometric Design Standards* focus on Ontario highways in rural environments, it is believed that this criteria should not be applied for the proposed eastbound left-turn lane at Farley Road.

The spacing between the westerly edge of Farley Road and the easterly edge of the Wellington Place Access is approximately 55 metres. Since an eastbound left-turn lane is warranted by horizon year 2028 at Farley Road (see Table 8 in Section 5.1), it is recommended that an eastbound left-turn lane be provided with a 15-metre storage length and a 40 metre taper length (beginning adjacent to the easterly edge of the Wellington Place Access). This left-turn lane configuration would fit between the two intersections and provide an overall deceleration length of 55 metres, which meets the requirements of a 70 km/h design speed (*Geometric Design Guide for Canadian Roads, June 2017, TAC)*.

7.5 Road Cross-Sections

Colborne Street

Colborne Street is proposed as a collector road, serving as a connection for a grid of intersecting local roads, while also providing a connection between the communities of Fergus and Elora (i.e., the primary connection between the two communities is Wellington County Road 18). Therefore, the Draft Plan has provided for side lots only abutting this road (i.e., no direct driveway access). This concept allows Colborne Street to meet its collector road function, considering the forecast traffic volumes (AADT 4,800 vpd), providing both traffic mobility and access to the side streets in this area.

The cross-section proposed for Colborne Street is shown on Figure A12 (Appendix A) and includes the following:

- Urban cross section with 9.5 m asphalt within a 22 m ROW.
- Two travel lanes (one lane in each direction) plus a bike lane on each side of the travel lanes.
- Sidewalks on both sides of the roadway.

The closely spaced intersections and side lotting arrangement will eliminate the need for parking along Colborne Street, thereby maximizing traffic mobility. The provision of bike lanes along this road will reduce the overall travel lane widths, thereby calming traffic speeds, while providing an alternate mode of travel along the corridor, with delineated separation of bikes and cars for added safety. It should be noted that the *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, December 2009) states that the function of collector roads with respect to their traffic and land service functions is to consider both traffic movements and land access of equal importance. Thus, it is concluded that the proposed intersection spacing on Colborne Street is consistent with this objective.

Farley Road

Farley Road is proposed as a north-south collector road, connecting between Colborne Street, in the south, to Beatty Line, in the north. Farley Road is proposed to have direct driveway access along much of its length, and therefore its function to accommodate safe access to abutting properties is important, as is the provision of on-street parking. Considering the forecasted traffic volumes along the corridor (AADT 1,800 to 2,500 vpd), and the provision of on-street parking, bicycle travel is proposed in shared lanes, rather than via dedicated bicycle lanes.

The cross section proposed for Farley Road is shown on Figure A13 (Appendix A) and includes the following:

- Urban cross section with 9.5 m asphalt within a 22 m ROW.
- Two travel lanes (one lane in each direction), parking allowed on one side of the road.
- Provision of “share the road” signage and/or bicycle route signage, to facilitate bicycle travel, where required.
- Sidewalks on both sides of the roadway.

The allowance of parking along this roadway will generally calming traffic speeds, while the road widths will maintain traffic mobility.

Beatty Line

Beatty Line is proposed as a collector road, serving as a connection to relatively widely spaced grid of local and collector road intersections. This road also has a small amount of direct driveway access, existing and proposed, to the north of Millage Lane.

To the south of Garafraxa Street, Beatty Line also serves as a connection to a number of commercial and industrial properties. Considering the forecasted traffic volumes for this street (i.e., AADT 7,000 vpd), providing traffic mobility is expected to be increasingly important along this corridor, which may be addressed by the introduction of turning lanes at intersections.

The cross section proposed for Beatty Line is shown on Figure A14 (Appendix A) and includes the following:

- Urban section with 9.5 m asphalt within the existing ROW (assumed to range from about 20 m to 26 m).
- Two travel lanes (one lane each direction) plus a bike lane on each side of the travel lanes. However, given the ROW constraints, it is assumed that bike lanes may need to be replaced by sharrow markings through the intersection areas where left turn lanes are also developed, due to space constraints.
- Sidewalks on both sides of the road.

The existing and proposed land uses abutting Beatty Line have deep lots, thereby reducing the need for parking along this road and maximizing traffic mobility. Given the mobility requirements along Beatty Line it is recommended that parking be prohibited along this corridor. The provision of bike lanes along this road will reduce the overall travel lane widths, thereby calming traffic speeds, while providing an alternate mode of travel along the corridor, with delineated separation of bikes and cars for added safety. Exclusive turning lanes are proposed at Wellington Road 18 (St. Andrew Street), Garafraxa Street, Colborne Street, and NWFSP East Access/Millage Lane, further maximizing the traffic mobility along this corridor.

The spacing of the intersections along Beatty Line can accommodate the implementation of turning lanes and upgraded traffic controls along this corridor. Figure A15 (Appendix A) confirms the spatial requirements associated with the proposed improvements on Beatty Line, based on criteria specified in the *Geometric Design Guide for Canadian Roads* (TAC, June 2017).

Local Roads

The remaining roads in the NWFSP are proposed to be local roads, following the Township's R5 Local Road Standard (see Figure 16, Appendix A), which includes the following:

- Urban section with 8.0 m asphalt within an 18.0 m ROW.
- Two travel lanes (one lane each direction) plus provision for parking along one side (unmarked).
- Provision of “share the road” signage and/or bicycle route signage, to facilitate bicycle travel, where required.
- Sidewalks on one side of the road.

The peer review comments for the previous TIS reports requested confirmation of the sufficiency of the asphalt widths to accommodate bike lanes on Street A.

While Street A is part of the Phase 1 works and not part of this current TIS, the following additional considerations have been noted:

- Street A is proposed as a local road with a 20 metre ROW, with an asphalt width of 8.5 metres and sidewalks on both sides.

- Parking is proposed on one side of the street to accommodate drop-offs for the school operations.

- The width of the asphalt is considered to be sufficient to accommodate two-way traffic, parking on one side of the road and shared use of the roadway for cyclists via sharrow markings.

7.6 Response to Review Comments

This TIS was originally issued in December 2016, but has now been revised to respond to the comments provided by the Township’s Review Consultant (Triton Engineering, memorandum dated August 22, 2017) and to subsequent changes in the Draft Plan. The direct responses to the review comments received are provided in our Technical Memorandum (February 2018), which has been included as Appendix H to this updated TIS.

8.0 Recommendations and Concluding Remarks

8.1 Recommended Road Improvements

This TIS has identified potential road and traffic control improvements to accommodate the forecast increase in traffic from development within the study area, including from a phased development of the NWFSPA.

Based on the analysis completed, the recommended improvements to the roads and traffic controls within the study area are summarized in the following table:

Table 12 – Recommended Road Improvements

Location	Horizon Period	Planning Status	Proposed Improvement
Intersection of Beatty Line/ St. Andrew Street (Wellington Road 18)	2018 to 2023	Existing Development Charge Project	Traffic signals, including exclusive left turn lanes, where required. It is noted that the County's Development Charges Study identifies Wellington Road 18 to be widened to four lanes, between Gerrie Road and St. David Street, in 2017.
Intersection of Beatty Line/ Colborne Street	2023 to 2028	Future Development Charge Project	Eastbound left turn lane and northbound left turn lane at unsignalized intersection. In addition, signalization may be considered if warrants are met (monitor to confirm), or to respond to poor traffic operations. It is noted that the Township's Development Charges Study identifies Beatty Line to be reconstructed in the 2018 to 2026 time period.
Intersection of Beatty Line/ Garafraxa Street	2023 to 2028	Future Development Charge Project	Southbound left turn lane at unsignalized intersection. It is noted that the Township's Development Charges Study identifies Beatty Line to be reconstructed in the 2018 to 2026 time period.
Intersection of Beatty Line/ NWFSP East Access/ Millage Lane	2018 to 2023	Development Access	Northbound left turn lane at unsignalized intersection. In addition, signalization may be considered if warrants are met (monitor to confirm), or to respond to poor traffic operations.

Location	Horizon Period	Planning Status	Proposed Improvement
			Signalization would include exclusive left turn lanes, where required.
Intersection of Colborne Street / NWFSP South Access	2023 to 2028	Development Access	Eastbound left turn lane at unsignalized intersection.

Assuming the implementation of the above noted improvements, including traffic signals where required, the Level of Service (LOS) for all intersections will be good through horizon year 2028.

8.2 Concluding Remarks

This study has considered the traffic impact of the proposed developments in the study area, including the development of the Phase 2 and 3 Draft Plans of the NWFSP lands. Forecasts have been made of future traffic volumes in horizon years 2018, 2023 and 2028 and their impact on the arterial and collector roads in the study area. In particular, the operations of the intersections along Beatty Line and along Colborne Street have been assessed. Based on the analysis, various road improvements have been identified to respond to development within the horizon periods considered.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Figures

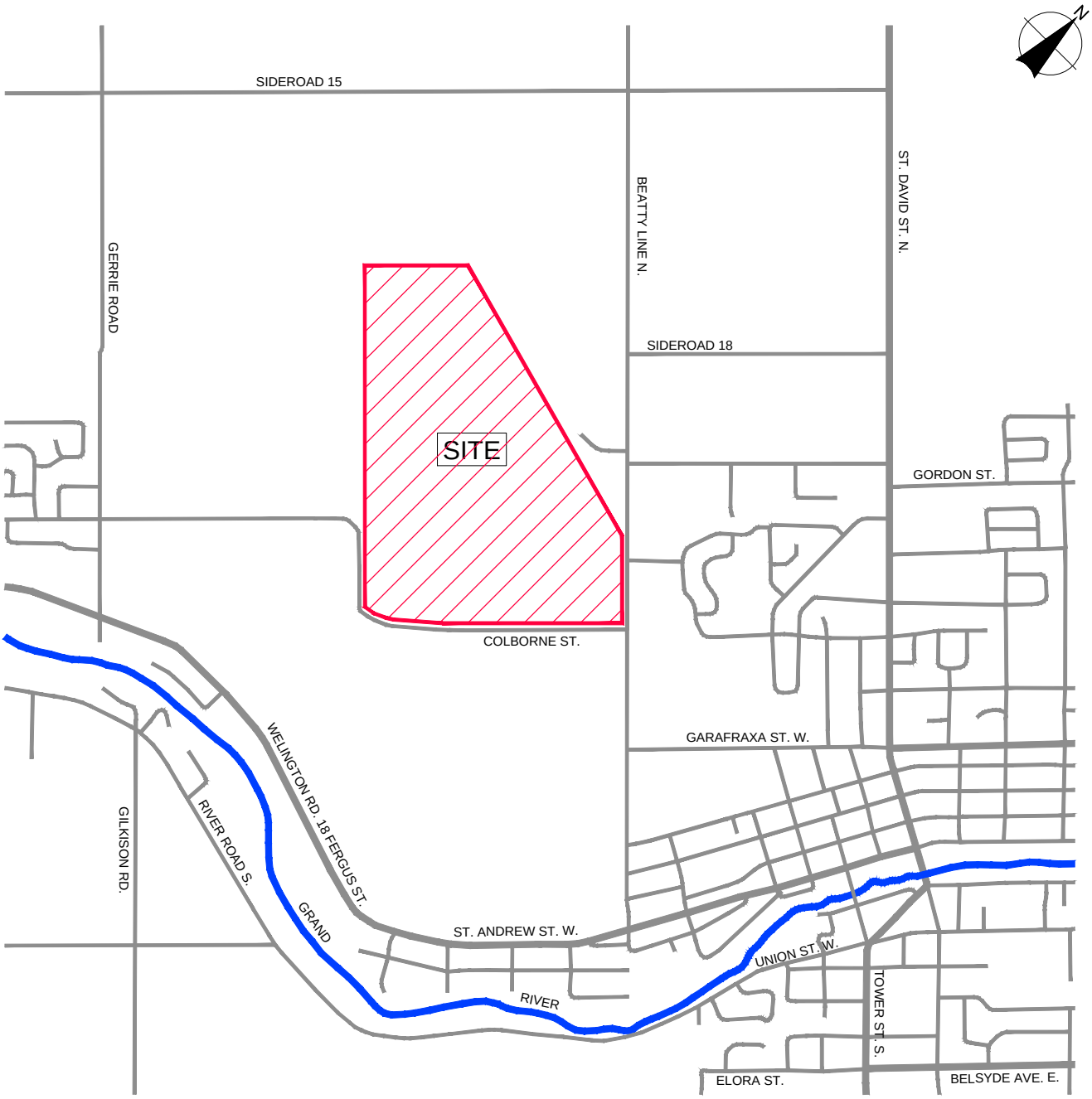

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Figure Title

DRAFT PLAN - NWFSP

SITE LOCATION PLAN

Client

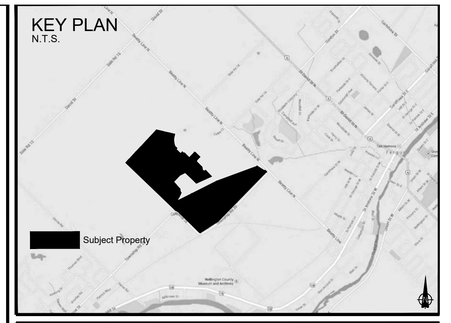
NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRURARY 2018	**A1**
Scale		Project No.	
NTS		300031145	

File: C:\Users\craposo\Documents\031145_DP_TIS_Figures.dwg Date Plotted: February 16, 2018 - 8:59 AM

FIGURE A2

KEY PLAN
N.T.S.



DRAFT PLAN OF SUBDIVISION

Part of Lots 18, 19 and 20
Concession 14
(Geographic Township of Nichol)
Township of Centre Wellington
County of Wellington

AREA SCHEDULE

DESCRIPTION	LOTS/BLKS.	UNITS	AREA (ha.)
Single Detached Residential & Street Towns	1-53	850-948	34.20
Medium Density Residential	54-58	202	7.51
Mixed Use	59	40	1.53
Existing Farmhouse	60		0.33
Park	61-65		2.43
Open Space	66		7.27
Stormwater Management	67,68		1.88
Servicing Blocks	69,70		0.04
0.3m Reserve	71-73		0.00
Roads			15.45
Total		1092-1190	70.64

ADDITIONAL INFORMATION
(UNDER SECTION 51(17) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g,j and I ARE AS SHOWN ON THE DRAFT PLAN.
h) Municipal water supply
i) Predominately sandy silt to clayey silt glacial till deposits, with sand and gravel deposits in certain locations.
k) All sanitary and storm sewers as required.

OWNER'S CERTIFICATE
I AUTHORIZE THE GSP GROUP INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE COUNTY OF WELLINGTON.

OWNER — DATE: December 16, 2016

SURVEYOR'S CERTIFICATE
I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR

GRANT STIDWILL, O.L.S.
J.D.Barnes Ltd.
DATE: Dec 13, 2016

GSP group
PLANNING | URBAN DESIGN
LANDSCAPE ARCHITECTURE
gspgroup ca

REVISIONS

Date: February 20, 2018	Drawn By: S.L.	Dwg. File Name: dp14175v - P2 & 3.dwg
Scale: 1:2,500 metric	Project No.: 14175.40	

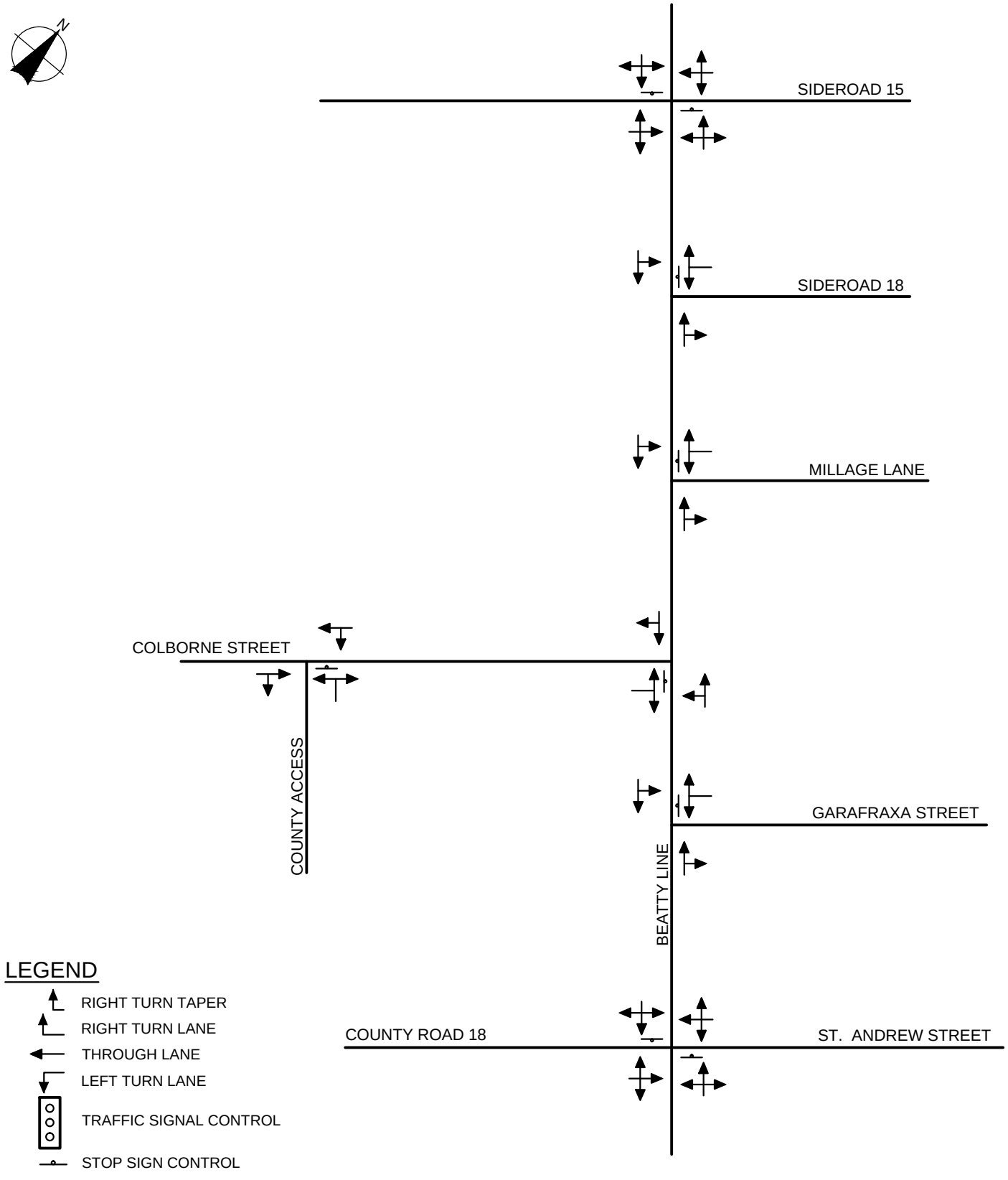


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Figure Title

DRAFT PLAN - NWFSP

EXISTING LANE CONFIGURATION AND TRAFFIC CONTROLS

Client

NIGUS FERGUS JOINT VENTURE

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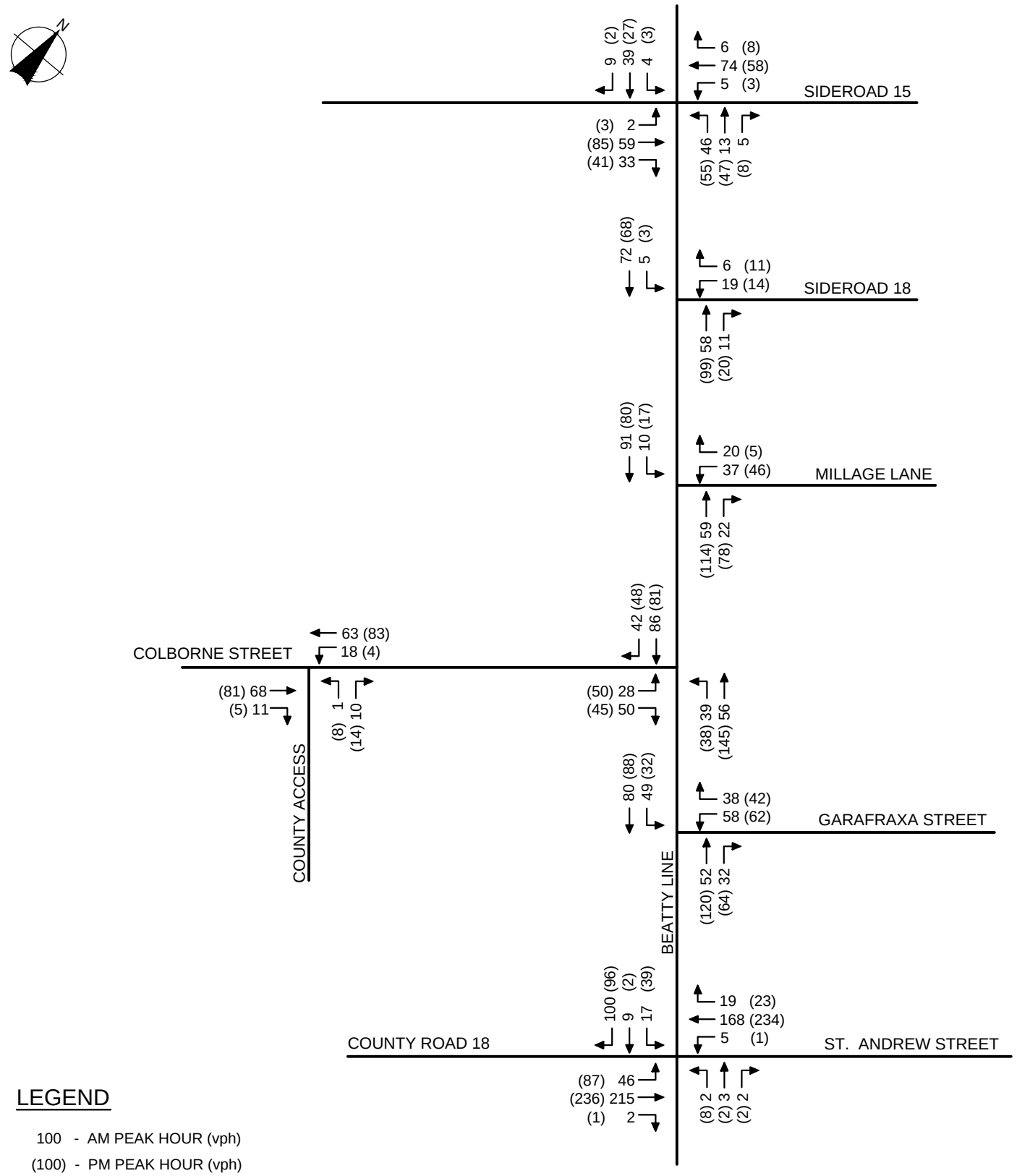

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Figure Title

DRAFT PLAN - NWFSP

2015 BACKGROUND TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

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JBL	HC	FEBRUARY 2018	**A4**
Scale		Project No.	
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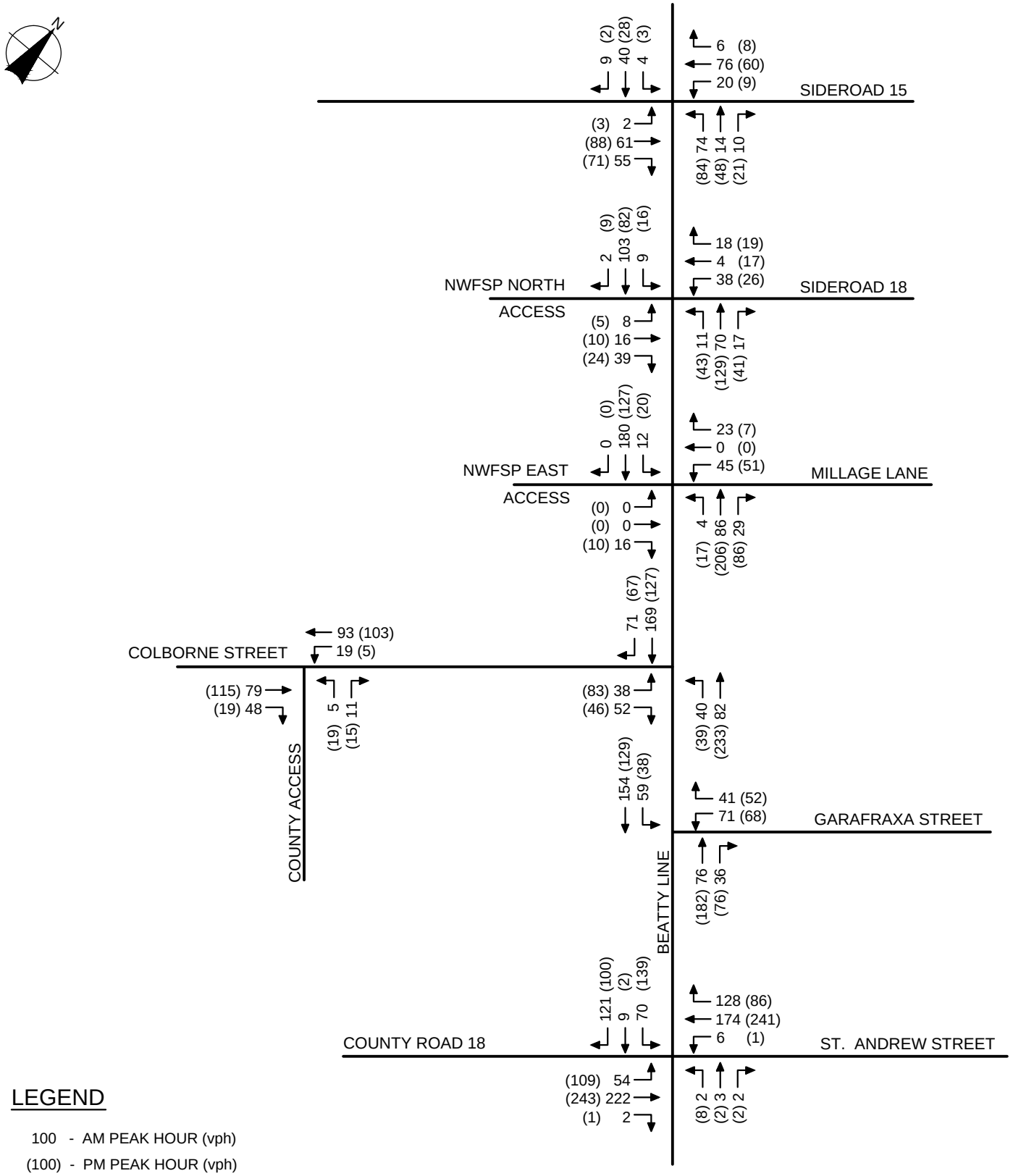

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Figure Title

DRAFT PLAN - NWFSP

2018 BACKGROUND TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
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Scale		Project No.	
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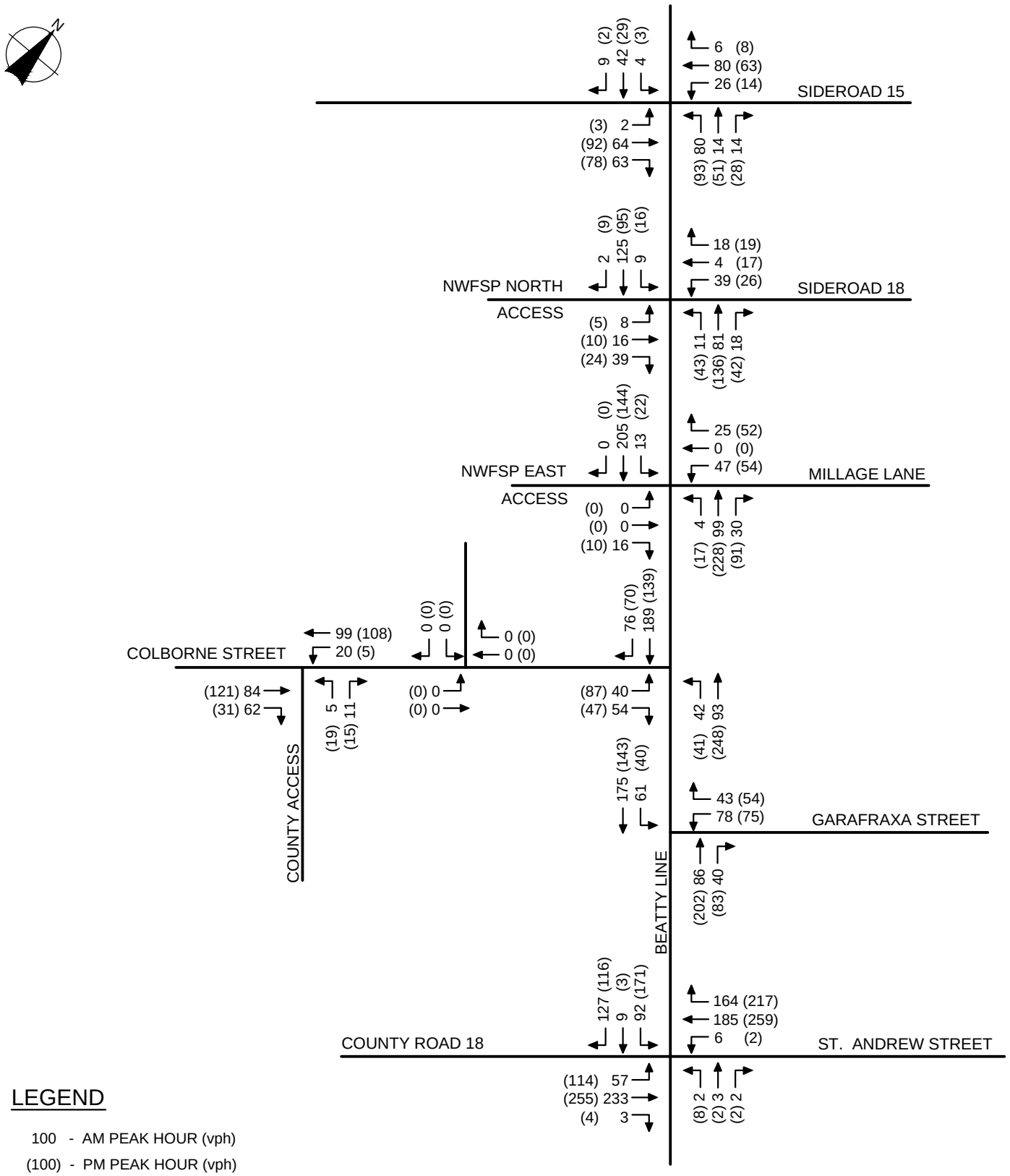

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Figure Title

DRAFT PLAN - NWFSP

2023 BACKGROUND TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A6**
Scale		Project No.	
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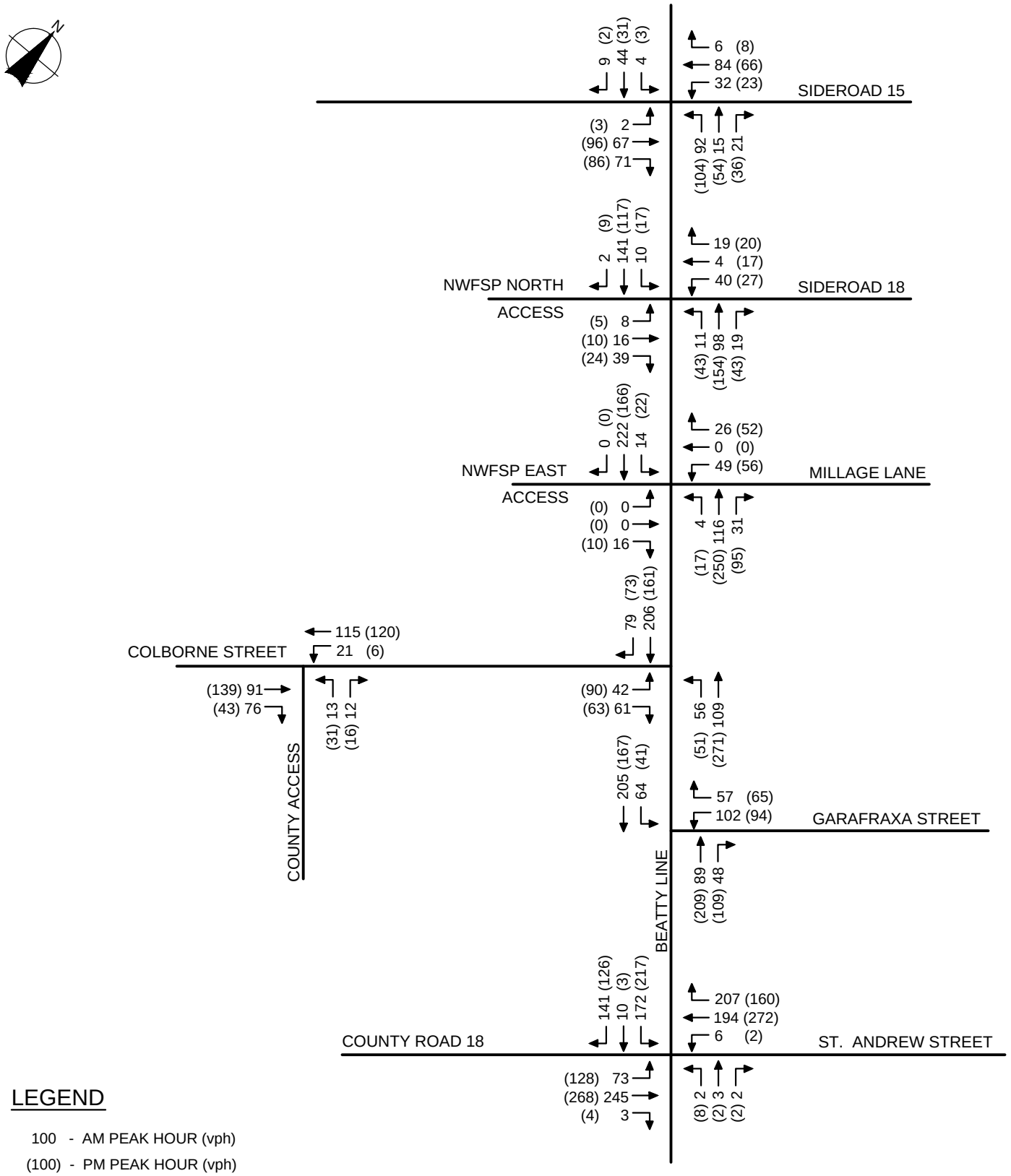

LEGEND

100 - AM PEAK HOUR (vph)

(100) - PM PEAK HOUR (vph)

BURNSIDE

Figure Title

DRAFT PLAN - NWFSP

2028 BACKGROUND TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A7**
Scale		Project No.	
NTS		300031145	

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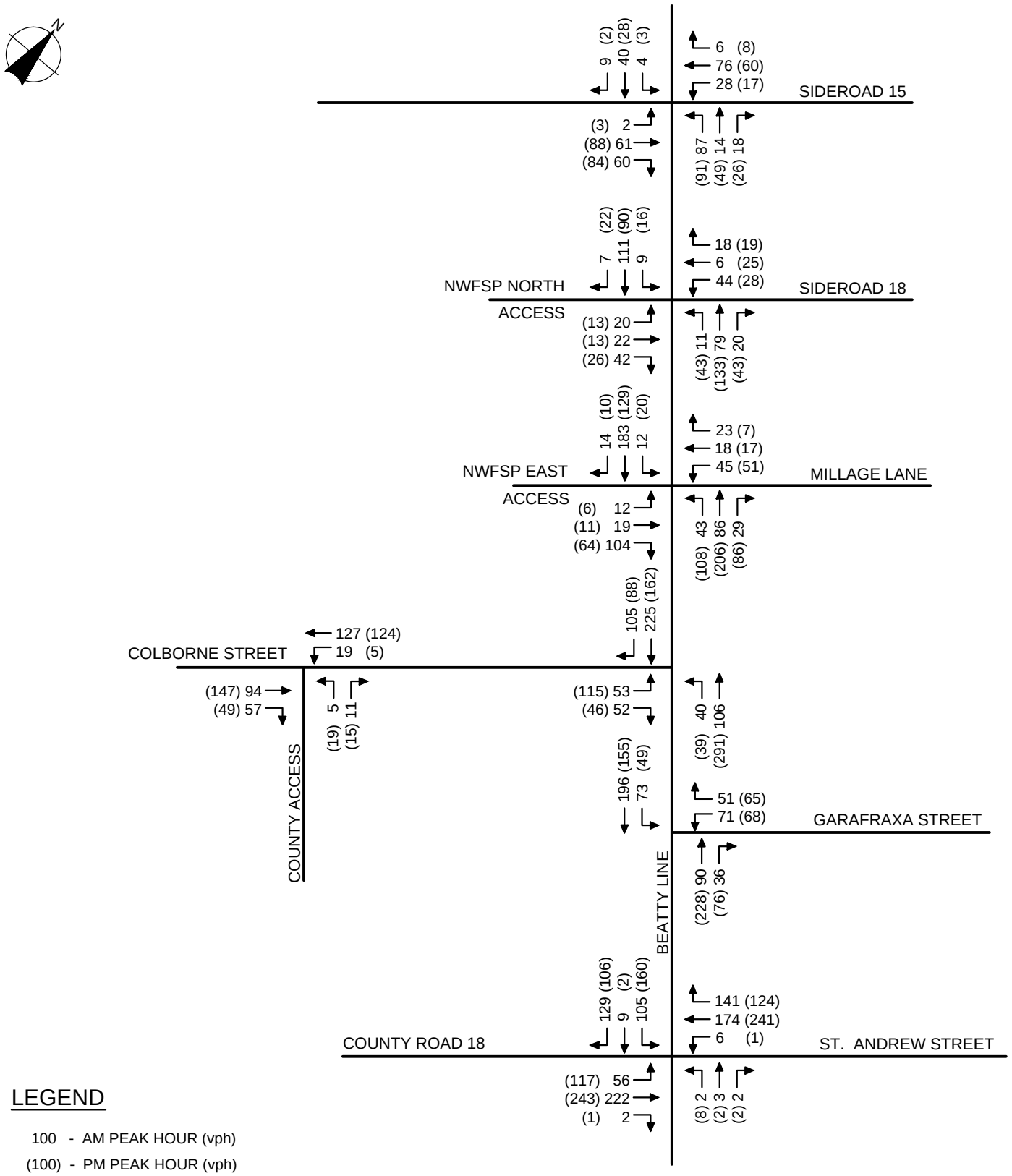

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Figure Title

DRAFT PLAN - NWFSP

2018 TOTAL TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A8**
Scale		Project No.	
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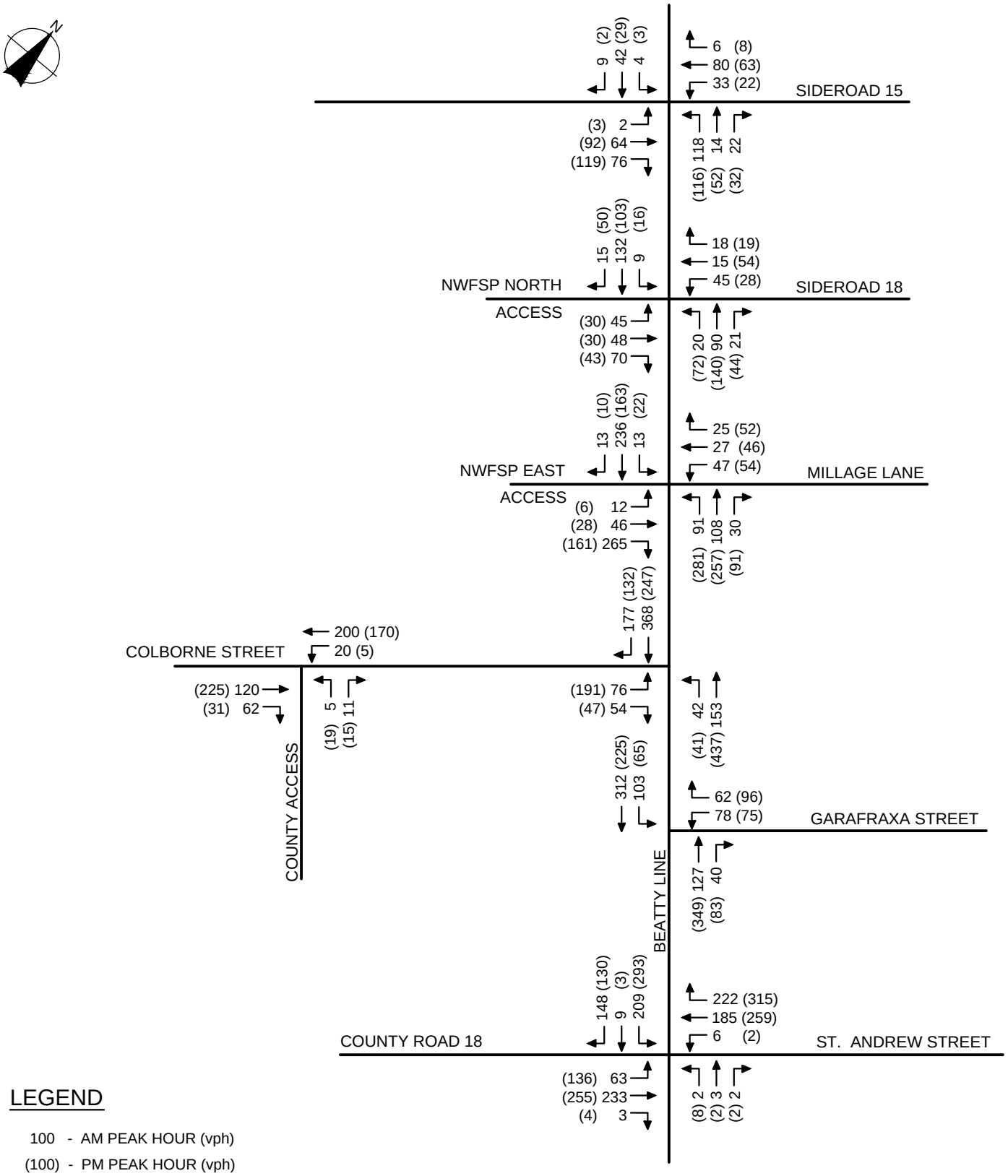

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Figure Title

DRAFT PLAN - NWFSP

2023 TOTAL TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A9**
Scale		Project No.	
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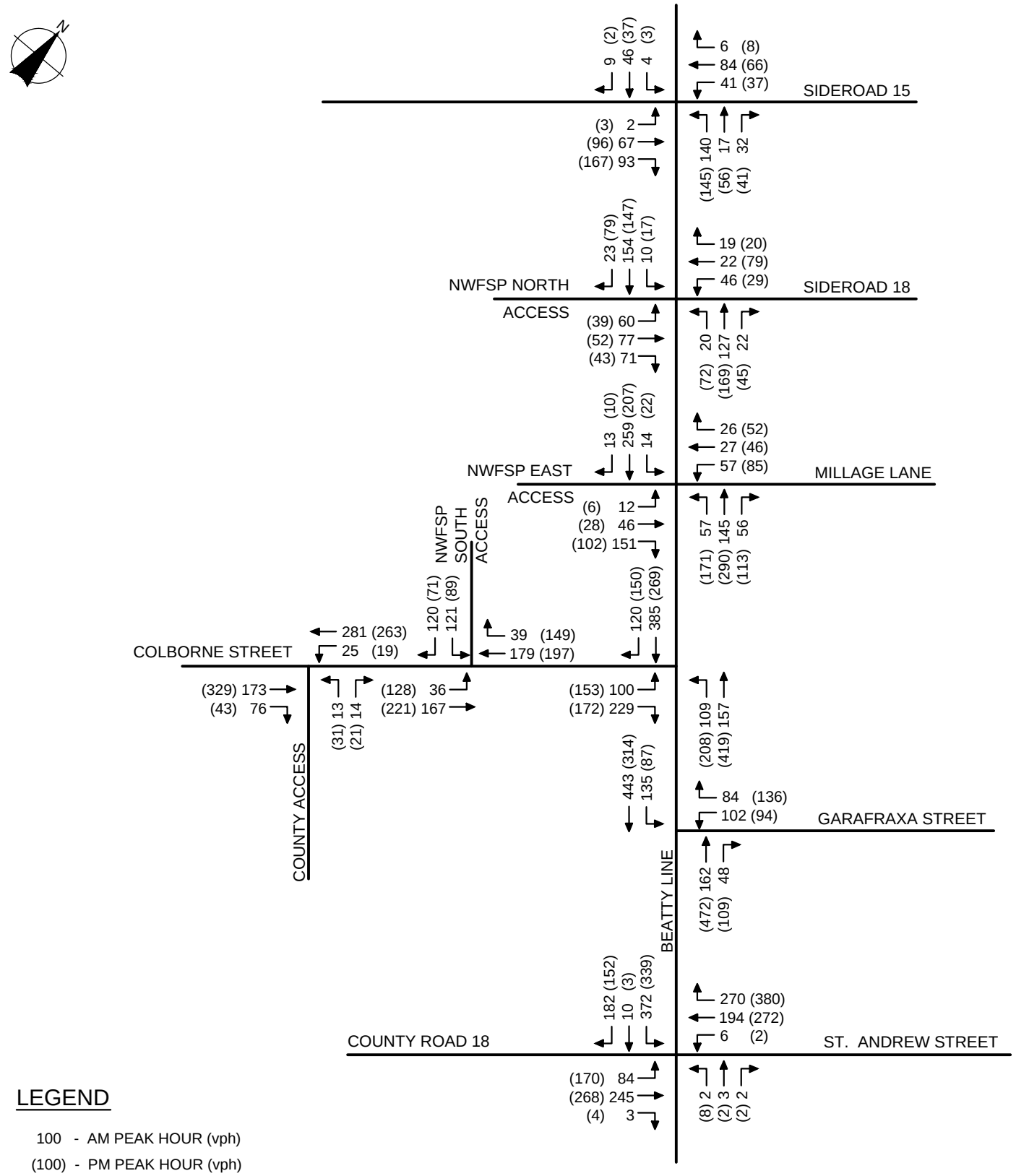


LEGEND

100 - AM PEAK HOUR (vph)

(100) - PM PEAK HOUR (vph)

BURNSIDE

Figure Title

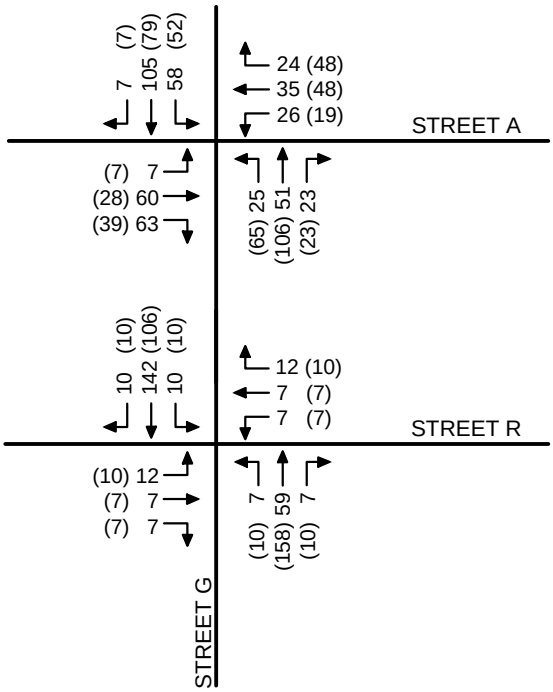
DRAFT PLAN - NWFSP

2028 TOTAL TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A10**
Scale		Project No.	
NTS		300031145	



LEGEND

100 - AM PEAK HOUR (vph)
(100) - PM PEAK HOUR (vph)

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Figure Title

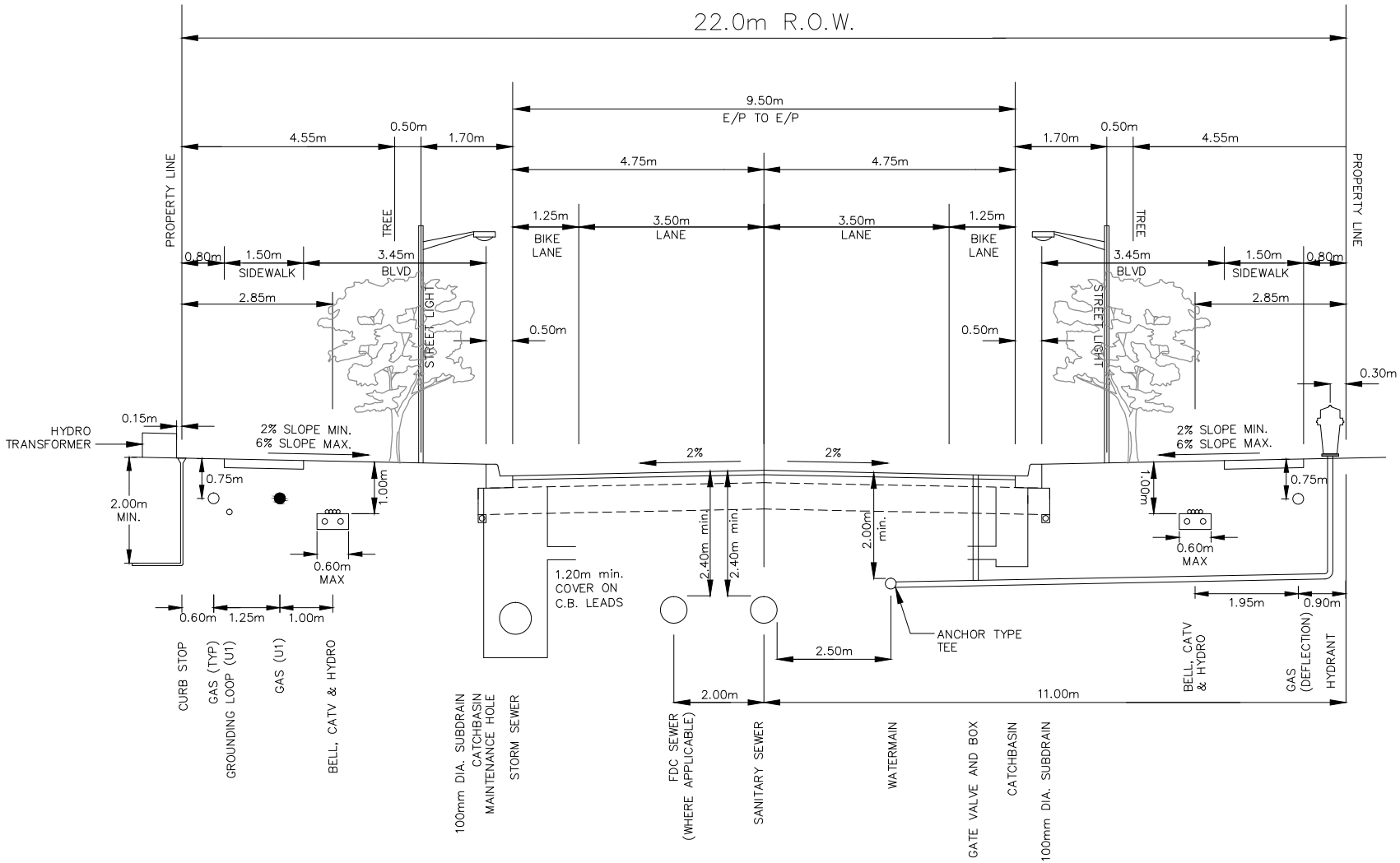
DRAFT PLAN - NWFSP

INTERNAL INTERSECTIONS 2028 TOTAL TRAFFIC

Client

NIGUS FERGUS JOINT VENTURE

Drawn	Checked	Date	Figure No.
JBL	HC	FEBRUARY 2018	**A11**
Scale		Project No.	
NTS		300031145	



22.0m ROW (COLBORNE STREET)

NOTES:

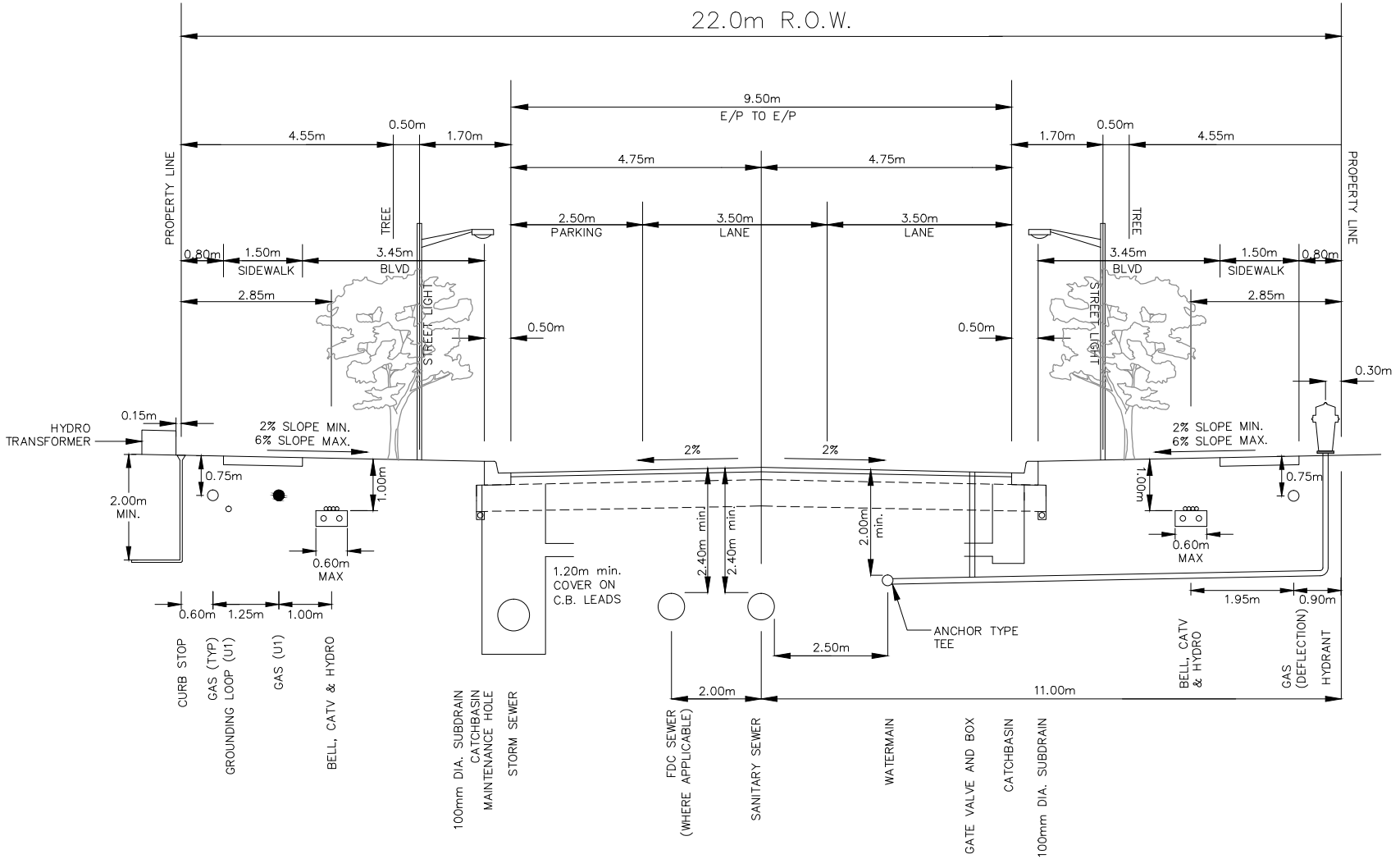
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
22.0m ROW

NTS

BURNSIDE

A12



22.0m ROW (FARLEY RD)

NOTES:

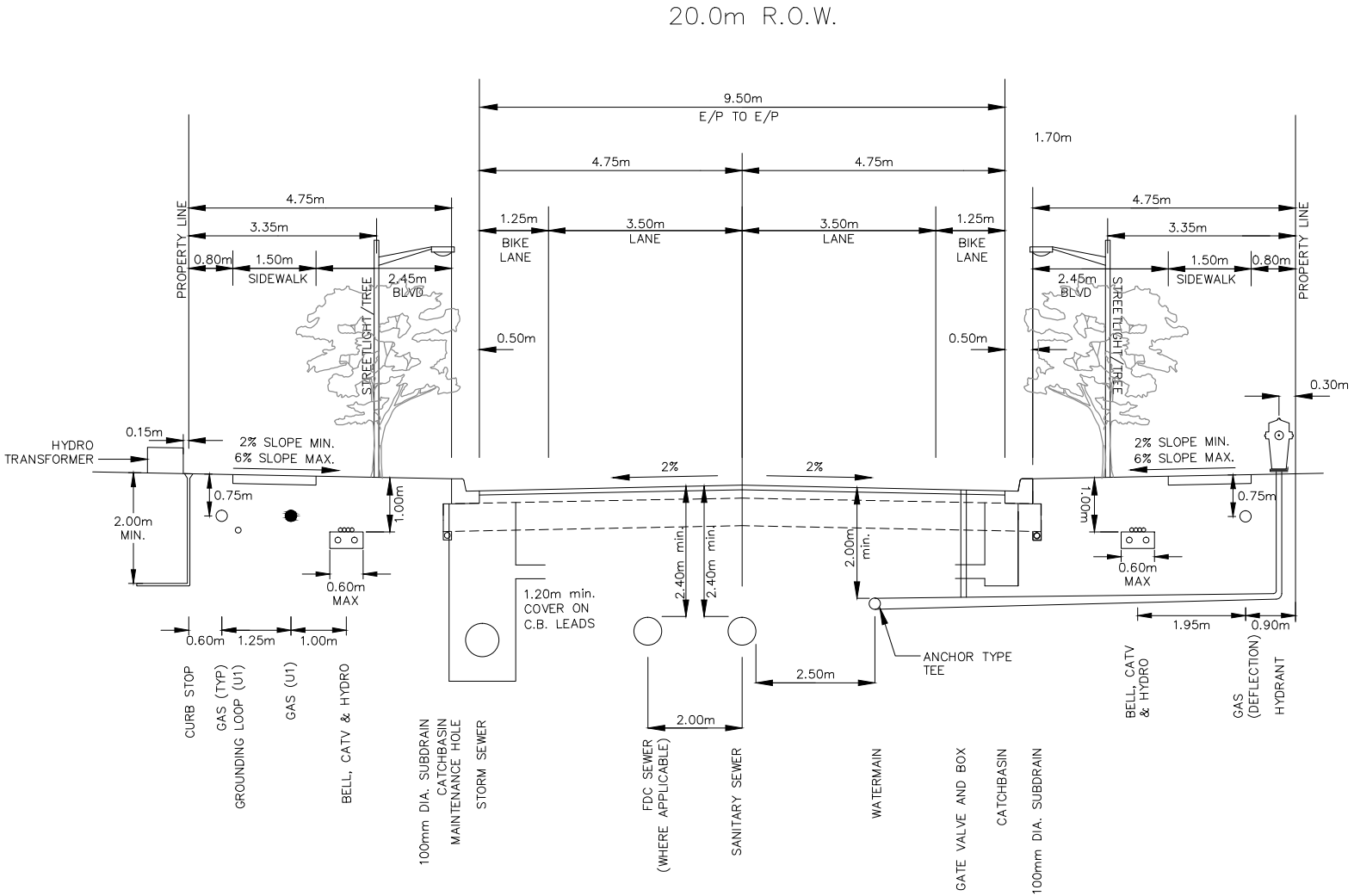
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
22.0m ROW

NTS

BURNSIDE

A13



BEATTY LINE

NOTES:

1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
20.0m ROW

NTS

BURNSIDE

A14

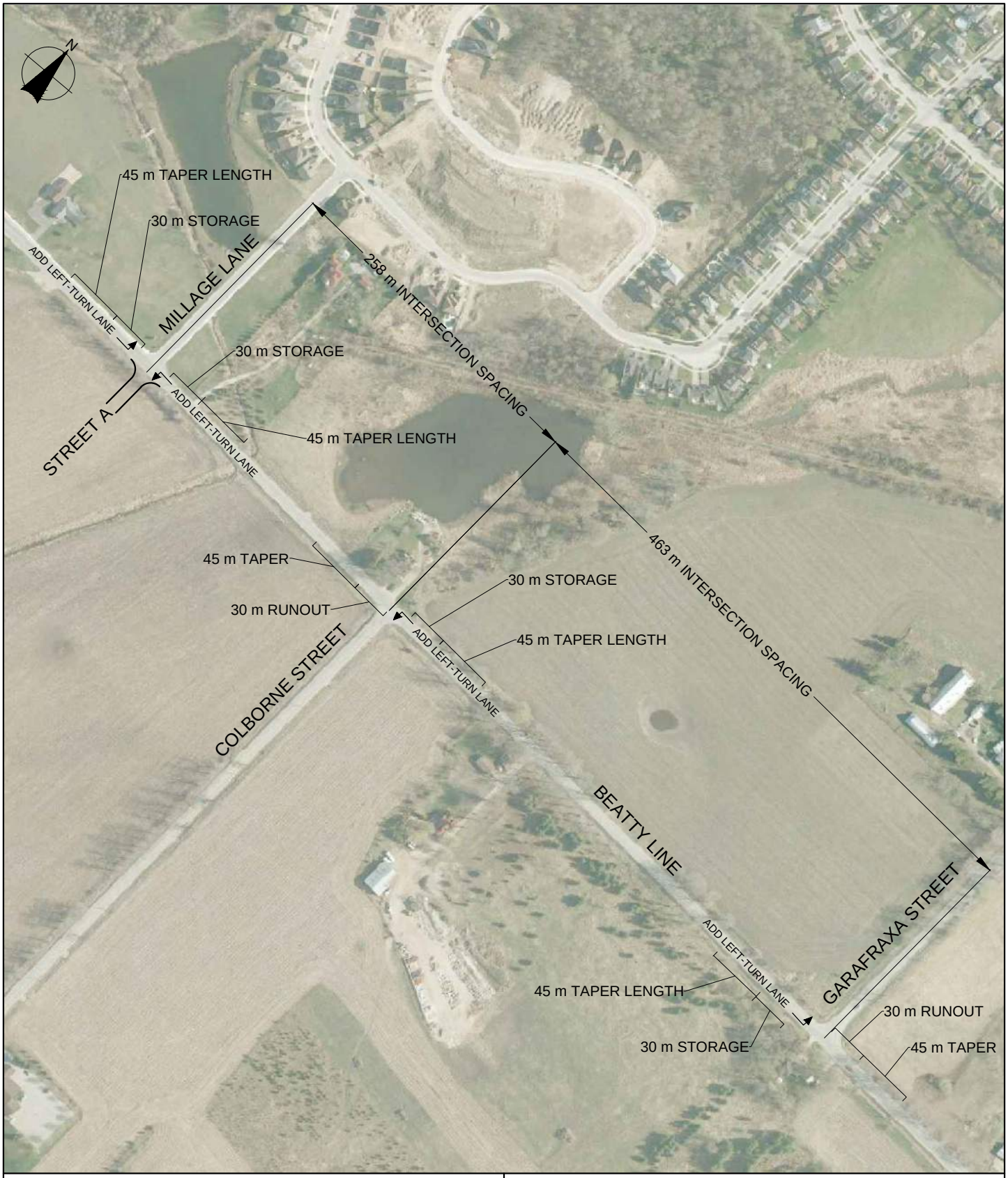


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Figure Title

DRAFT PLAN - NWFSP

SPATIAL REQUIREMENTS FOR IMPROVEMENTS TO BEATTY LINE

Client

NIGUS FERGUS JOINT VENTURE

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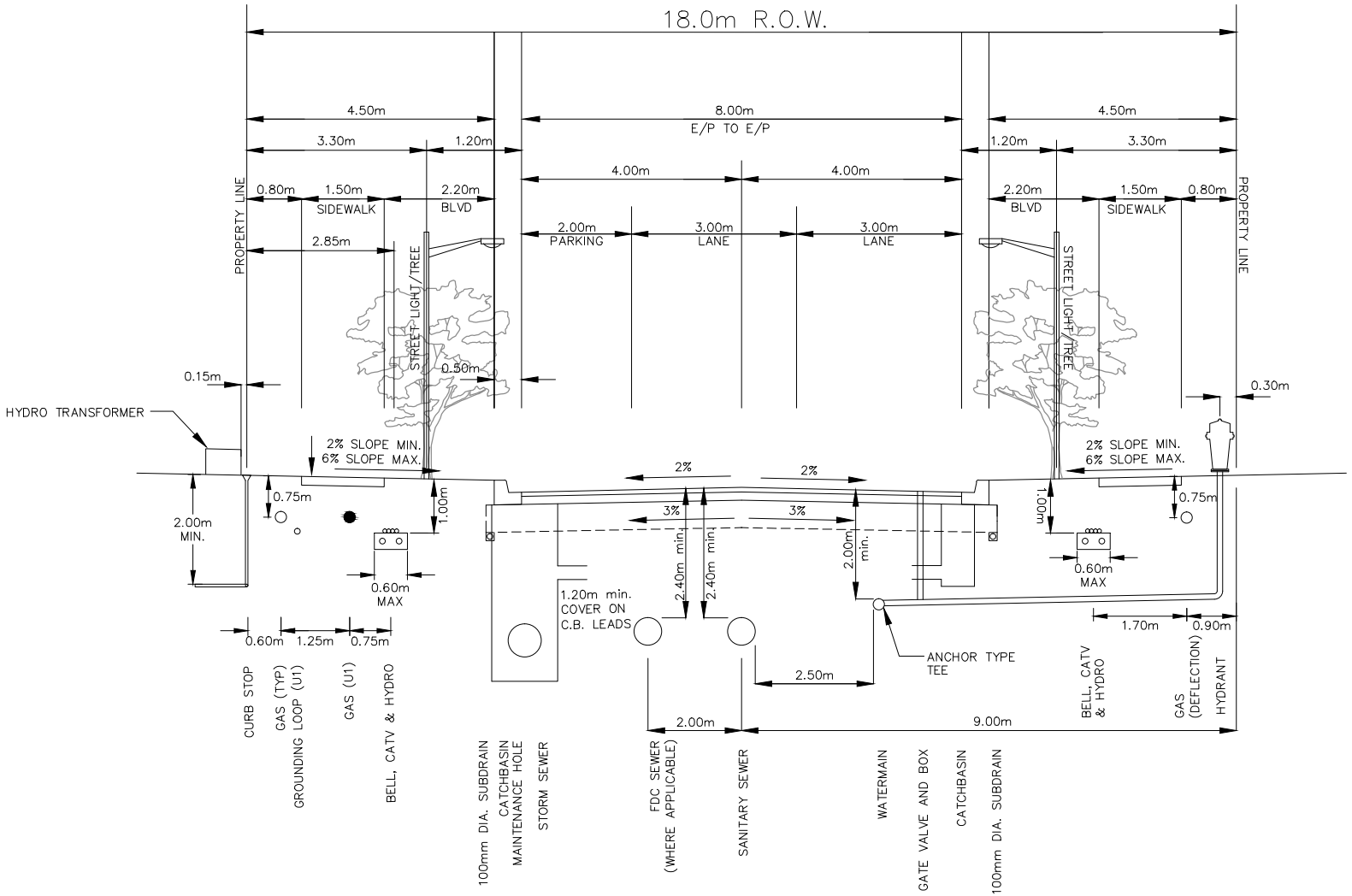

18.0m ROW

NOTES:

1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. STREET LIGHTING AND SIDEWALK REQUIRED ON ONE SIDE ONLY.
3. TREE PLANTING ON BOTH SIDES.

MODIFIED CROSS-SECTION
LOCAL STREET
18.0m ROW

NTS

BURNSIDE

A16

BURNSIDE

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Appendix B

Left Turn Lane Warrant Graphs

Table B1 – Left Turn Warrants at Colborne Street & Beatty Line (2023)

Left Turn Storage Lane Warrants		
Location: Colborne Street & Beatty Line		
Design Speed = 60 km/h	Time Period = Total Traffic (2023)	
Approach Direction	Northbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	195	478
Opposing Traffic	545	379
Left Turning Traffic	42	41
Percentage of Left Turning Traffic	21.5%	8.6%
Figure Used*	EA-8	EA-6
Storage Length Required	**15 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B2 – Left Turn Warrants at Colborne Street & Beatty Line (2028)

Left Turn Storage Lane Warrants		
Location: Colborne Street & Beatty Line		
Design Speed = 60 km/h	Time Period = Total Traffic (2028)	
Approach Direction	Northbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	266	627
Opposing Traffic	505	419
Left Turning Traffic	109	208
Percentage of Left Turning Traffic	41.0%	33.2%
Figure Used*	EA-9	EA-9
Storage Length Required	**40 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B3 – Left Turn Warrants at Garafraxa Street & Beatty Line (2023)

Left Turn Storage Lane Warrants		
Location: Garafraxa Street & Beatty Line		
Design Speed = 60 km/h	Time Period = Total Traffic (2023)	
Approach Direction	Southbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	415	290
Opposing Traffic	167	432
Left Turning Traffic	103	65
Percentage of Left Turning Traffic	24.8%	22.4%
Figure Used*	EA-8	EA-8
Storage Length Required	**15 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B4 – Left Turn Warrants at Garafraxa Street & Beatty Line (2028)

Left Turn Storage Lane Warrants		
Location: Garafraxa Street & Beatty Line		
Design Speed = 60 km/h	Time Period = Total Traffic (2028)	
Approach Direction	Southbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	578	401
Opposing Traffic	210	581
Left Turning Traffic	135	87
Percentage of Left Turning Traffic	23.3%	21.7%
Figure Used*	EA-8	EA-8
Storage Length Required	**25 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B5 – Left Turn Warrants at Sideroad 15 & Beatty Line (2028)

Left Turn Storage Lane Warrants				
Location: Sideroad 15 & Beatty Line				
Design Speed = 60 km/h	Time Period = Total Traffic (2028)			
Approach Direction	Northbound		Southbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	189	242	59	42
Opposing Traffic	59	42	189	242
Left Turning Traffic	140	145	4	3
Percentage of Left Turning Traffic	74.1%	59.9%	6.8%	7.1%
Figure Used*	EA-9	EA-9	EA-6	EA-6
Storage Length Required	**0 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B6 – Left Turn Warrants at Sideroad 18/NWFSP North Access & Beatty Line (2028)

Left Turn Storage Lane Warrants				
Location: Sideroad 18/NWFSP North Access & Beatty Line				
Design Speed = 60 km/h	Time Period = Total Traffic (2028)			
Approach Direction	Northbound		Southbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	169 286		187 243	
Opposing Traffic	187 243		169 286	
Left Turning Traffic	20	72	10	17
Percentage of Left Turning Traffic	11.8%	25.2%	5.3%	7.0%
Figure Used*	EA-7	EA-8	EA-6	EA-6
Storage Length Required	**0 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B7 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2015)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Existing Traffic (2015)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	263 324		192 258	
Opposing Traffic	192 258		263 324	
Left Turning Traffic	46	87	5	1
Percentage of Left Turning Traffic	17.5%	26.9%	2.6%	0.4%
Figure Used*	EA-7	EA-8	EA-6	N/A
Storage Length Required	**15 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B8 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2018)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Background Traffic (2018)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	278 353		308 328	
Opposing Traffic	308 328		278 353	
Left Turning Traffic	54	109	6	1
Percentage of Left Turning Traffic	19.4%	30.8%	1.9%	0.3%
Figure Used*	EA-7	EA-9	EA-6	N/A
Storage Length Required	**15 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B9 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2018)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2018)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	280 361		321 366	
Opposing Traffic	321 366		280 361	
Left Turning Traffic	56	117	6	1
Percentage of Left Turning Traffic	20.0%	32.4%	1.9%	0.3%
Figure Used*	EA-7	EA-9	EA-6	N/A
Storage Length Required	**15 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B10 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2023)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Background Traffic (2023)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	293 373		355 478	
Opposing Traffic	355 478		293 373	
Left Turning Traffic	57	114	6	2
Percentage of Left Turning Traffic	19.5%	30.6%	1.7%	0.4%
Figure Used*	EA-7	EA-8	EA-6	N/A
Storage Length Required	**25 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B11 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2023)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2023)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	299 395		413 576	
Opposing Traffic	413 576		299 395	
Left Turning Traffic	63	136	6	2
Percentage of Left Turning Traffic	21.1%	34.4%	1.5%	0.3%
Figure Used*	EA-8	EA-9	EA-6	N/A
Storage Length Required	**25 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B12 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2028)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Background Traffic (2028)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	321 400		407 434	
Opposing Traffic	407 434		321 400	
Left Turning Traffic	73	128	6	2
Percentage of Left Turning Traffic	22.7%	32.0%	1.5%	0.5%
Figure Used*	EA-8 EA-9		EA-7 EA-7	
Storage Length Required	**25 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B13 – Left Turn Warrants at St. Andrew Street/Wellington Road 18 & Beatty Line (2028)

Left Turn Storage Lane Warrants				
Location: St. Andrew Street/Wellington Road 18 & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2028)	
Approach Direction	Eastbound		Westbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	332 442		470 654	
Opposing Traffic	470 654		332 442	
Left Turning Traffic	84	170	6	2
Percentage of Left Turning Traffic	25.3%	38.5%	1.3%	0.3%
Figure Used*	EA-8	EA-9	N/A	N/A
Storage Length Required	**30 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B14 – Left Turn Warrants at Millage Lane/NWFSP East Access & Beatty Line (2018)

Left Turn Storage Lane Warrants				
Location: Millage Lane/NWFSP East Access & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2018)	
Approach Direction	Northbound		Southbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	158 400		209 159	
Opposing Traffic	209 159		158 400	
Left Turning Traffic	43	108	12	20
Percentage of Left Turning Traffic	27.2%	27.0%	5.7%	12.6%
Figure Used*	EA-8 EA-8		EA-6 EA-7	
Storage Length Required	**15 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B15 – Left Turn Warrants at Millage Lane/NWFSP East Access & Beatty Line (2023)

Left Turn Storage Lane Warrants				
Location: Millage Lane/NWFSP East Access & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2023)	
Approach Direction	Northbound		Southbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	229 629		262 195	
Opposing Traffic	262 195		229 629	
Left Turning Traffic	91	281	13	22
Percentage of Left Turning Traffic	39.7%	44.7%	5.0%	11.3%
Figure Used*	EA-9 EA-9		EA-6 EA-7	
Storage Length Required	**30 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B16 – Left Turn Warrants at Millage Lane/NWFSP East Access & Beatty Line (2028)

Left Turn Storage Lane Warrants				
Location: Millage Lane/NWFSP East Access & Beatty Line				
Design Speed = 60 km/h			Time Period = Total Traffic (2028)	
Approach Direction	Northbound		Southbound	
Peak Hours	Morning	Afternoon	Morning	Afternoon
Advancing Traffic	258 574		286 239	
Opposing Traffic	286 239		258 574	
Left Turning Traffic	57	171	14	22
Percentage of Left Turning Traffic	22.1%	29.8%	4.9%	9.2%
Figure Used*	EA-8 EA-8		EA-6 EA-6	
Storage Length Required	**25 meters**		**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B17 – Left Turn Warrants at NWFSP South Access & Colborne Street (2028)

Left Turn Storage Lane Warrants		
Location: NWFSP South Access & Colborne Street		
Design Speed = 60 km/h	Time Period = Total Traffic (2028)	
Approach Direction	Eastbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	203	349
Opposing Traffic	218	346
Left Turning Traffic	36	128
Percentage of Left Turning Traffic	17.7%	36.7%
Figure Used*	EA-7	EA-9
Storage Length Required	**15 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

Table B18 – Left Turn Warrants at County Access & Colborne Street (2028)

Left Turn Storage Lane Warrants		
Location: County Access & Colborne Street		
Design Speed = 60 km/h	Time Period = Total Traffic (2028)	
Approach Direction	Westbound	
Peak Hours	Morning	Afternoon
Advancing Traffic	306	282
Opposing Traffic	249	372
Left Turning Traffic	25	19
Percentage of Left Turning Traffic	8.2%	6.7%
Figure Used*	EA-6	EA-6
Storage Length Required	**0 meters**	

* Ministry of Transportation Ontario Geometric Design Standards for Ontario Highways, 1985.

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Appendix C

Traffic Signal Warrants

Appendix C - Table C1A

Beatty Line & Wellington Road 18 (St. Andrew Street) (8 Hour Warrant)

Count Date: Year 2015
Intersection: Beatty Line & Wellington Road 18 **Municipality:** County of Wellington
Major Road: Wellington Road 18 (St. Andrew St.) **Major Road Runs:** East/West
Operating Speed of Major Road 60 km/h **Operating under free flow conditions**

Warrant #1: Minimum Vehicular Volumes **Satisfied:** **Yes**

No **X**

A. All Approaches

No. of Lanes	Minimum Requirements				Hour								Percentage Warrant
	1 Lane Each Way		2 Lanes Each Way										
Flow Condition	1 Lane (F. Flow)	1 Lane (R. Flow)	2 Lanes (F. Flow)	2 Lanes (R. Flow)	1	2	3	4	5	6	7	8	
100%	480	720	600	900	414	600	483	630	562	738	726	613	
80%	385	575	480	720									
All Approaches	100% Fulfilled					100	100	100	100	100	100	100	700
	80% Fulfilled				80								80
	Actual % if Below 80%												
												Total	780
												Actual Average (Total/8)	98

B. Minor Street Both Approaches

100%	120	170	120	170	65	162	76	100	110	156	150	69	Percentage Warrant
80%	95	135	95	135									
Minor Street Both Approaches	100% Fulfilled					100		100	100	100	100		500
	80% Fulfilled						80						80
	Actual % if Below 80%				68							73	141
												Total	721
												Actual Average (Total/8)	90

Appendix C - Table C1B

Beatty Line & Wellington Road 18 (St. Andrew Street) (8 Hour Warrant)

Count Date: Year 2015
Intersection: Beatty Line & Wellington Road 18 **Municipality:** County of Wellington
Major Road: Wellington Road 18 (St. Andrew St.) **Major Road Runs:** East/West
Operating Speed of Major Road 60 km/h **Operating under free flow conditions**

Warrant #2: Delay To Cross Traffic Minimum Vehicular Volumes **Satisfied:** **Yes** **No** **X**

A. Major Approaches

No. of Lanes	Minimum Requirements				Hour								Percentage Warrant
	1 Lane Each Way		2 Lanes Each Way										
Flow Condition	1 Lane (F. Flow)	1 Lane (R. Flow)	2 Lanes (F. Flow)	2 Lanes (R. Flow)	1	2	3	4	5	6	7	8	
100%	480	720	600	900	349	438	407	530	452	582	576	463	
80%	385	575	480	720									
All Approaches	100% Fulfilled							100		100	100		300
	80% Fulfilled					80	80		80			80	320
	Actual % if Below 80%				73								73
												Total	693
												Actual Average (Total/8)	87

B. Crossing Traffic From Minor Streets (Both Approaches)

100%	50	75	50	75	29	64	44	53	46	99	83	34	
80%	40	60	40	60									
Minor Street Both Approaches	100% Fulfilled					100		100		100	100		400
	80% Fulfilled						80		80				160
	Actual % if Below 80%				58							68	126
												Total	686
												Actual Average (Total/8)	86

Warrant #4: Combination Warrant
(Used if no warrant satisfied 100%) **Satisfied:** **Yes** **No** **x**

Minimum Requirements	Warrant Satisfied 80% of More	Fulfilled			
Two Warrants Satisfied 80%	Warrant 1 (Minimum Vehicular Volume)	Yes	X	No	
	Warrant 2 (Delay To Cross Traffic)	Yes	X	No	

Conclusion: **Traffic Signals Warranted** **Yes:** **x** **No:**

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Signal Warrants

Major Street: Beatty Line

Minor Street: Colborne Street

Scenario: 2023 Total Traffic

T-Intersection: Yes [X] No [ ]

Number of Lanes: 1 Lane [X] 2 or More Lanes [ ]

Flow Condition: Urban (Resricted Flow) [ ] Rural (Free Flow) [X]

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**720**	**720**	**600**	**900**	491	68	**51**
AM Peak		870						
PM Peak		1095						
Criteria	**Minor Street Approaches**	**180**	**170**	**120**	**170**	92	51	
AM Peak		130						
PM Peak		238						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**720**	**720**	**600**	**900**	399	55	**35**
AM Peak		740						
PM Peak		857						
Criteria	**Traffic Crossing Major Street**	**60**	**75**	**50**	**75**	21	35	
AM Peak		42						
PM Peak		41						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

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Signal Warrants

Major Street: Beatty Line

Minor Street: Colborne Street

Scenario: 2028 Total Traffic

T-Intersection: Yes [X] No [ ]

Number of Lanes: 1 Lane [X] 2 or More Lanes [ ]

Flow Condition: Urban (Resricted Flow) [ ] Rural (Free Flow) [X]

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**720**	**720**	**600**	**900**	618	86	**86**
AM Peak		1100						
PM Peak		1371						
Criteria	**Minor Street Approaches**	**180**	**170**	**120**	**170**	164	91	
AM Peak		329						
PM Peak		325						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: YES
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**720**	**720**	**600**	**900**	454	63	**63**
AM Peak		771						
PM Peak		1046						
Criteria	**Traffic Crossing Major Street**	**60**	**75**	**50**	**75**	79	132	
AM Peak		109						
PM Peak		208						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

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Signal Warrants

Major Street: Beatty Line

Minor Street: Garafraxa Street

Scenario: 2028 Total Traffic

T-Intersection:	Yes	X	No	
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**720**	**720**	**600**	**900**	547	76	**58**
AM Peak		974						
PM Peak		1212						
Criteria	**Minor Street Approaches**	**180**	**170**	**120**	**170**	104	58	
AM Peak		186						
PM Peak		230						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**720**	**720**	**600**	**900**	443	61	**61**
AM Peak		788						
PM Peak		982						
Criteria	**Traffic Crossing Major Street**	**60**	**75**	**50**	**75**	49	82	
AM Peak		102						
PM Peak		94						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

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Signal Warrants

Major Street: Colborne Street

Minor Street: NWFSP South Access

Scenario: 2028 Total Traffic

T-Intersection:	Yes	X	No	
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**720**	**720**	**600**	**900**	379	53	**53**
AM Peak		662						
PM Peak		855						
Criteria	**Minor Street Approaches**	**180**	**170**	**120**	**170**	100	56	
AM Peak		241						
PM Peak		160						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**720**	**720**	**600**	**900**	279	39	**39**
AM Peak		421						
PM Peak		695						
Criteria	**Traffic Crossing Major Street**	**60**	**75**	**50**	**75**	41	68	
AM Peak		36						
PM Peak		128						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

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Signal Warrants

Major Street: Colborne Street

Minor Street: County Access

Scenario: 2028 Total Traffic

T-Intersection:	Yes	X	No	
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**720**	**720**	**600**	**900**	322	45	**11**
AM Peak		582						
PM Peak		706						
Criteria	**Minor Street Approaches**	**180**	**170**	**120**	**170**	20	11	
AM Peak		27						
PM Peak		52						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**720**	**720**	**600**	**900**	302	42	**18**
AM Peak		555						
PM Peak		654						
Criteria	**Traffic Crossing Major Street**	**60**	**75**	**50**	**75**	11	18	
AM Peak		25						
PM Peak		19						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

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Signal Warrants

Major Street: Beatty Line

Minor Street: Millage Lane / NWFSP East Access

Scenario: 2018 Total Traffic

T-Intersection:	Yes		No	X
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**480**	**720**	**600**	**900**	326	68	**68**
AM Peak		588						
PM Peak		715						
Criteria	**Minor Street Approaches**	**120**	**170**	**120**	**170**	94	79	
AM Peak		221						
PM Peak		156						

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

*Number is the Average Hourly Volume (AHV)

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**480**	**720**	**600**	**900**	232	48	**48**
AM Peak		367						
PM Peak		559						
Criteria	**Traffic Crossing Major Street**	**50**	**75**	**50**	**75**	38	75	
AM Peak		76						
PM Peak		74						

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

*Number is the Average Hourly Volume (AHV)

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Signal Warrants

Major Street: Beatty Line

Minor Street: Millage Lane / NWFSP East Access

Scenario: 2023 Total Traffic

T-Intersection:	Yes		No	X
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**480**	**720**	**600**	**900**	521	109	**109**
AM Peak		913						
PM Peak		1171						
Criteria	**Minor Street Approaches**	**120**	**170**	**120**	**170**	192	160	
AM Peak		422						
PM Peak		347						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	YES
100% Satisfied:	YES
120% Satisfied:	NO
150% Satisfied:	NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**480**	**720**	**600**	**900**	329	68	**68**
AM Peak		491						
PM Peak		824						
Criteria	**Traffic Crossing Major Street**	**50**	**75**	**50**	**75**	53	106	
AM Peak		105						
PM Peak		106						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

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Signal Warrants

Major Street: Beatty Line

Minor Street: Millage Lane / NWFSP East Access

Scenario: 2028 Total Traffic

T-Intersection:	Yes		No	X
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**480**	**720**	**600**	**900**	499	104	**104**
AM Peak		863						
PM Peak		1132						
Criteria	**Minor Street Approaches**	**120**	**170**	**120**	**170**	160	133	
AM Peak		319						
PM Peak		319						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	YES
100% Satisfied:	YES
120% Satisfied:	NO
150% Satisfied:	NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**480**	**720**	**600**	**900**	339	71	**71**
AM Peak		544						
PM Peak		813						
Criteria	**Traffic Crossing Major Street**	**50**	**75**	**50**	**75**	63	126	
AM Peak		115						
PM Peak		137						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

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Signal Warrants

Major Street: Beatty Line

Minor Street: Sideroad 18 / NWFSP North Access

Scenario: 2028 Total Traffic

T-Intersection:	Yes		No	X
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**480**	**720**	**600**	**900**	361	75	**75**
AM Peak		651						
PM Peak		791						
Criteria	**Minor Street Approaches**	**120**	**170**	**120**	**170**	139	116	
AM Peak		295						
PM Peak		262						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**480**	**720**	**600**	**900**	221	46	**46**
AM Peak		356						
PM Peak		529						
Criteria	**Traffic Crossing Major Street**	**50**	**75**	**50**	**75**	83	165	
AM Peak		183						
PM Peak		147						

*Number is the Average Hourly Volume (AHV)

80% Satisfied: NO
100% Satisfied: NO
120% Satisfied: NO
150% Satisfied: NO

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Signal Warrants

Major Street: Sideroad 15

Minor Street: Beatty Line

Scenario: 2028 Total Traffic

T-Intersection:	Yes		No	X
Number of Lanes:	1 Lane	X	2 or More Lanes	
Flow Condition:	Urban (Resricted Flow)		Rural (Free Flow)	X

Warrant 1 - Minimum Vehicular Volume

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**All Aproaches**	**480**	**720**	**600**	**900**	301	63	**63**
AM Peak		541						
PM Peak		661						
Criteria	**Minor Street Approaches**	**120**	**170**	**120**	**170**	133	111	
AM Peak		248						
PM Peak		284						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

Warrant 2 - Delay to Cross Traffic

Volume	Approach Lanes	1		2 or more		Section Compliance		Entire %
	Flow Condition	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Number*	%	
Criteria	**Major Street Aproaches**	**480**	**720**	**600**	**900**	165	34	**34**
AM Peak		283						
PM Peak		377						
Criteria	**Traffic Crossing Major Street**	**50**	**75**	**50**	**75**	99	197	
AM Peak		190						
PM Peak		204						

*Number is the Average Hourly Volume (AHV)

80% Satisfied:	NO
100% Satisfied:	NO
120% Satisfied:	NO
150% Satisfied:	NO

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Appendix D

Summary of Intersection Operations (Synchro Analysis)

Appendix D - Table D1 - Background Traffic (2015)
Summary of Level of Service, Delay and Capacity (v/c) For Intersection Turning Movements

Intersection	Turning Movement	AM Peak Hour (2015)			PM Peak Hour (2015)		
		LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c
Unsignalized Intersections							
Beatty Line / St. Andrew	EB T/L/R	A	1.6	0.04	A	2.7	0.07
	WB T/L/R	A	0.2	<0.01	A	<0.1	<0.01
	NB T/R/L	B	13.3	0.02	C	18.3	0.05
	SB T/R/L	B	11.3	0.19	B	14.1	0.27
Beatty Line / Garafraxa	WB R/L	B	10.3	0.13	B	10.9	0.16
	SB T/L/R	A	3.0	0.04	A	2.2	0.03
Beatty Line / Colborne	EB R/L	A	9.8	0.10	B	10.6	0.14
	NB T/L/R	A	3.2	0.03	A	1.8	0.03
Beatty Line / Sideroad 18 / NWFSP North Access	WB L/R	A	9.3	0.03	A	9.4	0.03
	SB T/L	A	0.5	<0.01	A	0.3	<0.01
Beatty Line / Sideroad 15	EB T/L/R	A	0.5	<0.01	A	0.2	<0.01
	WB T/L/R	A	0.5	<0.01	A	0.3	<0.01
	NB T/R/L	B	10.6	0.10	B	11.0	0.17
	SB T/R/L	B	10.3	0.08	B	10.5	0.05
Beatty Line / NWFSP East Access / Millage Lane	WB R/L	A	9.6	0.07	B	10.5	0.08
	SB T/L	A	0.8	0.01	A	1.4	0.01
Colborne Street / County Access	WB T/L	A	1.7	0.01	A	0.4	<0.01
	NB R/L	A	8.8	0.01	A	9.1	0.03
Critical Movements							

Appendix D - Table D2 - Background Traffic
Summary of Level of Service, Delay and Capacity (v/c) For Intersection Turning Movements

Intersection	Turning Movement	AM Peak Hour (2018)			PM Peak Hour (2018)			AM Peak Hour (2023)			PM Peak Hour (2023)			AM Peak Hour (2028)			PM Peak Hour (2028)		
		LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c
Unsignalized Intersections																			
Beatty Line / St. Andrew Street	EB T/L/R	A	1.9	0.05	A	3.2	0.10												
	WB T/L/R	A	0.2	<0.01	A	<0.1	<0.01												
	NB T/R/L	C	15.1	0.02	C	21.2	0.06												
	SB T/R/L	C	15.9	0.40	E	35.9	0.71												
Beatty Line / Garafraxa Street	WB R/L	B	11.5	0.18	B	12.2	0.21	B	12.0	0.20	B	12.9	0.24						
	SB T/L/R	A	2.4	0.04	A	2.0	0.03	A	2.3	0.05	A	2.0	0.03						
Beatty Line / Garafraxa Street (add SB L)	WB R/L							B	12.0	0.20	B	12.9	0.24	B	13.2	0.28	B	14.3	0.31
	SB L							A	7.6	0.05	A	8.0	0.03	A	7.6	0.05	A	8.1	0.04
Beatty Line / Colborne Street	EB R/L	B	11.0	0.14	B	12.9	0.24	B	11.3	0.15	B	13.5	0.26						
	NB T/L/R	A	2.8	0.03	A	1.4	0.03	A	2.7	0.04	A	1.4	0.03						
Beatty Line / Colborne Street (add NB L)	WB R/L							B	11.3	0.15	B	13.5	0.26	B	11.9	0.18	B	14.7	0.31
	SB T/L/R							A	7.9	0.04	A	7.8	0.03	A	8,0	0.05	A	7.9	0.04
Beatty Line / Sideroad 18 / North Access To Beatty Line	EB T/L/R	A	9.9	0.09	B	10.3	0.06	B	10.1	0.09	B	10.5	0.06	B	10.3	0.09	B	10.8	0.06
	WB T/L/R	B	10.8	0.09	B	11.9	0.11	B	11.1	0.10	B	12.1	0.12	B	11.5	0.11	B	12.7	0.13
	NB T/L/R	A	0.9	0.01	A	1.7	0.03	A	0.8	0.01	A	1.7	0.03	A	0.7	0.01	A	1.6	0.03
	SB T/L/R	A	0.6	0.01	A	1.2	0.01	A	0.5	0.01	A	1.1	0.01	A	0.5	0.01	A	1.0	0.01
Beatty Line / Sideroad 15	EB T/L/R	A	0.1	<0.01	A	0.2	<0.01	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01
	WB T/L/R	A	1.6	0.01	A	0.9	0.01	A	1.9	0.02	A	1.3	0.01	A	2.1	0.02	A	1.9	0.02
	NB T/R/L	B	11.4	0.16	B	1.8	0.24	B	11.8	0.18	B	12.3	0.28	B	12.4	0.22	B	13.2	0.33
	SB T/R/L	B	10.8	0.09	B	10.9	0.06	B	11.1	0.09	B	11.2	0.06	B	11.4	0.10	B	11.6	0.07
Beatty Line / NWFSP East Access / Millage Lane	EB T/R/L	A	9.3	0.02	A	9.0	0.01	A	9.5	0.02	A	9.1	0.01						
	WB T/R/L	B	11.1	0.11	B	13.5	0.13	B	11.5	0.12	B	13.4	0.21						
	NB L	A	0.3	<0.01	A	0.5	0.01	A	0.3	<0.01	A	0.5	0.01						
	SB T/L/R	A	0.5	0.01	A	1.2	0.02	A	0.5	0.01	A	1.2	0.02						
Beatty Line / NWFSP East Access / Millage Lane (add NB L)	EB T/L/R							A	9.5	0.02	A	9.1	0.01	A	9.6	0.02	A	9.2	0.01
	WB T/L/R							B	11.5	0.12	B	13.4	0.21	B	11.9	0.14	B	14.2	0.23
	NB L							A	7.7	<0.01	A	7.6	0.01	A	7.7	<0.01	A	7.6	0.01
	SB T/R/L							A	0.5	0.01	A	1.2	0.02	A	0.5	0.01	A	1.1	0.02
Colborne Street / County Access	WB T/L	A	1.4	0.01	A	0.4	<0.01	A	1.4	0.02	A	0.4	<0.01	A	1.3	0.02	A	0.4	0.12
	NB R/L	A	9.3	0.02	A	9.7	0.05	A	9.4	j0.02	A	9.8	0.05	A	9.9	0.04	B	10.3	0.07
Signalized Intersection																			
Beatty Line / St. Andrew Street (Wellington Road 18) (add signals plus left turn lanes on all approaches)	EB L	A	4.5	0.09	A	5.7	0.19	A 4.6		0.10	A	8.2	0.29	A 7.2		0.17	A	9.8	0.33
	EB T/R	A	5.0	0.21	A	5.7	0.24	A	5.1	0.23	A	7.1	0.27	A	7.5	0.27	A	8.4	0.30
	WB L	A	4.0	0.01	A	4.5	<0.01	A	4.1	0.01	A	5.5	<0.01	A	5.9	0.01	A	6.4	<0.01
	WB T/R	A	5.4	0.28	A	6.3	0.32	A	5.8	0.32	A	9.2	0.48	A	8.8	0.41	B	10.3	0.48
	NB L	B	18.2	0.01	B	17.8	0.04	B	18.1	0.01	B	16.8	0.03	B	15.2	0.01	B	14.9	0.03
	NB T/R	B	18.2	0.01	B	17.7	0.01	B	18.1	0.01	B	16.7	0.01	B	15.2	0.01	B	14.8	0.01
	SB L	C	20.0	0.33	C	3.3	0.58	C	20.7	0.43	C	21.6	0.58	B	19.2	0.54	C	21.0	0.63
	SB T/R	B	18.7	0.12	B	18.0	0.07	B	18.6	0.12	B	17.1	0.09	B	15.8	0.12	B	15.2	0.09
	Intersection	A	8.8	0.29	A	10.0	0.38	A	9.2	0.34	B	11.3	0.51	B	11.1	0.45	B	12.3	0.53
Critical Movements																			

Appendix D - Table D3 - Total Traffic
Summary of Level of Service, Delay and Capacity (v/c) For Intersection Turning Movements

Intersection	Turning Movement	AM Peak Hour (2018)			PM Peak Hour (2018)			AM Peak Hour (2023)			PM Peak Hour (2023)			AM Peak Hour (2028)			PM Peak Hour (2028)		
		LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c
Unsignalized Intersections																			
Beatty Line / St. Andrew Street	EB T/L/R	A	2.0	0.05	A	3.5	0.11												
	WB T/L/R	A	0.2	0.01	A	<0.1	<0.01												
	NB T/R/L	C	15.5	0.02	C	23.1	0.06												
	SB T/R/L	C	19.6	0.52	F	54.8	0.86												
Beatty Line / Garafraxa Street	WB R/L	B	12.2	0.21	B	13.4	0.25	C	15.6	0.31	C	18.7	0.42						
	SB T/L/R	A	2.4	0.05	A	2.2	0.04	A	2.5	0.08	A	2.4	0.06						
Beatty Line / Colborne Street	EB R/L	B	12.4	0.19	C	16.0	0.35	C	17.6	0.33	E	45.0	0.78						
	NB T/L/R	A	2.4	0.04	A	1.2	0.03	A	2.3	0.05	A	1.1	0.04						
Beatty Line / Colborne Street (add NB L)	EB R/L							C	17.6	0.33	E	45.0	0.78	E	41.2	0.82	F	248.5	1.42
	NB L							A	8.8	0.05	A	8.3	0.04	A	9.0	0.12	A	9.1	0.20
Beatty Line / Garafraxa Street (add SB L)	WB R/L							C	15.6	0.31	C	18.7	0.42	D	26.7	0.56	E	45.0	0.77
	SB L							A	7.8	0.08	A	8.5	0.06	A	8.0	0.11	A	9.2	0.10
Beatty Line / Sideroad 18 / North Access To Beatty Line	EB T/L/R	B	10.5	0.12	B	11.2	0.09	B	12.2	0.26	B	14.0	0.22	B	14.8	0.38	C	18.8	0.36
	WB T/L/R	B	11.3	0.12	B	12.5	0.14	B	12.9	0.16	C	15.6	0.25	B	14.8	0.21	C	20.3	0.38
	NB T/L/R	A	0.8	0.01	A	1.7	0.03	A	1.3	0.02	A	2.5	0.06	A	1.0	0.02	A	2.4	0.06
	SB T/L/R	A	0.6	0.01	A	1.0	0.01	A	0.5	0.01	A	0.8	0.01	A	0.5	0.01	A	0.6	0.01
Beatty Line / Sideroad 15	EB T/L/R	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01	A	0.1	<0.01
	WB T/L/R	A	2.0	0.02	A	1.6	0.01	A	2.2	0.03	A	1.9	0.02	A	2.6	0.03	A	2.8	0.03
	NB T/R/L	B	11.8	0.20	B	12.3	0.27	B	12.9	0.27	B	13.6	0.34	B	14.3	0.35	C	16.7	0.46
	SB T/R/L	B	11.0	0.09	B	11.2	0.06	B	11.4	0.10	B	11.8	0.06	B	11.9	0.11	B	13.0	0.09
Beatty Line / NWFSP Access / Millage Lane	EB T/R/L	B	11.4	0.21	B	11.5	0.14	C	17.4	0.55	C	22.0	0.50						
	WB T/R/L	B	14.9	0.21	C	21.7	0.27	E	38.2	0.51	F	236.8	1.28						
	NB L	A	2.3	0.03	A	2.7	0.08	A	3.6	0.08	A	5.0	0.22						
	SB T/L/R	A	0.5	0.01	A	1.1	0.02	A	0.5	0.01	A	1.1	0.02						
Beatty Line / NWFSP East Access / Millage Lane (add NB L)	EB T/L/R													C	15.4	0.40	C	18.3	0.35
	WB T/L/R													D	27.3	0.43	F	162.5	1.13
	NB L													A	8.0	0.05	A	8.1	0.14
	SB T/R/L													A	0.5	0.01	A	1.0	0.02
Colborne Street / NWFSP South Access	EB T/L													A	1.6	0.03	A	3.8	0.12
	SB L/R													B	14.3	0.41	C	19.8	0.42
Colborne Street / NWFSP South Access (add EB L)	EB L													A	7.8	0.03	A	8.4	0.12
	SB R/L													B	14.3	0.41	C	19.8	0.42
Colborne Street / County Access	WB T/L	A	1.1	0.01	A	0.3	<0.01	A	0.8	0.02	A	0.2	<0.01	A	0.8	0.02	A	0.7	0.02
	NB R/L	A	9.4	0.02	B	10.2	0.05	A	9.8	0.02	B	11.0	0.06	B	11.4	0.05	B	13.7	0.12
Street A / Street G (NWFSP)	EB T/R/L													B	11.9	0.21	B	12.0	0.13
	WB T/R/L													B	12.8	0.17	B	13.4	0.23

Appendix D - Table D3 - Total Traffic
Summary of Level of Service, Delay and Capacity (v/c) For Intersection Turning Movements

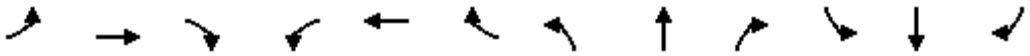
Intersection	Turning Movement	AM Peak Hour (2018)			PM Peak Hour (2018)			AM Peak Hour (2023)			PM Peak Hour (2023)			AM Peak Hour (2028)			PM Peak Hour (2028)		
		LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c	LOS	Delay (sec.)	v/c
Signalized Intersections																			
Beatty Line / St. Andrew (signals plus left turn lanes on all approaches)	EB L	A	4.8	0.1	A	6.2	0.22	A	7.6	0.15	B	16.6	0.53	B	13.8	0.33	E	61.6	0.93
	EB T/R	A	5.3	0.22	A	5.9	0.24	A	8.0	0.26	A	9.0	0.29	B	11.8	0.34	A	9.8	0.32
	WB L	A	4.3	0.01	A	4.6	<0.01	A	6.4	0.01	A	7.0	<0.01	A	9.3	0.01	A	7.5	<0.01
	WB T/R	A	5.8	0.29	A	6.8	0.36	A	9.5	0.42	B	13.8	0.63	B	15.6	0.59	B	17.5	0.74
	NB L	B	17.9	0.01	B	17.7	0.04	B	14.8	0.01	B	14.8	0.03	B	11.3	<0.01	B	14.5	0.02
	NB T/R	B	17.9	0.01	B	17.5	0.01	B	14.8	0.01	B	14.7	0.01	B	11.3	0.01	B	14.3	<0.01
	SB L	C	20.9	0.47	C	24.7	0.64	C	20.6	0.61	C	28.6	0.79	C	24.1	0.79	D	35.0	0.86
	SB T/R	B	18.4	0.12	B	17.9	0.08	B	15.4	0.12	B	15.2	0.09	B	12.0	0.14	B	14.9	0.11
	Intersection	A	9.6	0.33	B	10.7	0.43	B	12.1	0.48	B	16.4	0.69	B	16.6	0.68	C	24.3	0.90
Beatty Line / Colborne (signals plus left turn lanes on approaches)	EB L													B	20.0	0.33	C	20.2	0.45
	EB R													B	19.1	0.16	B	18.1	0.12
	NB L													A	6.7	0.26	A	9.3	0.44
	SB T/R													A	8.0	0.49	A	7.7	0.42
	Intersection													B	10.9	0.45	B	10.6	0.44
Beatty Line / NWFSP East Access / Millage Lane (Signals plus left turn lanes on all approaches)	EB L							B	14.0	0.04	B	18.4	0.03	B	15.7	0.05	C	20.0	0.03
	EB T/R							B	15.4	0.31	B	19.3	0.20	B	16.7	0.24	C	20.8	0.18
	WB L							B	15.5	0.27	B	19.9	0.27	B	16.4	0.25	C	23.2	0.47
	WB T/R							B	14.2	0.09	B	19.2	0.19	B	16.0	0.10	C	20.9	0.22
	NB L							A	6.8	0.17	A	7.9	0.43	A	5.7	0.10	A	5.5	0.26
	NB T/R							A	6.3	0.15	A	6.5	0.33	A	6.1	0.20	A	6.0	0.37
	SB L							A	5.7	0.02	A	4.8	0.04	A	5.2	0.02	A	4.1	0.04
	SB T/R							A	7.2	0.28	A	5.3	0.17	A	6.7	0.29	A	4.8	0.20
	Intersection							B	10.7	0.29	B	10.5	0.39	B	10.1	0.28	A	10.0	0.39
Roundabouts																			
Beatty Line / St. Andrew (single-lane roundabout)	SB Approach	A	5.1	0.01	A	6	0.02	A	5.8	0.01	A	7.2	0.03	A	7.3	0.02	A	8.1	0.03
	EB Approach	A	6.9	0.34	A	8.4	0.41	A	8.4	0.44	B	14.4	0.66	A	9.8	0.51	C	20.6	0.78
	NB Approach	A	7.1	0.29	A	8.3	0.35	A	9.4	0.45	B	12.7	0.56	B	16.1	0.69	B	16.0	0.66
	WB Approach	A	7.0	0.31	A	8.9	0.42	A	8.5	0.38	B	12.4	0.54	B	12.4	0.50	B	15.8	0.64
Beatty Line / NWFSP East Access / Millage Lane (single-lane roundabout)	SB Approach							A	5.9	0.24	B	13.1	0.66	A	6.2	0.27	B	11.5	0.6
	EB Approach							A	5.3	0.12	A	9.5	0.27	A	5.5	0.14	A	9.3	0.30
	NB Approach							A	7.2	0.31	A	8.4	0.29	A	7.3	0.33	A	8.4	0.33
	WB Approach							B	10.2	0.44	A	6.9	0.25	A	8.1	0.30	A	6.6	0.19
Beatty Line / Colborne (single-lane roundabout)	SB Approach													A	6.6	0.29	B	17.3	0.73
	EB Approach													A	4.9	<0.01	A	7.8	0.01
	NB Approach													B	11.1	0.56	B	11.1	0.52
	WB Approach													B	12.3	0.50	A	9.8	0.43
Critical Movements																			

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix E

Detailed Synchro Reports – Existing (2015) Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	215	2	5	168	19	2	3	2	17	9	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	50	234	2	5	183	21	2	3	2	18	10	109
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	203			236			652	549	235	542	540	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	203			236			652	549	235	542	540	193
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			99	99	100	96	98	87
cM capacity (veh/h)	1368			1331			316	425	804	433	431	849

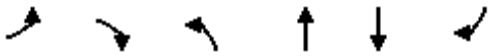
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	286	209	8	137
Volume Left	50	5	2	18
Volume Right	2	21	2	109
cSH	1368	1331	441	708
Volume to Capacity	0.04	0.00	0.02	0.19
Queue Length 95th (m)	0.9	0.1	0.4	5.4
Control Delay (s)	1.6	0.2	13.3	11.3
Lane LOS	A	A	B	B
Approach Delay (s)	1.6	0.2	13.3	11.3
Approach LOS			B	B

Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	42.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	58	38	52	32	49	80
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)	63	41	57	35	53	87
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	267	74			91	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267	74			91	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	96			96	
cM capacity (veh/h)	696	988			1504	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	104	91	140
Volume Left	63	0	53
Volume Right	41	35	0
cSH	788	1700	1504
Volume to Capacity	0.13	0.05	0.04
Queue Length 95th (m)	3.5	0.0	0.8
Control Delay (s)	10.3	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	28	50	39	56	86	42
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)	30	54	42	61	93	46
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	262	116	139			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262	116	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 %	96	94	97			
cM capacity (veh/h)	706	936	1444			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	103	139
Volume Left	30	42	0
Volume Right	54	0	46
cSH	838	1444	1700
Volume to Capacity	0.10	0.03	0.08
Queue Length 95th (m)	2.6	0.7	0.0
Control Delay (s)	9.8	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.8	3.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	37	20	59	22	10	91
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)	40	22	64	24	11	99
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	197	76			88	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	197	76			88	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			99	
cM capacity (veh/h)	786	985			1508	

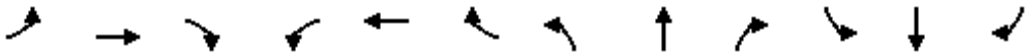
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	62	88	110
Volume Left	40	0	11
Volume Right	22	24	0
cSH	846	1700	1508
Volume to Capacity	0.07	0.05	0.01
Queue Length 95th (m)	1.8	0.0	0.2
Control Delay (s)	9.6	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.6	0.0	0.8
Approach LOS	A		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	19	6	58	11	5	72
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)	21	7	63	12	5	78
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	158	69			75	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158	69			75	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	830	994			1524	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	75	84
Volume Left	21	0	5
Volume Right	7	12	0
cSH	864	1700	1524
Volume to Capacity	0.03	0.04	0.00
Queue Length 95th (m)	0.7	0.0	0.1
Control Delay (s)	9.3	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	59	33	5	74	6	46	13	5	4	39	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	64	36	5	80	7	50	14	5	4	42	10
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	87			100			212	184	82	193	199	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	87			100			212	184	82	193	199	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			93	98	99	99	94	99
cM capacity (veh/h)	1509			1493			700	706	978	747	693	976

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	102	92	70	57
Volume Left	2	5	50	4
Volume Right	36	7	5	10
cSH	1509	1493	718	734
Volume to Capacity	0.00	0.00	0.10	0.08
Queue Length 95th (m)	0.0	0.1	2.4	1.9
Control Delay (s)	0.2	0.5	10.6	10.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.5	10.6	10.3
Approach LOS			B	B

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	68	11	18	63	1	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	12	20	68	1	11
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			86		188	80
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			86		188	80
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1510		791	980

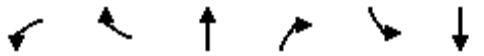
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	86	88	12
Volume Left	0	20	1
Volume Right	12	0	11
cSH	1700	1510	959
Volume to Capacity	0.05	0.01	0.01
Queue Length 95th (m)	0.0	0.3	0.3
Control Delay (s)	0.0	1.7	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.7	8.8
Approach LOS			A

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		21.0%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	87	236	1	1	234	23	8	2	2	39	2	96
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	95	257	1	1	254	25	9	2	2	42	2	104
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	279			258			821	728	257	718	716	267
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279			258			821	728	257	718	716	267
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			96	99	100	87	99	86
cM capacity (veh/h)	1283			1307			238	324	782	322	329	772

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	352	280	13	149
Volume Left	95	1	9	42
Volume Right	1	25	2	104
cSH	1283	1307	284	544
Volume to Capacity	0.07	0.00	0.05	0.27
Queue Length 95th (m)	1.8	0.0	1.1	8.4
Control Delay (s)	2.7	0.0	18.3	14.1
Lane LOS	A	A	C	B
Approach Delay (s)	2.7	0.0	18.3	14.1
Approach LOS			C	B

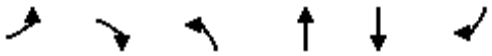
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	49.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	62	42	120	64	32	88
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)	67	46	130	70	35	96
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	330	165			200	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	165			200	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	95			97	
cM capacity (veh/h)	647	879			1372	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	113	200	130
Volume Left	67	0	35
Volume Right	46	70	0
cSH	725	1700	1372
Volume to Capacity	0.16	0.12	0.03
Queue Length 95th (m)	4.2	0.0	0.6
Control Delay (s)	10.9	0.0	2.2
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	2.2
Approach LOS	B		

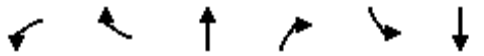
Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		32.6%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	45	38	145	81	48
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)	54	49	41	158	88	52
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	354	114	140			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	114	140			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	95	97			
cM capacity (veh/h)	625	938	1443			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	103	199	140
Volume Left	54	41	0
Volume Right	49	0	52
cSH	743	1443	1700
Volume to Capacity	0.14	0.03	0.08
Queue Length 95th (m)	3.7	0.7	0.0
Control Delay (s)	10.6	1.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	1.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	46	5	114	78	17	80
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)	50	5	124	85	18	87
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	290	166			209	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	166			209	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	691	878			1362	

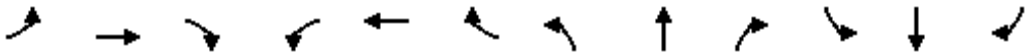
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	55	209	105
Volume Left	50	0	18
Volume Right	5	85	0
cSH	706	1700	1362
Volume to Capacity	0.08	0.12	0.01
Queue Length 95th (m)	1.9	0.0	0.3
Control Delay (s)	10.5	0.0	1.4
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	1.4
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	11	99	20	3	68
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)	15	12	108	22	3	74
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	199	118			129	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	199	118			129	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	788	933			1456	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	129	77
Volume Left	15	0	3
Volume Right	12	22	0
cSH	846	1700	1456
Volume to Capacity	0.03	0.08	0.00
Queue Length 95th (m)	0.8	0.0	0.1
Control Delay (s)	9.4	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	16.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	85	41	3	58	8	55	47	8	3	27	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	92	45	3	63	9	60	51	9	3	29	2
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	72			137			212	199	115	229	217	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72			137			212	199	115	229	217	67
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			92	93	99	100	96	100
cM capacity (veh/h)	1528			1447			716	693	938	676	678	996

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	140	75	120	35
Volume Left	3	3	60	3
Volume Right	45	9	9	2
cSH	1528	1447	719	691
Volume to Capacity	0.00	0.00	0.17	0.05
Queue Length 95th (m)	0.0	0.1	4.5	1.2
Control Delay (s)	0.2	0.3	11.0	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.3	11.0	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	27.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	81	5	4	83	8	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	5	4	90	9	15
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			93		190	91
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			93		190	91
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	98
cM capacity (veh/h)			1501		797	967

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	93	95	24
Volume Left	0	4	9
Volume Right	5	0	15
cSH	1700	1501	897
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (m)	0.0	0.1	0.6
Control Delay (s)	0.0	0.4	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.1
Approach LOS			A

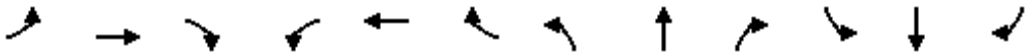
Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)		15	

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix F

Detailed Synchro Reports – Background Traffic



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	222	2	6	174	128	2	3	2	70	9	121
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	59	241	2	7	189	139	2	3	2	76	10	132
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	328			243			768	701	242	635	633	259
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			243			768	701	242	635	633	259
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			99	99	100	80	97	83
cM capacity (veh/h)	1231			1323			249	344	796	372	376	780

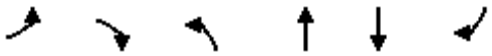
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	302	335	8	217
Volume Left	59	7	2	76
Volume Right	2	139	2	132
cSH	1231	1323	363	544
Volume to Capacity	0.05	0.00	0.02	0.40
Queue Length 95th (m)	1.1	0.1	0.5	14.5
Control Delay (s)	1.9	0.2	15.1	15.9
Lane LOS	A	A	C	C
Approach Delay (s)	1.9	0.2	15.1	15.9
Approach LOS			C	C

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	59.0%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	71	41	76	36	59	154
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)	77	45	83	39	64	167
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	398	102			122	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	102			122	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	95			96	
cM capacity (veh/h)	581	953			1466	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	122	122	232
Volume Left	77	0	64
Volume Right	45	39	0
cSH	678	1700	1466
Volume to Capacity	0.18	0.07	0.04
Queue Length 95th (m)	4.9	0.0	1.0
Control Delay (s)	11.5	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	2.4
Approach LOS	B		

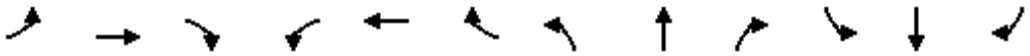
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	38	52	40	82	169	71
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)	41	57	43	89	184	77
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	398	222	261			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	222	261			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	93	97			
cM capacity (veh/h)	587	817	1304			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	98	133	261
Volume Left	41	43	0
Volume Right	57	0	77
cSH	701	1304	1700
Volume to Capacity	0.14	0.03	0.15
Queue Length 95th (m)	3.7	0.8	0.0
Control Delay (s)	11.0	2.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.0	2.8	0.0
Approach LOS	B		

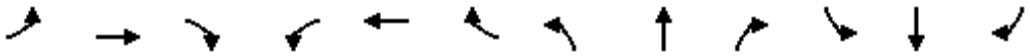
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	16	45	0	23	4	86	29	12	180	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	17	49	0	25	4	93	32	13	196	0
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	365	355	196	357	340	109	196			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365	355	196	357	340	109	196			125		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	92	100	97	100			99		
cM capacity (veh/h)	570	563	846	581	575	944	1377			1462		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	74	129	209
Volume Left	0	49	4	13
Volume Right	17	25	32	0
cSH	846	668	1377	1462
Volume to Capacity	0.02	0.11	0.00	0.01
Queue Length 95th (m)	0.5	2.8	0.1	0.2
Control Delay (s)	9.3	11.1	0.3	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.3	11.1	0.3	0.5
Approach LOS	A	B		

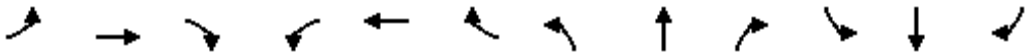
Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	31.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	16	39	38	4	18	11	70	17	9	103	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	17	42	41	4	20	12	76	18	10	112	2
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	264	251	113	293	243	85	114			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264	251	113	293	243	85	114			95		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	97	95	93	99	98	99			99		
cM capacity (veh/h)	664	642	940	610	649	974	1475			1499		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	68	65	107	124
Volume Left	9	41	12	10
Volume Right	42	20	18	2
cSH	803	690	1475	1499
Volume to Capacity	0.09	0.09	0.01	0.01
Queue Length 95th (m)	2.1	2.4	0.2	0.1
Control Delay (s)	9.9	10.8	0.9	0.6
Lane LOS	A	B	A	A
Approach Delay (s)	9.9	10.8	0.9	0.6
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	24.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	61	55	20	76	6	74	14	10	4	40	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	66	60	22	83	7	80	15	11	4	43	10
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	89			126			261	233	96	248	260	86
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	89			126			261	233	96	248	260	86
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			87	98	99	99	93	99
cM capacity (veh/h)	1506			1460			641	656	960	676	634	973

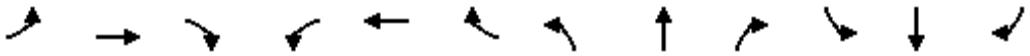
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	128	111	107	58
Volume Left	2	22	80	4
Volume Right	60	7	11	10
cSH	1506	1460	665	677
Volume to Capacity	0.00	0.01	0.16	0.09
Queue Length 95th (m)	0.0	0.3	4.3	2.1
Control Delay (s)	0.1	1.6	11.4	10.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.6	11.4	10.8
Approach LOS			B	B

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	30.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	79	48	19	93	5	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	52	21	101	5	12
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			138		254	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			138		254	112
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1446		724	941

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	138	122	17
Volume Left	0	21	5
Volume Right	52	0	12
cSH	1700	1446	860
Volume to Capacity	0.08	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.5
Control Delay (s)	0.0	1.4	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	1.4	9.3
Approach LOS			A

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		26.4%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	109	243	1	1	241	86	8	2	2	139	2	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	118	264	1	1	262	93	9	2	2	151	2	109
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	355			265			922	859	265	816	813	309
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	355			265			922	859	265	816	813	309
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			96	99	100	44	99	85
cM capacity (veh/h)	1203			1299			196	265	774	271	282	731

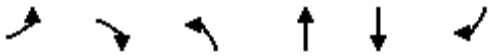
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	384	357	13	262
Volume Left	118	1	9	151
Volume Right	1	93	2	109
cSH	1203	1299	235	367
Volume to Capacity	0.10	0.00	0.06	0.71
Queue Length 95th (m)	2.5	0.0	1.3	40.5
Control Delay (s)	3.2	0.0	21.2	35.9
Lane LOS	A	A	C	E
Approach Delay (s)	3.2	0.0	21.2	35.9
Approach LOS			C	E

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	68	52	182	76	38	129
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)	74	57	198	83	41	140
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	462	239			280	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	462	239			280	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	93			97	
cM capacity (veh/h)	540	800			1282	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	130	280	182
Volume Left	74	0	41
Volume Right	57	83	0
cSH	628	1700	1282
Volume to Capacity	0.21	0.16	0.03
Queue Length 95th (m)	5.9	0.0	0.8
Control Delay (s)	12.2	0.0	2.0
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	2.0
Approach LOS	B		

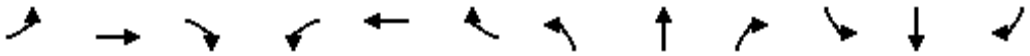
Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization		40.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	46	39	232	127	67
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)	90	50	42	252	138	73
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	511	174	211			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	511	174	211			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	94	97			
cM capacity (veh/h)	506	869	1360			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	140	295	211
Volume Left	90	42	0
Volume Right	50	0	73
cSH	595	1360	1700
Volume to Capacity	0.24	0.03	0.12
Queue Length 95th (m)	6.9	0.7	0.0
Control Delay (s)	12.9	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	12.9	1.4	0.0
Approach LOS	B		

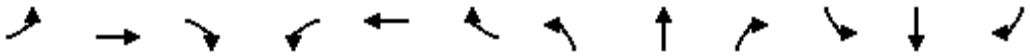
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	51	0	7	17	206	86	20	127	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	11	55	0	8	18	224	93	22	138	0
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	497	536	138	500	489	271	138			317		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497	536	138	500	489	271	138			317		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	88	100	99	99			98		
cM capacity (veh/h)	468	437	910	465	465	768	1446			1243		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	63	336	160
Volume Left	0	55	18	22
Volume Right	11	8	93	0
cSH	910	488	1446	1243
Volume to Capacity	0.01	0.13	0.01	0.02
Queue Length 95th (m)	0.3	3.4	0.3	0.4
Control Delay (s)	9.0	13.5	0.5	1.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.0	13.5	0.5	1.2
Approach LOS	A	B		

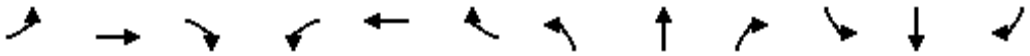
Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	24	26	17	19	43	129	41	16	82	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	11	26	28	18	21	47	140	45	17	89	10
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	415	407	94	416	390	162	99			185		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415	407	94	416	390	162	99			185		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	97	94	96	98	97			99		
cM capacity (veh/h)	504	510	963	506	522	882	1494			1390		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	67	232	116
Volume Left	5	28	47	17
Volume Right	26	21	45	10
cSH	716	588	1494	1390
Volume to Capacity	0.06	0.11	0.03	0.01
Queue Length 95th (m)	1.4	2.9	0.7	0.3
Control Delay (s)	10.3	11.9	1.7	1.2
Lane LOS	B	B	A	A
Approach Delay (s)	10.3	11.9	1.7	1.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	32.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	88	71	9	60	8	84	48	21	3	28	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	96	77	10	65	9	91	52	23	3	30	2
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	74			173			247	234	134	279	268	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			173			247	234	134	279	268	70
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			86	92	98	99	95	100
cM capacity (veh/h)	1526			1404			674	660	915	613	632	993

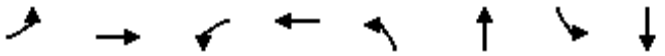
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	176	84	166	36
Volume Left	3	10	91	3
Volume Right	77	9	23	2
cSH	1526	1404	695	644
Volume to Capacity	0.00	0.01	0.24	0.06
Queue Length 95th (m)	0.0	0.2	7.1	1.3
Control Delay (s)	0.2	0.9	11.8	10.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.9	11.8	10.9
Approach LOS			B	B

Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	31.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	115	19	5	103	19	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	21	5	112	21	16
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			146		258	135
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			146		258	135
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			1436		728	913

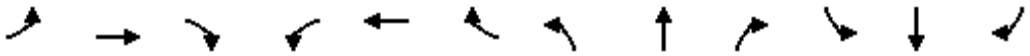
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	146	117	37
Volume Left	0	5	21
Volume Right	21	0	16
cSH	1700	1436	800
Volume to Capacity	0.09	0.00	0.05
Queue Length 95th (m)	0.0	0.1	1.1
Control Delay (s)	0.0	0.4	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.7
Approach LOS			A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		



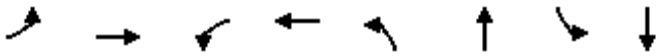
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	59	243	7	328	2	5	76	142
v/c Ratio	0.09	0.20	0.01	0.28	0.01	0.01	0.26	0.33
Control Delay	5.8	6.0	5.2	5.1	16.0	14.0	19.6	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	6.0	5.2	5.1	16.0	14.0	19.6	7.1
Queue Length 50th (m)	2.1	9.4	0.2	9.7	0.2	0.3	5.8	0.7
Queue Length 95th (m)	6.2	19.0	1.5	20.9	1.5	2.2	14.5	11.4
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	683	1215	739	1167	501	709	568	728
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.20	0.01	0.28	0.00	0.01	0.13	0.20

Intersection Summary



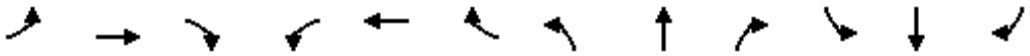
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	222	2	6	174	128	2	3	2	70	9	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.94		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1881		1789	1764		1789	1770		1789	1621	
Flt Permitted	0.56	1.00		0.61	1.00		0.67	1.00		0.75	1.00	
Satd. Flow (perm)	1059	1881		1145	1764		1255	1770		1421	1621	
Peak-hour factor, PHF	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)	59	241	2	7	189	139	2	3	2	76	10	132
RTOR Reduction (vph)	0	0	0	0	33	0	0	2	0	0	111	0
Lane Group Flow (vph)	59	243	0	7	295	0	2	3	0	76	31	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		31.1	31.1		8.2	8.2		8.2	8.2	
Effective Green, g (s)	31.1	31.1		31.1	31.1		8.2	8.2		8.2	8.2	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.16	0.16		0.16	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	642	1140		694	1069		200	282		227	259	
v/s Ratio Prot		0.13			c0.17			0.00			0.02	
v/s Ratio Perm	0.06			0.01			0.00			c0.05		
v/c Ratio	0.09	0.21		0.01	0.28		0.01	0.01		0.33	0.12	
Uniform Delay, d1	4.2	4.6		4.0	4.8		18.1	18.1		19.1	18.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.0	0.6		0.0	0.0		0.9	0.2	
Delay (s)	4.5	5.0		4.0	5.4		18.2	18.2		20.0	18.7	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		4.9			5.4			18.2			19.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



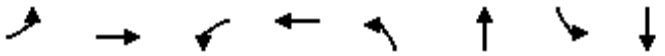
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	118	265	1	355	9	4	151	111
v/c Ratio	0.18	0.22	0.00	0.31	0.03	0.01	0.47	0.25
Control Delay	7.9	7.2	7.0	7.1	15.2	12.8	22.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	7.2	7.0	7.1	15.2	12.8	22.3	5.8
Queue Length 50th (m)	4.7	10.8	0.0	13.3	0.7	0.2	12.1	0.2
Queue Length 95th (m)	14.5	26.6	0.6	33.4	3.2	1.8	25.2	8.9
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	650	1183	706	1153	500	677	551	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.22	0.00	0.31	0.02	0.01	0.27	0.16

Intersection Summary



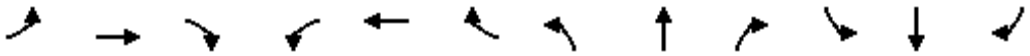
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	243	1	1	241	86	8	2	2	139	2	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1882		1789	1809		1789	1742		1789	1606	
Flt Permitted	0.55	1.00		0.60	1.00		0.69	1.00		0.76	1.00	
Satd. Flow (perm)	1033	1882		1122	1809		1291	1742		1422	1606	
Peak-hour factor, PHF	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)	118	264	1	1	262	93	9	2	2	151	2	109
RTOR Reduction (vph)	0	0	0	0	16	0	0	2	0	0	89	0
Lane Group Flow (vph)	118	265	0	1	339	0	9	2	0	151	22	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.2	31.2		31.2	31.2		9.7	9.7		9.7	9.7	
Effective Green, g (s)	31.2	31.2		31.2	31.2		9.7	9.7		9.7	9.7	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.18	0.18		0.18	0.18	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	609	1109		661	1066		236	319		260	294	
v/s Ratio Prot		0.14			c0.19			0.00			0.01	
v/s Ratio Perm	0.11			0.00			0.01			c0.11		
v/c Ratio	0.19	0.24		0.00	0.32		0.04	0.01		0.58	0.07	
Uniform Delay, d1	5.0	5.2		4.5	5.5		17.8	17.7		19.7	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.5		0.0	0.8		0.1	0.0		3.3	0.1	
Delay (s)	5.7	5.7		4.5	6.3		17.8	17.7		23.0	18.0	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		5.7			6.3			17.8			20.9	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	256	7	379	2	5	100	148
v/c Ratio	0.10	0.21	0.01	0.33	0.01	0.01	0.34	0.33
Control Delay	6.1	6.2	5.5	5.4	15.5	13.8	20.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.2	5.5	5.4	15.5	13.8	20.6	6.8
Queue Length 50th (m)	2.2	10.0	0.2	11.2	0.2	0.3	7.7	0.7
Queue Length 95th (m)	7.0	21.5	1.6	26.0	1.4	2.2	17.9	11.4
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	650	1208	727	1161	496	705	564	727
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.21	0.01	0.33	0.00	0.01	0.18	0.20

Intersection Summary



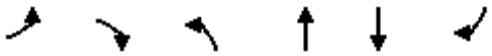
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	233	3	6	185	164	2	3	2	92	9	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.93		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1751		1789	1770		1789	1620	
Flt Permitted	0.54	1.00		0.60	1.00		0.66	1.00		0.75	1.00	
Satd. Flow (perm)	1011	1880		1131	1751		1248	1770		1421	1620	
Peak-hour factor, PHF	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)	62	253	3	7	201	178	2	3	2	100	10	138
RTOR Reduction (vph)	0	0	0	0	40	0	0	2	0	0	115	0
Lane Group Flow (vph)	62	256	0	7	339	0	2	3	0	100	33	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		31.1	31.1		8.4	8.4		8.4	8.4	
Effective Green, g (s)	31.1	31.1		31.1	31.1		8.4	8.4		8.4	8.4	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.16	0.16		0.16	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	610	1135		682	1057		203	288		231	264	
v/s Ratio Prot		0.14			c0.19			0.00			0.02	
v/s Ratio Perm	0.06			0.01			0.00			c0.07		
v/c Ratio	0.10	0.23		0.01	0.32		0.01	0.01		0.43	0.12	
Uniform Delay, d1	4.3	4.7		4.1	5.0		18.1	18.1		19.4	18.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.0	0.8		0.0	0.0		1.3	0.2	
Delay (s)	4.6	5.1		4.1	5.8		18.1	18.1		20.7	18.6	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		5.0			5.8			18.1			19.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	78	43	86	40	61	175
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)	85	47	93	43	66	190
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	438	115			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	115			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	95			95	
cM capacity (veh/h)	550	937			1447	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	132	137	257
Volume Left	85	0	66
Volume Right	47	43	0
cSH	644	1700	1447
Volume to Capacity	0.20	0.08	0.05
Queue Length 95th (m)	5.8	0.0	1.1
Control Delay (s)	12.0	0.0	2.3
Lane LOS	B		A
Approach Delay (s)	12.0	0.0	2.3
Approach LOS	B		

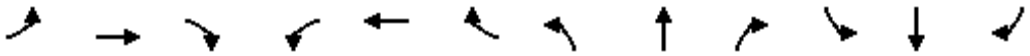
Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		36.5%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	54	42	93	189	76
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)	43	59	46	101	205	83
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	439	247	288			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	247	288			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	93	96			
cM capacity (veh/h)	555	792	1274			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	147	288
Volume Left	43	46	0
Volume Right	59	0	83
cSH	670	1274	1700
Volume to Capacity	0.15	0.04	0.17
Queue Length 95th (m)	4.1	0.8	0.0
Control Delay (s)	11.3	2.7	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	2.7	0.0
Approach LOS	B		

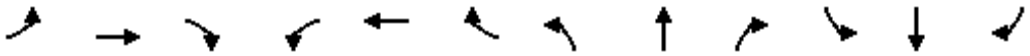
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	16	47	0	25	4	99	30	13	205	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	17	51	0	27	4	108	33	14	223	0
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	411	400	223	401	384	124	223			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	411	400	223	401	384	124	223			140		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	91	100	97	100			99		
cM capacity (veh/h)	530	531	817	542	543	927	1346			1443		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	78	145	237
Volume Left	0	51	4	14
Volume Right	17	27	33	0
cSH	817	633	1346	1443
Volume to Capacity	0.02	0.12	0.00	0.01
Queue Length 95th (m)	0.5	3.2	0.1	0.2
Control Delay (s)	9.5	11.5	0.3	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	11.5	0.3	0.5
Approach LOS	A	B		

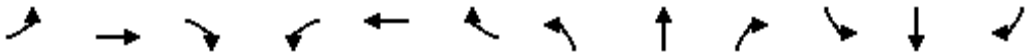
Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	16	39	39	4	18	11	81	18	9	125	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	17	42	42	4	20	12	88	20	10	136	2
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	288	137	329	279	98	138			108		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300	288	137	329	279	98	138			108		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	97	95	93	99	98	99			99		
cM capacity (veh/h)	628	613	912	575	619	958	1446			1483		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	68	66	120	148
Volume Left	9	42	12	10
Volume Right	42	20	20	2
cSH	772	656	1446	1483
Volume to Capacity	0.09	0.10	0.01	0.01
Queue Length 95th (m)	2.2	2.6	0.2	0.2
Control Delay (s)	10.1	11.1	0.8	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.1	11.1	0.8	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	25.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	64	63	26	80	6	80	14	14	4	42	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	70	68	28	87	7	87	15	15	4	46	10
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	93			138			288	258	104	278	289	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			138			288	258	104	278	289	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			86	98	98	99	92	99
cM capacity (veh/h)	1501			1446			610	633	951	641	608	968

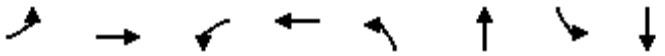
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	140	122	117	60
Volume Left	2	28	87	4
Volume Right	68	7	15	10
cSH	1501	1446	643	650
Volume to Capacity	0.00	0.02	0.18	0.09
Queue Length 95th (m)	0.0	0.5	5.0	2.3
Control Delay (s)	0.1	1.9	11.8	11.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.9	11.8	11.1
Approach LOS			B	B

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	36.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	84	62	20	99	5	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	67	22	108	5	12
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			159		276	125
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			159		276	125
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1421		703	926

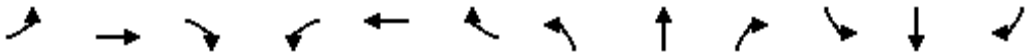
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	159	129	17
Volume Left	0	22	5
Volume Right	67	0	12
cSH	1700	1421	842
Volume to Capacity	0.09	0.02	0.02
Queue Length 95th (m)	0.0	0.4	0.5
Control Delay (s)	0.0	1.4	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	1.4	9.4
Approach LOS			A

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		27.9%	ICU Level of Service
Analysis Period (min)		15	



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	281	2	518	9	4	186	129
v/c Ratio	0.29	0.27	0.00	0.51	0.03	0.01	0.57	0.28
Control Delay	9.7	7.8	6.5	8.6	16.4	13.5	26.6	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	7.8	6.5	8.6	16.4	13.5	26.6	5.9
Queue Length 50th (m)	5.7	12.7	0.1	21.0	0.7	0.2	16.7	0.3
Queue Length 95th (m)	16.8	28.3	0.9	49.4	3.4	1.9	32.8	10.2
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	431	1047	615	1023	387	533	434	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.27	0.00	0.51	0.02	0.01	0.43	0.22

Intersection Summary



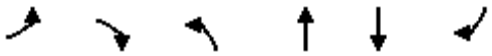
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	255	4	2	259	217	8	2	2	171	3	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.93		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1879		1789	1755		1789	1742		1789	1607	
Flt Permitted	0.41	1.00		0.59	1.00		0.67	1.00		0.76	1.00	
Satd. Flow (perm)	776	1879		1106	1755		1270	1742		1422	1607	
Peak-hour factor, PHF	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)	124	277	4	2	282	236	9	2	2	186	3	126
RTOR Reduction (vph)	0	1	0	0	46	0	0	2	0	0	97	0
Lane Group Flow (vph)	124	280	0	2	472	0	9	2	0	186	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		31.1	31.1		12.7	12.7		12.7	12.7	
Effective Green, g (s)	31.1	31.1		31.1	31.1		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.23	0.23		0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	1047		616	978		289	396		323	365	
v/s Ratio Prot		0.15			c0.27			0.00			0.02	
v/s Ratio Perm	0.16			0.00			0.01			c0.13		
v/c Ratio	0.29	0.27		0.00	0.48		0.03	0.01		0.58	0.09	
Uniform Delay, d1	6.5	6.4		5.5	7.5		16.8	16.7		19.2	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.6		0.0	1.7		0.0	0.0		2.5	0.1	
Delay (s)	8.2	7.1		5.5	9.2		16.8	16.7		21.6	17.1	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		7.4			9.2			16.8			19.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	75	54	202	83	40	143
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)	82	59	220	90	43	155
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	507	265			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	507	265			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	92			97	
cM capacity (veh/h)	507	774			1251	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	140	310	199
Volume Left	82	0	43
Volume Right	59	90	0
cSH	593	1700	1251
Volume to Capacity	0.24	0.18	0.03
Queue Length 95th (m)	7.0	0.0	0.8
Control Delay (s)	12.9	0.0	2.0
Lane LOS	B		A
Approach Delay (s)	12.9	0.0	2.0
Approach LOS	B		

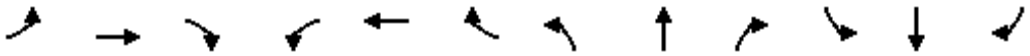
Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		42.9%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	47	41	248	139	70
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)	95	51	45	270	151	76
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	548	189	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	189	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	94	97			
cM capacity (veh/h)	481	853	1341			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	146	314	227
Volume Left	95	45	0
Volume Right	51	0	76
cSH	568	1341	1700
Volume to Capacity	0.26	0.03	0.13
Queue Length 95th (m)	7.7	0.8	0.0
Control Delay (s)	13.5	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	1.4	0.0
Approach LOS	B		

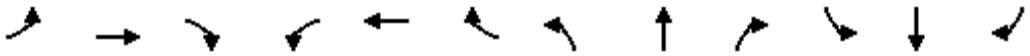
Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		44.6%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	54	0	52	17	228	91	22	144	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	11	59	0	57	18	248	99	24	157	0
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	595	588	157	549	539	297	157			347		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595	588	157	549	539	297	157			347		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	86	100	92	99			98		
cM capacity (veh/h)	375	408	889	430	435	742	1423			1212		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	115	365	180
Volume Left	0	59	18	24
Volume Right	11	57	99	0
cSH	889	542	1423	1212
Volume to Capacity	0.01	0.21	0.01	0.02
Queue Length 95th (m)	0.3	6.1	0.3	0.5
Control Delay (s)	9.1	13.4	0.5	1.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.1	13.4	0.5	1.2
Approach LOS	A	B		

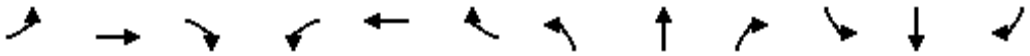
Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	24	26	17	19	43	136	42	16	95	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	11	26	28	18	21	47	148	46	17	103	10
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	437	430	108	439	412	171	113			193		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	437	430	108	439	412	171	113			193		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	97	94	96	98	97			99		
cM capacity (veh/h)	486	495	946	488	507	873	1476			1380		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	67	240	130
Volume Left	5	28	47	17
Volume Right	26	21	46	10
cSH	698	571	1476	1380
Volume to Capacity	0.06	0.12	0.03	0.01
Queue Length 95th (m)	1.5	3.0	0.7	0.3
Control Delay (s)	10.5	12.1	1.7	1.1
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	12.1	1.7	1.1
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	33.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	92	78	14	63	8	93	51	28	3	29	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	100	85	15	68	9	101	55	30	3	32	2
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	77			185			270	257	142	310	295	73
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	77			185			270	257	142	310	295	73
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			84	91	97	99	95	100
cM capacity (veh/h)	1521			1390			648	639	905	574	609	989

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	188	92	187	37
Volume Left	3	15	101	3
Volume Right	85	9	30	2
cSH	1521	1390	676	619
Volume to Capacity	0.00	0.01	0.28	0.06
Queue Length 95th (m)	0.0	0.3	8.6	1.4
Control Delay (s)	0.1	1.3	12.3	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.3	12.3	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	35.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	121	31	5	108	19	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	34	5	117	21	16
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			165		277	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		277	148
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			1413		710	898

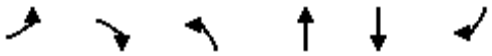
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	165	123	37
Volume Left	0	5	21
Volume Right	34	0	16
cSH	1700	1413	783
Volume to Capacity	0.10	0.00	0.05
Queue Length 95th (m)	0.0	0.1	1.1
Control Delay (s)	0.0	0.4	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		19.7%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	78	43	86	40	61	175
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)	85	47	93	43	66	190
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	438	115			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	438	115			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	95			95	
cM capacity (veh/h)	550	937			1447	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	132	137	66	190
Volume Left	85	0	66	0
Volume Right	47	43	0	0
cSH	644	1700	1447	1700
Volume to Capacity	0.20	0.08	0.05	0.11
Queue Length 95th (m)	5.8	0.0	1.1	0.0
Control Delay (s)	12.0	0.0	7.6	0.0
Lane LOS	B		A	
Approach Delay (s)	12.0	0.0	2.0	
Approach LOS	B			

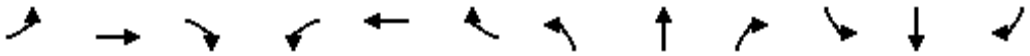
Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	54	42	93	189	76
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)	43	59	46	101	205	83
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	439	247	288			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	247	288			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	93	96			
cM capacity (veh/h)	555	792	1274			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	102	46	101	288
Volume Left	43	46	0	0
Volume Right	59	0	0	83
cSH	670	1274	1700	1700
Volume to Capacity	0.15	0.04	0.06	0.17
Queue Length 95th (m)	4.1	0.8	0.0	0.0
Control Delay (s)	11.3	7.9	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.3	2.5		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	16	47	0	25	4	99	30	13	205	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	17	51	0	27	4	108	33	14	223	0
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	395	400	223	401	384	124	223			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	395	400	223	401	384	124	223			140		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	91	100	97	100			99		
cM capacity (veh/h)	543	531	817	542	543	927	1346			1443		

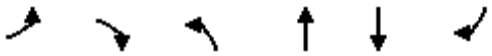
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	17	78	4	140	237
Volume Left	0	51	4	0	14
Volume Right	17	27	0	33	0
cSH	817	633	1346	1700	1443
Volume to Capacity	0.02	0.12	0.00	0.08	0.01
Queue Length 95th (m)	0.5	3.2	0.1	0.0	0.2
Control Delay (s)	9.5	11.5	7.7	0.0	0.5
Lane LOS	A	B	A		A
Approach Delay (s)	9.5	11.5	0.2		0.5
Approach LOS	A	B			

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	75	54	202	83	40	143
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)	82	59	220	90	43	155
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	507	265			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	507	265			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	92			97	
cM capacity (veh/h)	507	774			1251	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	140	310	43	155
Volume Left	82	0	43	0
Volume Right	59	90	0	0
cSH	593	1700	1251	1700
Volume to Capacity	0.24	0.18	0.03	0.09
Queue Length 95th (m)	7.0	0.0	0.8	0.0
Control Delay (s)	12.9	0.0	8.0	0.0
Lane LOS	B		A	
Approach Delay (s)	12.9	0.0	1.7	
Approach LOS	B			

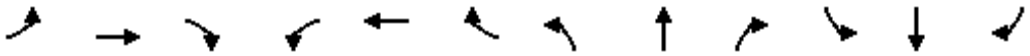
Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	47	41	248	139	70
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)	95	51	45	270	151	76
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	548	189	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	189	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	94	97			
cM capacity (veh/h)	481	853	1341			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	146	45	270	227
Volume Left	95	45	0	0
Volume Right	51	0	0	76
cSH	568	1341	1700	1700
Volume to Capacity	0.26	0.03	0.16	0.13
Queue Length 95th (m)	7.7	0.8	0.0	0.0
Control Delay (s)	13.5	7.8	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.5	1.1		0.0
Approach LOS	B			

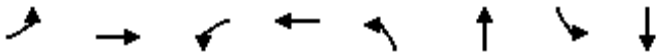
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	54	0	52	17	228	91	22	144	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	11	59	0	57	18	248	99	24	157	0
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	546	588	157	549	539	297	157			347		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	546	588	157	549	539	297	157			347		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	86	100	92	99			98		
cM capacity (veh/h)	404	408	889	430	435	742	1423			1212		

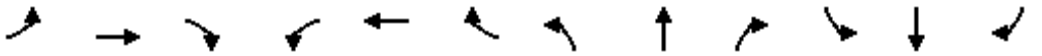
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	11	115	18	347	180
Volume Left	0	59	18	0	24
Volume Right	11	57	0	99	0
cSH	889	542	1423	1700	1212
Volume to Capacity	0.01	0.21	0.01	0.20	0.02
Queue Length 95th (m)	0.3	6.1	0.3	0.0	0.5
Control Delay (s)	9.1	13.4	7.6	0.0	1.2
Lane LOS	A	B	A		A
Approach Delay (s)	9.1	13.4	0.4		1.2
Approach LOS	A	B			

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	45.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	79	269	7	436	2	5	187	164
v/c Ratio	0.17	0.27	0.01	0.45	0.01	0.01	0.54	0.32
Control Delay	8.7	8.5	7.5	7.8	14.5	12.4	23.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	8.5	7.5	7.8	14.5	12.4	23.6	5.7
Queue Length 50th (m)	3.3	11.8	0.3	14.7	0.2	0.3	15.5	0.8
Queue Length 95th (m)	11.5	29.5	2.0	40.4	1.3	2.1	30.5	11.3
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	473	997	593	977	465	671	537	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.27	0.01	0.45	0.00	0.01	0.35	0.23

Intersection Summary



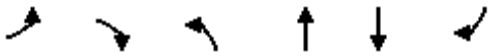
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	245	3	6	194	207	2	3	2	172	10	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.92		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1738		1789	1770		1789	1620	
Flt Permitted	0.47	1.00		0.59	1.00		0.65	1.00		0.75	1.00	
Satd. Flow (perm)	892	1880		1118	1738		1230	1770		1421	1620	
Peak-hour factor, PHF	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)	79	266	3	7	211	225	2	3	2	187	11	153
RTOR Reduction (vph)	0	0	0	0	56	0	0	2	0	0	116	0
Lane Group Flow (vph)	79	269	0	7	380	0	2	3	0	187	48	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	28.1	28.1		28.1	28.1		12.9	12.9		12.9	12.9	
Effective Green, g (s)	28.1	28.1		28.1	28.1		12.9	12.9		12.9	12.9	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.24	0.24		0.24	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	472	996		592	921		299	430		345	394	
v/s Ratio Prot		0.14			c0.22			0.00			0.03	
v/s Ratio Perm	0.09			0.01			0.00			c0.13		
v/c Ratio	0.17	0.27		0.01	0.41		0.01	0.01		0.54	0.12	
Uniform Delay, d1	6.4	6.8		5.9	7.5		15.2	15.2		17.5	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.7		0.0	1.4		0.0	0.0		1.7	0.1	
Delay (s)	7.2	7.5		5.9	8.8		15.2	15.2		19.2	15.8	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		7.4			8.8			15.2			17.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	102	57	89	48	64	205
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)	111	62	97	52	70	223
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	485	123			149	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	485	123			149	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	93			95	
cM capacity (veh/h)	515	928			1433	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	173	149	70	223
Volume Left	111	0	70	0
Volume Right	62	52	0	0
cSH	613	1700	1433	1700
Volume to Capacity	0.28	0.09	0.05	0.13
Queue Length 95th (m)	8.8	0.0	1.2	0.0
Control Delay (s)	13.2	0.0	7.6	0.0
Lane LOS	B		A	
Approach Delay (s)	13.2	0.0	1.8	
Approach LOS	B			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	61	56	109	206	79
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)	46	66	61	118	224	86
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	507	267	310			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	507	267	310			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	91	95			
cM capacity (veh/h)	500	772	1251			

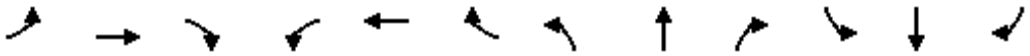
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	112	61	118	310
Volume Left	46	61	0	0
Volume Right	66	0	0	86
cSH	632	1251	1700	1700
Volume to Capacity	0.18	0.05	0.07	0.18
Queue Length 95th (m)	4.9	1.2	0.0	0.0
Control Delay (s)	11.9	8.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.9	2.7		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	16	49	0	26	4	116	31	14	222	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	17	53	0	28	4	126	34	15	241	0
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	435	440	241	441	423	143	241			160		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	435	440	241	441	423	143	241			160		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	90	100	97	100			99		
cM capacity (veh/h)	509	504	798	510	515	905	1325			1419		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	17	82	4	160	257
Volume Left	0	53	4	0	15
Volume Right	17	28	0	34	0
cSH	798	601	1325	1700	1419
Volume to Capacity	0.02	0.14	0.00	0.09	0.01
Queue Length 95th (m)	0.5	3.6	0.1	0.0	0.2
Control Delay (s)	9.6	11.9	7.7	0.0	0.5
Lane LOS	A	B	A		A
Approach Delay (s)	9.6	11.9	0.2		0.5
Approach LOS	A	B			

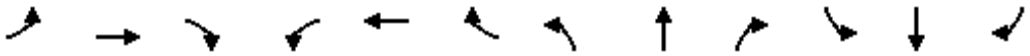
Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	16	39	40	4	19	11	98	19	10	141	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	17	42	43	4	21	12	107	21	11	153	2
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	340	327	154	368	318	117	155			127		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340	327	154	368	318	117	155			127		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	97	95	92	99	98	99			99		
cM capacity (veh/h)	590	582	892	541	589	935	1425			1459		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	68	68	139	166
Volume Left	9	43	12	11
Volume Right	42	21	21	2
cSH	743	624	1425	1459
Volume to Capacity	0.09	0.11	0.01	0.01
Queue Length 95th (m)	2.3	2.8	0.2	0.2
Control Delay (s)	10.3	11.5	0.7	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.3	11.5	0.7	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	26.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	67	71	32	84	6	92	15	21	4	44	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	73	77	35	91	7	100	16	23	4	48	10
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	98			150			314	283	111	311	318	95
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			150			314	283	111	311	318	95
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			83	97	98	99	92	99
cM capacity (veh/h)	1495			1431			581	610	942	601	583	962

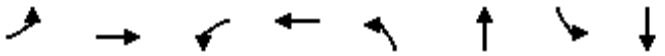
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	152	133	139	62
Volume Left	2	35	100	4
Volume Right	77	7	23	10
cSH	1495	1431	624	623
Volume to Capacity	0.00	0.02	0.22	0.10
Queue Length 95th (m)	0.0	0.6	6.5	2.5
Control Delay (s)	0.1	2.1	12.4	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	2.1	12.4	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	38.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	91	76	21	115	13	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	99	83	23	125	14	13
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			182		311	140
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		311	140
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	99
cM capacity (veh/h)			1394		670	908

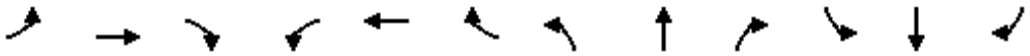
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	182	148	27
Volume Left	0	23	14
Volume Right	83	0	13
cSH	1700	1394	767
Volume to Capacity	0.11	0.02	0.04
Queue Length 95th (m)	0.0	0.4	0.8
Control Delay (s)	0.0	1.3	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	1.3	9.9
Approach LOS			A

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		30.0%	ICU Level of Service
Analysis Period (min)		15	



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	139	295	2	470	9	4	236	140
v/c Ratio	0.33	0.30	0.00	0.50	0.03	0.01	0.63	0.27
Control Delay	11.8	9.5	8.0	10.4	14.1	11.8	25.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	9.5	8.0	10.4	14.1	11.8	25.6	4.9
Queue Length 50th (m)	7.0	14.6	0.1	22.0	0.7	0.2	20.3	0.3
Queue Length 95th (m)	21.0	33.6	1.0	52.0	3.1	1.8	38.5	9.8
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	422	969	562	947	463	642	523	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.30	0.00	0.50	0.02	0.01	0.45	0.21

Intersection Summary



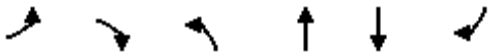
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	268	4	2	272	160	8	2	2	217	3	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.94		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1779		1789	1742		1789	1607	
Flt Permitted	0.44	1.00		0.58	1.00		0.67	1.00		0.76	1.00	
Satd. Flow (perm)	820	1880		1092	1779		1257	1742		1422	1607	
Peak-hour factor, PHF	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)	139	291	4	2	296	174	9	2	2	236	3	137
RTOR Reduction (vph)	0	1	0	0	32	0	0	1	0	0	101	0
Lane Group Flow (vph)	139	294	0	2	438	0	9	3	0	236	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	28.1	28.1		28.1	28.1		14.4	14.4		14.4	14.4	
Effective Green, g (s)	28.1	28.1		28.1	28.1		14.4	14.4		14.4	14.4	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	969		563	917		332	460		375	424	
v/s Ratio Prot		0.16			c0.25			0.00			0.02	
v/s Ratio Perm	0.17			0.00			0.01			c0.17		
v/c Ratio	0.33	0.30		0.00	0.48		0.03	0.01		0.63	0.09	
Uniform Delay, d1	7.7	7.6		6.4	8.5		14.9	14.8		17.7	15.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.8		0.0	1.8		0.0	0.0		3.3	0.1	
Delay (s)	9.8	8.4		6.4	10.3		14.9	14.8		21.0	15.2	
Level of Service	A	A		A	B		B	B		C	B	
Approach Delay (s)		8.8			10.2			14.9			18.8	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	54.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	94	65	209	109	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)	102	71	227	118	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	557	286			346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	557	286			346	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	91			96	
cM capacity (veh/h)	473	753			1213	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	173	346	45	182
Volume Left	102	0	45	0
Volume Right	71	118	0	0
cSH	558	1700	1213	1700
Volume to Capacity	0.31	0.20	0.04	0.11
Queue Length 95th (m)	10.0	0.0	0.9	0.0
Control Delay (s)	14.3	0.0	8.1	0.0
Lane LOS	B		A	
Approach Delay (s)	14.3	0.0	1.6	
Approach LOS	B			

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	90	63	51	271	161	73
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)	98	68	55	295	175	79
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	620	215	254			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	620	215	254			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	92	96			
cM capacity (veh/h)	432	825	1311			

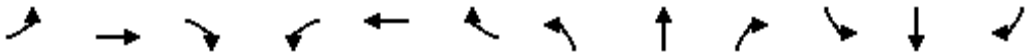
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	166	55	295	254
Volume Left	98	55	0	0
Volume Right	68	0	0	79
cSH	538	1311	1700	1700
Volume to Capacity	0.31	0.04	0.17	0.15
Queue Length 95th (m)	9.9	1.0	0.0	0.0
Control Delay (s)	14.7	7.9	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.7	1.2		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	10	56	0	52	17	250	95	22	166	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	11	61	0	57	18	272	103	24	180	0
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	593	640	180	599	589	323	180			375		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	593	640	180	599	589	323	180			375		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	85	100	92	99			98		
cM capacity (veh/h)	374	380	862	398	407	718	1395			1183		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	11	117	18	375	204
Volume Left	0	61	18	0	24
Volume Right	11	57	0	103	0
cSH	862	506	1395	1700	1183
Volume to Capacity	0.01	0.23	0.01	0.22	0.02
Queue Length 95th (m)	0.3	6.8	0.3	0.0	0.5
Control Delay (s)	9.2	14.2	7.6	0.0	1.1
Lane LOS	A	B	A		A
Approach Delay (s)	9.2	14.2	0.4		1.1
Approach LOS	A	B			

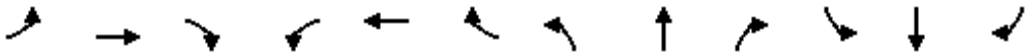
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	10	24	27	17	20	43	154	43	17	117	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	11	26	29	18	22	47	167	47	18	127	10
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	484	477	132	485	458	191	137			214		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484	477	132	485	458	191	137			214		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	98	97	94	96	97	97			99		
cM capacity (veh/h)	450	465	917	454	476	851	1447			1356		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	70	261	155
Volume Left	5	29	47	18
Volume Right	26	22	47	10
cSH	664	539	1447	1356
Volume to Capacity	0.06	0.13	0.03	0.01
Queue Length 95th (m)	1.6	3.4	0.8	0.3
Control Delay (s)	10.8	12.7	1.6	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	12.7	1.6	1.0
Approach LOS	B	B		

Intersection Summary				
Average Delay			3.6	
Intersection Capacity Utilization			35.7%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	96	86	23	66	8	104	54	36	3	31	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	104	93	25	72	9	113	59	39	3	34	2
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	80			198			303	288	151	352	330	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	80			198			303	288	151	352	330	76
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			81	90	96	99	94	100
cM capacity (veh/h)	1517			1375			610	609	895	526	577	985

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	201	105	211	39
Volume Left	3	25	113	3
Volume Right	93	9	39	2
cSH	1517	1375	648	586
Volume to Capacity	0.00	0.02	0.33	0.07
Queue Length 95th (m)	0.0	0.4	10.7	1.6
Control Delay (s)	0.1	1.9	13.2	11.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.9	13.2	11.6
Approach LOS			B	B

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	42.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	139	43	6	120	31	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	47	7	130	34	17
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			198		318	174
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			198		318	174
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	98
cM capacity (veh/h)			1375		672	869

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	198	137	51
Volume Left	0	7	34
Volume Right	47	0	17
cSH	1700	1375	728
Volume to Capacity	0.12	0.00	0.07
Queue Length 95th (m)	0.0	0.1	1.7
Control Delay (s)	0.0	0.4	10.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	10.3
Approach LOS			B

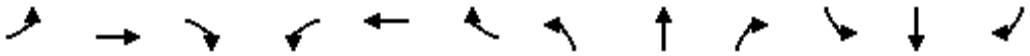
Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		21.2%	ICU Level of Service A
Analysis Period (min)		15	

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix G

Detailed Synchro/Sidra Reports – Total Traffic



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	222	2	6	174	141	2	3	2	105	9	129
Future Volume (Veh/h)	56	222	2	6	174	141	2	3	2	105	9	129
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	61	241	2	7	189	153	2	3	2	114	10	140
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	342			243			788	720	242	647	644	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	342			243			788	720	242	647	644	266
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			99	99	100	69	97	82
cM capacity (veh/h)	1217			1323			237	334	797	364	369	773

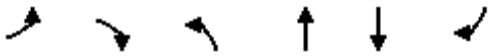
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	304	349	7	264
Volume Left	61	7	2	114
Volume Right	2	153	2	140
cSH	1217	1323	351	507
Volume to Capacity	0.05	0.01	0.02	0.52
Queue Length 95th (m)	1.2	0.1	0.5	22.6
Control Delay (s)	2.0	0.2	15.5	19.6
Lane LOS	A	A	C	C
Approach Delay (s)	2.0	0.2	15.5	19.6
Approach LOS			C	C

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	71	51	90	36	73	196
Future Volume (Veh/h)	71	51	90	36	73	196
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)	77	55	98	39	79	213
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	488	118			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488	118			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	94			95	
cM capacity (veh/h)	509	934			1447	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	132	137	292
Volume Left	77	0	79
Volume Right	55	39	0
cSH	628	1700	1447
Volume to Capacity	0.21	0.08	0.05
Queue Length 95th (m)	6.0	0.0	1.3
Control Delay (s)	12.2	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	2.4
Approach LOS	B		

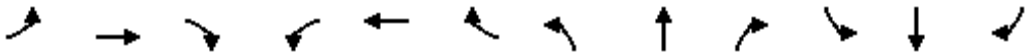
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	52	40	106	225	105
Future Volume (Veh/h)	53	52	40	106	225	105
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)	58	57	43	115	245	114
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	503	302	359			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503	302	359			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	92	96			
cM capacity (veh/h)	509	738	1200			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	115	158	359
Volume Left	58	43	0
Volume Right	57	0	114
cSH	602	1200	1700
Volume to Capacity	0.19	0.04	0.21
Queue Length 95th (m)	5.3	0.8	0.0
Control Delay (s)	12.4	2.4	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	2.4	0.0
Approach LOS	B		

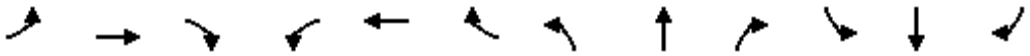
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	19	104	45	18	23	43	86	29	12	183	14
Future Volume (Veh/h)	12	19	104	45	18	23	43	86	29	12	183	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	13	21	113	49	20	25	47	93	32	13	199	15
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	470	452	206	559	443	109	214			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	470	452	206	559	443	109	214			125		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	86	86	96	97	97			99		
cM capacity (veh/h)	459	482	834	355	487	945	1356			1462		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	94	172	227
Volume Left	13	49	47	13
Volume Right	113	25	32	15
cSH	709	458	1356	1462
Volume to Capacity	0.21	0.21	0.03	0.01
Queue Length 95th (m)	5.9	5.8	0.8	0.2
Control Delay (s)	11.4	14.9	2.3	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.4	14.9	2.3	0.5
Approach LOS	B	B		

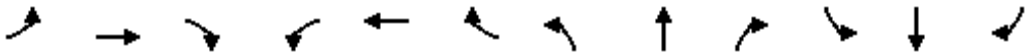
Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	45.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	22	42	44	6	18	11	79	20	9	111	7
Future Volume (Veh/h)	20	22	42	44	6	18	11	79	20	9	111	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	22	24	46	48	7	20	12	86	22	10	121	8
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	290	277	125	324	270	97	129			108		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	290	277	125	324	270	97	129			108		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	96	95	92	99	98	99			99		
cM capacity (veh/h)	636	621	926	574	627	959	1457			1483		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	75	120	139
Volume Left	22	48	12	10
Volume Right	46	20	22	8
cSH	748	648	1457	1483
Volume to Capacity	0.12	0.12	0.01	0.01
Queue Length 95th (m)	3.2	3.0	0.2	0.2
Control Delay (s)	10.5	11.3	0.8	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	11.3	0.8	0.6
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	24.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	61	60	28	76	6	87	14	18	4	40	9
Future Volume (Veh/h)	2	61	60	28	76	6	87	14	18	4	40	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	66	65	30	83	7	95	15	20	4	43	10
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	90			131			280	252	98	276	282	86
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	90			131			280	252	98	276	282	86
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			85	98	98	99	93	99
cM capacity (veh/h)	1505			1454			619	637	957	639	613	972

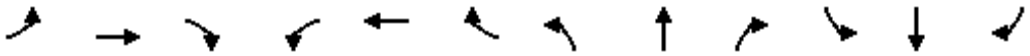
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	133	120	130	57
Volume Left	2	30	95	4
Volume Right	65	7	20	10
cSH	1505	1454	657	658
Volume to Capacity	0.00	0.02	0.20	0.09
Queue Length 95th (m)	0.0	0.5	5.6	2.2
Control Delay (s)	0.1	2.0	11.8	11.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	2.0	11.8	11.0
Approach LOS			B	B

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	36.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	94	57	19	127	5	11
Future Volume (Veh/h)	94	57	19	127	5	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	102	62	21	138	5	12
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			164		313	133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			164		313	133
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1414		670	916

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	164	159	17
Volume Left	0	21	5
Volume Right	62	0	12
cSH	1700	1414	827
Volume to Capacity	0.10	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.5
Control Delay (s)	0.0	1.1	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	1.1	9.4
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	243	1	1	241	124	8	2	2	160	2	106
Future Volume (Veh/h)	117	243	1	1	241	124	8	2	2	160	2	106
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	127	264	1	1	262	135	9	2	2	174	2	115
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	397			265			966	918	264	853	850	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397			265			966	918	264	853	850	330
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			95	99	100	31	99	84
cM capacity (veh/h)	1162			1299			179	242	774	253	265	712

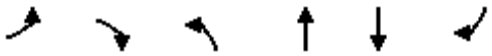
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	392	398	13	291
Volume Left	127	1	9	174
Volume Right	1	135	2	115
cSH	1162	1299	212	340
Volume to Capacity	0.11	0.00	0.06	0.86
Queue Length 95th (m)	2.8	0.0	1.5	59.4
Control Delay (s)	3.5	0.0	23.1	54.8
Lane LOS	A	A	C	F
Approach Delay (s)	3.5	0.0	23.1	54.8
Approach LOS			C	F

Intersection Summary			
Average Delay	16.1		
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	68	65	228	76	49	155
Future Volume (Veh/h)	68	65	228	76	49	155
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)	74	71	248	83	53	168
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	564	290			331	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	564	290			331	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	91			96	
cM capacity (veh/h)	466	750			1228	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	145	331	221
Volume Left	74	0	53
Volume Right	71	83	0
cSH	572	1700	1228
Volume to Capacity	0.25	0.19	0.04
Queue Length 95th (m)	7.6	0.0	1.0
Control Delay (s)	13.4	0.0	2.2
Lane LOS	B		A
Approach Delay (s)	13.4	0.0	2.2
Approach LOS	B		

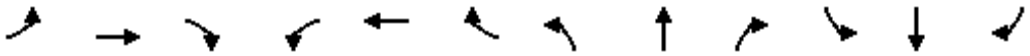
Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	46	39	291	162	88
Future Volume (Veh/h)	115	46	39	291	162	88
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)	125	50	42	316	176	96
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	624	224	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	624	224	272			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	94	97			
cM capacity (veh/h)	435	815	1291			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	175	358	272
Volume Left	125	42	0
Volume Right	50	0	96
cSH	502	1291	1700
Volume to Capacity	0.35	0.03	0.16
Queue Length 95th (m)	11.8	0.8	0.0
Control Delay (s)	16.0	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.0	1.2	0.0
Approach LOS	C		

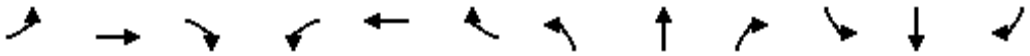
Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	11	64	51	17	7	108	206	86	20	129	10
Future Volume (Veh/h)	6	11	64	51	17	7	108	206	86	20	129	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	12	70	55	18	8	117	224	93	22	140	11
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	711	740	146	770	700	270	151			317		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	711	740	146	770	700	270	151			317		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	96	92	79	95	99	92			98		
cM capacity (veh/h)	305	311	902	263	328	768	1430			1243		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	89	81	434	173
Volume Left	7	55	117	22
Volume Right	70	8	93	11
cSH	639	295	1430	1243
Volume to Capacity	0.14	0.27	0.08	0.02
Queue Length 95th (m)	3.7	8.3	2.0	0.4
Control Delay (s)	11.5	21.7	2.7	1.1
Lane LOS	B	C	A	A
Approach Delay (s)	11.5	21.7	2.7	1.1
Approach LOS	B	C		

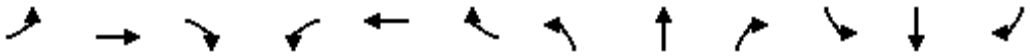
Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	51.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	13	26	28	25	19	43	133	43	16	90	22
Future Volume (Veh/h)	13	13	26	28	25	19	43	133	43	16	90	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	14	28	30	27	21	47	145	47	17	98	24
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	441	430	110	442	418	168	122			192		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441	430	110	442	418	168	122			192		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	97	94	95	98	97			99		
cM capacity (veh/h)	476	495	943	483	502	876	1465			1381		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	56	78	239	139
Volume Left	14	30	47	17
Volume Right	28	21	47	24
cSH	641	558	1465	1381
Volume to Capacity	0.09	0.14	0.03	0.01
Queue Length 95th (m)	2.2	3.7	0.8	0.3
Control Delay (s)	11.2	12.5	1.7	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	11.2	12.5	1.7	1.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	31.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	88	84	17	60	8	91	49	26	3	28	2
Future Volume (Veh/h)	3	88	84	17	60	8	91	49	26	3	28	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	96	91	18	65	9	99	53	28	3	30	2
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	74			187			270	258	142	308	298	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			187			270	258	142	308	298	70
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			85	92	97	99	95	100
cM capacity (veh/h)	1526			1387			648	637	906	579	604	993

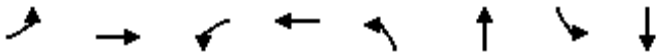
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	190	92	180	35
Volume Left	3	18	99	3
Volume Right	91	9	28	2
cSH	1526	1387	674	616
Volume to Capacity	0.00	0.01	0.27	0.06
Queue Length 95th (m)	0.0	0.3	8.2	1.4
Control Delay (s)	0.1	1.6	12.3	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.6	12.3	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	36.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	147	49	5	124	19	15
Future Volume (Veh/h)	147	49	5	124	19	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	160	53	5	135	21	16
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			213		332	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			213		332	186
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			1357		661	856

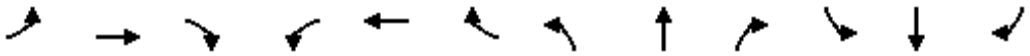
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	213	140	37
Volume Left	0	5	21
Volume Right	53	0	16
cSH	1700	1357	733
Volume to Capacity	0.13	0.00	0.05
Queue Length 95th (m)	0.0	0.1	1.2
Control Delay (s)	0.0	0.3	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	10.2
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	243	7	342	2	5	114	150
v/c Ratio	0.09	0.20	0.01	0.30	0.01	0.01	0.37	0.33
Control Delay	6.5	6.5	6.0	5.5	15.5	13.4	20.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	6.5	6.0	5.5	15.5	13.4	20.9	6.6
Queue Length 50th (m)	2.2	9.4	0.2	10.0	0.2	0.3	8.9	0.7
Queue Length 95th (m)	7.4	22.2	1.7	25.3	1.4	2.2	19.8	11.2
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	666	1200	730	1153	491	699	560	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.20	0.01	0.30	0.00	0.01	0.20	0.21

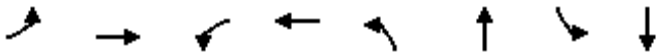
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	222	2	6	174	141	2	3	2	105	9	129
Future Volume (vph)	56	222	2	6	174	141	2	3	2	105	9	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.93		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1881		1789	1757		1789	1770		1789	1620	
Flt Permitted	0.56	1.00		0.61	1.00		0.66	1.00		0.75	1.00	
Satd. Flow (perm)	1046	1881		1145	1757		1246	1770		1421	1620	
Peak-hour factor, PHF	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)	61	241	2	7	189	153	2	3	2	114	10	140
RTOR Reduction (vph)	0	0	0	0	37	0	0	2	0	0	116	0
Lane Group Flow (vph)	61	243	0	7	305	0	2	3	0	114	34	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.1	31.1		31.1	31.1		8.9	8.9		8.9	8.9	
Effective Green, g (s)	31.1	31.1		31.1	31.1		8.9	8.9		8.9	8.9	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	625	1124		684	1050		213	302		243	277	
v/s Ratio Prot		0.13			c0.17			0.00			0.02	
v/s Ratio Perm	0.06			0.01			0.00			c0.08		
v/c Ratio	0.10	0.22		0.01	0.29		0.01	0.01		0.47	0.12	
Uniform Delay, d1	4.5	4.8		4.2	5.1		17.9	17.9		19.4	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.0	0.7		0.0	0.0		1.4	0.2	
Delay (s)	4.8	5.3		4.3	5.8		17.9	17.9		20.9	18.4	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		5.2			5.8			17.9			19.5	
Approach LOS		A			A			B			B	

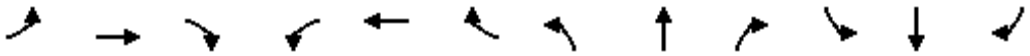
Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	265	1	397	9	4	174	117
v/c Ratio	0.21	0.23	0.00	0.35	0.03	0.01	0.51	0.25
Control Delay	8.7	7.7	7.0	7.6	14.9	12.2	23.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	7.7	7.0	7.6	14.9	12.2	23.1	5.5
Queue Length 50th (m)	5.4	11.3	0.0	15.4	0.7	0.2	14.2	0.2
Queue Length 95th (m)	16.7	28.2	0.7	39.4	3.2	1.8	28.6	9.0
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	612	1170	698	1133	492	668	544	686
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.23	0.00	0.35	0.02	0.01	0.32	0.17

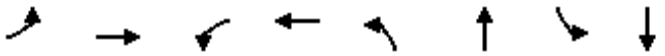
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	243	1	1	241	124	8	2	2	160	2	106
Future Volume (vph)	117	243	1	1	241	124	8	2	2	160	2	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.95		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1882		1789	1787		1789	1742		1789	1606	
Flt Permitted	0.52	1.00		0.60	1.00		0.68	1.00		0.76	1.00	
Satd. Flow (perm)	984	1882		1122	1787		1284	1742		1422	1606	
Peak-hour factor, PHF	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)	127	264	1	1	262	135	9	2	2	174	2	115
RTOR Reduction (vph)	0	0	0	0	24	0	0	2	0	0	93	0
Lane Group Flow (vph)	127	265	0	1	373	0	9	2	0	174	24	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.3	31.3		31.3	31.3		10.3	10.3		10.3	10.3	
Effective Green, g (s)	31.3	31.3		31.3	31.3		10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.19	0.19		0.19	0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	574	1099		655	1043		246	334		273	308	
v/s Ratio Prot		0.14			c0.21			0.00			0.02	
v/s Ratio Perm	0.13			0.00			0.01			c0.12		
v/c Ratio	0.22	0.24		0.00	0.36		0.04	0.01		0.64	0.08	
Uniform Delay, d1	5.3	5.4		4.6	5.9		17.6	17.5		19.9	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		0.0	1.0		0.1	0.0		4.8	0.1	
Delay (s)	6.2	5.9		4.6	6.8		17.7	17.5		24.7	17.9	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		6.0			6.8			17.6			22.0	
Approach LOS		A			A			B			C	

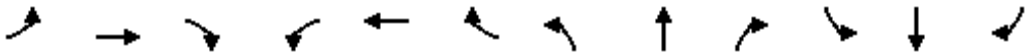
Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	68	256	7	442	2	5	227	171
v/c Ratio	0.15	0.26	0.01	0.46	0.01	0.01	0.61	0.32
Control Delay	9.3	9.1	8.2	8.2	14.0	12.0	25.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	9.1	8.2	8.2	14.0	12.0	25.1	5.3
Queue Length 50th (m)	3.1	12.2	0.3	15.4	0.2	0.3	19.4	0.7
Queue Length 95th (m)	10.5	29.1	2.1	41.1	1.3	2.0	36.9	11.3
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	449	973	585	959	451	655	524	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.26	0.01	0.46	0.00	0.01	0.43	0.24

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	233	3	6	185	222	2	3	2	209	9	148
Future Volume (vph)	63	233	3	6	185	222	2	3	2	209	9	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.92		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1729		1789	1770		1789	1617	
Flt Permitted	0.46	1.00		0.60	1.00		0.65	1.00		0.75	1.00	
Satd. Flow (perm)	868	1880		1131	1729		1223	1770		1421	1617	
Peak-hour factor, PHF	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)	68	253	3	7	201	241	2	3	2	227	10	161
RTOR Reduction (vph)	0	0	0	0	65	0	0	1	0	0	119	0
Lane Group Flow (vph)	68	256	0	7	377	0	2	4	0	227	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	28.1	28.1		28.1	28.1		14.2	14.2		14.2	14.2	
Effective Green, g (s)	28.1	28.1		28.1	28.1		14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	449	972		585	894		319	462		371	422	
v/s Ratio Prot		0.14			c0.22			0.00			0.03	
v/s Ratio Perm	0.08			0.01			0.00			c0.16		
v/c Ratio	0.15	0.26		0.01	0.42		0.01	0.01		0.61	0.12	
Uniform Delay, d1	6.9	7.3		6.4	8.1		14.8	14.8		17.6	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.7		0.0	1.5		0.0	0.0		3.0	0.1	
Delay (s)	7.6	8.0		6.4	9.5		14.8	14.8		20.6	15.4	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		7.9			9.5			14.8			18.4	
Approach LOS		A			A			B			B	

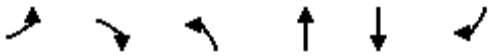
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	78	62	127	40	103	312
Future Volume (Veh/h)	78	62	127	40	103	312
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)	85	67	138	43	112	339
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	722	160			181	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	722	160			181	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	92			92	
cM capacity (veh/h)	362	886			1394	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	152	181	451
Volume Left	85	0	112
Volume Right	67	43	0
cSH	489	1700	1394
Volume to Capacity	0.31	0.11	0.08
Queue Length 95th (m)	10.0	0.0	2.0
Control Delay (s)	15.6	0.0	2.5
Lane LOS	C		A
Approach Delay (s)	15.6	0.0	2.5
Approach LOS	C		

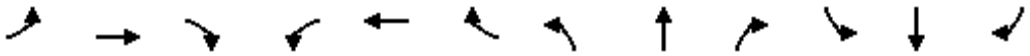
Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	54	42	153	368	177
Future Volume (Veh/h)	76	54	42	153	368	177
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)	83	59	46	166	400	192
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	754	496	592			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	496	592			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	90	95			
cM capacity (veh/h)	359	574	984			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	142	212	592
Volume Left	83	46	0
Volume Right	59	0	192
cSH	425	984	1700
Volume to Capacity	0.33	0.05	0.35
Queue Length 95th (m)	11.0	1.1	0.0
Control Delay (s)	17.6	2.3	0.0
Lane LOS	C	A	
Approach Delay (s)	17.6	2.3	0.0
Approach LOS	C		

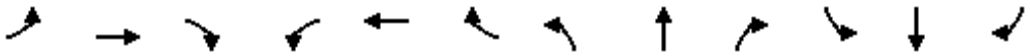
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	46	265	47	27	25	91	108	30	13	236	13
Future Volume (Veh/h)	12	46	265	47	27	25	91	108	30	13	236	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	13	50	288	51	29	27	99	117	33	14	257	14
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	665	640	264	936	630	134	271			150		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	665	640	264	936	630	134	271			150		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	86	63	60	92	97	92			99		
cM capacity (veh/h)	318	360	775	129	364	916	1292			1431		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	351	107	249	285
Volume Left	13	51	99	14
Volume Right	288	27	33	14
cSH	636	212	1292	1431
Volume to Capacity	0.55	0.51	0.08	0.01
Queue Length 95th (m)	25.6	19.5	1.9	0.2
Control Delay (s)	17.4	38.2	3.6	0.5
Lane LOS	C	E	A	A
Approach Delay (s)	17.4	38.2	3.6	0.5
Approach LOS	C	E		

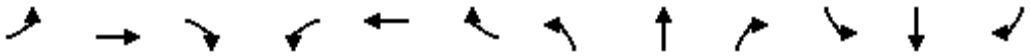
Intersection Summary				
Average Delay	11.3			
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	48	70	45	15	18	20	90	21	9	132	15
Future Volume (Veh/h)	45	48	70	45	15	18	20	90	21	9	132	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	49	52	76	49	16	20	22	98	23	10	143	16
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	352	336	151	426	332	110	159			121		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	352	336	151	426	332	110	159			121		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	91	92	89	97	98	98			99		
cM capacity (veh/h)	567	572	895	451	574	944	1420			1467		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	177	85	143	169
Volume Left	49	49	22	10
Volume Right	76	20	23	16
cSH	675	539	1420	1467
Volume to Capacity	0.26	0.16	0.02	0.01
Queue Length 95th (m)	8.0	4.2	0.4	0.2
Control Delay (s)	12.2	12.9	1.3	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	12.2	12.9	1.3	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	64	76	33	80	6	118	14	22	4	42	9
Future Volume (Veh/h)	2	64	76	33	80	6	118	14	22	4	42	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	70	83	36	87	7	128	15	24	4	46	10
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	94			153			311	282	112	310	320	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	94			153			311	282	112	310	320	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			78	98	97	99	92	99
cM capacity (veh/h)	1500			1428			585	610	942	602	581	967

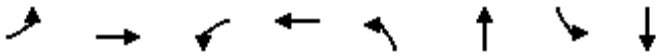
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	155	130	167	60
Volume Left	2	36	128	4
Volume Right	83	7	24	10
cSH	1500	1428	621	624
Volume to Capacity	0.00	0.03	0.27	0.10
Queue Length 95th (m)	0.0	0.6	8.2	2.4
Control Delay (s)	0.1	2.2	12.9	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	2.2	12.9	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	39.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	120	62	20	200	5	11
Future Volume (Veh/h)	120	62	20	200	5	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	67	22	217	5	12
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			197		424	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			197		424	164
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1376		577	881

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	197	239	17
Volume Left	0	22	5
Volume Right	67	0	12
cSH	1700	1376	763
Volume to Capacity	0.12	0.02	0.02
Queue Length 95th (m)	0.0	0.4	0.5
Control Delay (s)	0.0	0.8	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.8	9.8
Approach LOS			A

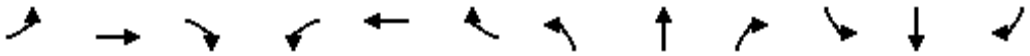
Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		35.1%	ICU Level of Service A
Analysis Period (min)		15	



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	281	2	624	9	4	318	144
v/c Ratio	0.53	0.30	0.00	0.66	0.03	0.01	0.79	0.26
Control Delay	19.4	9.9	8.0	12.7	14.5	12.0	34.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	9.9	8.0	12.7	14.5	12.0	34.6	4.9
Queue Length 50th (m)	10.5	17.1	0.1	36.5	0.7	0.2	30.3	0.3
Queue Length 95th (m)	#29.3	30.7	1.0	69.8	3.2	1.8	#62.9	10.1
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	281	952	559	944	415	579	471	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.30	0.00	0.66	0.02	0.01	0.68	0.23

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	255	4	2	259	315	8	2	2	293	3	130
Future Volume (vph)	136	255	4	2	259	315	8	2	2	293	3	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.92		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1879		1789	1729		1789	1742		1789	1607	
Flt Permitted	0.29	1.00		0.59	1.00		0.67	1.00		0.76	1.00	
Satd. Flow (perm)	555	1879		1106	1729		1253	1742		1422	1607	
Peak-hour factor, PHF	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)	148	277	4	2	282	342	9	2	2	318	3	141
RTOR Reduction (vph)	0	1	0	0	70	0	0	1	0	0	101	0
Lane Group Flow (vph)	148	280	0	2	554	0	9	3	0	318	43	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	29.1	29.1		29.1	29.1		16.4	16.4		16.4	16.4	
Effective Green, g (s)	29.1	29.1		29.1	29.1		16.4	16.4		16.4	16.4	
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.29	0.29		0.29	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	950		559	875		357	496		405	458	
v/s Ratio Prot		0.15			c0.32			0.00			0.03	
v/s Ratio Perm	0.27			0.00			0.01			c0.22		
v/c Ratio	0.53	0.29		0.00	0.63		0.03	0.01		0.79	0.09	
Uniform Delay, d1	9.6	8.2		7.0	10.3		14.8	14.7		18.9	15.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.0	0.8		0.0	3.5		0.0	0.0		9.6	0.1	
Delay (s)	16.6	9.0		7.0	13.8		14.8	14.7		28.6	15.2	
Level of Service	B	A		A	B		B	B		C	B	
Approach Delay (s)		11.6			13.8			14.8			24.4	
Approach LOS		B			B			B			C	

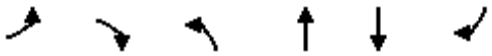
Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	96	349	83	65	225
Future Volume (Veh/h)	75	96	349	83	65	225
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)	82	104	379	90	71	245
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	811	424			469	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811	424			469	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	83			94	
cM capacity (veh/h)	326	630			1093	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	186	469	316
Volume Left	82	0	71
Volume Right	104	90	0
cSH	447	1700	1093
Volume to Capacity	0.42	0.28	0.06
Queue Length 95th (m)	15.3	0.0	1.6
Control Delay (s)	18.7	0.0	2.4
Lane LOS	C		A
Approach Delay (s)	18.7	0.0	2.4
Approach LOS	C		

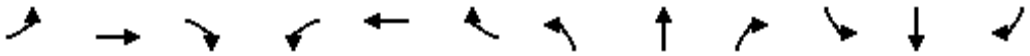
Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	191	47	41	437	247	132
Future Volume (Veh/h)	191	47	41	437	247	132
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)	208	51	45	475	268	143
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	904	340	411			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	340	411			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	30	93	96			
cM capacity (veh/h)	295	703	1148			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	259	520	411
Volume Left	208	45	0
Volume Right	51	0	143
cSH	333	1148	1700
Volume to Capacity	0.78	0.04	0.24
Queue Length 95th (m)	47.5	0.9	0.0
Control Delay (s)	45.0	1.1	0.0
Lane LOS	E	A	
Approach Delay (s)	45.0	1.1	0.0
Approach LOS	E		

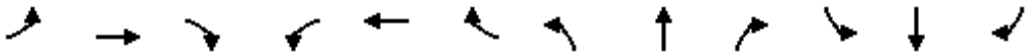
Intersection Summary			
Average Delay	10.3		
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	28	161	54	46	52	281	257	91	22	163	10
Future Volume (Veh/h)	6	28	161	54	46	52	281	257	91	22	163	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	30	175	59	50	57	305	279	99	24	177	11
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	1251	1218	182	1359	1174	328	188			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1251	1218	182	1359	1174	328	188			378		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	78	80	14	66	92	78			98		
cM capacity (veh/h)	84	138	860	69	146	713	1386			1180		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	212	166	683	212
Volume Left	7	59	305	24
Volume Right	175	57	99	11
cSH	420	130	1386	1180
Volume to Capacity	0.50	1.28	0.22	0.02
Queue Length 95th (m)	21.0	79.6	6.4	0.5
Control Delay (s)	22.0	236.8	5.0	1.1
Lane LOS	C	F	A	A
Approach Delay (s)	22.0	236.8	5.0	1.1
Approach LOS	C	F		

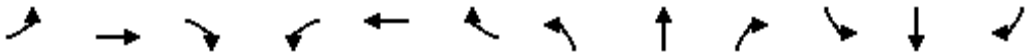
Intersection Summary				
Average Delay	37.4			
Intersection Capacity Utilization	78.7%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	30	43	28	54	19	72	140	44	16	103	50
Future Volume (Veh/h)	30	30	43	28	54	19	72	140	44	16	103	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	33	33	47	30	59	21	78	152	48	17	112	54
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	556	529	139	568	532	176	166			200		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	556	529	139	568	532	176	166			200		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	92	95	92	86	98	94			99		
cM capacity (veh/h)	366	425	909	367	423	867	1412			1372		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	113	110	278	183
Volume Left	33	30	78	17
Volume Right	47	21	48	54
cSH	515	448	1412	1372
Volume to Capacity	0.22	0.25	0.06	0.01
Queue Length 95th (m)	6.3	7.3	1.3	0.3
Control Delay (s)	14.0	15.6	2.5	0.8
Lane LOS	B	C	A	A
Approach Delay (s)	14.0	15.6	2.5	0.8
Approach LOS	B	C		

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	41.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	92	119	22	63	8	116	52	32	3	29	2
Future Volume (Veh/h)	3	92	119	22	63	8	116	52	32	3	29	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	100	129	24	68	9	126	57	35	3	32	2
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	77			229			309	296	164	354	356	72
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	77			229			309	296	164	354	356	72
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			79	91	96	99	94	100
cM capacity (veh/h)	1522			1339			605	604	880	527	559	990

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	232	101	218	37
Volume Left	3	24	126	3
Volume Right	129	9	35	2
cSH	1522	1339	636	569
Volume to Capacity	0.00	0.02	0.34	0.06
Queue Length 95th (m)	0.0	0.4	11.5	1.6
Control Delay (s)	0.1	1.9	13.6	11.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	1.9	13.6	11.8
Approach LOS			B	B

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	42.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	225	31	5	170	19	15
Future Volume (Veh/h)	225	31	5	170	19	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	245	34	5	185	21	16
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			279		457	262
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			279		457	262
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	98
cM capacity (veh/h)			1284		559	777

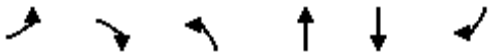
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	279	190	37
Volume Left	0	5	21
Volume Right	34	0	16
cSH	1700	1284	636
Volume to Capacity	0.16	0.00	0.06
Queue Length 95th (m)	0.0	0.1	1.4
Control Delay (s)	0.0	0.2	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.0
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	78	62	127	40	103	312
Future Volume (Veh/h)	78	62	127	40	103	312
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)	85	67	138	43	112	339
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	722	160			181	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	722	160			181	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	92			92	
cM capacity (veh/h)	362	886			1394	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	152	181	112	339
Volume Left	85	0	112	0
Volume Right	67	43	0	0
cSH	489	1700	1394	1700
Volume to Capacity	0.31	0.11	0.08	0.20
Queue Length 95th (m)	10.0	0.0	2.0	0.0
Control Delay (s)	15.6	0.0	7.8	0.0
Lane LOS	C		A	
Approach Delay (s)	15.6	0.0	1.9	
Approach LOS	C			

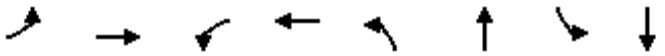
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	54	42	153	368	177
Future Volume (Veh/h)	76	54	42	153	368	177
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)	83	59	46	166	400	192
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					256	
pX, platoon unblocked						
vC, conflicting volume	754	496	592			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	496	592			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	90	95			
cM capacity (veh/h)	359	574	984			

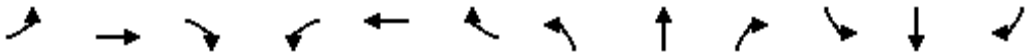
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	142	46	166	592
Volume Left	83	46	0	0
Volume Right	59	0	0	192
cSH	425	984	1700	1700
Volume to Capacity	0.33	0.05	0.10	0.35
Queue Length 95th (m)	11.0	1.1	0.0	0.0
Control Delay (s)	17.6	8.8	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.6	1.9		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	13	338	51	56	99	150	14	271
v/c Ratio	0.04	0.56	0.27	0.13	0.17	0.16	0.02	0.28
Control Delay	14.0	7.8	18.7	10.0	7.6	5.9	6.5	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	7.8	18.7	10.0	7.6	5.9	6.5	7.7
Queue Length 50th (m)	0.8	3.3	3.4	1.9	3.7	4.5	0.5	10.5
Queue Length 95th (m)	3.8	18.3	10.2	8.0	11.4	13.1	2.7	25.3
Internal Link Dist (m)		136.6		191.7		232.0		346.8
Turn Bay Length (m)	15.0		15.0		30.0		30.0	
Base Capacity (vph)	694	981	421	908	572	946	638	960
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.34	0.12	0.06	0.17	0.16	0.02	0.28

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	46	265	47	27	25	91	108	30	13	236	13
Future Volume (vph)	12	46	265	47	27	25	91	108	30	13	236	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.93		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1643		1789	1747		1789	1821		1789	1869	
Flt Permitted	0.72	1.00		0.44	1.00		0.59	1.00		0.66	1.00	
Satd. Flow (perm)	1357	1643		824	1747		1116	1821		1246	1869	
Peak-hour factor, PHF	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)	13	50	288	51	29	27	99	117	33	14	257	14
RTOR Reduction (vph)	0	222	0	0	21	0	0	14	0	0	2	0
Lane Group Flow (vph)	13	116	0	51	35	0	99	136	0	14	269	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.8	10.8		10.8	10.8		24.0	24.0		24.0	24.0	
Effective Green, g (s)	10.8	10.8		10.8	10.8		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.51	0.51		0.51	0.51	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	313	379		190	403		572	933		638	958	
v/s Ratio Prot		c0.07			0.02			0.07			c0.14	
v/s Ratio Perm	0.01			0.06			0.09			0.01		
v/c Ratio	0.04	0.31		0.27	0.09		0.17	0.15		0.02	0.28	
Uniform Delay, d1	14.0	14.9		14.8	14.1		6.1	6.0		5.6	6.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.8	0.1		0.7	0.3		0.1	0.7	
Delay (s)	14.0	15.4		15.5	14.2		6.8	6.3		5.7	7.2	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		15.3			14.8			6.5			7.1	
Approach LOS		B			B			A			A	

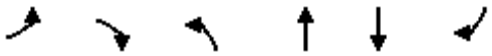
Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	96	349	83	65	225
Future Volume (Veh/h)	75	96	349	83	65	225
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)	82	104	379	90	71	245
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	811	424			469	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811	424			469	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	83			94	
cM capacity (veh/h)	326	630			1093	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	186	469	71	245
Volume Left	82	0	71	0
Volume Right	104	90	0	0
cSH	447	1700	1093	1700
Volume to Capacity	0.42	0.28	0.06	0.14
Queue Length 95th (m)	15.3	0.0	1.6	0.0
Control Delay (s)	18.7	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	18.7	0.0	1.9	
Approach LOS	C			

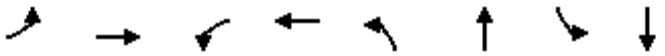
Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	191	47	41	437	247	132
Future Volume (Veh/h)	191	47	41	437	247	132
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)	208	51	45	475	268	143
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					256	
pX, platoon unblocked						
vC, conflicting volume	904	340	411			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	340	411			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	30	93	96			
cM capacity (veh/h)	295	703	1148			

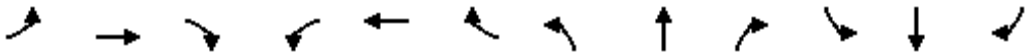
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	259	45	475	411
Volume Left	208	45	0	0
Volume Right	51	0	0	143
cSH	333	1148	1700	1700
Volume to Capacity	0.78	0.04	0.28	0.24
Queue Length 95th (m)	47.5	0.9	0.0	0.0
Control Delay (s)	45.0	8.3	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	45.0	0.7		0.0
Approach LOS	E			

Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	7	205	59	107	305	378	24	188
v/c Ratio	0.03	0.46	0.27	0.29	0.43	0.34	0.04	0.17
Control Delay	18.7	9.1	22.7	13.1	8.5	6.1	5.1	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	9.1	22.7	13.1	8.5	6.1	5.1	5.4
Queue Length 50th (m)	0.6	2.5	5.1	4.2	13.8	13.7	0.8	6.8
Queue Length 95th (m)	3.2	16.5	13.5	14.6	30.2	27.9	3.2	14.7
Internal Link Dist (m)		157.9		191.7		232.0		346.8
Turn Bay Length (m)	15.0		15.0		30.0		30.0	
Base Capacity (vph)	351	572	321	511	717	1097	602	1115
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.36	0.18	0.21	0.43	0.34	0.04	0.17

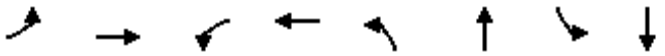
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	28	161	54	46	52	281	257	91	22	163	10
Future Volume (vph)	6	28	161	54	46	52	281	257	91	22	163	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1642		1789	1733		1789	1809		1789	1867	
Flt Permitted	0.69	1.00		0.63	1.00		0.64	1.00		0.54	1.00	
Satd. Flow (perm)	1296	1642		1185	1733		1204	1809		1012	1867	
Peak-hour factor, PHF	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)	7	30	175	59	50	57	305	279	99	24	177	11
RTOR Reduction (vph)	0	142	0	0	46	0	0	19	0	0	3	0
Lane Group Flow (vph)	7	63	0	59	61	0	305	359	0	24	185	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.4	10.4		10.4	10.4		33.0	33.0		33.0	33.0	
Effective Green, g (s)	10.4	10.4		10.4	10.4		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.60	0.60		0.60	0.60	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	243	308		222	325		717	1077		602	1112	
v/s Ratio Prot		0.04			0.04			0.20			0.10	
v/s Ratio Perm	0.01			c0.05			c0.25			0.02		
v/c Ratio	0.03	0.20		0.27	0.19		0.43	0.33		0.04	0.17	
Uniform Delay, d1	18.4	19.0		19.2	18.9		6.1	5.7		4.6	5.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.6	0.3		1.8	0.8		0.1	0.3	
Delay (s)	18.4	19.3		19.9	19.2		7.9	6.5		4.8	5.3	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		19.3			19.5			7.1			5.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

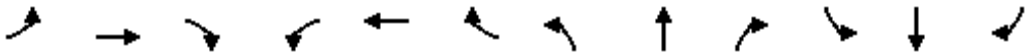
c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	269	7	504	2	5	404	209
v/c Ratio	0.33	0.34	0.01	0.63	0.00	0.01	0.80	0.30
Control Delay	17.0	13.6	11.5	14.3	10.5	9.0	28.4	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	13.6	11.5	14.3	10.5	9.0	28.4	3.7
Queue Length 50th (m)	6.2	18.2	0.4	27.9	0.1	0.2	34.6	0.7
Queue Length 95th (m)	17.8	36.5	2.5	61.4	1.1	1.7	#63.0	10.6
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	276	793	471	803	541	812	650	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.34	0.01	0.63	0.00	0.01	0.62	0.25

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	245	3	6	194	270	2	3	2	372	10	182
Future Volume (vph)	84	245	3	6	194	270	2	3	2	372	10	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.91		1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1719		1789	1770		1789	1616	
Flt Permitted	0.35	1.00		0.59	1.00		0.63	1.00		0.75	1.00	
Satd. Flow (perm)	655	1880		1118	1719		1181	1770		1421	1616	
Peak-hour factor, PHF	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)	91	266	3	7	211	293	2	3	2	404	11	198
RTOR Reduction (vph)	0	1	0	0	78	0	0	1	0	0	127	0
Lane Group Flow (vph)	91	268	0	7	426	0	2	4	0	404	82	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	23.2	23.2		23.2	23.2		19.7	19.7		19.7	19.7	
Effective Green, g (s)	23.2	23.2		23.2	23.2		19.7	19.7		19.7	19.7	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	276	794		472	726		423	635		509	579	
v/s Ratio Prot		0.14			c0.25			0.00			0.05	
v/s Ratio Perm	0.14			0.01			0.00			c0.28		
v/c Ratio	0.33	0.34		0.01	0.59		0.00	0.01		0.79	0.14	
Uniform Delay, d1	10.6	10.7		9.2	12.2		11.3	11.3		15.8	11.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	1.2		0.1	3.5		0.0	0.0		8.3	0.1	
Delay (s)	13.8	11.8		9.3	15.6		11.3	11.3		24.1	12.0	
Level of Service	B	B		A	B		B	B		C	B	
Approach Delay (s)		12.3			15.5			11.3			20.0	
Approach LOS		B			B			B			B	

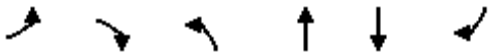
Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	102	84	162	48	135	443
Future Volume (Veh/h)	102	84	162	48	135	443
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)	111	91	176	52	147	482
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	978	202			228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	978	202			228	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	55	89			89	
cM capacity (veh/h)	247	839			1340	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	202	228	147	482
Volume Left	111	0	147	0
Volume Right	91	52	0	0
cSH	362	1700	1340	1700
Volume to Capacity	0.56	0.13	0.11	0.28
Queue Length 95th (m)	24.7	0.0	2.8	0.0
Control Delay (s)	26.7	0.0	8.0	0.0
Lane LOS	D		A	
Approach Delay (s)	26.7	0.0	1.9	
Approach LOS	D			

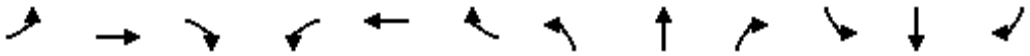
Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	229	109	157	385	120
Future Volume (Veh/h)	100	229	109	157	385	120
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)	109	249	118	171	418	130
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	890	483	548			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	890	483	548			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	57	88			
cM capacity (veh/h)	277	584	1021			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	358	118	171	548
Volume Left	109	118	0	0
Volume Right	249	0	0	130
cSH	437	1021	1700	1700
Volume to Capacity	0.82	0.12	0.10	0.32
Queue Length 95th (m)	58.3	3.0	0.0	0.0
Control Delay (s)	41.2	9.0	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	41.2	3.7		0.0
Approach LOS	E			

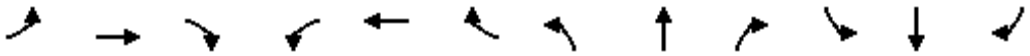
Intersection Summary			
Average Delay	13.2		
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	46	151	57	27	26	57	145	56	14	259	13
Future Volume (Veh/h)	12	46	151	57	27	26	57	145	56	14	259	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	13	50	164	62	29	28	62	158	61	15	282	14
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	644	662	289	820	638	188	296			219		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	644	662	289	820	638	188	296			219		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	86	78	68	92	97	95			99		
cM capacity (veh/h)	335	359	750	196	371	853	1265			1350		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	227	119	62	219	311
Volume Left	13	62	62	0	15
Volume Right	164	28	0	61	14
cSH	572	278	1265	1700	1350
Volume to Capacity	0.40	0.43	0.05	0.13	0.01
Queue Length 95th (m)	14.4	15.5	1.2	0.0	0.3
Control Delay (s)	15.4	27.3	8.0	0.0	0.5
Lane LOS	C	D	A		A
Approach Delay (s)	15.4	27.3	1.8		0.5
Approach LOS	C	D			

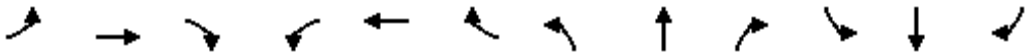
Intersection Summary				
Average Delay	7.9			
Intersection Capacity Utilization	55.8%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	77	71	46	22	19	20	127	22	10	154	23
Future Volume (Veh/h)	60	77	71	46	22	19	20	127	22	10	154	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	65	84	77	50	24	21	22	138	24	11	167	25
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	428	408	180	514	408	150	192			162		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	428	408	180	514	408	150	192			162		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	84	91	86	95	98	98			99		
cM capacity (veh/h)	497	521	863	369	520	896	1381			1417		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	226	95	184	203
Volume Left	65	50	22	11
Volume Right	77	21	24	25
cSH	592	463	1381	1417
Volume to Capacity	0.38	0.21	0.02	0.01
Queue Length 95th (m)	13.5	5.8	0.4	0.2
Control Delay (s)	14.8	14.8	1.0	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	14.8	14.8	1.0	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	7.1			
Intersection Capacity Utilization	34.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	67	93	41	84	6	140	17	32	4	46	9
Future Volume (Veh/h)	2	67	93	41	84	6	140	17	32	4	46	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	73	101	45	91	7	152	18	35	4	50	10
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	98			174			347	316	124	356	362	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			174			347	316	124	356	362	94
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			72	97	96	99	91	99
cM capacity (veh/h)	1495			1403			545	580	927	549	546	962

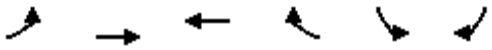
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	176	143	205	64
Volume Left	2	45	152	4
Volume Right	101	7	35	10
cSH	1495	1403	590	586
Volume to Capacity	0.00	0.03	0.35	0.11
Queue Length 95th (m)	0.0	0.8	11.8	2.8
Control Delay (s)	0.1	2.6	14.3	11.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	2.6	14.3	11.9
Approach LOS			B	B

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	43.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	173	76	25	281	13	14
Future Volume (Veh/h)	173	76	25	281	13	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	188	83	27	305	14	15
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			271		588	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			271		588	230
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	98
cM capacity (veh/h)			1292		461	810

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	271	332	29
Volume Left	0	27	14
Volume Right	83	0	15
cSH	1700	1292	593
Volume to Capacity	0.16	0.02	0.05
Queue Length 95th (m)	0.0	0.5	1.2
Control Delay (s)	0.0	0.8	11.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	11.4
Approach LOS			B

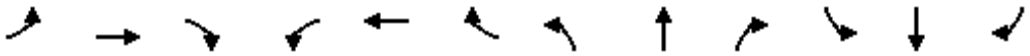
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	167	179	39	121	120
Future Volume (Veh/h)	36	167	179	39	121	120
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	182	195	42	132	130
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	237				476	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	237				476	216
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				75	84
cM capacity (veh/h)	1330				532	824

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	221	237	262
Volume Left	39	0	132
Volume Right	0	42	130
cSH	1330	1700	645
Volume to Capacity	0.03	0.14	0.41
Queue Length 95th (m)	0.7	0.0	15.0
Control Delay (s)	1.6	0.0	14.3
Lane LOS	A		B
Approach Delay (s)	1.6	0.0	14.3
Approach LOS			B

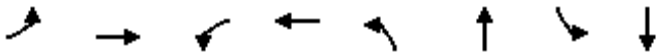
Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	60	63	26	35	24	25	51	23	58	105	7
Future Volume (Veh/h)	7	60	63	26	35	24	25	51	23	58	105	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	65	68	28	38	26	27	55	25	63	114	8
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	410	378	118	466	370	68	122			80		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	410	378	118	466	370	68	122			80		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	88	93	93	93	97	98			96		
cM capacity (veh/h)	485	521	934	406	527	996	1465			1518		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	92	107	185
Volume Left	8	28	27	63
Volume Right	68	26	25	8
cSH	659	550	1465	1518
Volume to Capacity	0.21	0.17	0.02	0.04
Queue Length 95th (m)	6.1	4.5	0.4	1.0
Control Delay (s)	11.9	12.8	2.0	2.8
Lane LOS	B	B	A	A
Approach Delay (s)	11.9	12.8	2.0	2.8
Approach LOS	B	B		

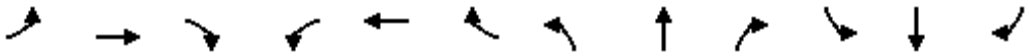
Intersection Summary				
Average Delay	6.8			
Intersection Capacity Utilization	34.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	185	295	2	709	9	4	368	168
v/c Ratio	0.93	0.32	0.00	0.76	0.02	0.01	0.86	0.28
Control Delay	70.8	10.4	8.0	16.5	14.5	12.0	41.5	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.8	10.4	8.0	16.5	14.5	12.0	41.5	4.6
Queue Length 50th (m)	18.1	18.4	0.1	45.8	0.7	0.2	36.7	0.3
Queue Length 95th (m)	#53.2	32.3	1.0	#94.8	3.2	1.8	#77.1	10.9
Internal Link Dist (m)		233.3		677.6		57.1		677.0
Turn Bay Length (m)	60.0		60.0		30.0		60.0	
Base Capacity (vph)	199	930	539	932	397	565	460	632
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.32	0.00	0.76	0.02	0.01	0.80	0.27

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	268	4	2	272	380	8	2	2	339	3	152
Future Volume (vph)	170	268	4	2	272	380	8	2	2	339	3	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.91		1.00	0.93		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1880		1789	1719		1789	1742		1789	1606	
Flt Permitted	0.21	1.00		0.58	1.00		0.65	1.00		0.76	1.00	
Satd. Flow (perm)	403	1880		1092	1719		1226	1742		1422	1606	
Peak-hour factor, PHF	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)	185	291	4	2	296	413	9	2	2	368	3	165
RTOR Reduction (vph)	0	1	0	0	82	0	0	1	0	0	115	0
Lane Group Flow (vph)	185	294	0	2	627	0	9	3	0	368	53	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	29.0	29.0		29.0	29.0		17.7	17.7		17.7	17.7	
Effective Green, g (s)	29.0	29.0		29.0	29.0		17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.30	0.30		0.30	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	199	928		539	849		369	525		428	484	
v/s Ratio Prot		0.16			0.36			0.00			0.03	
v/s Ratio Perm	c0.46			0.00			0.01			c0.26		
v/c Ratio	0.93	0.32		0.00	0.74		0.02	0.00		0.86	0.11	
Uniform Delay, d1	13.9	8.9		7.5	11.8		14.4	14.3		19.3	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	47.7	0.9		0.0	5.7		0.0	0.0		15.7	0.1	
Delay (s)	61.6	9.8		7.5	17.5		14.5	14.3		35.0	14.9	
Level of Service	E	A		A	B		B	B		D	B	
Approach Delay (s)		29.8			17.5			14.4			28.7	
Approach LOS		C			B			B			C	

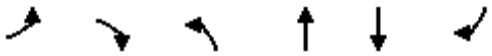
Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	94	136	472	109	87	314
Future Volume (Veh/h)	94	136	472	109	87	314
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)	102	148	513	118	95	341
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	1103	572			631	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1103	572			631	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	52	72			90	
cM capacity (veh/h)	211	520			951	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	250	631	95	341
Volume Left	102	0	95	0
Volume Right	148	118	0	0
cSH	325	1700	951	1700
Volume to Capacity	0.77	0.37	0.10	0.20
Queue Length 95th (m)	46.1	0.0	2.5	0.0
Control Delay (s)	45.0	0.0	9.2	0.0
Lane LOS	E		A	
Approach Delay (s)	45.0	0.0	2.0	
Approach LOS	E			

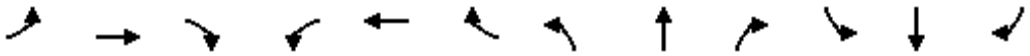
Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	153	172	208	419	269	150
Future Volume (Veh/h)	153	172	208	419	269	150
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)	166	187	226	455	292	163
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	1280	374	455			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1280	374	455			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	72	80			
cM capacity (veh/h)	145	673	1106			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	353	226	455	455
Volume Left	166	226	0	0
Volume Right	187	0	0	163
cSH	249	1106	1700	1700
Volume to Capacity	1.42	0.20	0.27	0.27
Queue Length 95th (m)	150.0	5.8	0.0	0.0
Control Delay (s)	248.5	9.1	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	248.5	3.0		0.0
Approach LOS	F			

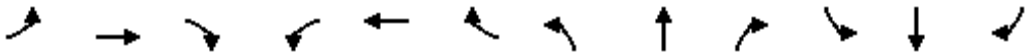
Intersection Summary			
Average Delay	60.3		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	28	102	85	46	52	171	290	113	22	207	10
Future Volume (Veh/h)	6	28	102	85	46	52	171	290	113	22	207	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	30	111	92	50	57	186	315	123	24	225	11
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	1048	1088	230	1153	1032	376	236			438		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1048	1088	230	1153	1032	376	236			438		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	83	86	21	74	91	86			98		
cM capacity (veh/h)	134	181	809	116	196	670	1331			1122		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	148	199	186	438	260
Volume Left	7	92	186	0	24
Volume Right	111	57	0	123	11
cSH	417	175	1331	1700	1122
Volume to Capacity	0.35	1.13	0.14	0.26	0.02
Queue Length 95th (m)	12.0	77.8	3.7	0.0	0.5
Control Delay (s)	18.3	162.5	8.1	0.0	1.0
Lane LOS	C	F	A		A
Approach Delay (s)	18.3	162.5	2.4		1.0
Approach LOS	C	F			

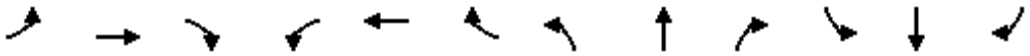
Intersection Summary				
Average Delay	29.9			
Intersection Capacity Utilization	66.6%	ICU Level of Service		C
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	52	43	29	79	20	72	169	45	17	147	79
Future Volume (Veh/h)	39	52	43	29	79	20	72	169	45	17	147	79
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	42	57	47	32	86	22	78	184	49	18	160	86
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	668	628	203	679	646	208	246			233		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668	628	203	679	646	208	246			233		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	85	94	89	76	97	94			99		
cM capacity (veh/h)	280	371	838	288	362	832	1320			1335		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	146	140	311	264
Volume Left	42	32	78	18
Volume Right	47	22	49	86
cSH	406	373	1320	1335
Volume to Capacity	0.36	0.38	0.06	0.01
Queue Length 95th (m)	12.2	12.9	1.4	0.3
Control Delay (s)	18.8	20.3	2.4	0.6
Lane LOS	C	C	A	A
Approach Delay (s)	18.8	20.3	2.4	0.6
Approach LOS	C	C		

Intersection Summary				
Average Delay	7.5			
Intersection Capacity Utilization	50.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	96	167	37	66	8	145	56	41	3	37	2
Future Volume (Veh/h)	3	96	167	37	66	8	145	56	41	3	37	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	104	182	40	72	9	158	61	45	3	40	2
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	81			286			380	362	195	433	448	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	81			286			380	362	195	433	448	76
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			70	89	95	99	92	100
cM capacity (veh/h)	1517			1276			527	547	846	450	489	985

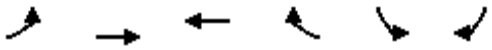
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	289	121	264	45
Volume Left	3	40	158	3
Volume Right	182	9	45	2
cSH	1517	1276	568	497
Volume to Capacity	0.00	0.03	0.46	0.09
Queue Length 95th (m)	0.0	0.7	18.6	2.3
Control Delay (s)	0.1	2.8	16.7	13.0
Lane LOS	A	A	C	B
Approach Delay (s)	0.1	2.8	16.7	13.0
Approach LOS			C	B

Intersection Summary				
Average Delay	7.5			
Intersection Capacity Utilization	51.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	329	43	19	263	31	21
Future Volume (Veh/h)	329	43	19	263	31	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	358	47	21	286	34	23
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			405		710	382
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			405		710	382
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		91	97
cM capacity (veh/h)			1154		393	666

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	405	307	57
Volume Left	0	21	34
Volume Right	47	0	23
cSH	1700	1154	471
Volume to Capacity	0.24	0.02	0.12
Queue Length 95th (m)	0.0	0.4	3.1
Control Delay (s)	0.0	0.7	13.7
Lane LOS		A	B
Approach Delay (s)	0.0	0.7	13.7
Approach LOS			B

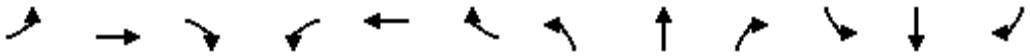
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	128	221	197	149	89	71
Future Volume (Veh/h)	128	221	197	149	89	71
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	240	214	162	97	77
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	376				813	295
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				813	295
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				68	90
cM capacity (veh/h)	1182				307	744

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	379	376	174
Volume Left	139	0	97
Volume Right	0	162	77
cSH	1182	1700	415
Volume to Capacity	0.12	0.22	0.42
Queue Length 95th (m)	3.0	0.0	15.4
Control Delay (s)	3.8	0.0	19.8
Lane LOS	A		C
Approach Delay (s)	3.8	0.0	19.8
Approach LOS			C

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



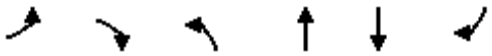
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	28	39	19	48	48	65	106	23	52	79	7
Future Volume (Veh/h)	7	28	39	19	48	48	65	106	23	52	79	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	30	42	21	52	52	71	115	25	57	86	8
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	552	486	90	530	478	128	94			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	552	486	90	530	478	128	94			140		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	93	96	95	88	94	95			96		
cM capacity (veh/h)	358	441	968	390	445	923	1500			1443		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	80	125	211	151
Volume Left	8	21	71	57
Volume Right	42	52	25	8
cSH	598	551	1500	1443
Volume to Capacity	0.13	0.23	0.05	0.04
Queue Length 95th (m)	3.5	6.6	1.1	0.9
Control Delay (s)	12.0	13.4	2.8	3.1
Lane LOS	B	B	A	A
Approach Delay (s)	12.0	13.4	2.8	3.1
Approach LOS	B	B		

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	30.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	109	249	118	171	548
v/c Ratio	0.33	0.50	0.26	0.15	0.50
Control Delay	22.5	7.1	7.4	5.5	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	7.1	7.4	5.5	7.9
Queue Length 50th (m)	9.6	0.0	4.7	6.3	23.8
Queue Length 95th (m)	20.8	14.7	12.8	13.9	46.9
Internal Link Dist (m)	487.7			441.8	232.0
Turn Bay Length (m)		60.0	30.0		
Base Capacity (vph)	484	615	456	1122	1103
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.40	0.26	0.15	0.50

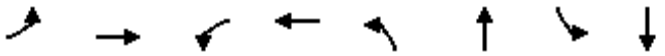
Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	229	109	157	385	120
Future Volume (vph)	100	229	109	157	385	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1601	1789	1883	1823	
Flt Permitted	0.95	1.00	0.41	1.00	1.00	
Satd. Flow (perm)	1789	1601	765	1883	1823	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	249	118	171	418	130
RTOR Reduction (vph)	0	202	0	0	17	0
Lane Group Flow (vph)	109	47	118	171	531	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	10.4	10.4	33.0	33.0	33.0	
Effective Green, g (s)	10.4	10.4	33.0	33.0	33.0	
Actuated g/C Ratio	0.19	0.19	0.60	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	335	300	455	1121	1085	
v/s Ratio Prot				0.09	c0.29	
v/s Ratio Perm	c0.06	0.03	0.15			
v/c Ratio	0.33	0.16	0.26	0.15	0.49	
Uniform Delay, d1	19.5	18.8	5.4	5.0	6.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.2	1.4	0.3	1.6	
Delay (s)	20.0	19.1	6.7	5.3	8.0	
Level of Service	C	B	A	A	A	
Approach Delay (s)	19.4			5.9	8.0	
Approach LOS	B			A	A	

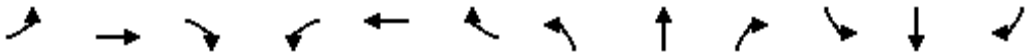
Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	13	214	62	57	62	219	15	296
v/c Ratio	0.05	0.45	0.25	0.15	0.10	0.22	0.02	0.29
Control Delay	16.0	9.0	19.3	11.3	6.1	5.3	5.5	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	9.0	19.3	11.3	6.1	5.3	5.5	6.9
Queue Length 50th (m)	0.9	3.6	4.6	2.1	2.2	6.6	0.5	11.6
Queue Length 95th (m)	4.2	16.8	12.3	8.8	6.6	15.6	2.5	23.8
Internal Link Dist (m)		136.6		191.7		232.0		346.8
Turn Bay Length (m)	15.0		15.0		30.0		30.0	
Base Capacity (vph)	575	802	498	756	599	1009	642	1028
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.27	0.12	0.08	0.10	0.22	0.02	0.29

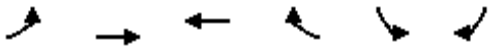
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	46	151	57	27	26	57	145	56	14	259	13
Future Volume (vph)	12	46	151	57	27	26	57	145	56	14	259	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.93		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1667		1789	1745		1789	1805		1789	1870	
Flt Permitted	0.72	1.00		0.62	1.00		0.58	1.00		0.62	1.00	
Satd. Flow (perm)	1356	1667		1176	1745		1091	1805		1170	1870	
Peak-hour factor, PHF	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)	13	50	164	62	29	28	62	158	61	15	282	14
RTOR Reduction (vph)	0	130	0	0	22	0	0	19	0	0	2	0
Lane Group Flow (vph)	13	84	0	62	35	0	62	200	0	15	294	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.3	10.3		10.3	10.3		27.2	27.2		27.2	27.2	
Effective Green, g (s)	10.3	10.3		10.3	10.3		27.2	27.2		27.2	27.2	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.55	0.55		0.55	0.55	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	346		244	363		599	991		642	1027	
v/s Ratio Prot		0.05			0.02			0.11			c0.16	
v/s Ratio Perm	0.01			c0.05			0.06			0.01		
v/c Ratio	0.05	0.24		0.25	0.10		0.10	0.20		0.02	0.29	
Uniform Delay, d1	15.7	16.3		16.4	15.8		5.3	5.6		5.1	6.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.6	0.1		0.3	0.5		0.1	0.7	
Delay (s)	15.7	16.7		16.9	16.0		5.7	6.1		5.2	6.7	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		16.7			16.5			6.0			6.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



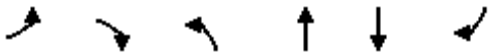
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	167	179	39	121	120
Future Volume (Veh/h)	36	167	179	39	121	120
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	182	195	42	132	130
Pedestrians						
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	237				476	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	237				476	216
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				75	84
cM capacity (veh/h)	1330				532	824

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	39	182	237	262
Volume Left	39	0	0	132
Volume Right	0	0	42	130
cSH	1330	1700	1700	645
Volume to Capacity	0.03	0.11	0.14	0.41
Queue Length 95th (m)	0.7	0.0	0.0	15.0
Control Delay (s)	7.8	0.0	0.0	14.3
Lane LOS	A			B
Approach Delay (s)	1.4		0.0	14.3
Approach LOS				B

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	166	187	226	455	455
v/c Ratio	0.45	0.39	0.44	0.42	0.43
Control Delay	23.6	6.3	10.5	8.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	6.3	10.5	8.3	7.2
Queue Length 50th (m)	14.7	0.0	10.4	20.5	16.7
Queue Length 95th (m)	28.8	12.3	28.7	43.9	38.8
Internal Link Dist (m)	489.3			441.8	232.0
Turn Bay Length (m)		60.0	30.0		
Base Capacity (vph)	518	596	513	1089	1068
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.31	0.44	0.42	0.43

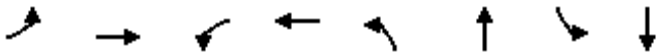
Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	153	172	208	419	269	150
Future Volume (vph)	153	172	208	419	269	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1601	1789	1883	1792	
Flt Permitted	0.95	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1789	1601	887	1883	1792	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	187	226	455	292	163
RTOR Reduction (vph)	0	149	0	0	30	0
Lane Group Flow (vph)	166	38	226	455	425	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	11.3	11.3	32.0	32.0	32.0	
Effective Green, g (s)	11.3	11.3	32.0	32.0	32.0	
Actuated g/C Ratio	0.20	0.20	0.58	0.58	0.58	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	365	327	513	1089	1036	
v/s Ratio Prot				0.24	0.24	
v/s Ratio Perm	c0.09	0.02	c0.25			
v/c Ratio	0.45	0.12	0.44	0.42	0.41	
Uniform Delay, d1	19.3	17.9	6.6	6.5	6.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.2	2.7	1.2	1.2	
Delay (s)	20.2	18.1	9.3	7.7	7.6	
Level of Service	C	B	A	A	A	
Approach Delay (s)	19.1			8.2	7.6	
Approach LOS	B			A	A	

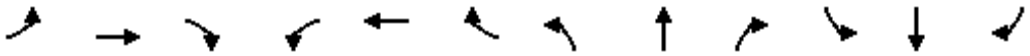
Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	7	141	92	107	186	438	24	236
v/c Ratio	0.03	0.34	0.37	0.27	0.24	0.36	0.04	0.19
Control Delay	17.7	9.1	23.7	12.3	6.9	6.4	5.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	9.1	23.7	12.3	6.9	6.4	5.6	5.8
Queue Length 50th (m)	0.6	2.5	8.0	4.1	7.5	16.8	0.8	8.9
Queue Length 95th (m)	3.1	13.7	18.5	14.2	19.0	36.9	3.6	20.1
Internal Link Dist (m)		157.9		191.7		232.0		346.8
Turn Bay Length (m)	15.0		15.0		30.0		30.0	
Base Capacity (vph)	379	564	367	547	766	1216	623	1245
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.25	0.25	0.20	0.24	0.36	0.04	0.19

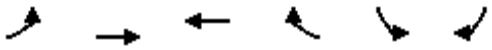
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	28	102	85	46	52	171	290	113	22	207	10
Future Volume (vph)	6	28	102	85	46	52	171	290	113	22	207	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1661		1789	1733		1789	1804		1789	1870	
Flt Permitted	0.69	1.00		0.67	1.00		0.61	1.00		0.50	1.00	
Satd. Flow (perm)	1296	1661		1256	1733		1152	1804		939	1870	
Peak-hour factor, PHF	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)	7	30	111	92	50	57	186	315	123	24	225	11
RTOR Reduction (vph)	0	94	0	0	48	0	0	19	0	0	2	0
Lane Group Flow (vph)	7	47	0	92	59	0	186	419	0	24	234	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.8	8.8		8.8	8.8		35.1	35.1		35.1	35.1	
Effective Green, g (s)	8.8	8.8		8.8	8.8		35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.63	0.63		0.63	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	204	261		197	272		723	1132		589	1174	
v/s Ratio Prot		0.03			0.03			c0.23			0.12	
v/s Ratio Perm	0.01			c0.07			0.16			0.03		
v/c Ratio	0.03	0.18		0.47	0.22		0.26	0.37		0.04	0.20	
Uniform Delay, d1	20.0	20.4		21.4	20.5		4.6	5.0		4.0	4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		1.7	0.4		0.9	0.9		0.1	0.4	
Delay (s)	20.0	20.8		23.2	20.9		5.5	6.0		4.1	4.8	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		20.7			22.0			5.8			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	128	221	197	149	89	71
Future Volume (Veh/h)	128	221	197	149	89	71
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	240	214	162	97	77
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	376				813	295
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				813	295
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				68	90
cM capacity (veh/h)	1182				307	744

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	139	240	376	174
Volume Left	139	0	0	97
Volume Right	0	0	162	77
cSH	1182	1700	1700	415
Volume to Capacity	0.12	0.14	0.22	0.42
Queue Length 95th (m)	3.0	0.0	0.0	15.4
Control Delay (s)	8.4	0.0	0.0	19.8
Lane LOS	A			C
Approach Delay (s)	3.1		0.0	19.8
Approach LOS				C

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: Colborne / Beatty Line Roundabout 2028 AM Total

Colborne Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	118	2.0	0.293	6.6	LOS A	1.3	10.0	0.29	0.34	36.3
8	T1	171	2.0	0.293	6.6	LOS A	1.3	10.0	0.29	0.34	36.3
18	R2	1	2.0	0.293	6.6	LOS A	1.3	10.0	0.29	0.34	36.3
Approach		290	2.0	0.293	6.6	LOS A	1.3	10.0	0.29	0.17	36.3
East: Private Driveway											
1	L2	1	2.0	0.004	4.9	LOS A	0.0	0.1	0.42	0.52	33.2
6	T1	1	2.0	0.004	4.9	LOS A	0.0	0.1	0.42	0.52	33.2
16	R2	1	2.0	0.004	4.9	LOS A	0.0	0.1	0.42	0.52	33.2
Approach		3	2.0	0.004	4.9	LOS A	0.0	0.1	0.42	0.26	33.2
North: Beatty Line											
7	L2	1	2.0	0.561	11.1	LOS B	3.6	27.7	0.44	0.57	33.5
4	T1	418	2.0	0.561	11.1	LOS B	3.6	27.7	0.44	0.57	33.5
14	R2	130	2.0	0.561	11.1	LOS B	3.6	27.7	0.44	0.57	33.5
Approach		550	2.0	0.561	11.1	LOS B	3.6	27.7	0.44	0.29	33.5
West: Colborne Street											
5	L2	109	2.0	0.497	12.3	LOS B	2.6	20.3	0.63	1.33	30.8
2	T1	1	2.0	0.497	12.3	LOS B	2.6	20.3	0.63	1.33	30.8
12	R2	249	2.0	0.497	12.3	LOS B	2.6	20.3	0.63	1.33	30.8
Approach		359	2.0	0.497	12.3	LOS B	2.6	20.3	0.63	0.66	30.8
All Vehicles		1202	2.0	0.561	10.4	LOS B	3.6	27.7	0.46	0.37	33.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Colborne / Beatty Line Roundabout 2028 PM Total

Colborne Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	226	2.0	0.732	17.3	LOS B	7.2	55.3	0.68	1.11	27.8
8	T1	455	2.0	0.732	17.3	LOS B	7.2	55.3	0.68	1.11	27.8
18	R2	1	2.0	0.732	17.3	LOS B	7.2	55.3	0.68	1.11	27.8
Approach		683	2.0	0.732	17.3	LOS B	7.2	55.3	0.68	0.55	27.8
East: Private Driveway											
1	L2	1	2.0	0.007	7.8	LOS A	0.0	0.2	0.58	0.96	29.9
6	T1	1	2.0	0.007	7.8	LOS A	0.0	0.2	0.58	0.96	29.9
16	R2	1	2.0	0.007	7.8	LOS A	0.0	0.2	0.58	0.96	29.9
Approach		3	2.0	0.007	7.8	LOS A	0.0	0.2	0.58	0.48	29.9
North: Beatty Line											
7	L2	1	2.0	0.520	11.1	LOS B	2.9	22.6	0.53	0.89	33.3
4	T1	292	2.0	0.520	11.1	LOS B	2.9	22.6	0.53	0.89	33.3
14	R2	163	2.0	0.520	11.1	LOS B	2.9	22.6	0.53	0.89	33.3
Approach		457	2.0	0.520	11.1	LOS B	2.9	22.6	0.53	0.44	33.3
West: Colborne Street											
5	L2	166	2.0	0.432	9.8	LOS A	2.0	15.8	0.53	0.93	32.3
2	T1	1	2.0	0.432	9.8	LOS A	2.0	15.8	0.53	0.93	32.3
12	R2	187	2.0	0.432	9.8	LOS A	2.0	15.8	0.53	0.93	32.3
Approach		354	2.0	0.432	9.8	LOS A	2.0	15.8	0.53	0.47	32.3
All Vehicles		1497	2.0	0.732	13.6	LOS B	7.2	55.3	0.60	0.50	30.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Millage / Beatty Line Roundabout 2023 AM Total

Millage Lane / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	99	2.0	0.243	5.9	LOS A	1.0	7.9	0.22	0.23	37.0
8	T1	117	2.0	0.243	5.9	LOS A	1.0	7.9	0.22	0.23	37.0
18	R2	33	2.0	0.243	5.9	LOS A	1.0	7.9	0.22	0.23	37.0
Approach		249	2.0	0.243	5.9	LOS A	1.0	7.9	0.22	0.11	37.0
East: Millage Lane											
1	L2	51	2.0	0.123	5.3	LOS A	0.4	3.4	0.35	0.50	37.1
6	T1	29	2.0	0.123	5.3	LOS A	0.4	3.4	0.35	0.50	37.1
16	R2	27	2.0	0.123	5.3	LOS A	0.4	3.4	0.35	0.50	37.1
Approach		108	2.0	0.123	5.3	LOS A	0.4	3.4	0.35	0.25	37.1
North: Beatty Line											
7	L2	14	2.0	0.309	7.2	LOS A	1.3	10.4	0.37	0.53	37.6
4	T1	257	2.0	0.309	7.2	LOS A	1.3	10.4	0.37	0.53	37.6
14	R2	14	2.0	0.309	7.2	LOS A	1.3	10.4	0.37	0.53	37.6
Approach		285	2.0	0.309	7.2	LOS A	1.3	10.4	0.37	0.27	37.6
West: NWFSP East Access											
5	L2	13	2.0	0.440	10.2	LOS B	2.1	16.4	0.55	1.02	33.5
2	T1	50	2.0	0.440	10.2	LOS B	2.1	16.4	0.55	1.02	33.5
12	R2	288	2.0	0.440	10.2	LOS B	2.1	16.4	0.55	1.02	33.5
Approach		351	2.0	0.440	10.2	LOS B	2.1	16.4	0.55	0.51	33.5
All Vehicles		992	2.0	0.440	7.7	LOS A	2.1	16.4	0.39	0.31	35.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Millage / Beatty Line Roundabout 2023 PM Total

Millage Lane / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	305	2.0	0.657	13.1	LOS B	5.5	42.3	0.38	0.39	30.2
8	T1	279	2.0	0.657	13.1	LOS B	5.5	42.3	0.38	0.39	30.2
18	R2	99	2.0	0.657	13.1	LOS B	5.5	42.3	0.38	0.39	30.2
Approach		684	2.0	0.657	13.1	LOS B	5.5	42.3	0.38	0.20	30.2
East: Millage Lane											
1	L2	59	2.0	0.273	9.5	LOS A	1.0	7.8	0.58	1.17	33.3
6	T1	50	2.0	0.273	9.5	LOS A	1.0	7.8	0.58	1.17	33.3
16	R2	57	2.0	0.273	9.5	LOS A	1.0	7.8	0.58	1.17	33.3
Approach		165	2.0	0.273	9.5	LOS A	1.0	7.8	0.58	0.58	33.3
North: Beatty Line											
7	L2	24	2.0	0.292	8.4	LOS A	1.1	8.9	0.53	1.01	35.8
4	T1	177	2.0	0.292	8.4	LOS A	1.1	8.9	0.53	1.01	35.8
14	R2	11	2.0	0.292	8.4	LOS A	1.1	8.9	0.53	1.01	35.8
Approach		212	2.0	0.292	8.4	LOS A	1.1	8.9	0.53	0.50	35.8
West: NWFSP East Access											
5	L2	7	2.0	0.249	6.9	LOS A	1.0	7.7	0.42	0.67	37.0
2	T1	30	2.0	0.249	6.9	LOS A	1.0	7.7	0.42	0.67	37.0
12	R2	175	2.0	0.249	6.9	LOS A	1.0	7.7	0.42	0.67	37.0
Approach		212	2.0	0.249	6.9	LOS A	1.0	7.7	0.42	0.33	37.0
All Vehicles		1273	2.0	0.657	10.8	LOS B	5.5	42.3	0.44	0.32	32.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Millage / Beatty Line Roundabout 2028 AM Total

Millage Lane / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	62	2.0	0.274	6.2	LOS A	1.2	9.3	0.23	0.24	37.5
8	T1	158	2.0	0.274	6.2	LOS A	1.2	9.3	0.23	0.24	37.5
18	R2	61	2.0	0.274	6.2	LOS A	1.2	9.3	0.23	0.24	37.5
Approach		280	2.0	0.274	6.2	LOS A	1.2	9.3	0.23	0.12	37.5
East: Millage Lane											
1	L2	62	2.0	0.137	5.5	LOS A	0.5	3.8	0.36	0.52	36.7
6	T1	29	2.0	0.137	5.5	LOS A	0.5	3.8	0.36	0.52	36.7
16	R2	28	2.0	0.137	5.5	LOS A	0.5	3.8	0.36	0.52	36.7
Approach		120	2.0	0.137	5.5	LOS A	0.5	3.8	0.36	0.26	36.7
North: Beatty Line											
7	L2	15	2.0	0.329	7.3	LOS A	1.5	11.5	0.35	0.48	37.5
4	T1	282	2.0	0.329	7.3	LOS A	1.5	11.5	0.35	0.48	37.5
14	R2	15	2.0	0.329	7.3	LOS A	1.5	11.5	0.35	0.48	37.5
Approach		312	2.0	0.329	7.3	LOS A	1.5	11.5	0.35	0.24	37.5
West: NWFSP East Access											
5	L2	13	2.0	0.296	8.1	LOS A	1.2	9.2	0.50	0.91	35.6
2	T1	50	2.0	0.296	8.1	LOS A	1.2	9.2	0.50	0.91	35.6
12	R2	164	2.0	0.296	8.1	LOS A	1.2	9.2	0.50	0.91	35.6
Approach		227	2.0	0.296	8.1	LOS A	1.2	9.2	0.50	0.46	35.6
All Vehicles		939	2.0	0.329	6.9	LOS A	1.5	11.5	0.35	0.26	36.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Millage / Beatty Line Roundabout 2028 PM Total

Millage Lane / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	186	2.0	0.599	11.5	LOS B	4.4	34.0	0.34	0.34	31.9
8	T1	315	2.0	0.599	11.5	LOS B	4.4	34.0	0.34	0.34	31.9
18	R2	123	2.0	0.599	11.5	LOS B	4.4	34.0	0.34	0.34	31.9
Approach		624	2.0	0.599	11.5	LOS B	4.4	34.0	0.34	0.17	31.9
East: Millage Lane											
1	L2	92	2.0	0.301	9.3	LOS A	1.2	9.0	0.57	1.14	33.1
6	T1	50	2.0	0.301	9.3	LOS A	1.2	9.0	0.57	1.14	33.1
16	R2	57	2.0	0.301	9.3	LOS A	1.2	9.0	0.57	1.14	33.1
Approach		199	2.0	0.301	9.3	LOS A	1.2	9.0	0.57	0.57	33.1
North: Beatty Line											
7	L2	24	2.0	0.328	8.4	LOS A	1.4	10.6	0.50	0.89	36.0
4	T1	225	2.0	0.328	8.4	LOS A	1.4	10.6	0.50	0.89	36.0
14	R2	11	2.0	0.328	8.4	LOS A	1.4	10.6	0.50	0.89	36.0
Approach		260	2.0	0.328	8.4	LOS A	1.4	10.6	0.50	0.44	36.0
West: NWFSP East Access											
5	L2	7	2.0	0.189	6.6	LOS A	0.7	5.4	0.45	0.77	37.4
2	T1	30	2.0	0.189	6.6	LOS A	0.7	5.4	0.45	0.77	37.4
12	R2	111	2.0	0.189	6.6	LOS A	0.7	5.4	0.45	0.77	37.4
Approach		148	2.0	0.189	6.6	LOS A	0.7	5.4	0.45	0.38	37.4
All Vehicles		1230	2.0	0.599	9.9	LOS A	4.4	34.0	0.42	0.32	33.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2018 AM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	2	2.0	0.011	5.1	LOS A	0.0	0.3	0.43	0.59	38.4
8	T1	3	2.0	0.011	5.1	LOS A	0.0	0.3	0.43	0.59	38.4
18	R2	2	2.0	0.011	5.1	LOS A	0.0	0.3	0.43	0.59	38.4
Approach		8	2.0	0.011	5.1	LOS A	0.0	0.3	0.43	0.30	38.4
East: St Andrew St											
1	L2	7	2.0	0.337	6.9	LOS A	1.6	12.4	0.23	0.23	37.6
6	T1	189	2.0	0.337	6.9	LOS A	1.6	12.4	0.23	0.23	37.6
16	R2	153	2.0	0.337	6.9	LOS A	1.6	12.4	0.23	0.23	37.6
Approach		349	2.0	0.337	6.9	LOS A	1.6	12.4	0.23	0.11	37.6
North: Beatty Line											
7	L2	114	2.0	0.292	7.1	LOS A	1.2	9.6	0.38	0.57	35.1
4	T1	10	2.0	0.292	7.1	LOS A	1.2	9.6	0.38	0.57	35.1
14	R2	140	2.0	0.292	7.1	LOS A	1.2	9.6	0.38	0.57	35.1
Approach		264	2.0	0.292	7.1	LOS A	1.2	9.6	0.38	0.28	35.1
West: St Andrew St											
5	L2	61	2.0	0.314	7.0	LOS A	1.4	10.9	0.32	0.41	37.0
2	T1	241	2.0	0.314	7.0	LOS A	1.4	10.9	0.32	0.41	37.0
12	R2	2	2.0	0.314	7.0	LOS A	1.4	10.9	0.32	0.41	37.0
Approach		304	2.0	0.314	7.0	LOS A	1.4	10.9	0.32	0.20	37.0
All Vehicles		925	2.0	0.337	7.0	LOS A	1.6	12.4	0.31	0.19	36.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2018 PM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	9	2.0	0.021	6.0	LOS A	0.1	0.5	0.50	0.81	35.4
8	T1	2	2.0	0.021	6.0	LOS A	0.1	0.5	0.50	0.81	35.4
18	R2	2	2.0	0.021	6.0	LOS A	0.1	0.5	0.50	0.81	35.4
Approach		13	2.0	0.021	6.0	LOS A	0.1	0.5	0.50	0.40	35.4
East: St Andrew St											
1	L2	1	2.0	0.413	8.4	LOS A	2.1	16.1	0.37	0.50	36.1
6	T1	262	2.0	0.413	8.4	LOS A	2.1	16.1	0.37	0.50	36.1
16	R2	135	2.0	0.413	8.4	LOS A	2.1	16.1	0.37	0.50	36.1
Approach		398	2.0	0.413	8.4	LOS A	2.1	16.1	0.37	0.25	36.1
North: Beatty Line											
7	L2	174	2.0	0.347	8.3	LOS A	1.5	11.7	0.47	0.79	33.3
4	T1	2	2.0	0.347	8.3	LOS A	1.5	11.7	0.47	0.79	33.3
14	R2	115	2.0	0.347	8.3	LOS A	1.5	11.7	0.47	0.79	33.3
Approach		291	2.0	0.347	8.3	LOS A	1.5	11.7	0.47	0.39	33.3
West: St Andrew St											
5	L2	127	2.0	0.424	8.9	LOS A	2.1	16.4	0.42	0.62	34.4
2	T1	264	2.0	0.424	8.9	LOS A	2.1	16.4	0.42	0.62	34.4
12	R2	1	2.0	0.424	8.9	LOS A	2.1	16.4	0.42	0.62	34.4
Approach		392	2.0	0.424	8.9	LOS A	2.1	16.4	0.42	0.31	34.4
All Vehicles		1095	2.0	0.424	8.5	LOS A	2.1	16.4	0.42	0.31	34.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2023 AM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	2	2.0	0.012	5.8	LOS A	0.0	0.3	0.49	0.74	37.5
8	T1	3	2.0	0.012	5.8	LOS A	0.0	0.3	0.49	0.74	37.5
18	R2	2	2.0	0.012	5.8	LOS A	0.0	0.3	0.49	0.74	37.5
Approach		8	2.0	0.012	5.8	LOS A	0.0	0.3	0.49	0.37	37.5
East: St Andrew St											
1	L2	7	2.0	0.437	8.4	LOS A	2.4	18.4	0.28	0.30	35.8
6	T1	201	2.0	0.437	8.4	LOS A	2.4	18.4	0.28	0.30	35.8
16	R2	241	2.0	0.437	8.4	LOS A	2.4	18.4	0.28	0.30	35.8
Approach		449	2.0	0.437	8.4	LOS A	2.4	18.4	0.28	0.15	35.8
North: Beatty Line											
7	L2	227	2.0	0.445	9.4	LOS A	2.2	17.3	0.47	0.74	32.4
4	T1	10	2.0	0.445	9.4	LOS A	2.2	17.3	0.47	0.74	32.4
14	R2	161	2.0	0.445	9.4	LOS A	2.2	17.3	0.47	0.74	32.4
Approach		398	2.0	0.445	9.4	LOS A	2.2	17.3	0.47	0.37	32.4
West: St Andrew St											
5	L2	68	2.0	0.376	8.5	LOS A	1.7	13.2	0.46	0.75	35.3
2	T1	253	2.0	0.376	8.5	LOS A	1.7	13.2	0.46	0.75	35.3
12	R2	3	2.0	0.376	8.5	LOS A	1.7	13.2	0.46	0.75	35.3
Approach		325	2.0	0.376	8.5	LOS A	1.7	13.2	0.46	0.38	35.3
All Vehicles		1179	2.0	0.445	8.8	LOS A	2.4	18.4	0.39	0.29	34.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2023 PM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	9	2.0	0.025	7.2	LOS A	0.1	0.6	0.55	1.00	34.2
8	T1	2	2.0	0.025	7.2	LOS A	0.1	0.6	0.55	1.00	34.2
18	R2	2	2.0	0.025	7.2	LOS A	0.1	0.6	0.55	1.00	34.2
Approach		13	2.0	0.025	7.2	LOS A	0.1	0.6	0.55	0.50	34.2
East: St Andrew St											
1	L2	2	2.0	0.664	14.4	LOS B	5.2	40.5	0.58	0.89	30.3
6	T1	282	2.0	0.664	14.4	LOS B	5.2	40.5	0.58	0.89	30.3
16	R2	342	2.0	0.664	14.4	LOS B	5.2	40.5	0.58	0.89	30.3
Approach		626	2.0	0.664	14.4	LOS B	5.2	40.5	0.58	0.44	30.3
North: Beatty Line											
7	L2	318	2.0	0.563	12.7	LOS B	3.5	27.1	0.61	1.17	29.6
4	T1	3	2.0	0.563	12.7	LOS B	3.5	27.1	0.61	1.17	29.6
14	R2	141	2.0	0.563	12.7	LOS B	3.5	27.1	0.61	1.17	29.6
Approach		463	2.0	0.563	12.7	LOS B	3.5	27.1	0.61	0.58	29.6
West: St Andrew St											
5	L2	148	2.0	0.539	12.4	LOS B	3.2	24.5	0.61	1.20	31.2
2	T1	277	2.0	0.539	12.4	LOS B	3.2	24.5	0.61	1.20	31.2
12	R2	4	2.0	0.539	12.4	LOS B	3.2	24.5	0.61	1.20	31.2
Approach		429	2.0	0.539	12.4	LOS B	3.2	24.5	0.61	0.60	31.2
All Vehicles		1532	2.0	0.664	13.2	LOS B	5.2	40.5	0.60	0.53	30.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2028 AM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	2	2.0	0.015	7.3	LOS A	0.0	0.4	0.55	0.96	35.9
8	T1	3	2.0	0.015	7.3	LOS A	0.0	0.4	0.55	0.96	35.9
18	R2	2	2.0	0.015	7.3	LOS A	0.0	0.4	0.55	0.96	35.9
Approach		8	2.0	0.015	7.3	LOS A	0.0	0.4	0.55	0.48	35.9
East: St Andrew St											
1	L2	7	2.0	0.509	9.8	LOS A	3.1	23.6	0.36	0.43	34.3
6	T1	211	2.0	0.509	9.8	LOS A	3.1	23.6	0.36	0.43	34.3
16	R2	293	2.0	0.509	9.8	LOS A	3.1	23.6	0.36	0.43	34.3
Approach		511	2.0	0.509	9.8	LOS A	3.1	23.6	0.36	0.22	34.3
North: Beatty Line											
7	L2	404	2.0	0.692	16.1	LOS B	6.0	46.3	0.68	1.22	27.5
4	T1	11	2.0	0.692	16.1	LOS B	6.0	46.3	0.68	1.22	27.5
14	R2	198	2.0	0.692	16.1	LOS B	6.0	46.3	0.68	1.22	27.5
Approach		613	2.0	0.692	16.1	LOS B	6.0	46.3	0.68	0.61	27.5
West: St Andrew St											
5	L2	91	2.0	0.501	12.4	LOS B	2.7	20.6	0.63	1.34	31.5
2	T1	266	2.0	0.501	12.4	LOS B	2.7	20.6	0.63	1.34	31.5
12	R2	3	2.0	0.501	12.4	LOS B	2.7	20.6	0.63	1.34	31.5
Approach		361	2.0	0.501	12.4	LOS B	2.7	20.6	0.63	0.67	31.5
All Vehicles		1492	2.0	0.692	13.0	LOS B	6.0	46.3	0.56	0.49	30.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: St Andrew / Beatty Line Roundabout 2028 PM Total

St Andrew Street / Beatty Line
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beatty Line											
3	L2	9	2.0	0.028	8.1	LOS A	0.1	0.7	0.58	1.11	33.5
8	T1	2	2.0	0.028	8.1	LOS A	0.1	0.7	0.58	1.11	33.5
18	R2	2	2.0	0.028	8.1	LOS A	0.1	0.7	0.58	1.11	33.5
Approach		13	2.0	0.028	8.1	LOS A	0.1	0.7	0.58	0.55	33.5
East: St Andrew St											
1	L2	2	2.0	0.783	20.6	LOS C	9.0	69.9	0.79	1.41	26.1
6	T1	296	2.0	0.783	20.6	LOS C	9.0	69.9	0.79	1.41	26.1
16	R2	413	2.0	0.783	20.6	LOS C	9.0	69.9	0.79	1.41	26.1
Approach		711	2.0	0.783	20.6	LOS C	9.0	69.9	0.79	0.71	26.1
North: Beatty Line											
7	L2	368	2.0	0.663	16.0	LOS B	5.1	39.5	0.70	1.44	27.5
4	T1	3	2.0	0.663	16.0	LOS B	5.1	39.5	0.70	1.44	27.5
14	R2	165	2.0	0.663	16.0	LOS B	5.1	39.5	0.70	1.44	27.5
Approach		537	2.0	0.663	16.0	LOS B	5.1	39.5	0.70	0.72	27.5
West: St Andrew St											
5	L2	185	2.0	0.635	15.8	LOS B	4.4	34.3	0.71	1.55	28.6
2	T1	291	2.0	0.635	15.8	LOS B	4.4	34.3	0.71	1.55	28.6
12	R2	4	2.0	0.635	15.8	LOS B	4.4	34.3	0.71	1.55	28.6
Approach		480	2.0	0.635	15.8	LOS B	4.4	34.3	0.71	0.77	28.6
All Vehicles		1741	2.0	0.783	17.8	LOS B	9.0	69.9	0.74	0.73	27.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix H

Technical Memorandum – Response to Review Comments

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BURNSIDE
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Technical Memorandum

Date: February 28, 2018 **Project No.:** 300031145.5379

Project Name: Storeybrook Subdivision Phase 2/3 Draft Plan
Response to Traffic Comments

Client Name: Nigus Fergus Joint Venture

Submitted To: Ray Kirtz, Triton Engineering Services Limited

Submitted By: Henry Centen, P.Eng.

Reviewed By: Lorena Niemi, P.Eng.

This technical memorandum provides our response to the traffic related review comments, provided by Triton Engineering Services Limited on behalf of the Township of Centre Wellington, in their memorandum dated August 22, 2017. Triton's comments were based on their review of our earlier Traffic Impact Study, dated December 2016. Our numbering follows the numbering in Triton's comments. This memorandum also forms an Appendix to our revised *Traffic Impact Study in Support of Draft Plan Approvals (Phases 2 & 3), North West Fergus Secondary Plan*.

We are attaching various Figures to clarify/confirm our analysis: Intersection (INT) figures, Sight Distance (SD) figures and Road Section (RS) figures.

1.2 - Intersections of Streets O, P. Q with Street N, Street A with Street D provide a tight radius to bring to 90 degrees. Provide a larger scale typical detail with curbs to illustrate the proposed intersection configuration.

Figure 1 INT-1 provides the typical detail for these intersections. The stop controlled approaches are proposed to have centreline radii of 30 metres, which will accommodate operating speeds of over 30 km/h (Figure 3.2.4, *Geometric Design Guide for Canadian Roads, June 2017*). These approach speeds are considered to be acceptable for low speed urban design conditions, for approaches to stop controlled intersections.

1.3 - The configuration of Street A at Streets B, H, and M requires further review. Intersection spacing appears to be too close. Comment on spacing and provide a detail with curbs to illustrate how the deflection and close spacing will be addressed.

The spacing between intersections in the current plan is about 42.3 metres, which meets the TAC guidelines for spacing along local streets (i.e., 40 metres). Figure INT-2 illustrates the intersection details.

1.4 – Illustrate the available sight distance at the following intersections: A/D, N/R, O/N, S/Colborne, V/Colborne. The issue is available sight distance on the inside of the curves for vehicles exiting the side street. Sight distance must be available within the ROW due to potential blockage from fences, vegetation, etc. on private property.

The available Intersection Sight Distances (ISD) and/or Stopping Sight Distances (SSD) have been reviewed for the intersections noted, based on the criteria in the TAC *Geometric Design Guide for Canadian Roads, June 2017* (Table 9.9.4 for left turn movements and Table 9.9.6 for right turn movements or crossing movements).

Intersection N/R is at the junction of two local roads and the critical intersection sight distance is shown on Figure SD-1. The ISD to the west (96.03 m) provides a SSD for an operating speed of 66 km/h. Considering that traffic will be travelling at reduced speeds due to the bend in the road (i.e., R=40 metres, 38 km/h operating speed), as well as the low traffic volumes and traffic speeds (local/local junction), the available ISD to the west is considered to be acceptable, since SSD criteria are met.

Intersection O/N is at the junction of two local roads and the intersection sight distances are shown on Figure SD-2. The ISD to the east (90.81 m) provides a SSD for an operating speed of 64 km/h. Considering that traffic will be travelling at reduced speeds due to the bend in the road (i.e., R=40 m, 38 km/h operating speed), as well as the low traffic volumes and traffic speeds (local/local junction), the available ISD to the east is considered to be acceptable, since SSD criteria are met.

Intersection S/Colborne is at the junction of a local road and a minor collector road and the critical sight distance is shown on Figure SD-3. The ISD to the east (99.71 m) provides a SSD for an operating speed of 67 km/h, an ISD for left turns for an operating speed of 47 km/h and an ISD for right turns for an operating speed of 55 km/h. Turning movements from Street S are forecast to be very low and therefore some minor impact of the left turn movements from this street on the traffic speeds on Colborne is tolerable. The SSD provided is sufficient to maintain the safety of traffic operations at this intersection.

Intersection V/Colborne is at the junction of a local road and a minor collector road and the critical sight distance is shown on Figure SD-4. The ISD to the west (109.5 m) provides a SSD for an operating speed of 72 km/h, an ISD for left turns for an operating speed of 53 km/h and an ISD for right turns for an operating speed of 61 km/h. Therefore, travel speeds on Colborne can be maintained at the posted speed, without impact from the turning movements from Street V. The SSD provided is sufficient to maintain the safety of traffic operations at this intersection.

Intersection D/A is at the junction of two local roads and the critical intersection sight distance is shown on Figure SD-5. The ISD to the south (60.59 m) provides a SSD for an operating speed of 48 km/h and an ISD for left turns for an operating speed of about 28 km/h. The curve on Street A (R=90 m) can accommodate operating speeds of about 50 km/h, which is slightly higher than the SSD provided and significantly higher than the ISD recommended for left turn movements. Considering the minimal traffic calming effect of the curve, it is recommended that

left turn egress movements from Street D onto Street A be prohibited, via a raised island, as shown on Figure SD-5. Since the demands for such movements are considered to be minimal, this prohibition will not have any significant impact on travel patterns in this area.

1.11 – Township has revised typical road sections. Phase 1 and the West Phase will need to reflect these update sections. Confirm ROW widths are acceptable to accommodate these sections and intended function.

The proposed road cross sections have been developed based on the Township's new typical sections and have been submitted on Drawing C1001 for Phase 1 and as described below for Phase 2 / 3. The sections confirm that the ROW widths are acceptable to accommodate their intended function. The Phase 2 / 3 cross sections are attached and summarized as follows:

- Farley Road – Modified Standard R2(2) (minor collector street) – Figure RS2-1 - 9.5 m asphalt within a 22 m ROW, 2 travel lanes and 1 parking lane.
- Colborne Street – Modified Standard R2(2) (minor collector street) – Figure RS2-2 - 9.5 m asphalt within a 22 m ROW, 2 travel lanes and 2 bike lanes. Bike lanes are proposed in lieu of a parking lane in the standard.
- Beatty Line – Modified Standard R2(2) (minor collector street) – Figure RS2-3 - 9.5 m asphalt within a 20 m ROW, 2 travel lanes and 2 bike lanes. Bike lanes are proposed in lieu of parking lane in the standard. ROW is reduced from 22 m to 20 m.
- Street A and Street N – Standard R1(1) (minor collector street) – Figure RS1-4 - 8.5 m asphalt within a 20 m ROW, 2 shared travel lanes. These are local streets in the plan. Shared lanes are proposed, in lieu of designated parking lane in the standard.
- Remaining Roads – Standard R5(1) (local street) – Figure RS5-5 - 8.0 m asphalt within an 18 m ROW.

1.12 – Are ROWs large enough to accommodate left turn lanes where required? Typical cross-sections should be provided to show the sections with left turn lanes.

The road sections at the intersections are attached, showing the left turn lanes at the intersections, as follows:

- Colborne Street – Modified Standard R2(2) (minor collector street) – Figure RS2-6 - 12.9 m asphalt within a 22 m ROW, 2 travel lanes, 1 left turn lane, 2 bike lanes. Separation between back of curb and sidewalk is reduced to 1.75 metres, but still considered to be acceptable.
- Beatty Line – Modified Standard R2(2) – Figure RS2-7 – 10.5 m asphalt within a 20 m ROW, 2 travel lanes and 1 left turn lane. Separation distance between the back of curb and sidewalk is reduced to 1.95 metres, but still considered to be acceptable. Available ROW width is insufficient to accommodate bike lanes on Beatty Line as part of the current works. Implementation of future bike lanes on Beatty Line would be subject to future study work by the Town and likely require widening of the ROW in the area of the left turn lane.

1.13 – The July 2015 TIS has provided recommendations for off-site traffic/intersection improvements including preliminary lane and taper lengths, and approximate timings for implementation. Acceptance of these recommendations by the Township will need to be

confirmed. Also, which improvements would be covered by Development Charges, and which are the responsibilities of the developer, will need to be assessed. The Beatty Line issues in proximity to Phase 1 are currently being dealt with as part of Phase 1, however, additional issues (i.e., Colborne and Beatty Line south) will need to be addressed as part of the West Phase.

The TIS identifies the following external roadworks to be required to provide development access:

- Intersection of Beatty Line / NWFSP East Access / Millage Lane – northbound left turn lane on Beatty Line, signalization and additional left turn lanes, if warrants are met. The Phase 1 design submission proposes left turn lanes on three legs of this intersection (i.e., excluding Millage Lane), as part of the initial subdivision works. Future signalization (including a left turn lane on Millage Lane) would be undertaken by the Township as a Development Charge project.
- Intersection of Colborne Street / NWFSP South Access – eastbound left turn lane.

In addition to the above works, the realignment of Colborne Street will need to be completed as part of the ultimate subdivision development. It is assumed that the improvement/oversizing of this road would also be subject to Development Charge funding.

In addition to the above works the TIS also identifies the following external roadworks that may be required to accommodate forecasted traffic in the broader road network. It is assumed that these projects would be planned and implemented by the Township or County, under Development Charges, including the following:

- Intersection of Beatty Line / Colborne Street – northbound left turn lane on Beatty Line, eastbound left turn lane on Colborne Street, signalization when warranted.
- Intersection of Beatty Line / St. Andrew Street - signalization and turning lanes
- Intersection of Beatty Line / Garafraxa Street – southbound left turn lane
- Reconstruction and/or upgrading of Beatty Line.

The works affecting Colborne Street (i.e., realignment, addition of the south access to the NWFSP and improvements at the intersection of Colborne/Beatty Line) will be implemented at the time of the construction of the abutting subdivision works, since the Colborne improvements are not required to accommodate the subdivision phases that are located to the north of the drain. The existing intersection configurations / traffic controls at the intersection of Colborne Street / Beatty Line can accommodate the complete development of the lands to the north of the drain, with the following forecasted operations (2023 Total Traffic):

- Eastbound left / right turn movement – AM peak hour delay of 17.6 seconds/vehicle and volume/capacity (v/c) ratio of 0.33; PM peak hour delay of 45.0 seconds/vehicle and v/c ratio of 0.78.
- Northbound left turn movement – AM peak hour delay of 2.3 seconds/vehicle and v/c ratio of 0.05; PM peak hour delay of 1.1 seconds/vehicle and v/c ratio of 0.04.

1.14 – Road signage and markings on drawings will need to reflect intent of typical road sections (i.e., no parking, bike lanes, turn lanes).

Pavement marking and signage drawings will be provided as part of the detailed designs and reflect the various functional cross sections proposed.

1.15 – TIS report indicates signals may be required at Colborne/Beatty Line for operational reasons by 2028. Signals are not indicated as warranted by 2028 but additional traffic control will be required prior to that since the intersection will have serious operational deficiencies under stop control. Signalization or roundabout will be required as part of West Phase.

It is proposed that the intersection of Colborne Street / Beatty Line continue to be monitored as development proceeds, with signalization implemented once signal warrants have been met. As an interim condition the intersection would be improved via the implementation of left turn lanes on the south and east approaches, and undergrounds for future signalization will be provided. It is acknowledged that the TAC *Geometric Design Guide for Canadian Roads, June 2017* notes that it may be undesirable to have 2-lane entry from a minor road onto a major highway, except at certain low speed urban locations. Considering that this is a tee intersection of two low speed minor collector roads, the provision of a left turn lane at the stop control on Colborne Street is considered to be acceptable, especially considering the potential to upgrade the intersection in the future to full signalized control.

1.16 – Previous Draft Plan concepts had Farley Road and Street N as a roundabout, this is no longer indicated. As such, the Farley Road alignment is not acceptable for a through road. Unclear why the roundabout was dismissed for this intersection. As such, ROW requirements to accommodate this possibility.

This intersection is proposed to operate under stop control on the minor street legs (Street N). It is acknowledged that the Street N legs intersect with Farley Road at an angle of about 65 degrees, which is slightly below the minimum recommended 70-degree skew angle. Considering the low traffic volumes anticipated on Street N, the minor skew angle deficiency is not considered to be critical. The critical Intersection Sight Distance from Street N accommodates a design speed on Farley Road of over 70 km/h (see Figure SD-6). A park block has been added in the southeast quadrant of this intersection, which further improves visibility in this area. The horizontal curvature on Farley Road through the intersection has a radius of 130 metres, which meets the design requirements for a collector road. Therefore, the proposed traffic control and geometric configuration at this intersection is considered to be acceptable, without introducing more restrictive traffic controls (i.e., roundabout control).

1.17 – Phase 1 will include construction of a NB left turn lane on Beatty Line, and placement of ducts for future signals. Operations to be monitored to determine timing for signal installation. This issue is commented on further as part of Phase 1 detailed design.

Phase 1 design is proposing to implement northbound and southbound left turn lanes on Beatty Line and an eastbound left turn lane on Elliot Drive, as an interim condition at the site access, with ongoing monitoring to confirm if, or when, signal warrants are met. Considering the uncertainty over whether signals will be warranted on Beatty Line at Colborne Street, we

recommend that turning lanes be implemented as an interim condition, with ongoing signal warrant monitoring, for this intersection.

1.18 – The TIS includes recommendations for the configuration of Colborne Street, these are to be revised to reflect the updated typical road section for Minor Collector including 22 m ROW.

The Colborne Street cross section has been updated as requested (i.e., modified Standard R2(2) (minor collector street) – Figure RS2-2 - 9.5 m asphalt within a 22 m ROW, 2 travel lanes and 2 bike lanes. Bike lanes are proposed in lieu of a parking lane in the standard.

1.19 – The connection of the internal north-south collector road (Farley Road) has been strategically offset from the Wellington Place access to the south to minimize the potential for traffic infiltration. The amount of the offset has not been identified, but it should be a sufficient distance to not create operational problems, particularly if an eastbound left turn lane on Colborne is implemented at Farley Road. The TIS indicates that the MTO Geometric Design Standards should not apply to this intersection in terms of taper length. It is acknowledged that the intersection offset will impact the taper length. Detailed design will need to consider how best to mitigate conflicts to operation at these intersections.

The eastbound left turn lane on Colborne Street at Farley Road is proposed to have a storage length of 15 metres and a taper length of 40 metres (see Figure INT-3, attached), to allow for the taper to commence to the east of the Wellington Place access. The resulting taper ratio is about 25:1, with an overall deceleration length of 55 metres, which meets the requirements of a 70 km/h design speed (TAC *Geometric Design Guide For Canadian Roads, June 2017)*.

1.20 – The latest plan eliminates most direct driveway access to Colborne which is an improvement from the previous configuration in terms of traffic movement. However, driveways are still proposed at the west end of the realignment which are on a curve. These are not desirable given the collector function and need to be eliminated. The TIS provides the opinion that the provision of 15 direct driveway accesses is "acceptable and desirable". The TIS does not address that these accesses are on a curve, with limited visibility. Since the remainder of Colborne has been designed with limited driveway access, introducing a few driveways which will be unexpected, and placing them on a horizontal curve, is not acceptable or desirable.

The Draft Plan has subsequently been revised to replace the lots, in the area of the bend on Colborne Street, with blocks (i.e., stormwater management block and park block), thereby removing the visibility concerns at driveways.

1.21 – The TIS states that Colborne is "primarily serving as a connection for a grid of intersecting local roads". It should also be stated that Colborne provides a through function, as it connects the communities of Fergus and Elora. This is an important consideration for selection of a typical road section for Colborne.

We acknowledge that Colborne Street provides a connection function between Fergus and Elora, however the traffic volumes are consistent with collector road operations. By definition, the function of collector roads is to both provide access to adjacent lands and mobility for

through traffic. The proposed cross section meets the Township's collector road standards for road width, however replaces the parking lane with bike lanes, which will improve the traffic mobility along this corridor, in recognition of its interconnection function.

1.22 – Long term configuration of Beatty Line needs to be considered further; the option of a two-way centre turn lane with left turn lanes at intersections vs. a two lane roadway with roundabouts requires further study. The response notes that the cost for roundabouts is considerably higher than for signals, but this is not necessarily the case if the construction, of left turn lanes for signals, is taken into account. The statement that a two-way centre left turn lane is not required may support the roundabout option. A roundabout at Beatty Line and Colborne should remain a consideration for future design. As such, ROW requirements to accommodate this possibility.

Based on the study work to date, it is recommended that turning lanes be implemented on Beatty Line at the Phase 1 access, at Colborne Street and at Garafraxa Street. Signal warrants are not forecasted to be met at these intersections, however ongoing monitoring is recommended as development occurs to identify if signalization should ultimately be implemented. Considering the uncertainty in whether signals will be required, it is considered premature to plan for roundabout control. It is expected that future study work will be completed by the Township to confirm the ultimate requirements for the overall Beatty Line corridor, which would include consideration of any additional ROW requirements.

1.23 – Bicycle lanes have been recommended for Beatty Line. If implemented, they should be provided for the full length of Beatty Line. The feasibility of doing so with existing road configuration and ROW should be reviewed to confirm if proposed Draft Plan can accommodate this.

Considering the existing ROW constraints on Beatty Line, the implementation of bicycle lanes will be a future consideration. The proposed development is expected to provide sufficient vehicular mobility at the intersections, including the addition of turning lanes. It is expected that future study work will be completed by the Township to confirm the ultimate requirements for the overall Beatty Line corridor, which would include consideration of implementing bicycle lanes.

1.24 – The pavement widths identified do not include the numerous left turn lanes that have been recommended. Elsewhere in the TIS, a continuous left turn lane has been recommended between Colborne and Millage Lane. Typical section provided in TIS (A14) needs to illustrate that left turn lanes can be accommodated within the existing ROW. If not, a widening of Beatty Line ROW may be required.

The proposed interim intersection cross section at Beatty Line / Colborne Street is attached (RS2-7) and represents a modification of standard cross section RS2. As shown on the cross section, the available ROW on Beatty Line (20 metres) can accommodate a left turn lane at this intersection. As shown on the attached Figure INT-4, the development of a northbound left turn lane at this intersection does not require a continuous left turn lane to be developed (i.e., there will not be any overlap with the left turn lane developed at the intersection of Beatty Line / Street A to the north).

With the addition of the left turn lane, the available ROW on Beatty Line is insufficient to accommodate bicycle lanes through the intersection, without significantly constraining the

boulevard widths to accommodate other infrastructure requirements. Given the existing ROW constraints along Beatty Line, we do not anticipate that bicycle lanes will be implemented along Beatty Line in this area.

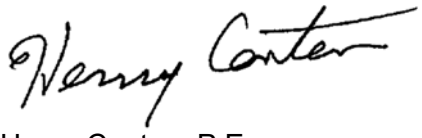
1.25 – In regard to 2.2 Planned Road Network Enhancements, Wellington County has advised that widening WR 18 to four lanes and installing traffic signals at the intersection of WR 18 and Beatty Line is not in their five-year program. However, phase 1 TIS shows that traffic signals and turn lanes will be required for Phase 1.

The widening of WR 18 was identified as a Development Charge project in the County's 2012 Development Charge Background Study. This project has subsequently been identified for the 2026 to 2031 timeframe. We have assumed that signalization will be part of this work, when it proceeds. The decision on when to procced with this work rests with the County. The intersection will continue to function without signals, and the signals are not a requirement for maintaining access for the NWFSP (i.e., there are alternate routes that traffic will divert to, such as Garafraxa Street). However, maintaining access for the hospital and the industrial lands in this area may require the County, or the Township, to advance the signalization project earlier than in their current plans.

1.26 – Table 9 indicates that traffic signals are warranted at WR 18 / Beatty Line in 2015. A traffic count carried out by Wellington County in 2016 shows that traffic signals are not warranted under existing traffic conditions.

We have subsequently been circulated with the signal warrants completed for this intersection by the County in 2016. There is an error in the calculation (i.e. it bases the eight hour warrant on seven hours of data), and therefore the actual warrant values are higher. There also appear to be significant variations in the traffic data and warrant calculations that were provided by the County in 2013. Based on our review of the County's information we believe that OTM Book 12 Signal Justification 3 (Volume/Delay Combination) was close to being met in 2016. Therefore, our recommendation that signals may be warranted in the 2018 to 2023 time period still applies. However, we defer to the County to plan the improvements to this intersection, which is under their jurisdiction.

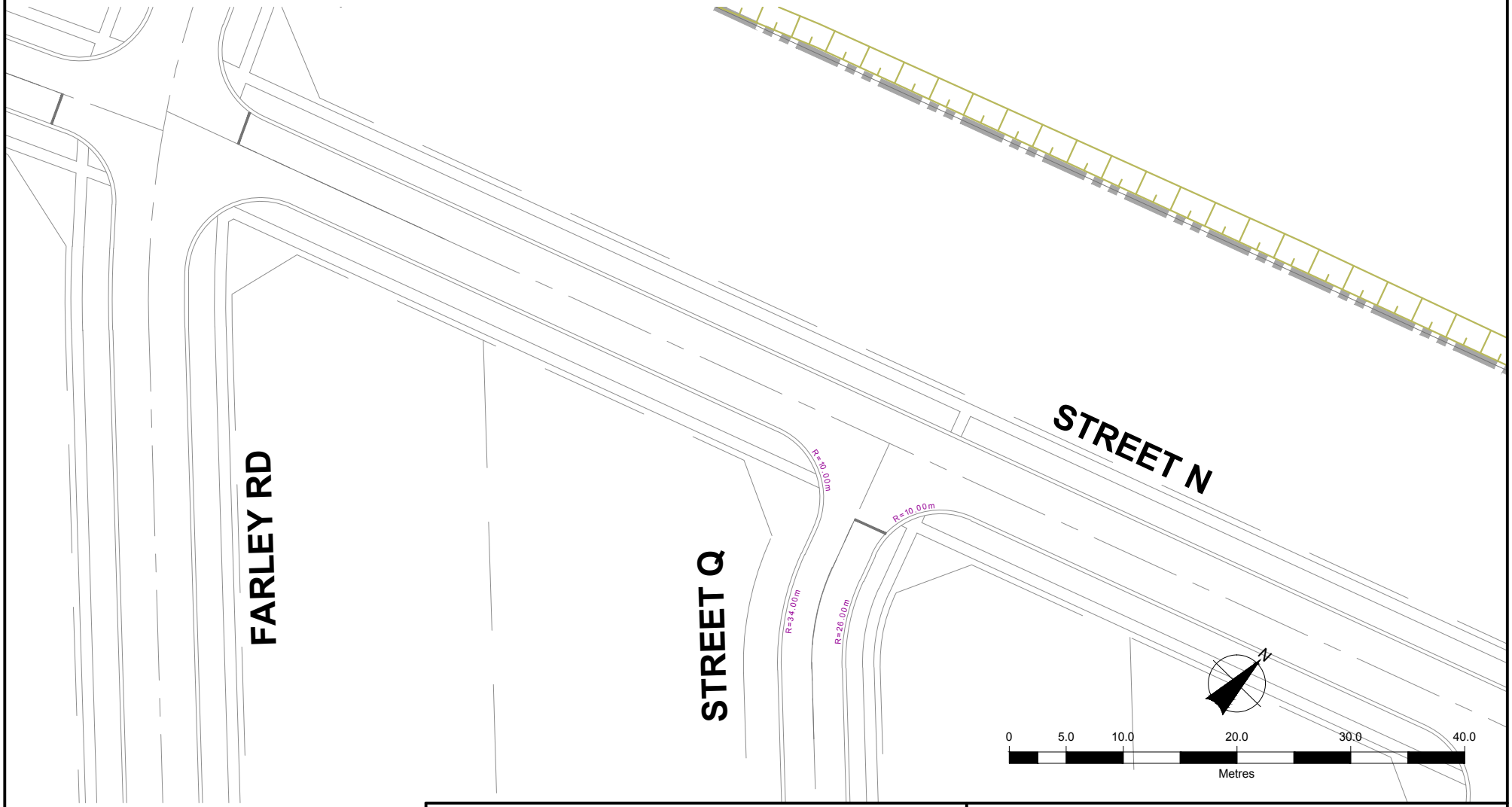
R.J. Burnside & Associates Limited



Henry Centen, P.Eng.
Senior Transportation Engineer
HBC:ls

Enclosure(s) INT-1 – Street N & Street Q Intersection
INT-2 – Street A & B H M Intersection
INT-3 – Colborne Street & Farley Road Intersection

INT-4 – Colborne Street & Beatty Line
SD-1 – Street N & Street R Intersection
SD-2 – Street N & Street O Intersection
SD-3 – Colborne Street & Street S Intersection
SD-4 – Colborne Street & Street U V Intersection
SD-5 – Street A & Street D Intersection
SD-6 – Farley Street & Street N Intersection
RS2-1 – Modified Cross Section 22.0 m ROW (Farley Road)
RS-2-2 – Modified Cross Section 22.0 m ROW (Colborne Street)
RS-2-3 – Modified Cross Section 20.0 m ROW (Beatty Line)
RS1-4 – Modified Cross Section 20.0 m ROW, Local Street A & N
RS5-5 – Modified Cross Section 18.0 m ROW, Local Street
RS2-6 – Modified Cross Section 22.0 m ROW, Colborne Street at Intersection
RS2-7 – Modified cross Section 20.0 m ROW, Beatty Line at Intersection



BURNSIDE

Figure Title

NW Fergus

Street N & Street Q Intersection

Client

SORBARA GROUP OF COMPANIES

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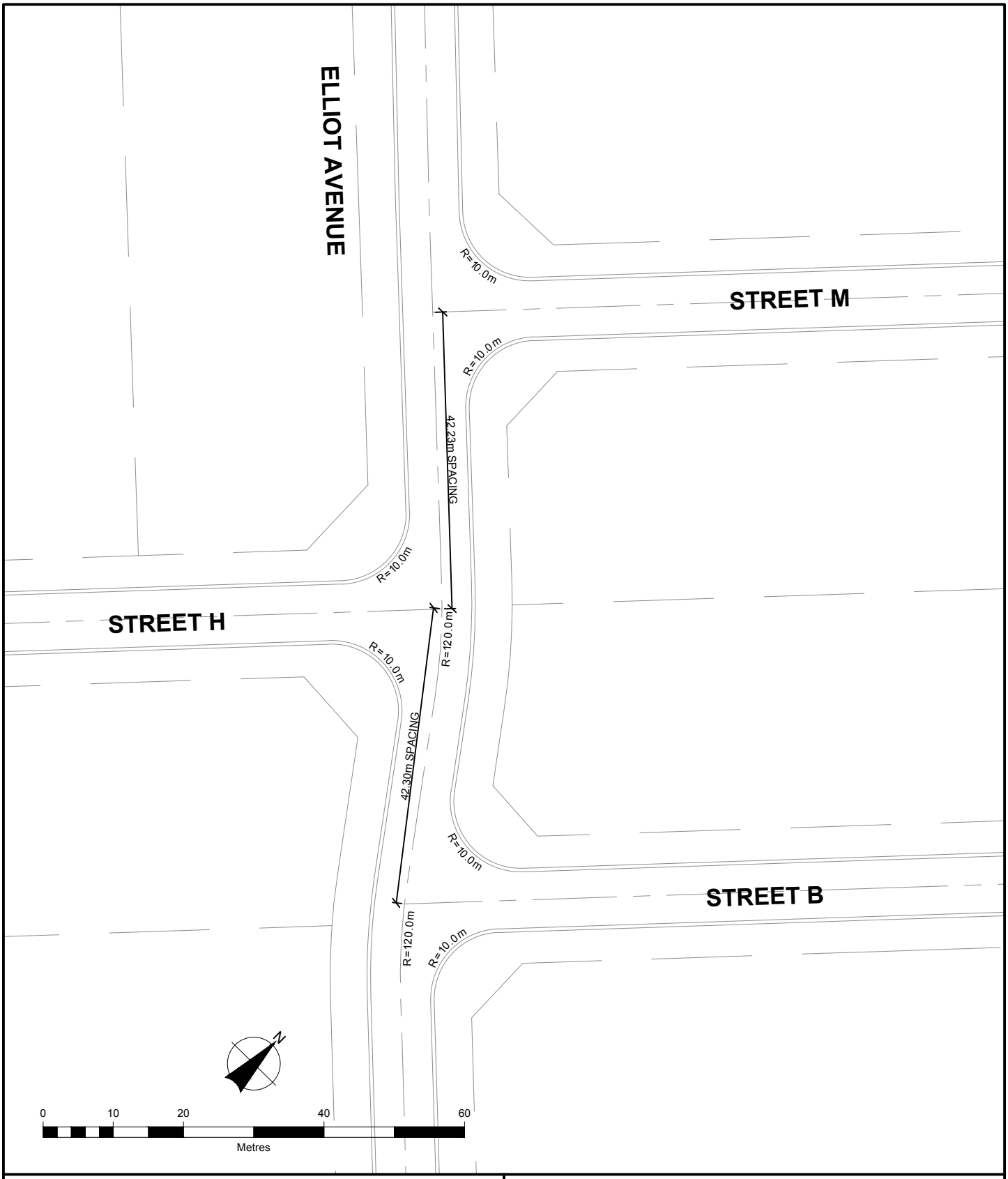

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Figure Title

NW Fergus

STREET A & B H M INTERSECTION

Client

SORBARA GROUP OF COMPANIES

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Scale		Project No.	
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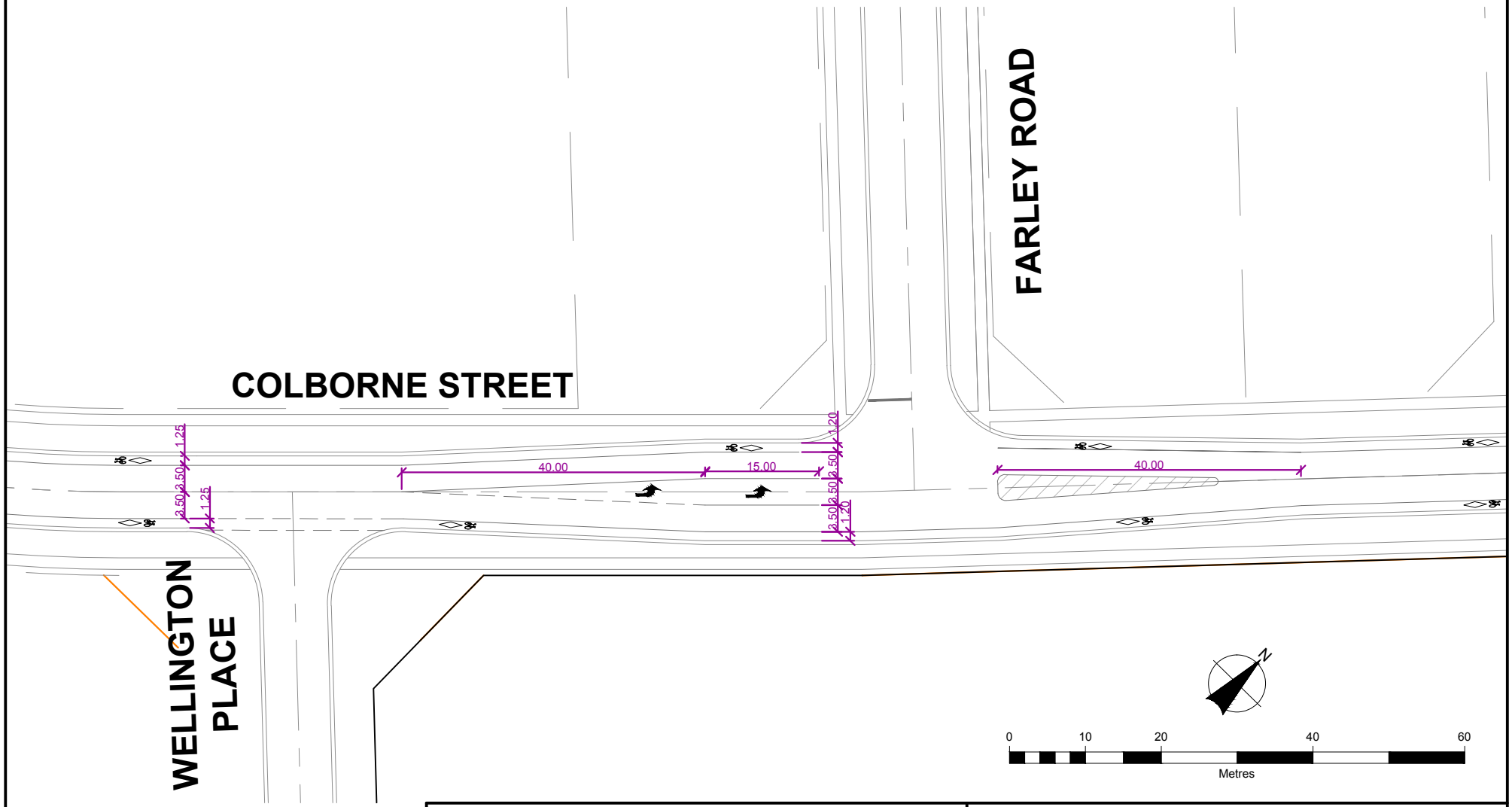

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Figure Title

NW Fergus

Colborne Street & Farley Road Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
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Scale		Project No.	
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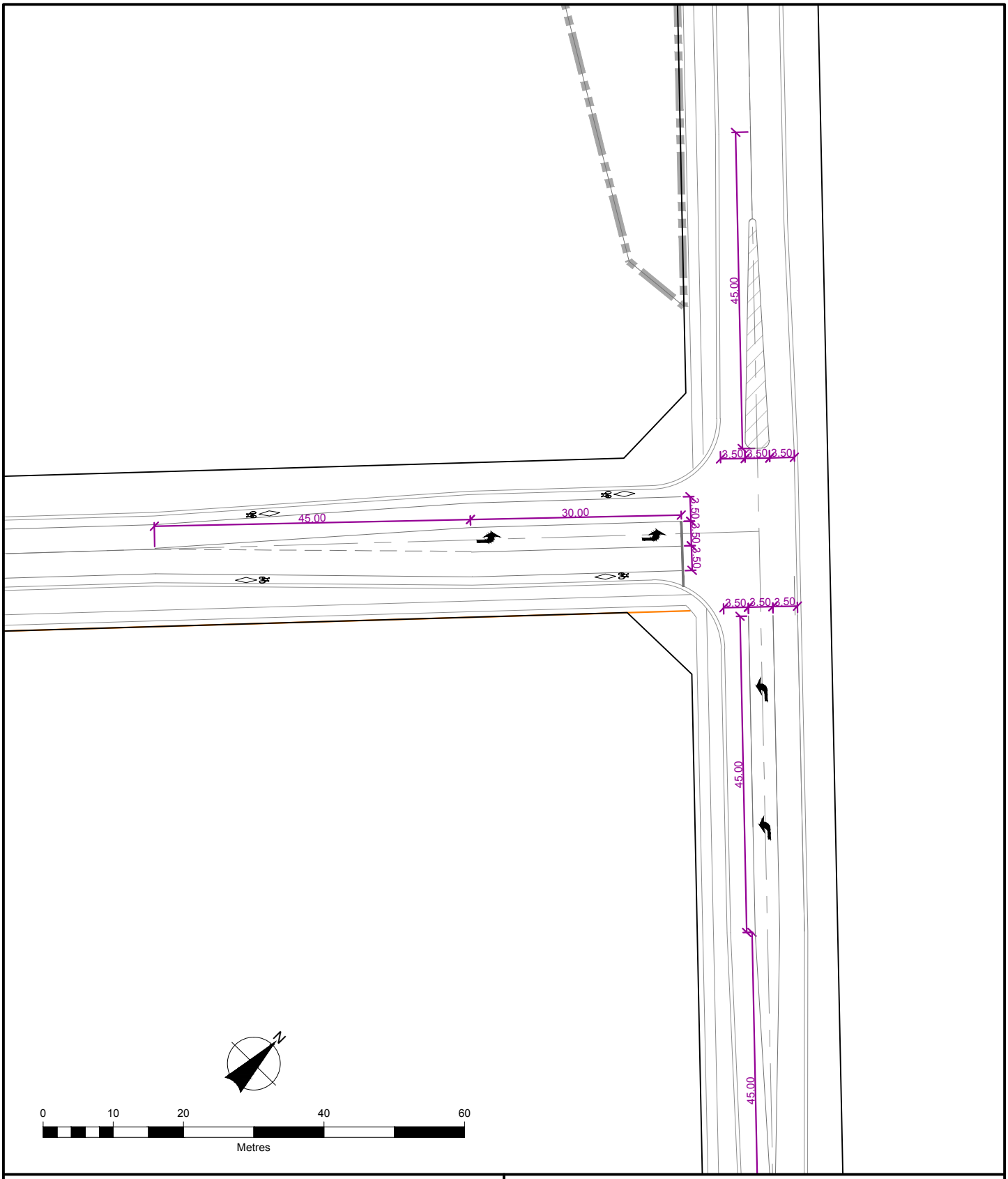

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Figure Title

NW Fergus

Colborne Street & Beatty Line

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
EDT	HC	17/11/13	**INT-4**
Scale		Project No.	
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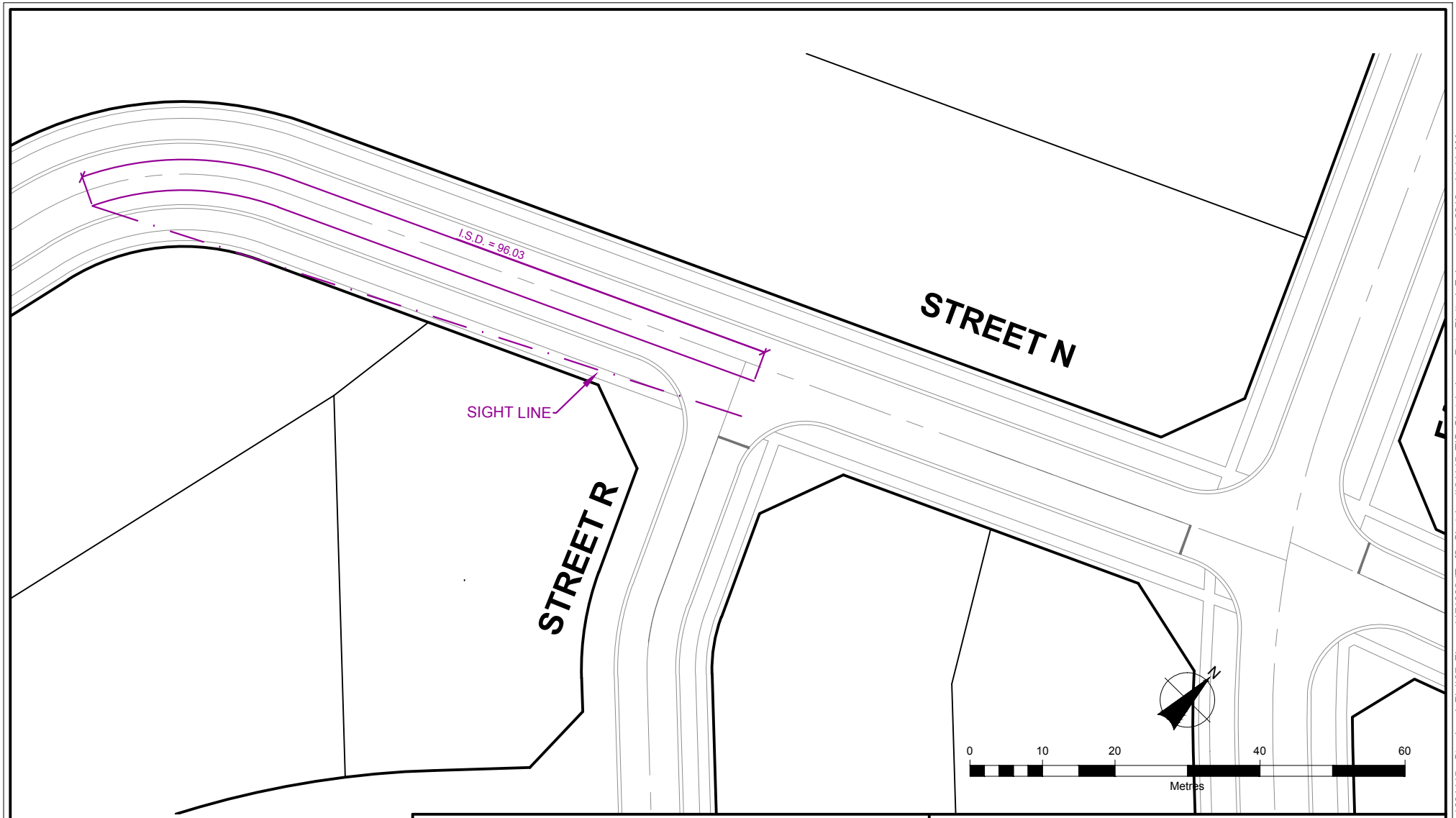

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Figure Title

NW Fergus

Street N & Street R Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
EDT	LN	17/12/12	**SD-1**
Scale		Project No.	
1:750		300031145	

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Figure Title

NW Fergus

Street N & Street O Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
PG	LN	17/11/27	**SD-2**
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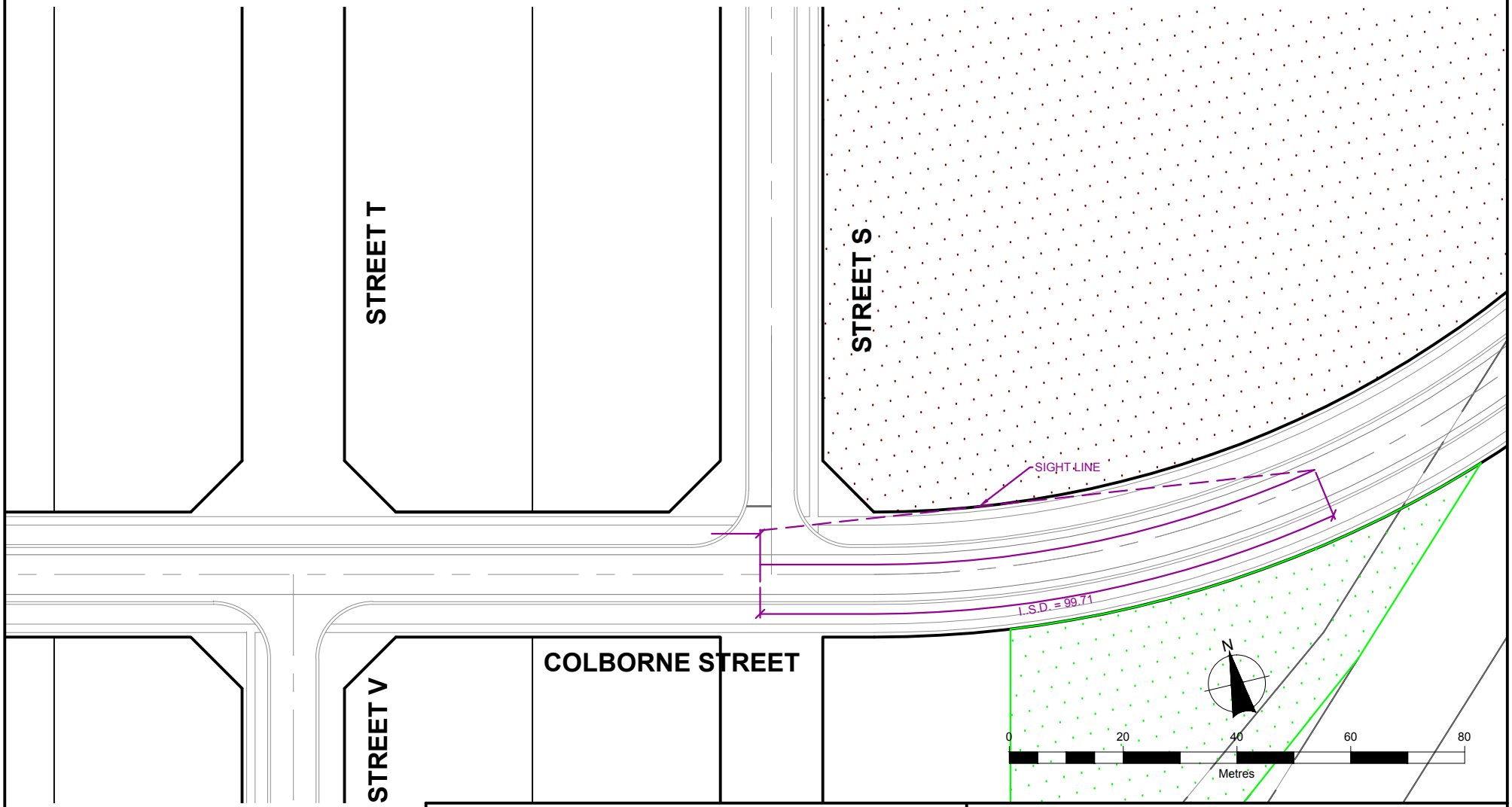

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Figure Title

NW Fergus

Colborne Street & Street S Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
PG	LN	17/11/10	**SD-3**
Scale		Project No.	
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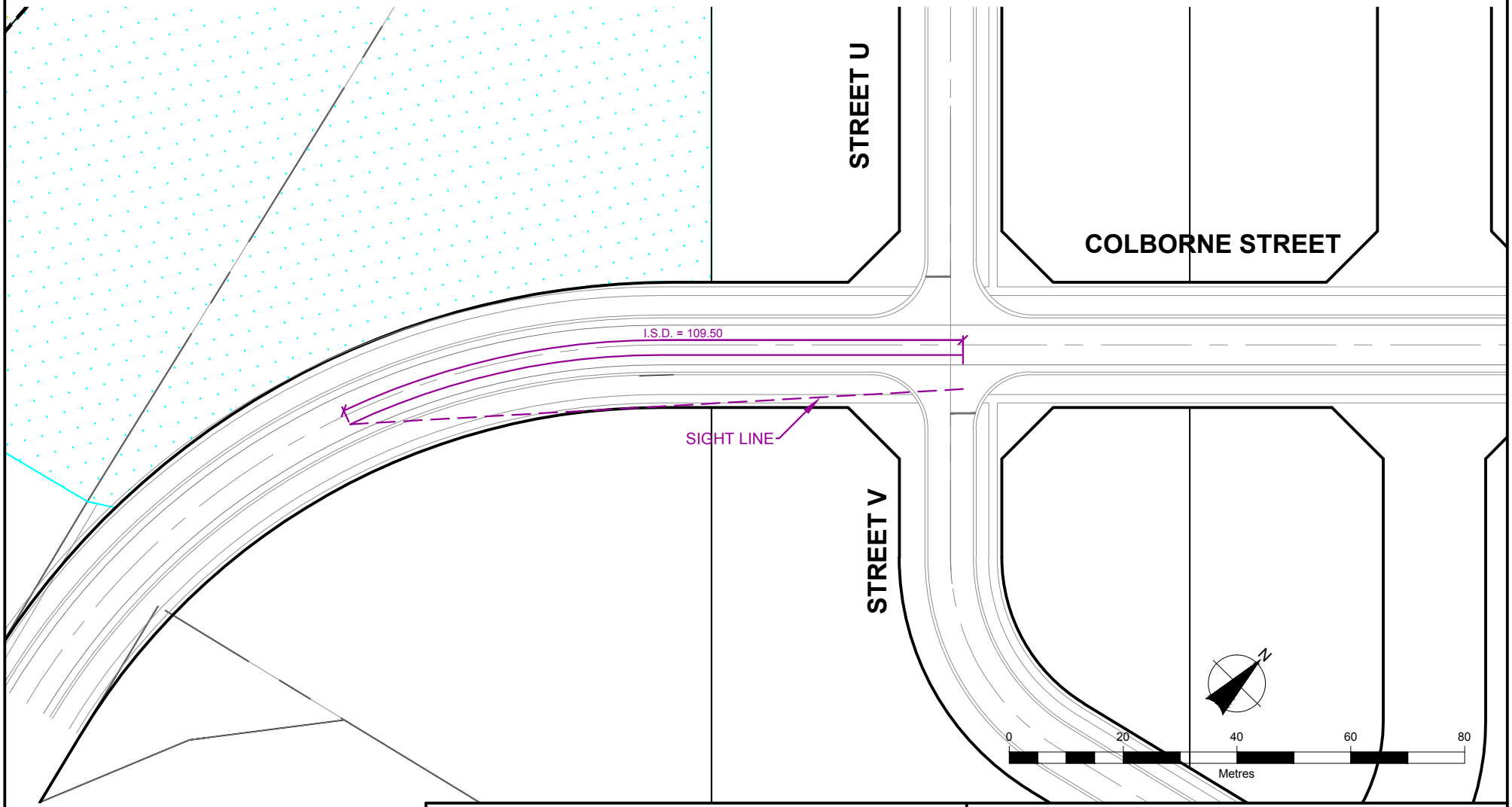

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Figure Title

NW Fergus

Colborne Street & Street U V Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
PG	LN	YY/MM/DD	**SD-4**
Scale		Project No.	
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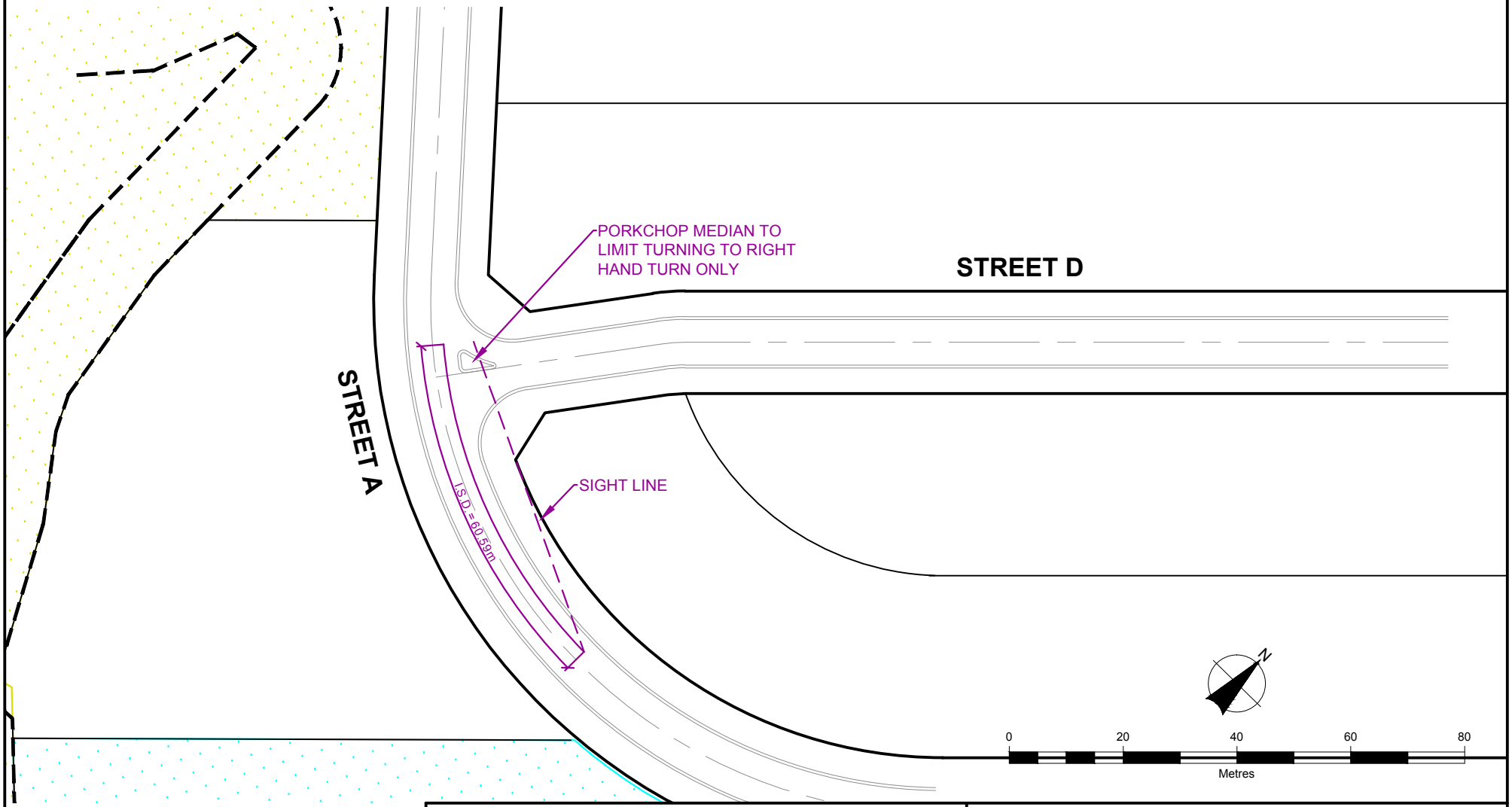

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Figure Title

NW Fergus

Street A & Street D Intersection

Client

SORBARA GROUP OF COMPANIES

Drawn	Checked	Date	Figure No.
ET	HC	18/02/16	**SD-5**
Scale		Project No.	
1:1000		300031145	

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I.S.D. = 147.12

R=130m

SIGHT LINE

STREET N

FARLEY ROAD

0 5.0 10.0 20.0 30.0 40.0

Metres

BURNSIDE

Client

SORBARA GROUP OF COMPANIES

Figure Title

NW Fergus

Farley Street & Street N Intersection

Drawn	Checked	Date	Figure No.
EDT	LN	17/12/12	**SD-6**
Scale		Project No.	
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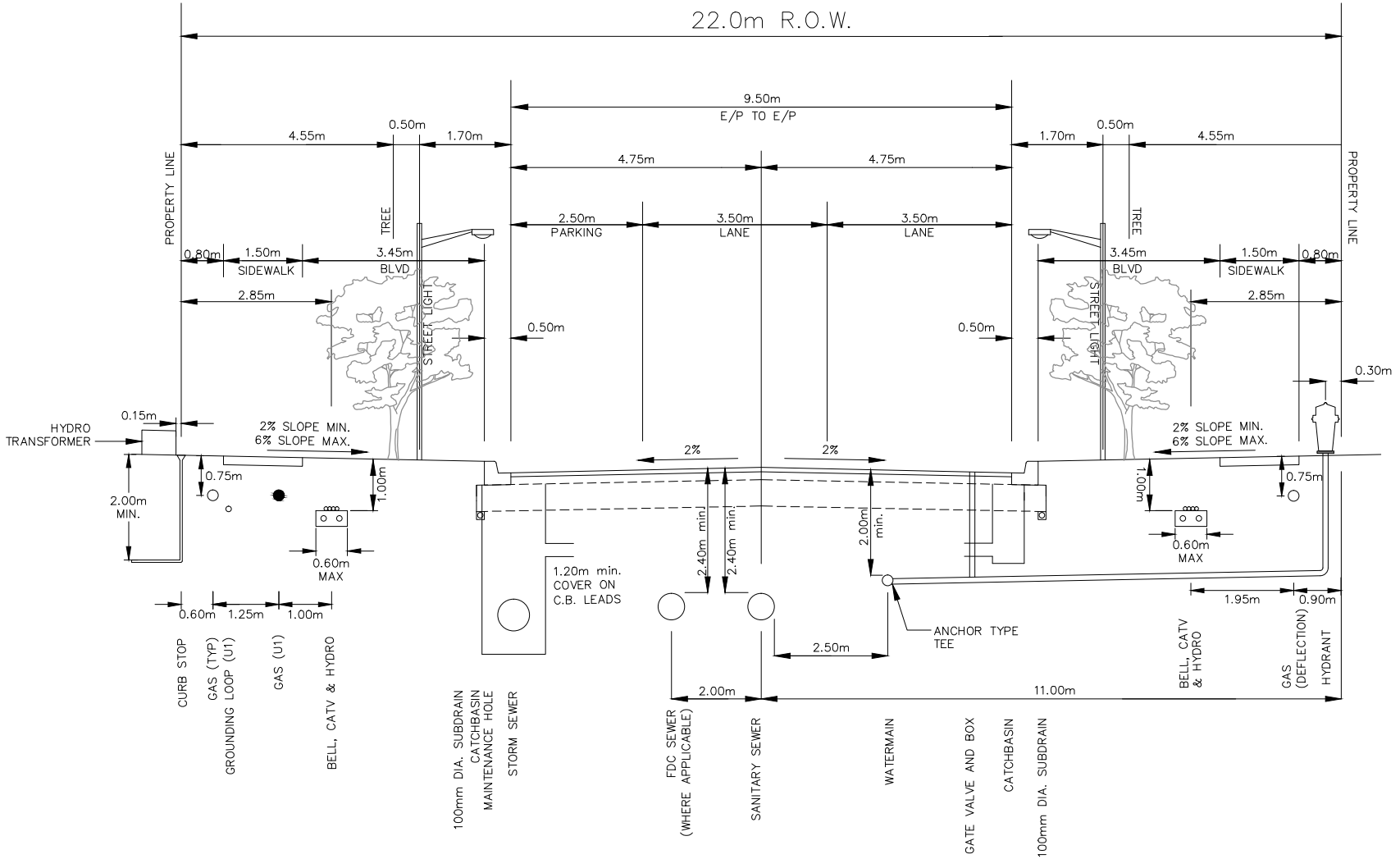


22.0m ROW (FARLEY RD)

NOTES:

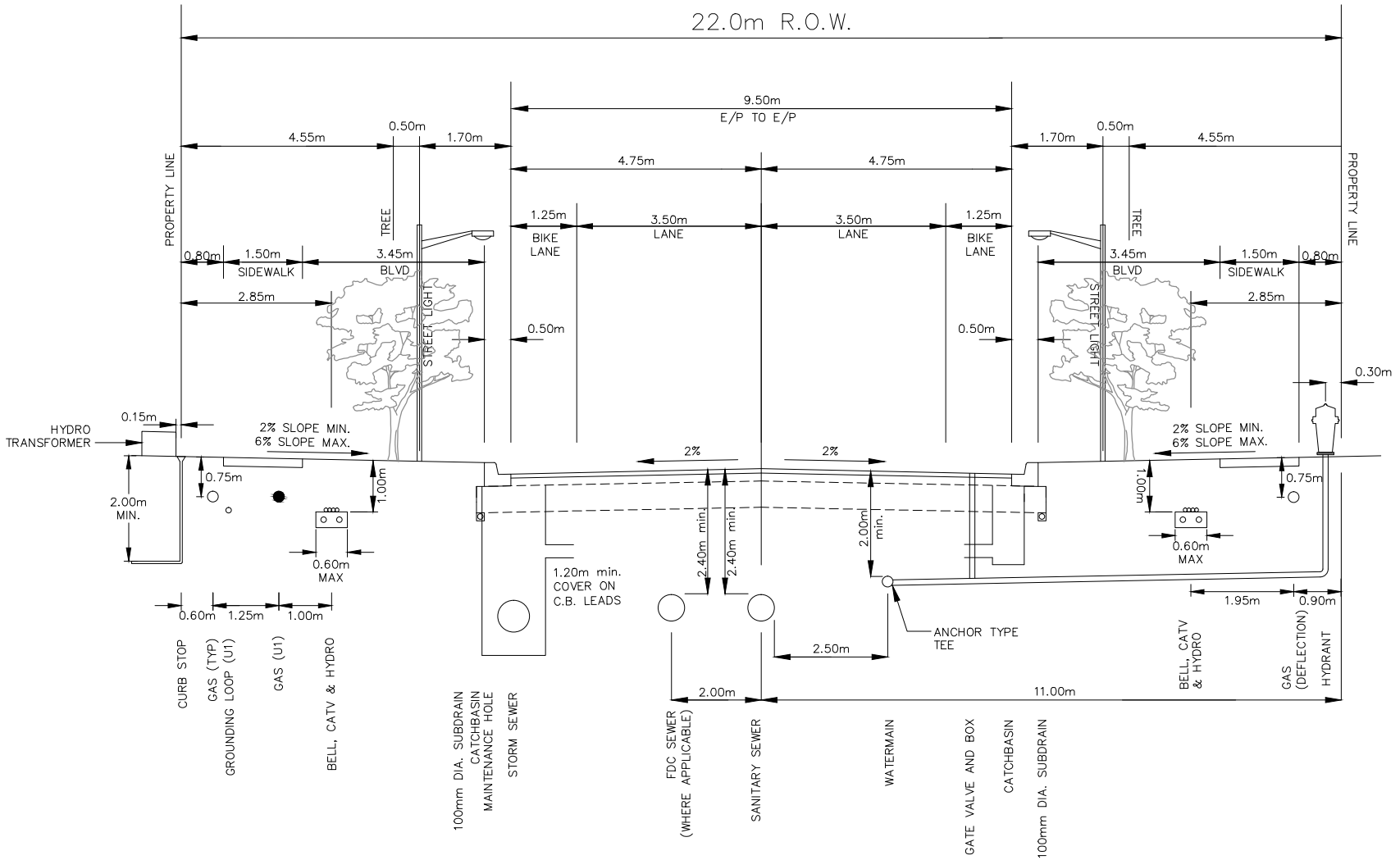
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
22.0m ROW

NTS

BURNSIDE

RS2-1



22.0m ROW (COLBORNE STREET)

NOTES:

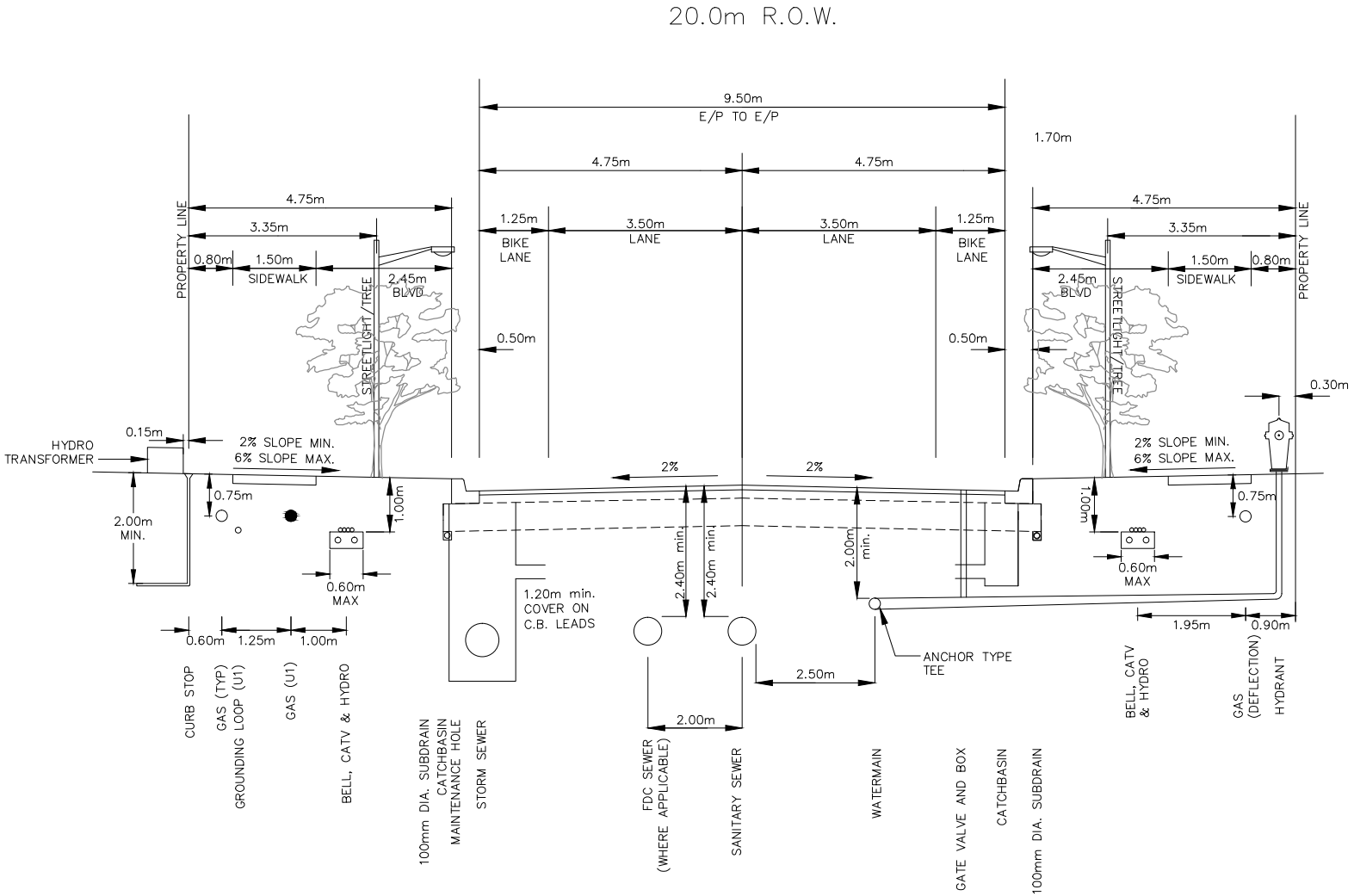
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
22.0m ROW

NTS

BURNSIDE

RS2-2



BEATTY LINE

NOTES:

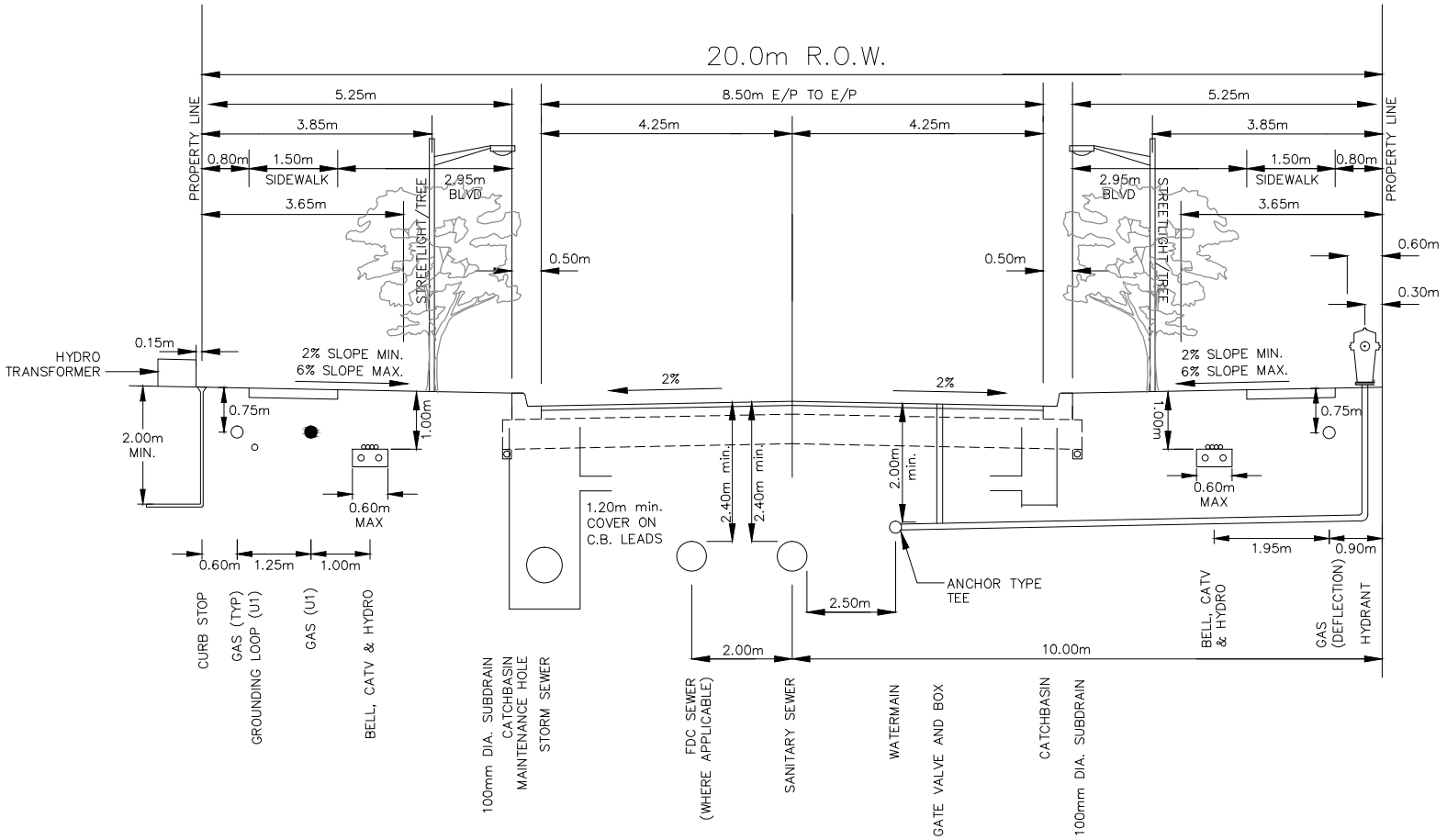
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
20.0m ROW

NTS

BURNSIDE

RS2-3



STREET A & STREET N

NOTES:

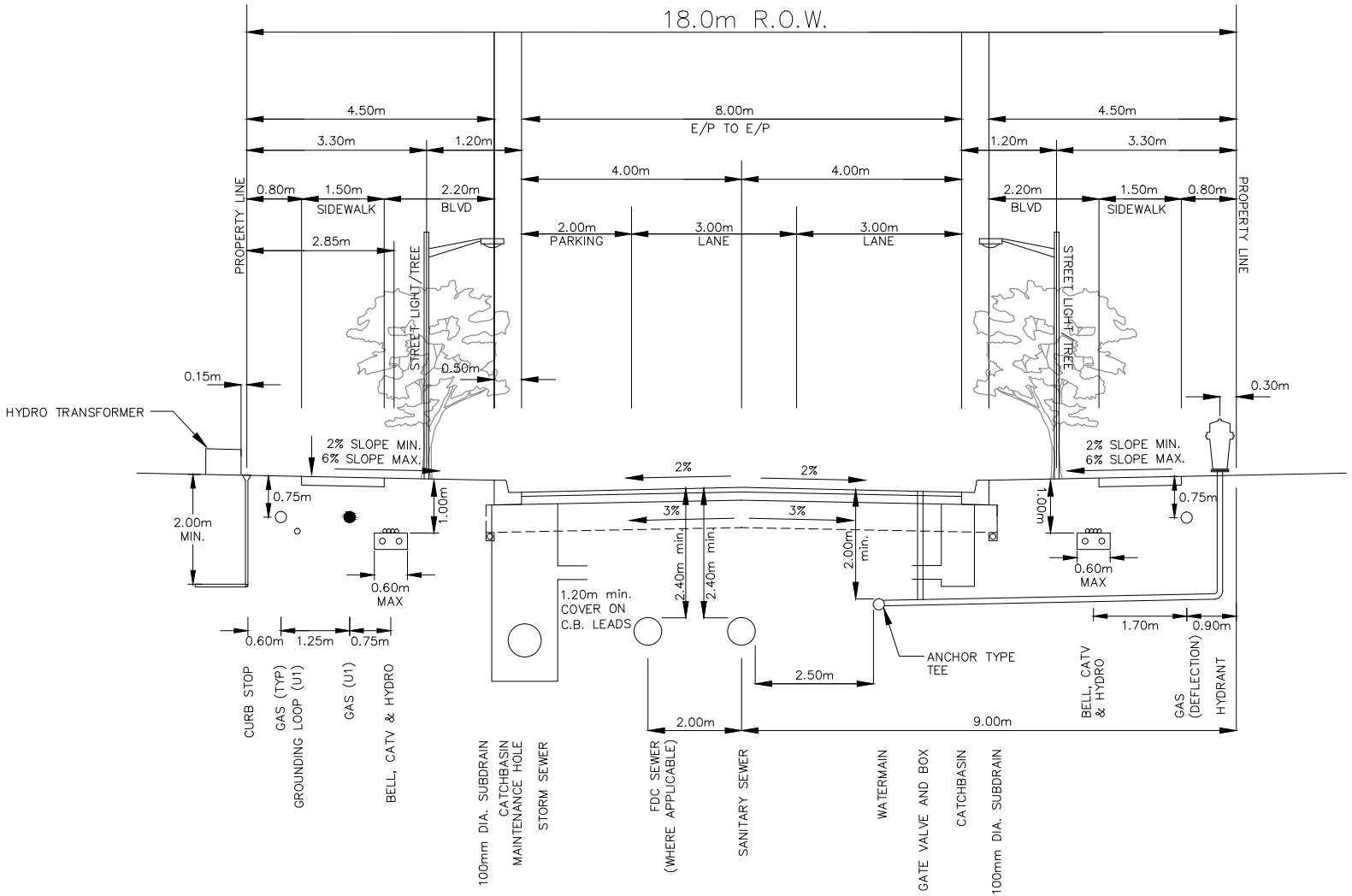
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK ON BOTH SIDES.

MODIFIED CROSS-SECTION
LOCAL STREET
20.0m ROW WITH 8.5m PAVEMENT
SHARED TRAVEL LANE

NTS

BURNSIDE

RS1-4



18.0m ROW

NOTES:

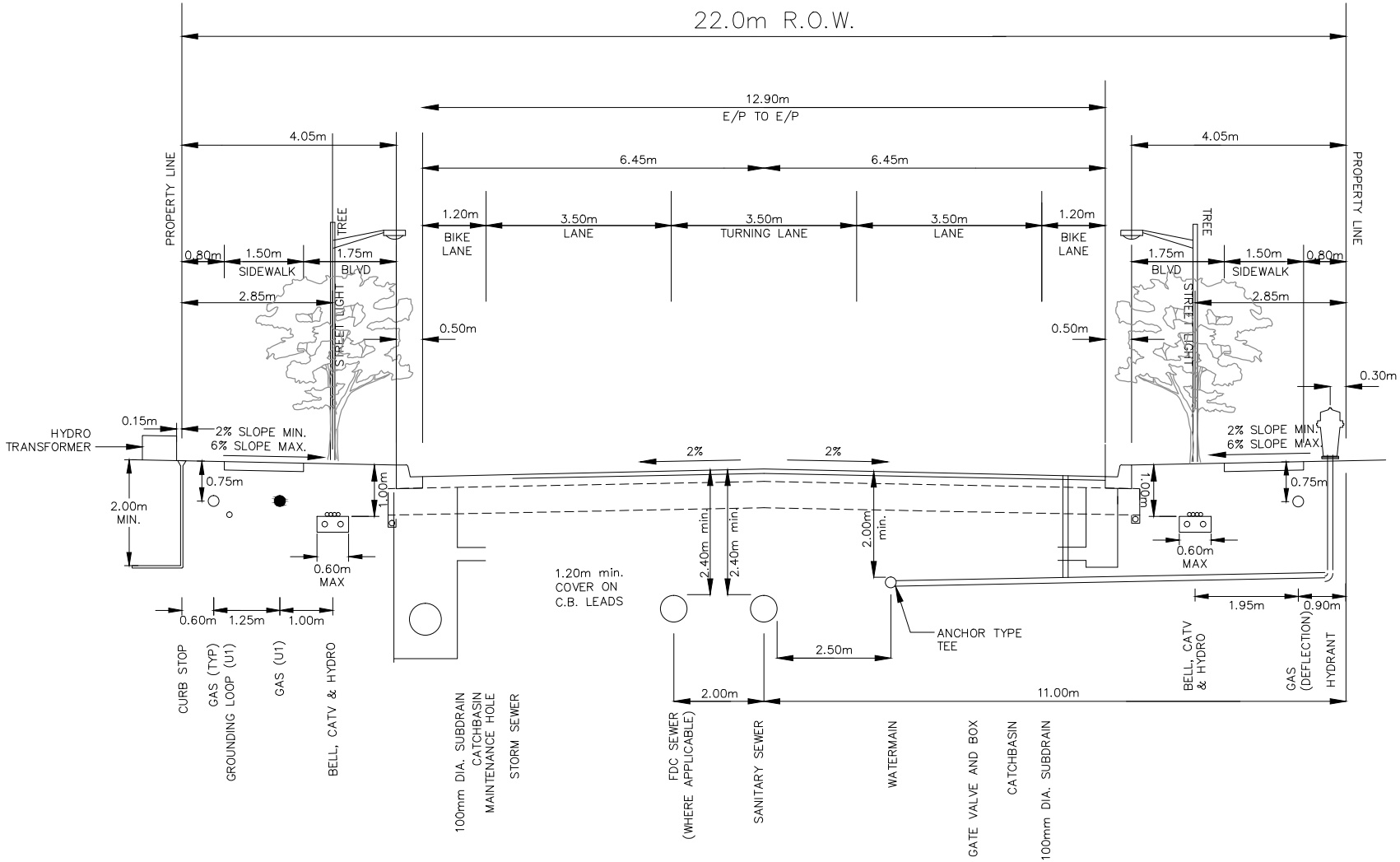
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. STREET LIGHTING AND SIDEWALK REQUIRED ON ONE SIDE ONLY.
3. TREE PLANTING ON BOTH SIDES.

MODIFIED CROSS-SECTION
LOCAL STREET
18.0m ROW

NTS

BURNSIDE

RS5-5



22.0m ROW (COLBORNE STREET) @ INTERSECTION

NOTES:

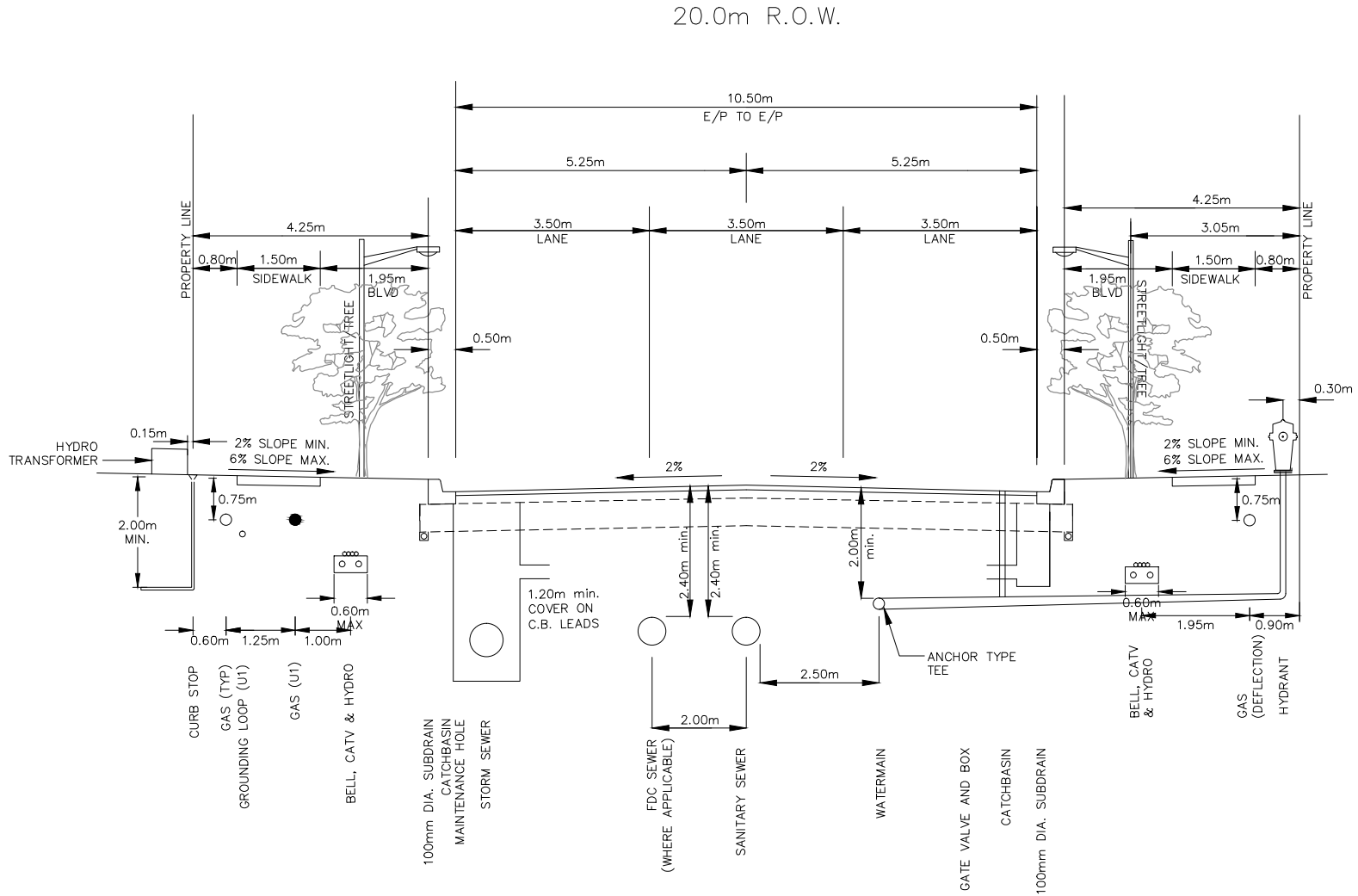
1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
22.0m ROW

NTS

BURNSIDE

RS2-6



20.0m ROW (BEATTY LINE) @ INTERSECTION

NOTES:

1. TRANSFORMER TO BE PLACED AS PER TWSP STANDARD U1.
2. TREE PLANTING ON BOTH SIDES.
3. SIDEWALK AND STREET LIGHTS ON BOTH SIDES.

MODIFIED CROSS-SECTION
COLLECTOR STREET
20.0m ROW

NTS

BURNSIDE

RS2-7