TRANSPORTATION STUDY

January 2024

Proposed Industrial Development
123 Highway 47
Township of Uxbridge, Durham Region, Ontario

Prepared For

Urbanway Development
Management Inc.

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Transportation Engineering

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January 23, 2024

Mr. Richard Ramos
Urbanway Development Management Inc.
175 Commerce Valley Drive West, Suite 320
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Re: Proposed Industrial Development, 123 Highway 47, Township of Uxbridge, ON – Transportation Study

TRANS-PLAN is pleased to submit this Transportation Study for the proposed industrial development located at 123 Highway 47, Township of Uxbridge, Durham Region. The proposed 60 acre parcel consists of 14 lots to be used for industrial use. Two access connections to Highway 47 from the internal roadway are proposed, with one full-moves access connecting to Highway 47 and Paisley Lane, and one right-in/right-out access at the east end of the property.

Our TIS findings indicate that the surrounding road network can accommodate the traffic volumes generated by the site in the build-out horizon year 2028 due to the similarities in the future background and total traffic operations. For the horizon year of 2033, minor signal timing adjustments were applied to reduce the vehicle capacity at the intersection of Highway 47 and York Durham Line.

The 2017 Durham Region Transportation Master Plan recommended a road widening from two to four travel lanes along Highway 47. As the EA study for this roadway improvement has not been completed, the road widening was included in a separate scenario analysis which considerably helped the 2033 traffic conditions.

A signal warrant review was completed for the new four-way intersection of Highway 47 and Paisley Lane due to the inclusion of the proposed site access. Under OTM Book 12 guidelines, a traffic signal was not warranted under 2033 conditions.

The proposed access designs were reviewed for vehicle ingress and egress with a Transportation Association of Canada (TAC) WB-20 tractor trailer, resulting in proper circulation for the large trucks in and out of both site accesses. Sight lines were reviewed under TAC requirements for both access locations, which indicated sufficient available sight distance for vehicles to safely exit the subject site.

Sincerely,

Anil Seegobin, P.Eng.
Partner, Engineer

Trans-Plan Transportation Inc.
Transportation Consultants

Charles Chung
Traffic Analyst

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1. INTRODUCTION

Trans-Plan has been retained by Urbanway Development Management Inc. to complete a Transportation Study, for a proposed industrial development located at 123 Highway 47, Township of Uxbridge. This study includes the following components and scope of work:

- A review and assessment of the existing road network
- An assessment of boundary roadway operations under future background conditions, including a review of traffic growth, area developments and planned transportation improvements in the study area
- An assessment of site-generated traffic impacts on the study area intersections under future background and total traffic conditions
- Recommendations to mitigate any identified traffic impacts on the boundary roadways, resulting from the proposed development
- The determination of roadway and intersection improvements and transit and pedestrian / cycling infrastructure improvements, as required, to accommodate the proposed development
- A signal warrant review for the proposed site access connection to Highway 47 and Paisley Lane
- A conceptual functional design drawing illustrating the proposed access points and a vehicle turning template review of loading vehicles, demonstrating proper ingress and egress within the site
- A sight distance analysis review of the proposed access locations in accordance with Transportation Association of Canada (TAC) guidelines

This report adheres to the Durham Region Traffic Impact Study Guidelines, and Chapter 9 of the Design Specifications for Traffic Control Devices, Pavement Marking, Signage, and Roadside Protection, for the Synchro traffic analysis.

2. STUDY AREA CONTEXT

2.1 Site Location

The site location is shown in Figure 1. The lot is currently occupied by a two-storey building and three one-storey abandon structures, planned to be demolished to allow for the proposed 17.8-hectare industrial subdivision consisting of 14 industrial lots.

Surrounding land uses in the study area, on the northside of Highway 47 (north of the subject site), are mainly industrial buildlings/warehouses/offices, constructions related suppliers and retailers. South of Highway 47 in the study area(directly south, west and east), are open lands.

3. PROPOSED DEVELOPMENT

The proposed industrial development located at 123 Highway 47, Township of Uxbridge, Durham Region. The proposed 60 acre parcel consists of 14 lots to be used for industrial use, as illustrated in the grading plan provided in Figure 2. While the building sizes for each lot is yet to be fully determined, correspondence with the client and previous iterations of the plan indicate an approximate overall GFA of 720,000 sq.ft. of industrial use.

Two access connections to Highway 47 from the internal roadway are proposed, through a full-moves access connecting to Paisley Lane to form a 4-way minor stop-control intersection, and a right-in/right-out access at the east end of the subject site.

4. EXISTING CONDITIONS

4.1 Road Network

The study area roadways are described as follows:

York Durham Line is a regional road running in a north-south direction. The section north of Highway 47 in the study area is a Type B arterial road under the jurisdiction of Durham Region, the section south of Highway 47 in the study area is under the jurisdiction of York Region. It has two travel lanes: one in each direction. The posted speed limit within the vicinity of the site is 80 km/h.

Highway 47 is a Type A arterial road under the jurisdiction of Durham Region and runs in an east-west direction within the study area. It has two travel lanes: one in each direction. The posted speed limit on the roadway is 80 km/h.

Paisley Lane is a local road under the jurisdiction of Durham Region and runs in an north-south direction within the study area. It has two travel lanes: one in each direction. The assumed speed limit is 50 km/h.

York Durham Line and Highway 47 forms a signalized intersection. Highway 47 and Paisley Lane forms an un-signalized intersection, with the proposed access expected to connect as the south leg to form a 4-way intersection.

The existing study area roadway characteristics are provided in Figure 3.

4.2 Traffic Counts

To determine the existing operating conditions in the study area, Trans-Plan conducted intersection turning movement counts (TMCs) on Wednesday May 17, 2023. A site visit was also conducted to record traffic observations, as needed. The detailed TMC data is provided in Appendix A, and the count dates, times, and peak hours are summarized below in Table 1.

Table 1 – Intersection Turning Movement Count Details

Location	Count Hours	Peak Hours
Highway 47 at York / Durham Line	7:00am – 9:30am 4:00pm – 6:30pm	7:30am – 8:30am 4:15pm – 5:15pm
Highway 47 at Paisley Lane	7:00am – 9:30am 4:00pm – 6:30pm	7:30am – 8:30am 4:15pm – 5:15pm

The existing traffic volumes along the Highway 47 corridor were reviewed for consistency of upstream and downstream traffic volumes and increased appropriately, where required. The existing traffic volumes for the weekday AM and PM peak hours are shown in Figure 4.

4.3 Transit Service

The site is served by GO Transit, connecting transit riders to major locations throughout the City of Toronto. The following bus routes have stops:

GO Transit, Bus Route 70/71 Stouffville is a transit route that generally runs between Downtown Toronto and Uxbridge. It connects riders from Union Station (connecting to Line 1 subway route) to Railway Street at Albert Street at Uxbridge. The nearest bus stop is located at the intersection of Highway 47 and Paisley Lane (right in front of the site across Highway 47).

Table 2 provides details regarding the transit routes near the subject site, including the route name, nearest transit stops to the site and service frequency. Figure 5 provides the GO transit service map.

Table 2 – Transit Service in the Study Area

Route	No.	Nearest Bus Stop at Site	Approximate Service Times		Approximate Peak Service Frequency (min)		
			Weekdays	Weekends	AM	PM	SAT
GO Transit	70/71	Highway 47 and Paisley Lane	04:20 – 00:29	05:58 – 00:34	60	30	120

Source: GO Transit website

5. FUTURE BACKGROUND CONDITIONS

Future background traffic volumes were determined based on a review of planned developments, road improvements and future traffic volume growth in the study area. Planned roadway and transit improvements are also reviewed in this section.

5.1 Horizon Years

An analysis of future conditions was completed at build-out and five years after build-out. The study horizon years are detailed as follows:

- Existing conditions, year 2024;
- 4-year horizon period for build-out, year 2028;
- 5-years after build-out horizon period, year 2033

5.2 Planned Background Developments

Based on review of the Region of Durham Active Development Applications, and the Township of Uxbridge Current Planning Applications, there are no notable background developments near the study area that would have an impact on the road network.

Due to the open space within the surrounding area, a conservative two percent growth rate per annum was applied to the existing traffic volumes for each horizon year to capture any future development.

5.3 Planned Roadway and Transit Improvements

Based on a review of the Durham Region Capital Works, there are no currently planned roadway improvements noted in the study area. The Durham Transportation Master Plan, dated December 2017, indicates that Highway 47 is recommended to be widened from 2 to 4 lanes with intersection modifications. The plan indicated a recommended phasing of 2022-2026, however an EA study has not been completed at this time.

The future background traffic volumes for the 2028 and 2033 horizon year for the weekday AM and PM peak hours are shown in Figure 6 and Figure 7.

6. SITE TRAFFIC

6.1 Trip Generation

The auto trip rates from the Institute of Transportation Engineers (ITE) Trip Generation manuals, 11th Edition, Land Use Code (LUC) 150 for Industrial Use (Warehousing), was referenced to estimate the trip volumes generated by the site.

Table 3 – Site Trip Generation

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Warehouse LUC 150	Distribution	77%	23%	100%	28%	72%	100%
	Equation	(T) = 0.12(X) + 23.62			(T) = 0.12(X) + 26.48		
	Rate	0.12	0.04	0.16	0.04	0.11	0.16
720,000 sq.ft.	Trips	85	25	110	32	81	113

The subject site is expected to generate approximately 110 and 113 new two-way auto trips, during the weekday AM and PM peak hours, respectively.

6.2 Auto Trip Distribution and Assignment

The auto site trips were distributed to / from the surrounding road network based on the existing travel patterns in the surrounding area, due to the high usage of other industrial type buildings utilizing these roadways. Vehicle trips entering and exiting Paisley Lane were reviewed, resulting in an approximate 60%/40% split for travelling to/from the west and to/from the east of the subject site.

The site traffic assignment for the weekday AM and PM peak hours are shown in Figure 8.

7. FUTURE TOTAL TRAFFIC CONDITIONS

The future total traffic volumes for horizon year 2028 and 2033, during the weekday AM and PM peak hours, are shown in Figure 9 and Figure 10. They were calculated by adding the new subject site trips to the future 2028 and 2023 background traffic volumes.

8. CAPACITY ANALYSIS

A capacity analysis was performed for the study area intersections and site driveway using Synchro 11 analysis software. The capacity analysis results for existing conditions and horizon year 2024 are shown below in Table 4. Capacity analysis sheets and Level of Service (LOS) definitions are provided in Appendix B and Appendix C, respectively.

According to the Region of Durham Traffic Impact Study Guidelines, rural highways are expected to operate at an overall LOS of 'C' or better, with turn lanes expected to operate at an LOS of 'D'. Critical movements have been identified as part of the analysis provided below.

York Durham Line & Highway 40 / Highway 47

Under existing conditions, during the weekday AM peak hour, the intersection operates at an overall acceptable LOS of D with a vehicle-capacity (v/c) ratio of 0.76. The westbound through / right, northbound left / through, and southbound approach operate at an LOS of D but with reserve capacity.

During weekday PM peak hour, the intersection operates at an overall acceptable LOS of D with a v/c ratio of 0.94. The westbound left movement operates at an acceptable LOS of D, while the northbound left / through and southbound approach operating at an LOS of E. These movements operate with reserve capacity. The eastbound through / right movement operates at an LOS of E, and slightly overcapacity with a v/c ratio of 1.03.

2028 Conditions

During the weekday AM peak hour, the intersection is expected to continue to operate at an overall acceptable LOS of D with a vehicle-capacity (v/c) ratio of 0.85. The eastbound through / right, westbound through / right, and southbound approach are expected to operate at an acceptable LOS of D. The northbound left / through movement is expected to operate at an LOS of D. All approaches are expected to continue to operate with reserve capacity.

During weekday PM peak hour, the intersection is expected to operate at an overall LOS of E, with a v/c ratio of 1.07. The eastbound through / right and southbound approach are expected to operate at an LOS of F and over capacity. Due to the similarities between the background and total conditions, the subject site is expected to have minimal impact to the study area network.

2033 Conditions

Due to the increase in traffic volumes from the background traffic growth, roadway improvements were considered for the 2033 horizon year. The cycle length of 125 seconds was not changed when considering the signal timing modifications.

During the weekday AM peak hour, the westbound and eastbound exclusive left green time, and northbound and southbound green time were slightly decreased to increase the westbound and eastbound green time. With these signal timing modifications, the intersection is expected to operate at an overall LOS of E with a v/c ratio of 0.96. The northbound left / through movement is expected to operate at an LOS of F with a v/c ratio of 0.99. The westbound through / right and southbound approach are expected to operate at an LOS of E and also near capacity.

During the weekday PM peak hour, the intersection is expected to operate at an overall LOS of F with a v/c ratio of 1.25. The eastbound approach, westbound left, northbound and southbound approaches are expected to operate at an LOS of F.

As signal timing modifications would negatively impact either direction, a review of increasing the through lanes in the eastbound and westbound directions (as recommended in the Durham Region Transportation Master Plan) was completed. Along with this roadway improvement, the northbound and southbound green times were increased, while decreasing the eastbound and westbound green times. The results are provided in Table 5.

With these improvements, the intersection is expected to operate at an overall acceptable LOS of D and a v/c ratio of 0.85. The northbound approach is expected to operate at an LOS of E with a v/c ratio of 0.93,

and the southbound approach is expected to operate at an LOS of F with a v/c ratio of 0.99. With the eastbound and westbound approaches expected to operate at a good LOS of C, some additional signal modifications could be considered to provide the northbound and southbound approaches additional green time.

Highway 47 & Paisley Lane / Proposed Site Access

Under existing conditions, vehicles exiting from Paisley Lane observe a delay of approximately 20 seconds during both the weekday AM and PM peak hours. These conditions are expected to continue similarly in the 2028 background conditions.

With the addition of the proposed site access, during the weekday AM peak hour, the northbound and southbound approach are expected to operate at an acceptable LOS of C with delays of approximately 20 seconds. During the weekday PM peak hour, the northbound approach is expected to operate at an acceptable LOS of D and delays of 33 seconds. The southbound approach is expected to operate at an LOS of E and delays of 38 seconds.

Under 2033 conditions, during the weekday AM peak hour, the approaches are expected to operate similarly to the 2028 conditions. During the weekday PM peak hour, the northbound approach is expected to operate at an LOS of E and delays of 43 seconds. The southbound approach is expected to operate at an LOS of F and delays of 64 seconds. These delays can be expected for vehicles exiting from a minor roadway onto a major arterial roadway and can be attributed to the increase in through traffic due to the background growth.

Highway 47 & Proposed RIRO Access

Under future conditions, the proposed right-in/right-out access is expected to operate at a good LOS of B during the weekday AM peak hour, and an acceptable LOS of C during the weekday PM peak hour.

Table 4 - Capacity Analysis Results

Intersection	Existing Traffic Conditions						2028 Background Traffic Conditions						2028 Total Traffic Conditions					
Movement	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
York Durham Line & Highway 40 / Highway 47	**0.76**	**37**	**D**	**0.94**	**53**	**D**	**0.84**	**42**	**D**	**1.05**	**72**	**E**	**0.85**	**44**	**D**	**1.07**	**76**	**E**
Eastbound Left	0.45	23	C	0.16	16	B	0.54	27	C	0.19	17	B	0.57	28	C	0.20	18	B
Eastbound Through / Right	0.65	34	C	1.03	72	E	0.71	36	D	1.12	102	F	0.75	38	D	1.14	110	F
Westbound Left	0.46	19	B	0.77	49	D	0.54	21	C	0.82	57	E	0.59	23	C	0.85	64	E
Westbound Through / Right	0.81	40	D	0.59	27	C	0.90	49	D	0.64	28	C	0.92	52	D	0.70	30	C
Northbound Left / Through	0.72	47	D	0.86	62	E	0.81	56	E	0.96	80	E	0.82	56	E	0.96	79	E
Northbound Right	0.09	28	C	0.18	33	C	0.09	28	C	0.22	34	C	0.10	28	C	0.22	34	C
Southbound Left / Through / Right	0.67	42	D	0.83	58	E	0.76	46	D	1.01	94	F	0.79	49	D	1.03	100	F
Highgway 47 & Paisley Lane / Proposed Site Access																		
Eastbound Left	0.10	10	B	0.04	9	A	0.11	10	B	0.05	9	A	0.11	10	B	0.05	9	A
Eastbound Through / Right	0.27	0	A	0.55	0	A	0.29	0	A	0.60	0	A	0.32	0	A	0.61	0	A
Westbound Left	0.44	0	A	0.31	0	A	0.48	0	A	0.34	0	A	0.05	1	A	0.02	1	A
Westbound Left / Through	0.04	0	A	0.01	0	A	0.05	0	A	0.01	0	A	0.05	0	A	0.01	0	A
Northbound Left / Through / Right													0.13	24	C	0.39	33	D
Southbound Left / Through / Right	0.12	16	C	0.44	21	C	0.14	18	C	0.52	25	C	0.16	20	C	0.65	38	E
Highway 47 & Proposed RIRO Access																		
Eastbound Through / Right													0.30	0	A	0.66	0	A
Westbound Left													0.55	0	A	0.36	0	A
Northbound Right													0.00	11	B	0.04	20	C

	2033 Background Traffic Conditions						2033 Total Traffic Conditions					
	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
York Durham Line & Highway 40 / Highway 47	**0.95**	**53**	**D**	**1.23**	**112**	**F**	**0.96**	**56**	**E**	**1.25**	**116**	**F**
Eastbound Left	0.76	47	D	0.23	18	B	0.80	56	E	0.25	19	B
Eastbound Through / Right	0.73	34	C	1.24	153	F	0.77	36	D	1.26	160	F
Westbound Left	0.67	29	C	0.88	70	E	0.74	34	C	0.93	81	F
Westbound Through / Right	0.94	53	D	0.71	31	C	0.96	56	E	0.77	33	C
Northbound Left / Through	0.99	90	F	1.11	125	F	0.99	90	F	1.11	124	F
Northbound Right	0.10	29	C	0.27	34	C	0.11	29	C	0.28	35	C
Southbound Left / Through / Right	0.95	72	E	1.30	201	F	0.98	79	E	1.33	215	F
Highgway 47 & Paisley Lane / Proposed Site Access												
Eastbound Left	0.13	11	B	0.06	10	A	0.13	11	B	0.06	10	A
Eastbound Through / Right	0.32	0	A	0.66	0	A	0.35	0	A	0.68	0	A
Westbound Left	0.53	0	A	0.38	0	A	0.05	1	A	0.02	1	A
Westbound Left / Through	0.05	0	A	0.01	0	A	0.05	0	A	0.01	0	A
Northbound Left / Through / Right							0.16	30	D	0.46	43	E
Southbound Left / Through / Right	0.18	20	C	0.64	33	D	0.21	23	C	0.84	64	F
Highway 47 & Proposed RIRO Access												
Eastbound Through / Right							0.34	0	A	0.73	0	A
Westbound Left							0.61	0	A	0.39	0	A
Northbound Right							0.00	12	B	0.04	23	C

Table 5 – Capacity Analysis Results, Roadway Improvements

Intersection	2033 Total Traffic Conditions		
Movement	PM Peak Hour		
	v/c	Delay	LOS
York Durham Line & Highway 40 / Highway 47	**0.85**	**43**	**D**
Eastbound Left	0.20	19	B
Eastbound Through / Right	0.72	33	C
Westbound Left	0.73	30	C
Westbound Through / Right	0.44	25	C
Northbound Left / Through	0.93	69	E
Northbound Right	0.24	30	C
Southbound Left / Through / Right	0.99	85	F

Conclusions

Due to the similarities between the future background and total conditions, the subject site is expected to have minimal impact to the study area network. The conservative growth rate of 2 percent utilized for each horizon year may not properly reflect future traffic volumes within the study area and is recommended to be monitored in the future.

The minor signal timing modifications assist in reducing all movements to be operating below capacity, however, the Durham Region TMP recommendation of increasing the eastbound and westbound through lanes should be considered in supporting the traffic along Highway 47.

The four-way minor stop-control intersection with Paisley Lane and the proposed site access is expected to operate well under future conditions without any roadway improvements. A signal warrant review for the intersection has been provided in the following section.

9. SIGNAL WARRANT REVIEW

A signal warrant analysis was completed based on the Ontario Traffic Manual, Book 12 – Traffic Signals guidelines for the intersection of Highway 47 and Paisley Lane / Proposed Site Access. The signal warrant analysis reviews the intersection under 2033 future total conditions. Eight-hour traffic volumes (7am-10am, 1pm-2pm and 4pm-6pm) were estimated based on the conducted traffic counts.

The traffic volume percentage used in the analysis for each off-peak hour, in comparison to the weekday AM, MD and PM peak hour volumes is shown in Table 6.

Table 6 – Hourly Volumes, Highway 47 and Paisley Lane/Proposed Site Access

	AM Peak			MD Peak		PM Peak		
Hour Ending	8:00	9:00	10:00	13:00	14:00	16:00	17:00	18:00
2033 Future Traffic Volumes	1648	1533	1269	1648	1483	1986	1847	1291
Percent of Peak Hour	100%	93%	77%	100%	90%	100%	93%	65%

The traffic signal warrant was completed using volumes of 2033 future total conditions, weekday AM and PM peak hours. The detailed signal warrant analysis is provided in Appendix D, and the results are summarized below in Table 7.

Table 7 – Signal Warrant Analysis Results, Highway 47 and Paisley Lane/Proposed Site Access

Traffic Signal Warrant	2033 Total Conditions		
	Required	Satisfied	Warrant Met?
1 - Minimum Vehicular Volume	100%	72%	No
2 - Delay to Cross Traffic	100%	77%	No
Combination Warrant (1 & 2)	80%	72%	No
Overall Result			No

The warrant analysis results indicate that a traffic signal is not warranted at Highway 47 and Paisley Lane / Proposed Site Access.

10. SITE ACCESS FUNCTIONAL DESIGN REVIEW

A site circulation review was completed using AutoTurn vehicle turning template software to demonstrate that a loading vehicle, based on the WB-20 tractor trailer design vehicle in TAC 2017 can circulate the proposed site accesses properly.

- **West Access:** The full-moves access is to align with Paisley Lane located directly opposite of Highway 47. The proposed access design illustrates a curb radii of 15m, with a pavement width of 11m. Due to the use of tractor trailers, the wider width of the roadway would assist in allowing safe turns and providing two-way travel operations. Figure 11 and Figure 12 illustrate a WB-20 design vehicle entering and exiting the full-moves site access.
- **East Access:** The RIRO access located at the east end of the subject site provides a concrete triangle to restrict left turns in and out of the site. It is expected that the majority of larger vehicles would exit the site through the larger full-moves access, however this design with 6m pavement widths and 10m curb radii allow for the ingress and egress of WB-20 design vehicles. Figure 13 and Figure 14 illustrate a WB-20 vehicle entering and exiting the subject site through the proposed RIRO access.

The design of the roadway and access to the individual lots with respect to truck ingress / egress movements, as well as the loading area/docks are to be further refined during the Site Plan Application, where a thorough review of vehicle circulation is to be undertaken.

11. SIGHTLINE REVIEW

A sight distance review was conducted for the proposed site accesses onto Highway 47 (looking east and west). The review was based on the Transportation Association of Canada (TAC) 2017 standards. A design speed limit of 100 km/h was assumed for Highway 47. The eye height measured from is 1.05m which is also consistent with TAC standards.

A comparison of the minimum sight distance requirements to the available sight distance is provided in Table 8. The TAC source and in-depth details of the sight distance survey conducted on December 8, 2023, are provided in Appendix E.

Table 8 – Sight Distance Requirements and Availability

Location	Design Speed (km/h)	Criteria	Required Stopping Sight Distance (m)	Available Sight Distance (m)	Requirement Met? (Y/N)
Highway 47 at Proposed Site Access (West)	100	SSD (Left & Right)	185	205 & 350	Y
		ISD (Left Turn)	210	205	N
		ISD (Right Turn)	185	350	Y
Highway 47 at Proposed RIRO Access (East)		SSD (Left & Right)	185	350 & 363	Y
		ISD (Left Turn)	210	350	Y
		ISD (Right Turn)	185	363	Y

Source: Table 2.5.2, 9.9.4, and 9.9.6 from TAC 2017 for sight distance requirements

Based on the data collected in our sight distance survey, the available sight distance for both site accesses to the development meets TAC's required stopping sight distance (SSD) of 185m. The available sight distance for the proposed east access meets TAC's required minimum intersection sight distance (ISD) of 210m (for left turns) and 185m (for right turns).

The available sight distance for the proposed west access meets TAC's required minimum ISD of 185m (for right turns); However, the available sight distance for left turns at the proposed west access is slightly shorter than the TAC's minimum required ISD of 210m, due to the horizontal curve looking east from the site access. Given the shortage is fairly minimal (5m deficient), the available sight distance is expected to be acceptable.

12. SUMMARY

Our Transportation Study prepared for the proposed industrial development located at 123 Highway 47, Township of Uxbridge, is summarized as follows:

- The proposed industrial development consists of a 60-acre parcel with 14 lots intended for warehouse uses. The estimated overall GFA of the subject site is expected to be approximately 720,000 sq.ft.
- Traffic analysis was completed for a build-out horizon year of 2028, and five years after build-out for a horizon year of 2033.
- There are currently no planned roadway improvements in the study area, although the 2017 Durham Region Transportation Master Plan recommended a widening of Highway 47 from two to four travel lanes.
- The subject site is expected to generate approximately 110 and 113 new two-way trips, during the weekday AM and PM peak hours, respectively.
- Our findings indicate that the proposed development would have minimal impact to the surrounding network due to the similarities between the future background and total traffic operations. The

conservative growth rate of 2 percent per annum utilized in the study may overcompensate for future development and growth in the surrounding area.

- Minor signal timing adjustments were applied to the intersection of Highway 47 and York Durham Line to keep all movements under capacity. During the weekday PM peak hour in 2033 conditions, two additional through lanes were added to Highway 47 in a separate scenario based off the recommendation in the Region's TMP. We would recommend that future traffic is monitored and that the EA study be considered to review the road widening and intersection modifications.
- No roadway improvements are necessary for the subject site accesses, other than the construction of the two proposed access locations. A signal warrant was completed for the Highway 47 and Paisley Lane / Proposed Site Access intersection under 2033 conditions, and a signal was not warranted.
- The proposed full-moves access is to provide a curb radii of 15m, with a pavement width of 11m. The proposed RIRO access provides a concrete triangle to restrict left turns, along with 10m curb radii and pavement widths of 6m. The larger pavement widths is too allow for the safe circulation of tractor trailers and better accommodate two-way directional travel.
- A review of the proposed access designs results in the proper ingress and egress of TAC WB-20 tractor trailer vehicles at each access along Highway 47.
- A sightline review was conducted at the two access locations and the available sight distance is acceptable under the TAC requirements for a design speed of 100 km/h (posted speed limit of 80 km/h).
- The minimum required intersection sight distance for left turns at the proposed full-moves access is 210m, while the available sight distance is 205m. With a minor deficit of 5m, the available sight distance is expected to be sufficient to allow vehicles to exit the site safely.

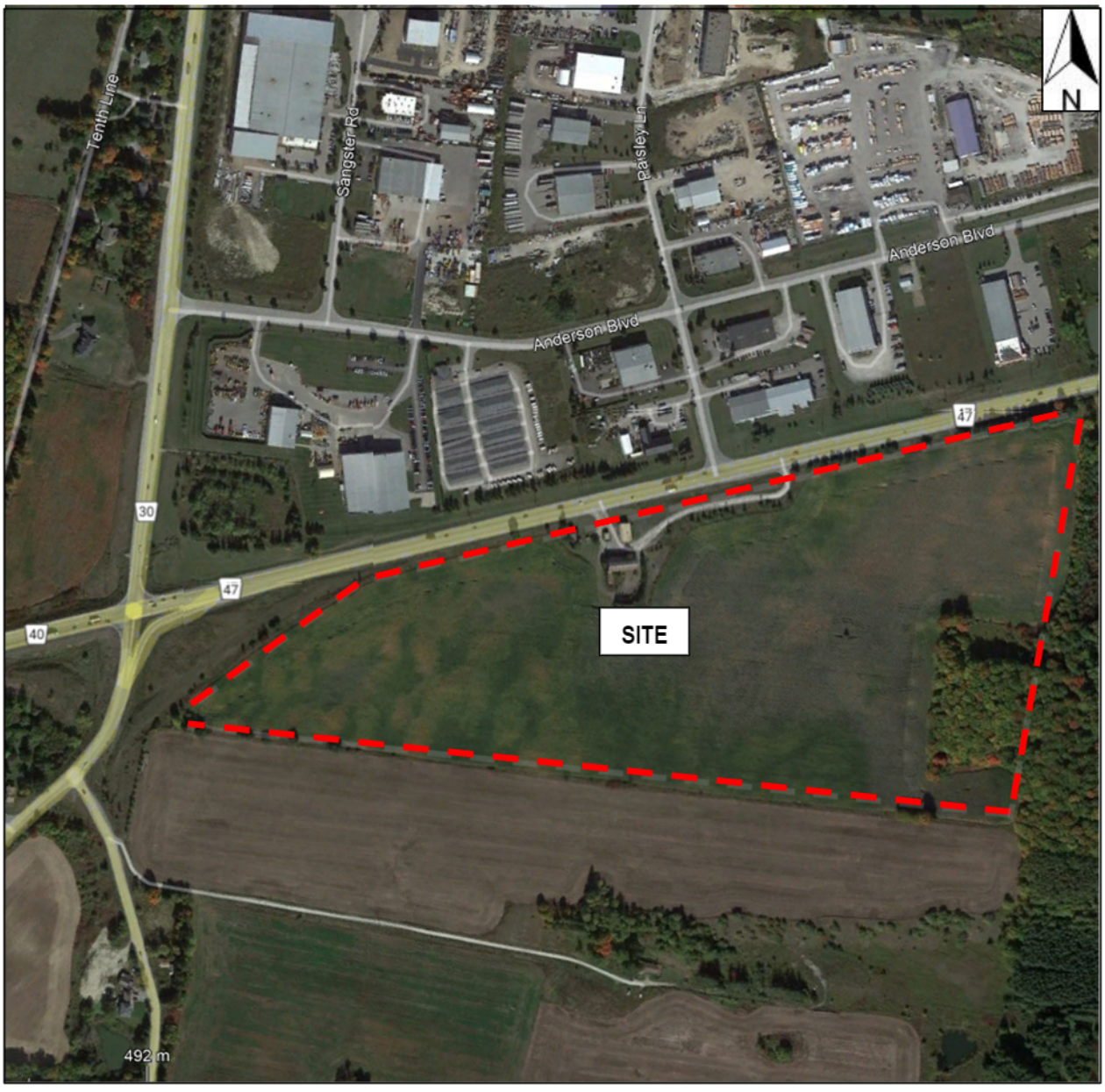
Respectfully submitted,

Anil Seegobin, P.Eng.
Partner, Engineer

Charles Chung
Traffic Analyst

Trans-Plan Transportation Inc.
Transportation Consultants

Figure 1 – Site Location



Source: Google Earth

GENERAL NOTES:

- THIS IS NOT A PLAN OF SURVEY. BOUNDARY, PLANS, AND DISTANCES SHOWN HEREON ARE COMPILED FROM REGISTRY OFFICE RECORDS AND BEST FIT TO FIELDWORK USING PREVIOUS TOPOGRAPHIC DETAIL FROM KING EPCM
- ELEVATION AND DISTANCES ARE IN METERS UNLESS OTHERWISE NOTED
- ELEVATIONS ARE GEODETIC HT_2 (2010) AND ARE DERIVED FROM CAN-NET VRS NETWORK
- THIS DRAWING IS PREPARED IN UTM NAD 83 ZONE 17 (CSRS 2010). BOUNDARY IS APPROXIMATE AND HAS NOT BEEN CONFIRMED IN THE FIELD
- HORIZONTAL COORDINATES IN THIS DRAWING ARE IN GRID COORDINATES AND CAN BE SCALED UP TO GROUND USING A SCALE FACTOR OF 1.0002. SCALING THE DRAWING UNIFORMLY MAY CAUSE DISCREPANCIES IN ELEVATION DATA
- BACKGROUND IMAGE FROM YORKMAPS AERIAL IMAGERY DATED 2017
- TRCA REGULATED LIMIT DERIVED FROM TRCA REGULATION MAPPING IMAGERY
- DIGITAL DRAWING IS PROVIDED AS-IS AND DOES NOT HAVE ANY GUARANTEE OR WARRANTY FROM KING EPCM
- ORIGINAL TREE CROWNLINE OBSERVED MAY 9, 2023; TRCA STAKING OBSERVED JULY 13, 2023 BY KING EPCM.

1. CONTRACTOR TO BE RESPONSIBLE TO ENSURE THAT THIS LOT AND ADJOINING AREAS OF SITE ARE KEPT CLEAN AND FREE OF CONSTRUCTION DEBRIS, AND THAT ROADWAYS ARE KEPT CLEAN OF MUD AND DEBRIS
2. ALL MEASUREMENTS STATED IN METERS, PIPE SIZES IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED EQUIVALENTS
3. CONTRACTOR SHALL CHECK AND VERIFY ALL GIVEN GRADE ELEVATIONS AND DRAINAGE PRIOR TO CONSTRUCTION
4. DRIVEWAY CONSTRUCTION
   INDUSTRIAL AND COMMERCIAL:

- ASPHALT: 40mm HL3 SURFACE COURSE & 50mm HL8 BASE COURSE
- GRANULAR: 150mm GRANULAR "A" & 350mm GRANULAR "B"
- GRANULAR SHALL BE 98% COMPACTION

LEGEND:

EX 338.20	EXISTING ELEVATION
339.20	PROPOSED ELEVATION
INV. 338.20	PROPOSED SWALE INVERT ELEVATION
	EXISTING SURFACE FLOW ROUTE
	PROPOSED SURFACE FLOW ROUTE
	EXISTING ELEVATION CONTOUR LINES
	R.O.W.
	PROPOSED SWALE
DCB	DOUBLE CATCHBASIN
HP	HYDRO POLE
HYD	HYDRANT
MH	MANHOLE
HO	OVERHEAD UTILITY WIRE
	GUY ANCHOR
	LEGAL PROPERTY BOUNDARY
	TREE CROWNLINE
	CONSERVATION STAKE
	CONSERVATION STAKING LINE

SCALE 1:2000
1 cm = 20m

0m 100m 200m

Municipality Notes

DRAWN: K.L.	STAMP
DATE: NOV. 13, 2023	

KEY MAP

N.T.S.

KING EPCM
3300 14th Ave., Unit 211
Markham, ON, L3R 9Y5
www.KingEPCM.com
647-459-5647

CLIENT: 123 HWY 47 INC.

PROJECT NAME: **123 HIGHWAY 47**

PROJECT LOCATION: 123 HIGHWAY 47
LEGAL DESCRIPTION: PT LTS 13 & 14 CON 1 UXBRIDGE PT 1 PL 40R5008 EXCEPT PT 1 PL 40R23365; UXBRIDGE, PIN 26830-0118

PRINT TITLE: **SITE GRADING PLAN**

FILE No.: EGR 1.1

No.	ISSUED FOR:	DATE	DRWN BY:	CHCK
V1	ISSUED TO CLIENT	NOV 13, 2023	KL	TW

Figure 3: Existing Study Area Roadway Characteristics

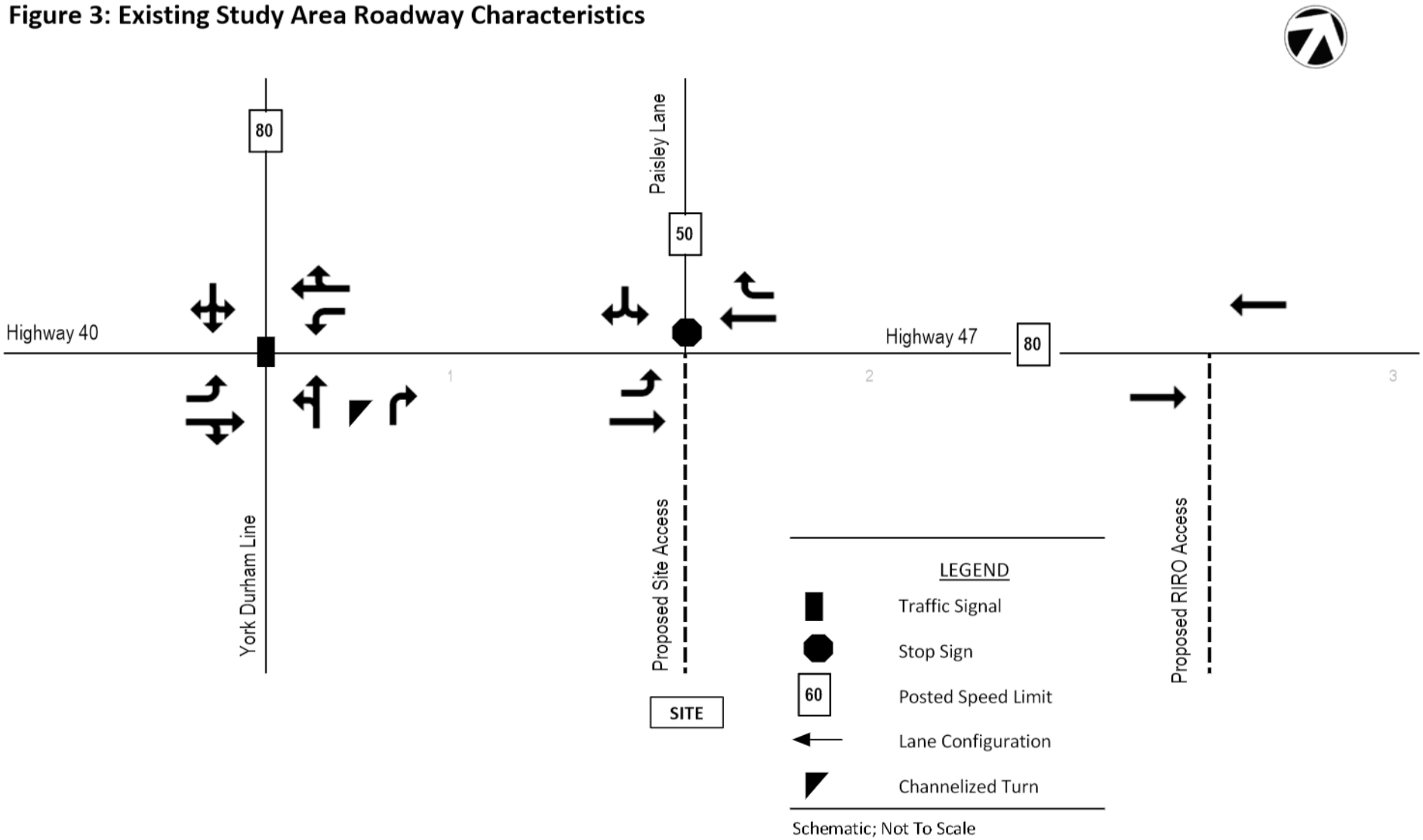
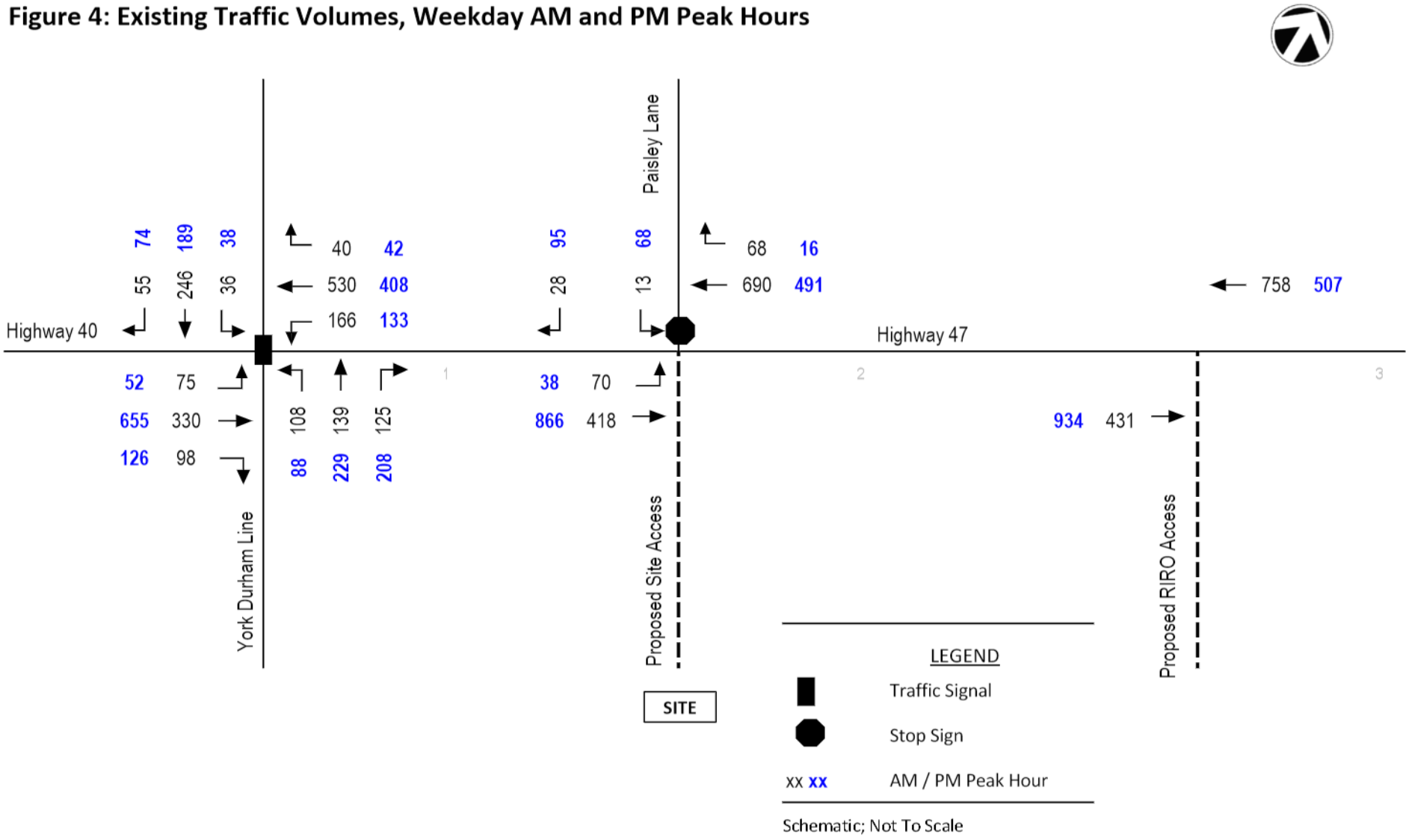


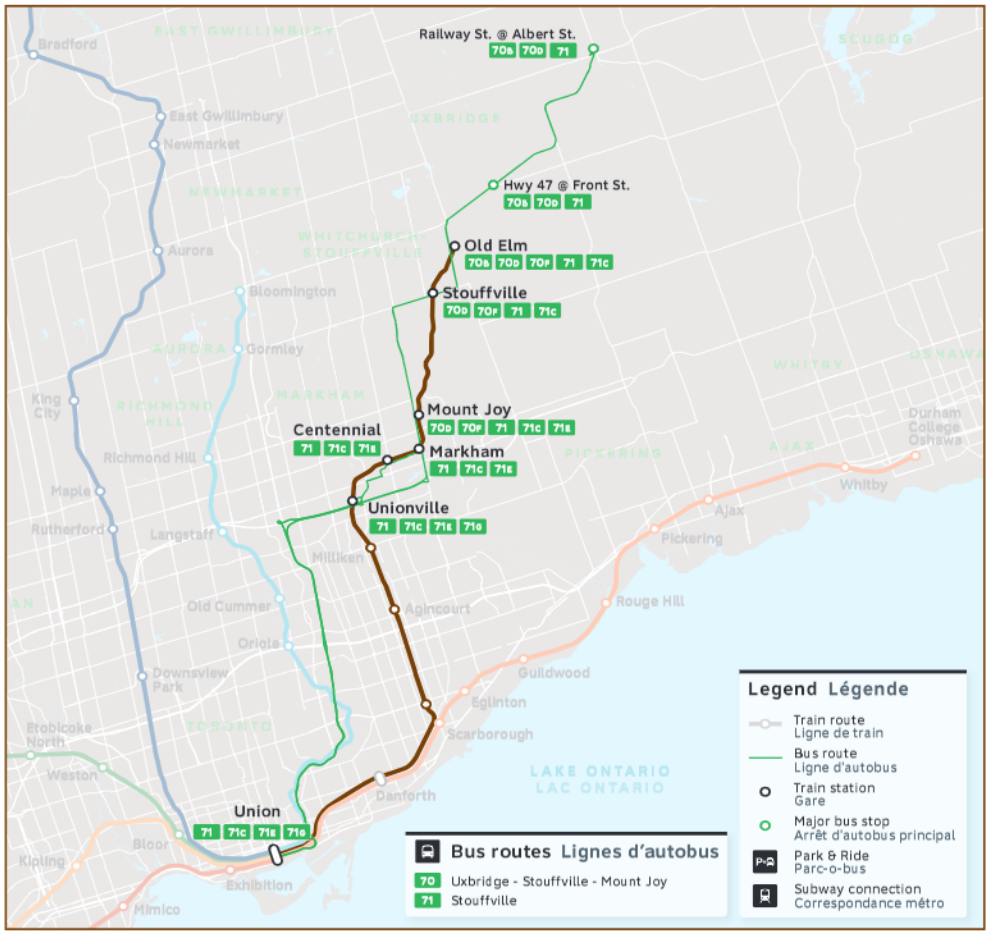
Figure 4: Existing Traffic Volumes, Weekday AM and PM Peak Hours



70-71

Route number
Numéro du trajet

Stouffville



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TTY: #711 or call
1 (800) 855-0511

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Stouffville

GO Train and Bus Schedule/
Horaire des trains et des autobus GO

METROLINX

ST 70 71

- Uxbridge
- Goodwood
- Old Elm GO
- Stouffville GO
- Mount Joy GO
- Markham GO
- Centennial GO
- Unionville GO
- Milliken GO
- Agincourt GO
- Kennedy GO
- Union Station

Daily / Quotidiennement
Includes GO Bus routes 70 and 71/
Inclut les trajets 70 et 71d'autobus GO

Effective / À partir de:
6 JANUARY JANVIER 2024

Figure 6: 2028 Background Traffic Volumes, Weekday AM and PM Peak Hours

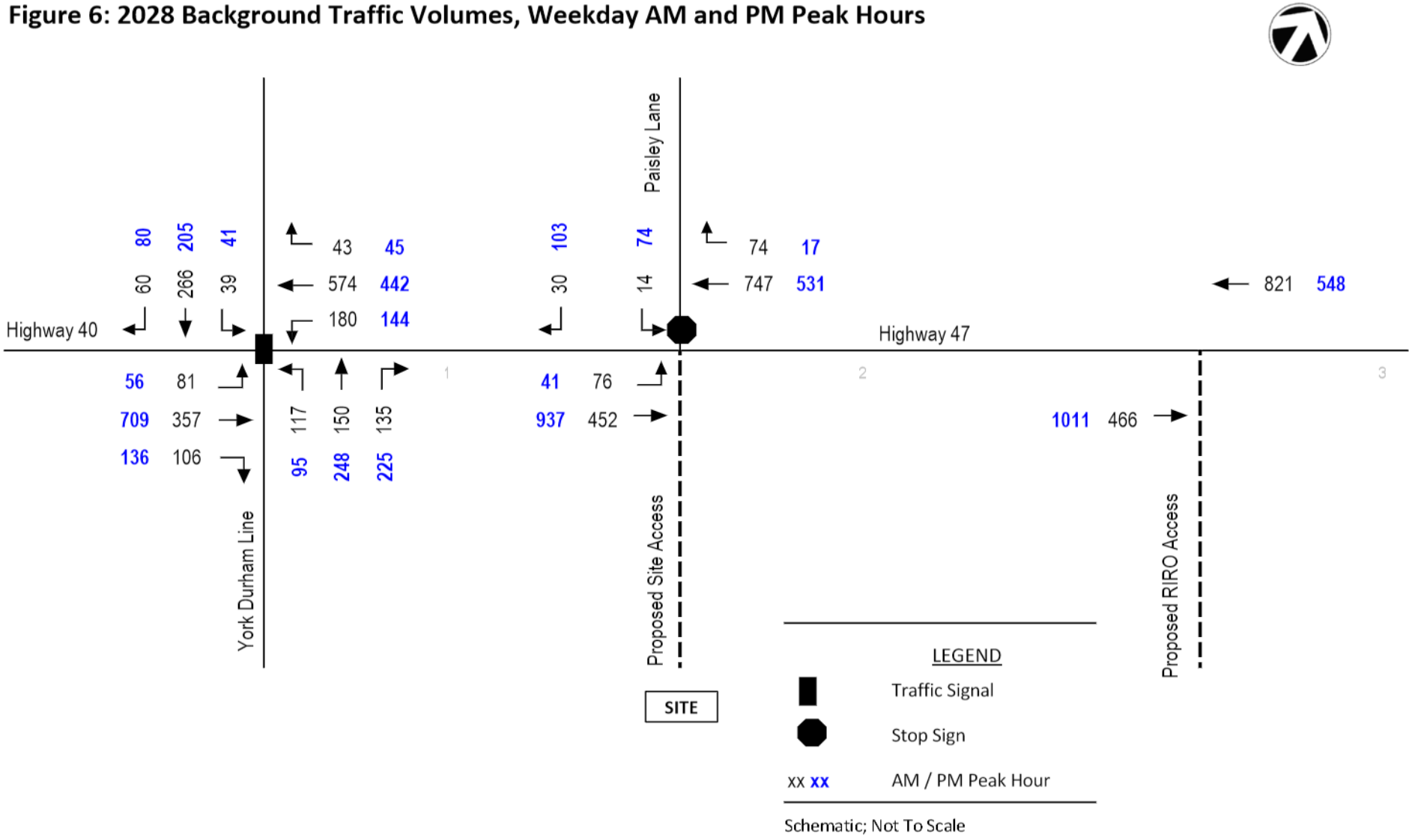


Figure 7: 2033 Background Traffic Volumes, Weekday AM and PM Peak Hours

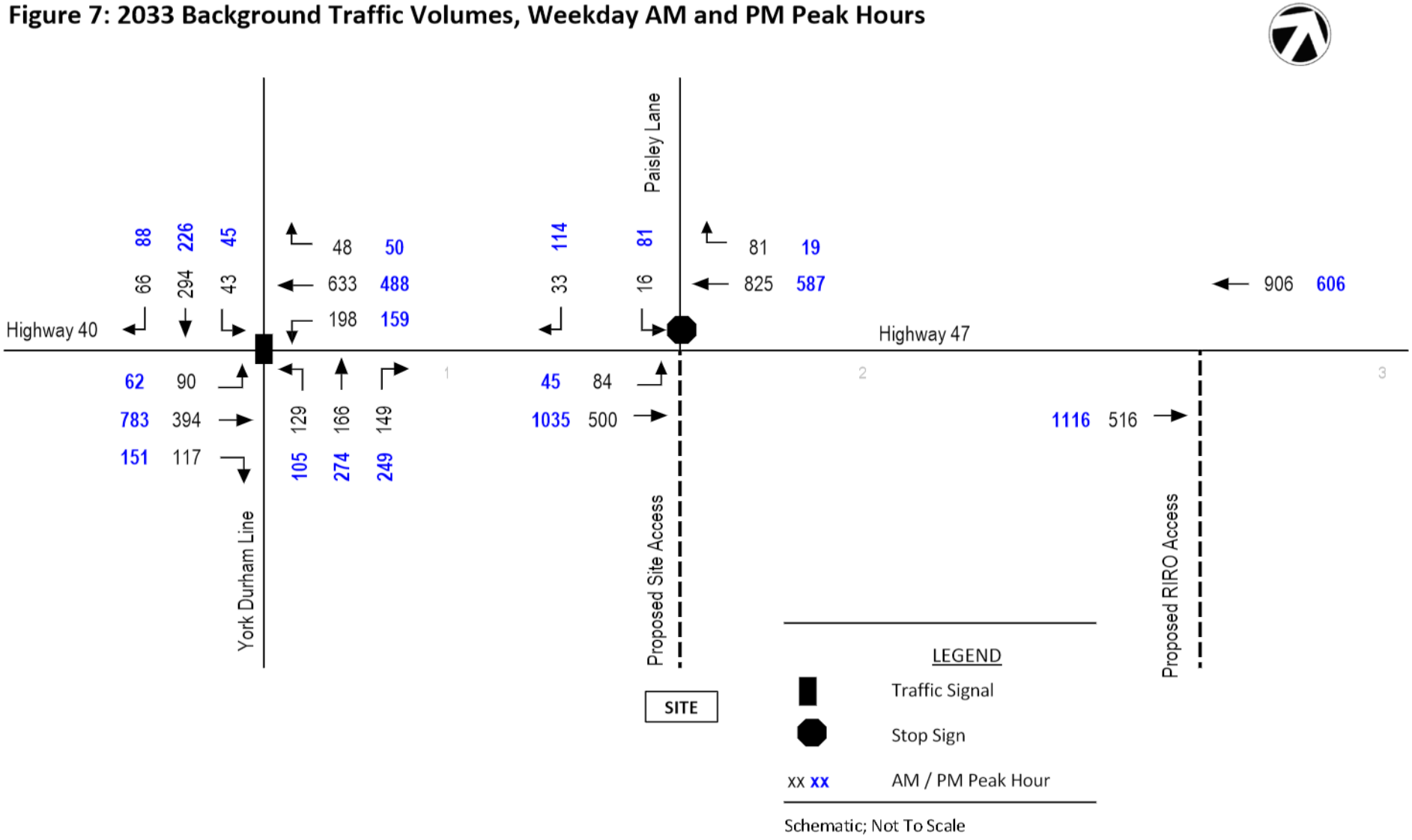


Figure 8: Site Traffic Assignment, Weekday AM and PM Peak Hours

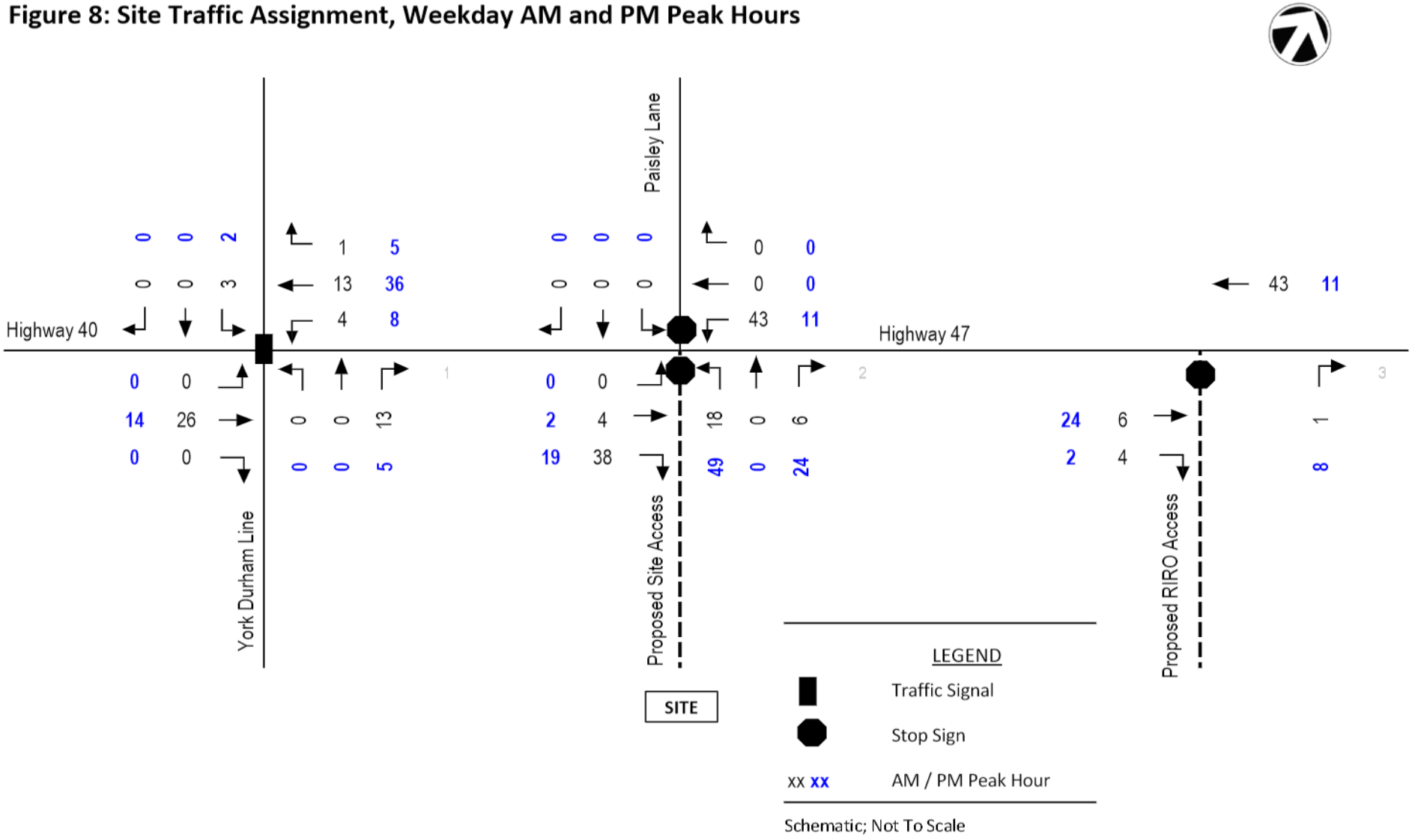


Figure 9: 2028 Total Traffic Volumes, Weekday AM and PM Peak Hours

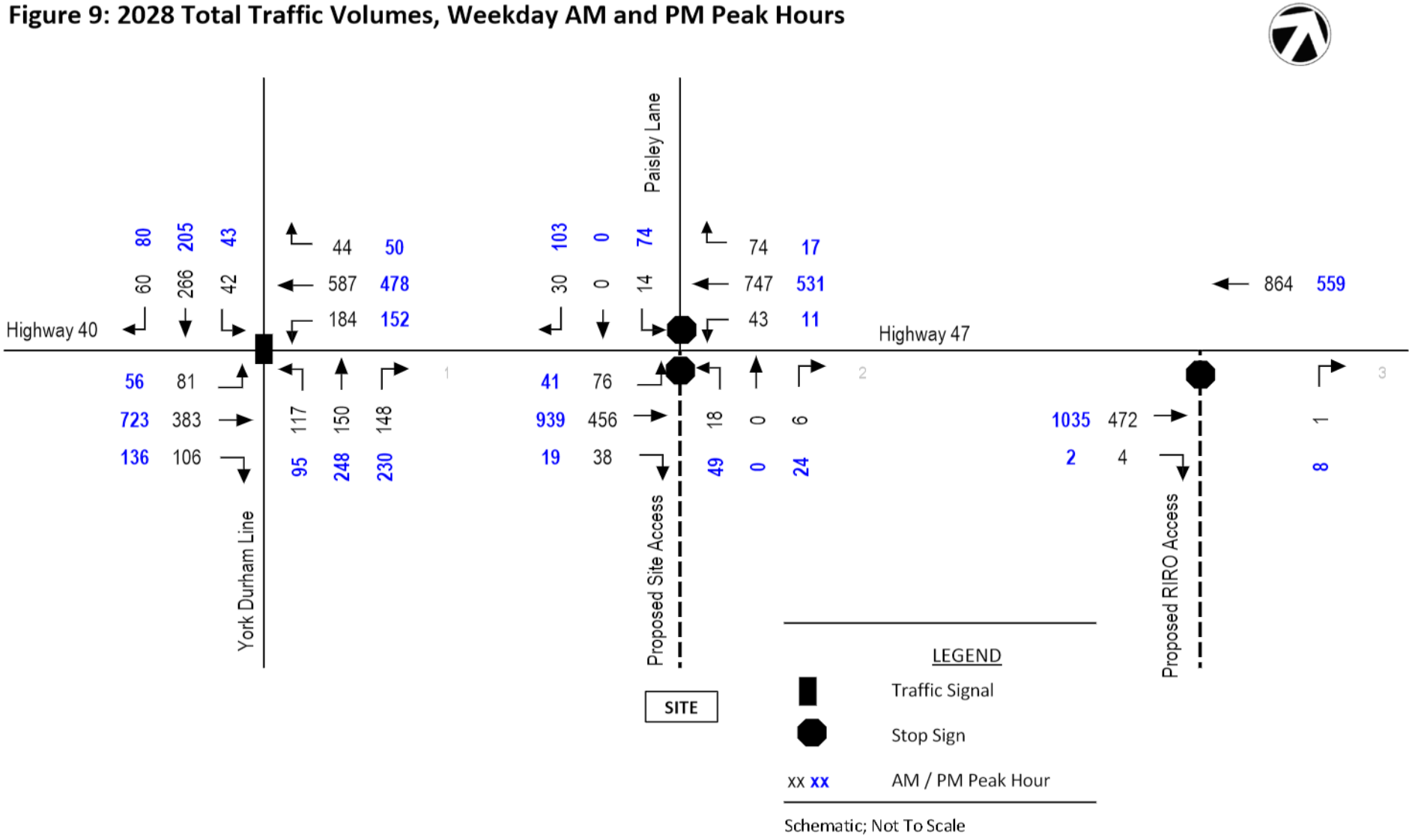
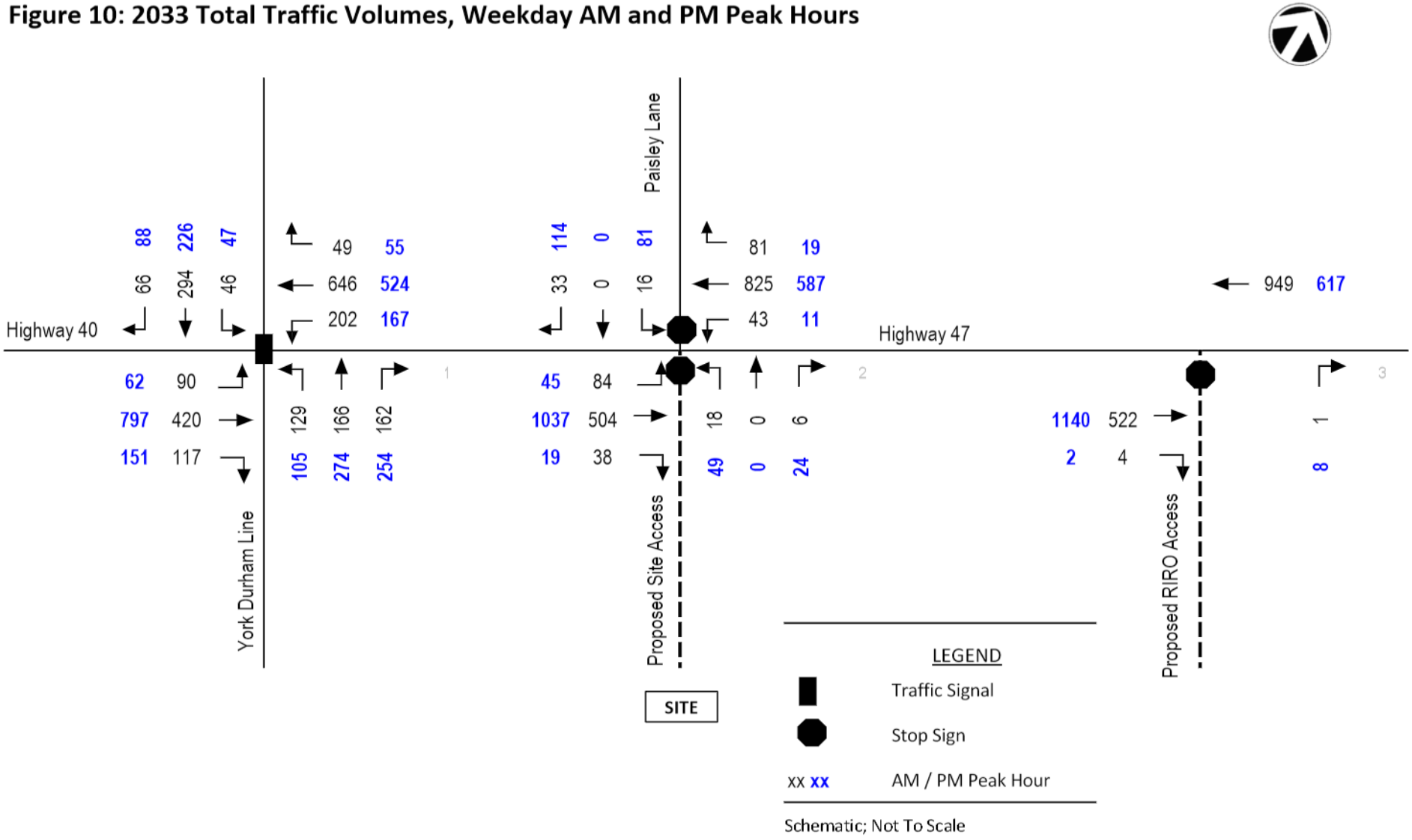


Figure 10: 2033 Total Traffic Volumes, Weekday AM and PM Peak Hours



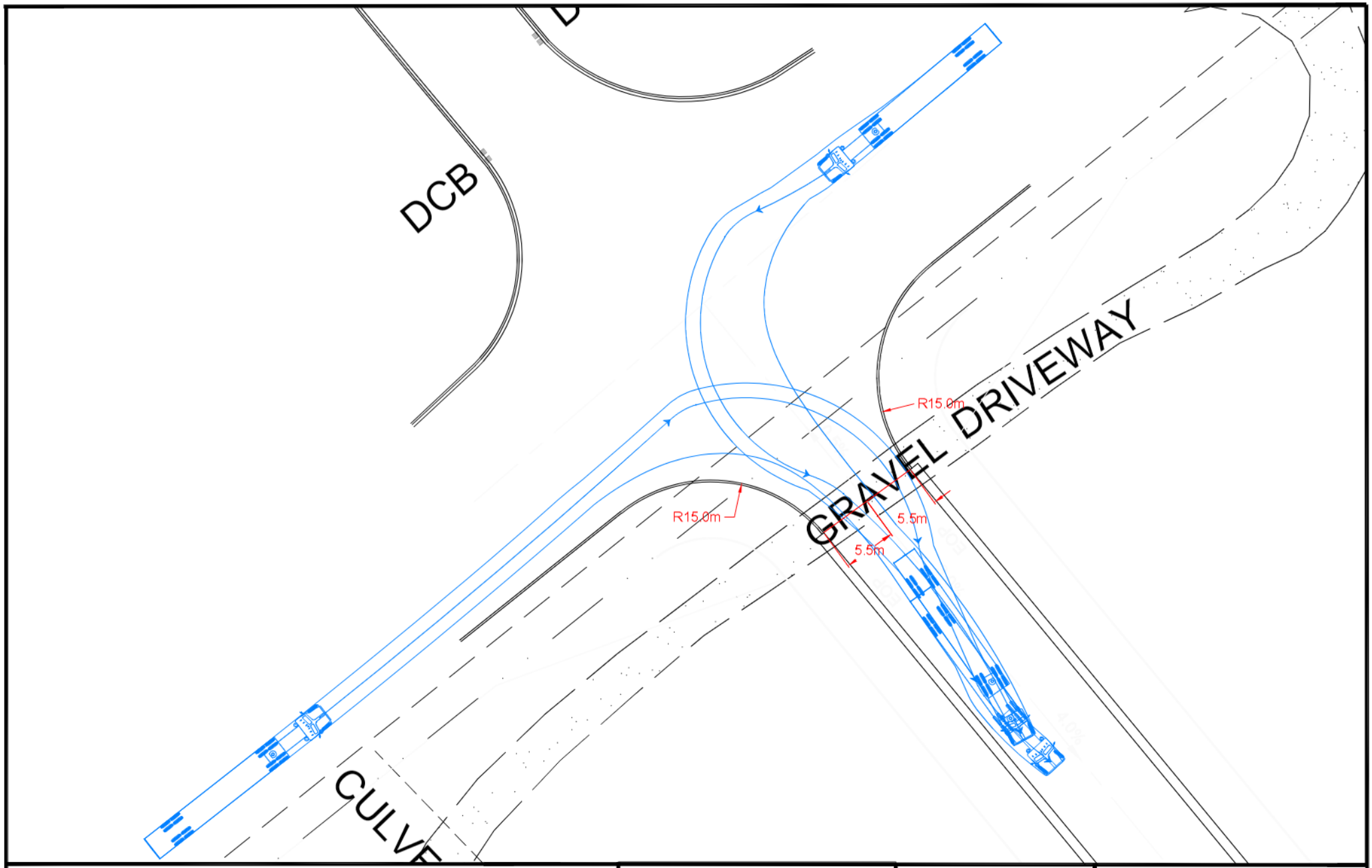
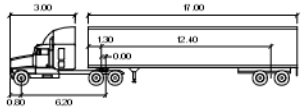


Figure 11 - WB-20 Tractor Trailer Entering the Full-moves Site Access

Proposed Warehouse Development
123 Highway 47
Town of Uxbridge, Ontario



WB-20

	meters		
Tractor Width	: 2.60	Lock to lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 38.2
Tractor Track	: 2.00	Articulating Angle	: 70.0
Trailer Track	: 2.60		

CONSTRUCTION NORTH

TRUE NORTH

TRANS-PLAN™
transportation engineering consultants

67 Mowat Avenue, Suite 331, Toronto, Ontario, M6K 3E3
tel: (647) 931-7383
website: www.trans-plan.com

Source: Site Plan by Cusimano Architect

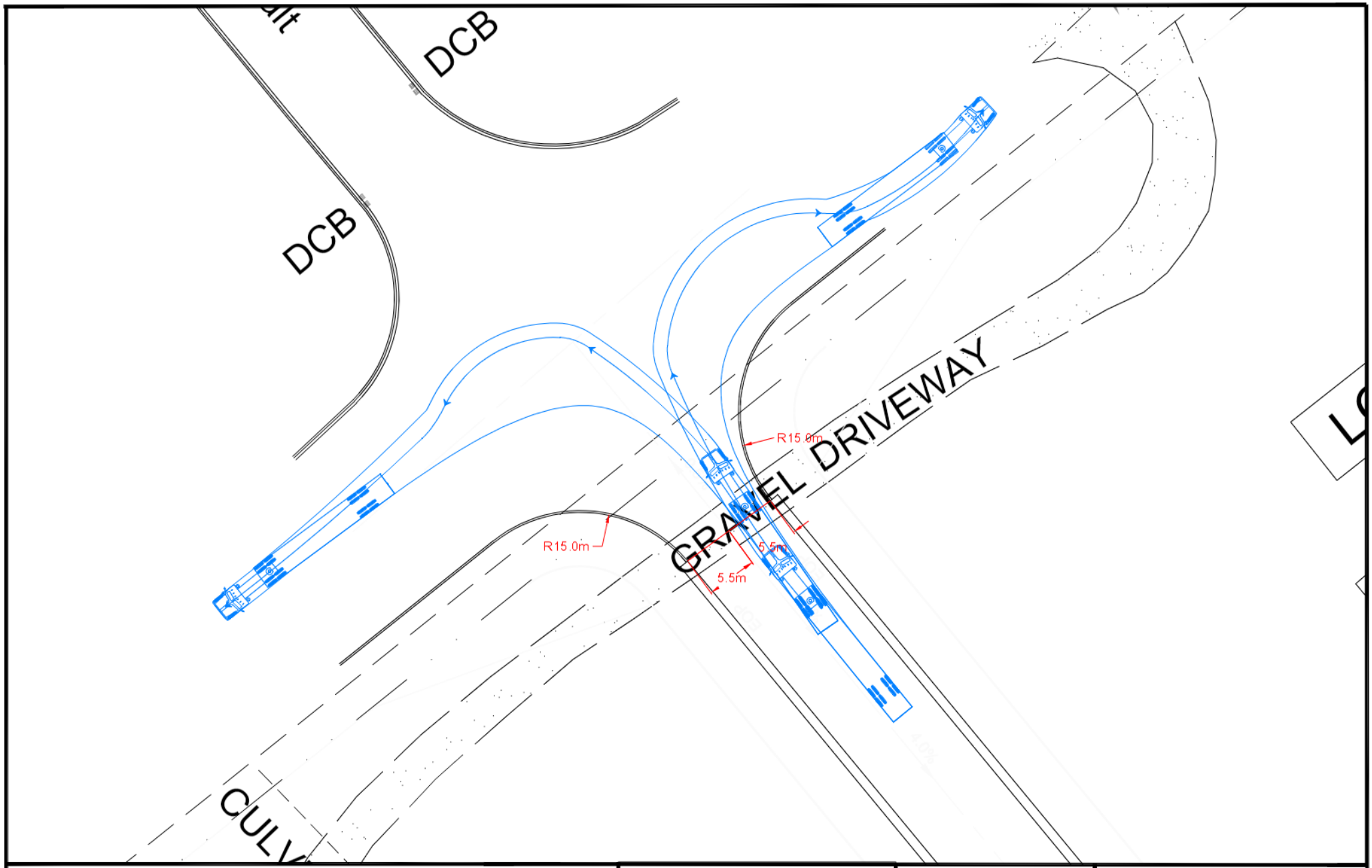
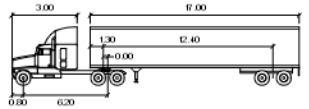


Figure 12 - WB-20 Tractor Trailer Exiting the Full-moves Site Access

Proposed Warehouse Development
123 Highway 47
Town of Uxbridge, Ontario



WB-20

metres

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 38.2
Tractor Track	: 2.00	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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Source: Site Plan by Cusimano Architect

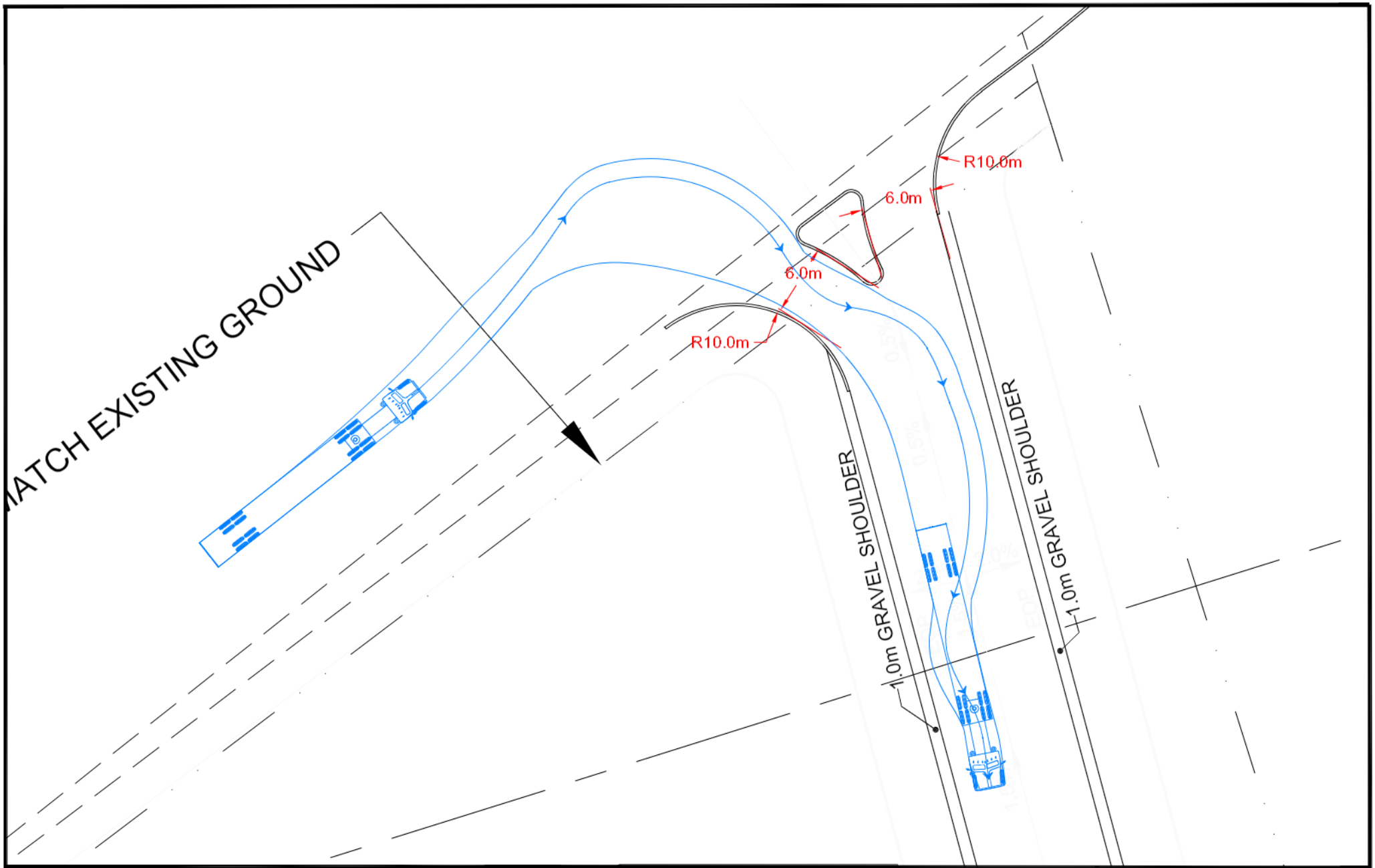
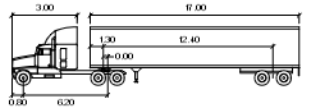


Figure 13 - WB-20 Tractor Trailer Entering the RIRO Site Access

Proposed Warehouse Development
123 Highway 47
Town of Uxbridge, Ontario



WB-20

metres

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 38.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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Source: Site Plan by Cusimano Architect

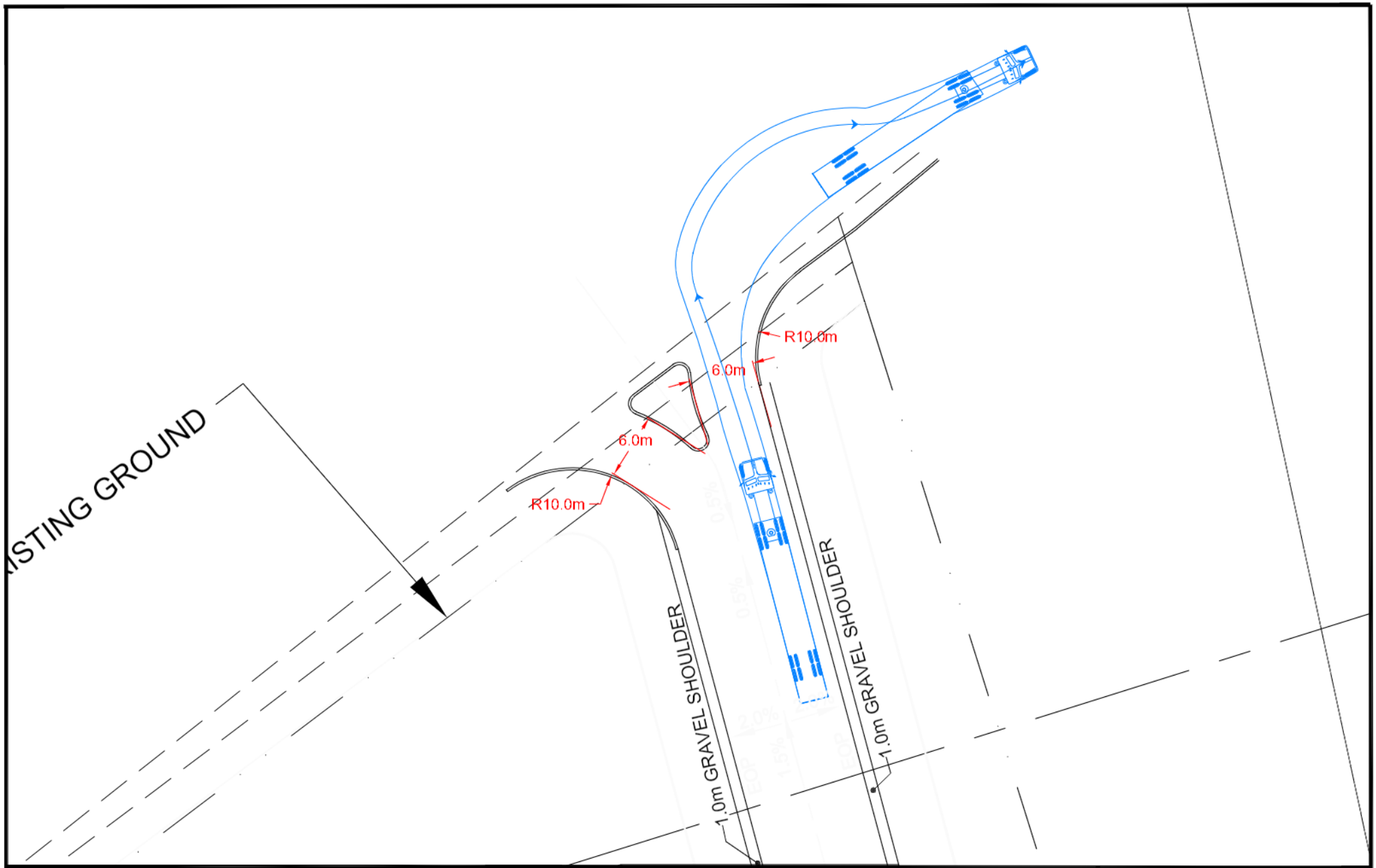
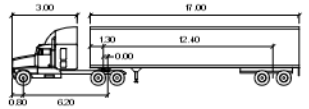


Figure 14 - WB-20 Tractor Trailer Exiting the RIRO Site Access

Proposed Warehouse Development
123 Highway 47
Town of Uxbridge, Ontario



WB-20

	metres		
Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 38.2
Tractor Track	: 2.00	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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Source: Site Plan by Cusimano Architect

APPENDICES

Appendix A – Turning Movement Counts and Signal Timing Plans

Appendix B – Capacity Analysis Sheets

Appendix C – Level of Service Definitions

Appendix D – Signal Warrant Analysis

Appendix E – Sight Line Analysis

APPENDIX A

Turning Movement Counts and Signal Timing Plans

Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location: Highway 40/47 and Road 30
Municipality: Uxbridge, Ontario
Count Date: Wednesday, May 17, 2023
Weather and Temperature: Mainly sunny, dry, 4 to 11 degrees.
Surveyor: TP

AM	NORTH APPROACH Road 30											EAST APPROACH Hwy 47											SOUTH APPROACH Road 30										Total	WEST APPROACH Hwy 40										Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			
7:00	1	45	6	1	0	5	0	0	0	0	58	44	118	8	1	13	3	0	0	0	0	187	12	31	15	1	0	2	0	0	0	0	61	11	57	16	3	8	3	0	0	0	0	98	404
7:15	5	46	5	3	2	7	0	0	0	0	68	26	107	4	1	11	1	0	0	0	0	150	21	32	18	1	2	1	0	0	0	0	75	11	52	21	4	10	3	0	0	0	0	101	394
7:30	10	43	7	5	2	2	0	0	0	0	69	33	171	11	2	6	0	0	0	0	0	223	32	31	29	2	2	0	0	0	0	0	96	5	88	18	7	16	3	0	0	0	0	137	525
7:45	4	58	3	1	2	6	0	0	0	0	74	41	114	6	2	14	4	0	0	0	0	181	35	38	35	2	3	0	0	0	0	0	113	8	55	22	9	9	3	0	0	0	0	106	474
8:00	1	69	5	4	5	10	0	0	0	0	94	47	99	6	2	19	5	0	0	0	0	178	20	37	30	2	0	1	0	0	0	0	90	3	66	24	12	15	2	0	0	0	0	122	484
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9:00	3	31	4	3	5	8	0	0	0	0	54	39	85	7	3	21	2	0	0	0	0	157	11	23	22	2	4	2	0	0	0	0	64	3	70	27	9	10	3	0	0	0	0	122	397
9:15	4	29	5	2	4	12	0	0	0	0	56	20	65	3	3	7	3	0	0	0	0	101	12	20	21	3	0	0	0	0	0	0	56	6	57	16	5	9	1	0	0	0	0	94	307
PM																																													
16:00	12	36	7	4	1	14	0	0	0	0	74	37	89	3	2	16	2	0	0	0	0	149	9	52	56	2	1	0	0	0	0	0	120	9	153	30	8	15	2	0	0	0	0	217	560
16:15	8	41	12	2	0	19	0	0	0	0	82	30	74	8	0	16	2	0	0	0	0	130	26	54	55	0	3	4	0	0	0	0	142	6	152	20	4	12	8	0	0	0	0	202	556
16:30	7	44	11	0	0	4	0	0	0	0	66	32	89	6	1	22	2	0	0	0	0	152	24	52	47	0	2	2	0	0	0	0	127	7	156	20	2	13	2	0	0	0	0	200	545
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17:00	12	49	23	1	2	0	0	0	0	0	87	34	105	8	2	13	2	0	0	0	0	164	20	63	47	0	3	5	0	0	0	0	138	19	162	38	3	12	1	0	0	0	0	235	624
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18:00	8	31	7	1	0	1	0	0	0	0	48	19	91	9	0	5	1	0	0	0	0	125	17	50	41	2	1	0	0	0	0	0	111	12	89	22	1	7	2	0	0	0	0	133	417
18:15	3	27	11	4	1	0	0	0	0	0	46	22	71	3	0	2	0	0	0	0	0	98	15	30	27	0	1	1	0	0	0	0	74	9	98	21	1	2	0	0	0	0	0	131	349

TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

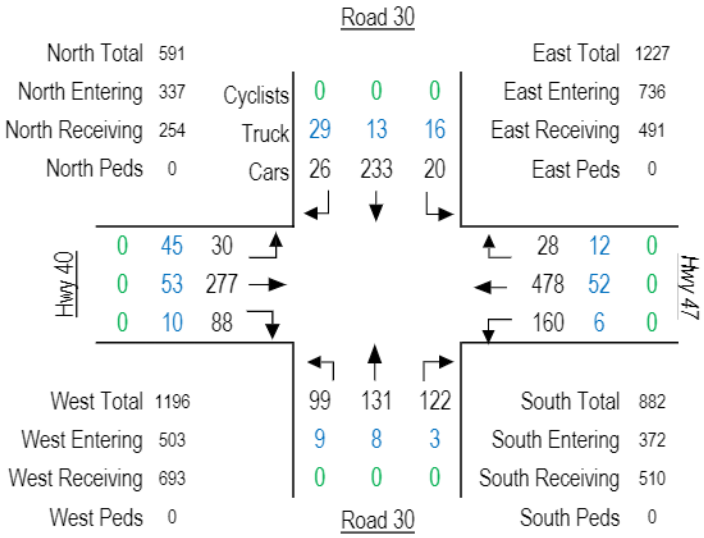
Intersection: Highway 40/47 and Road 30

Municipality: Uxbridge, Ontario

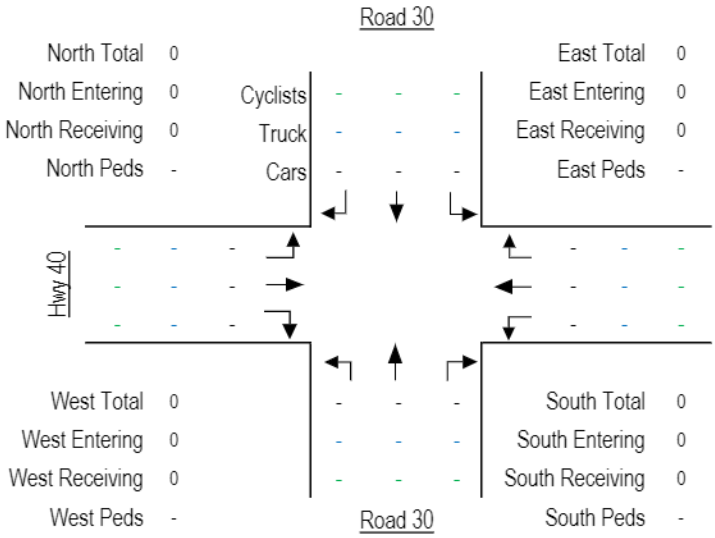
Intersection ID:

Date: Wednesday, May 17, 2023

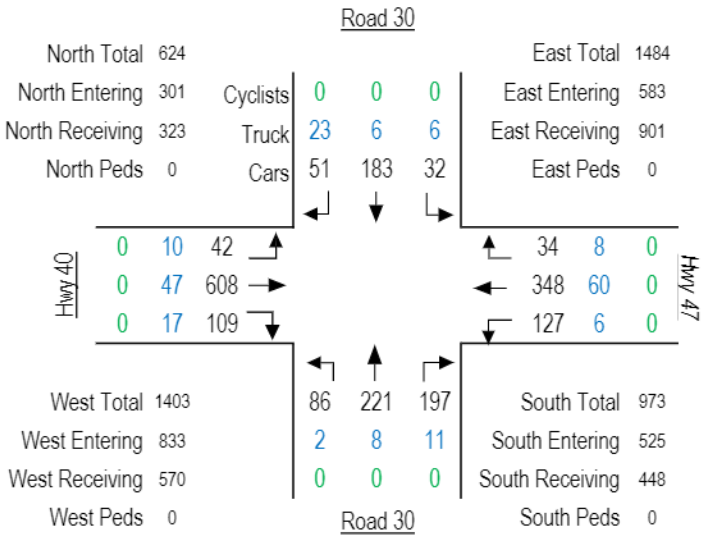
AM Peak Hour: 7:30 to 8:30



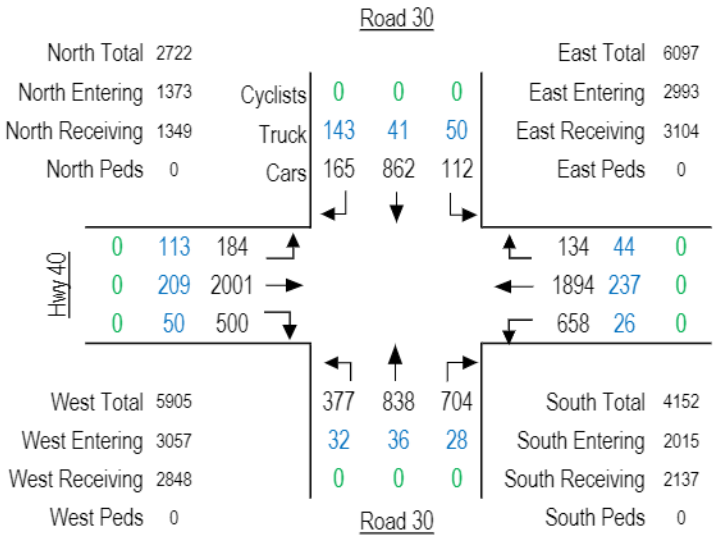
MD Peak Hour: - to -



PM Peak Hour: 16:15 to 17:15



Total 8-Hour Count



Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location: Highway 47 and Paisley Lane
Municipality: Uxbridge, Ontario
Count Date: Wednesday, May 17, 2023
Weather and Temperature: Mainly sunny, dry, 4 to 11 degrees.
Surveyor: TP

AM	NORTH APPROACH Paisley Ln											EAST APPROACH Hwy 47											SOUTH APPROACH n/a										Total	WEST APPROACH Hwy 47										Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds			CAR			TRUCKS			CYCLISTS			Peds		
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R				L	T	R	L	T	R	L	T	R			
7:00	1	0	7	1	0	3	0	0	0	0	12	0	161	10	0	12	1	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	9	57	0	0	9	0	0	0	0	0	75	271
7:15	2	0	2	1	0	4	0	0	0	0	9	0	141	12	0	8	0	0	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0	11	69	0	0	16	0	0	0	0	0	96	266
7:30	1	0	4	2	0	1	0	0	0	0	8	0	202	19	0	9	1	0	0	0	0	231	0	0	0	0	0	0	0	0	0	0	0	11	107	0	1	17	0	0	0	0	0	136	375
7:45	4	0	5	0	0	2	0	0	0	0	11	0	160	23	0	16	2	0	0	0	0	201	0	0	0	0	0	0	0	0	0	0	0	25	79	0	1	10	0	0	0	0	0	115	327
8:00	2	0	7	2	0	3	0	0	0	0	14	0	141	11	0	24	1	0	0	0	0	177	0	0	0	0	0	0	0	0	0	0	0	17	76	0	1	17	0	0	0	0	0	111	302
8:15	2	0	6	0	0	0	0	0	0	0	8	0	123	8	0	15	3	0	0	0	0	149	0	0	0	0	0	0	0	0	0	0	0	13	90	0	1	22	0	0	0	0	0	126	283
8:30	5	0	6	0	0	5	0	0	0	0	16	0	117	9	0	21	2	0	0	0	0	149	0	0	0	0	0	0	0	0	0	0	0	11	80	0	2	15	0	0	0	0	0	108	273
8:45	0	0	6	1	0	4	0	0	0	0	11	0	132	12	0	18	0	0	0	0	0	162	0	0	0	0	0	0	0	0	0	0	0	20	85	0	3	17	0	0	0	0	0	125	298
9:00	7	0	4	0	0	2	0	0	0	0	13	0	119	6	0	19	1	0	0	0	0	145	0	0	0	0	0	0	0	0	0	0	0	18	81	0	1	14	0	0	0	0	0	114	272
9:15	4	0	1	0	0	2	0	0	0	0	7	0	90	3	0	14	1	0	0	0	0	108	0	0	0	0	0	0	0	0	0	0	0	3	79	0	2	8	0	0	0	0	0	92	207
PM																																													
16:00	21	0	27	0	0	1	0	0	0	0	49	0	96	2	0	16	2	0	0	0	0	116	0	0	0	0	0	0	0	0	0	0	0	5	207	0	0	19	0	0	0	0	0	231	396
16:15	5	0	19	0	0	3	0	0	0	0	27	0	97	2	0	17	0	0	0	0	0	116	0	0	0	0	0	0	0	0	0	0	0	7	215	0	3	16	0	0	0	0	0	241	384
16:30	25	0	24	0	0	1	0	0	0	0	50	0	104	7	0	22	1	0	0	0	0	134	0	0	0	0	0	0	0	0	0	0	0	9	196	0	2	11	0	0	0	0	0	218	402
16:45	12	0	16	0	0	1	0	0	0	0	29	0	113	4	0	13	0	0	0	0	0	130	0	0	0	0	0	0	0	0	0	0	0	5	198	0	2	14	0	0	0	0	0	219	378
17:00	26	0	31	0	0	0	0	0	0	0	57	0	109	2	0	16	0	0	0	0	0	127	0	0	0	0	0	0	0	0	0	0	0	7	202	0	3	14	0	0	0	0	0	226	410
17:15	12	0	16	0	0	0	0	0	0	0	28	0	126	10	0	5	0	0	0	0	0	141	0	0	0	0	0	0	0	0	0	0	0	7	186	0	1	6	0	0	0	0	0	200	369
17:30	5	0	13	0	0	1	0	0	0	0	19	0	121	1	0	9	0	0	0	0	0	131	0	0	0	0	0	0	0	0	0	0	0	5	194	0	3	11	0	0	0	0	0	213	363
17:45	9	0	5	0	0	0	0	0	0	0	14	0	114	7	0	10	0	0	0	0	0	131	0	0	0	0	0	0	0	0	0	0	0	6	158	0	1	4	0	0	0	0	0	169	314
18:00	6	0	9	0	0	0	0	0	0	0	15	0	98	2	0	4	1	0	0	0	0	105	0	0	0	0	0	0	0	0	0	0	0	2	123	0	1	7	0	0	0	0	0	133	253
18:15	6	0	1	0	0	0	0	0	0	0	7	0	97	0	0	2	0	0	0	0	0	99	0	0	0	0	0	0	0	0	0	0	0	4	140	0	1	5	0	0	0	0	0	150	256

TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

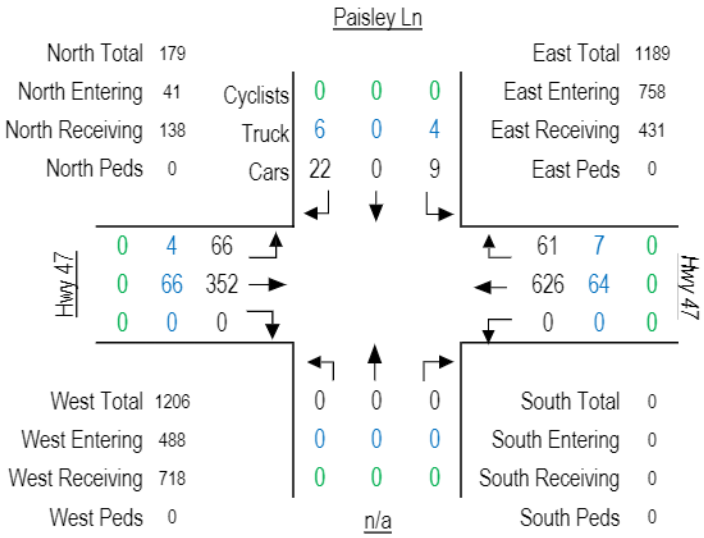
Intersection: Highway 47 and Paisley Lane

Municipality: Uxbridge, Ontario

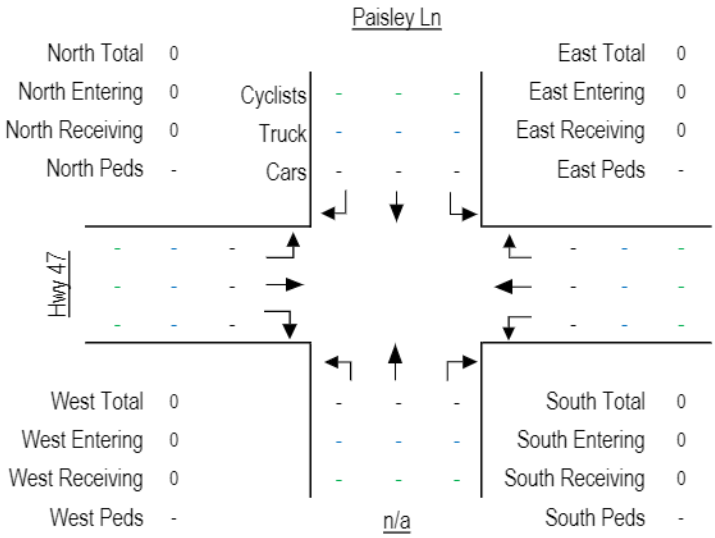
Intersection ID:

Date: Wednesday, May 17, 2023

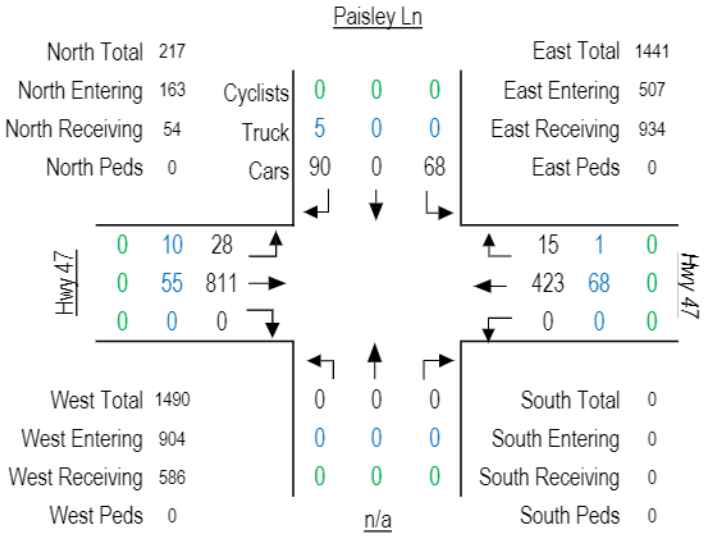
AM Peak Hour: 7:30 to 8:30



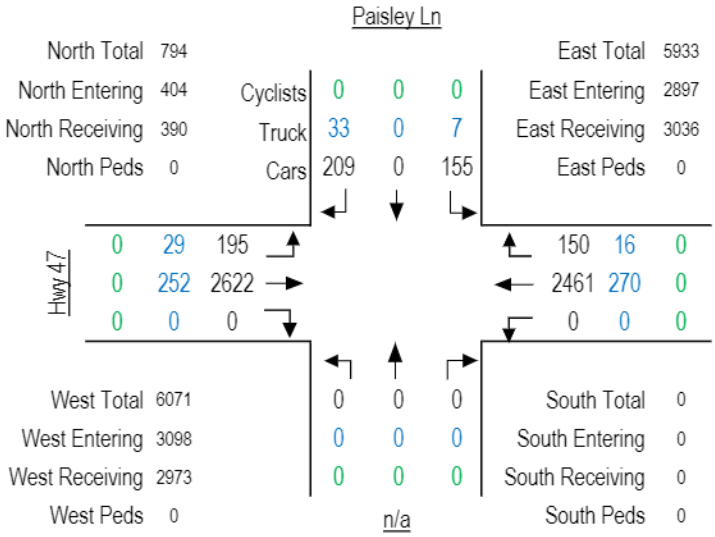
MD Peak Hour: - to -



PM Peak Hour: 16:15 to 17:15



Total 8-Hour Count



LOCATION:	**Blooomington Rd (YR 40) & York Durham Line (YR 30)**	*MUNICIPALITY:*	**Stouffville**
CTCS:	**359**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**AM**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:		*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.0 m/s)**
IMPLEMENTATION DATE:	**July 25, 2023**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM 07:00-09:00 M F	PM 16:00-18:00 M F	Free 09:00-16:00; 18:00 - 7:00 M-F; 24 Hrs Sat & Sun	Phase Mode (Fixed/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 99		
1. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 10 MAX2 0 AMB 3 ALR 1 SPLIT	**14**	**14**		Callable/Extendable by Setback Loop	
2. Westbound  Bloomington Rd	WLK FDW MIN 50 EXT 0 MAX1 50 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**60**	**65**	**0**	Fixed	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is served. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or MAX1 during Free operation.Unused extension time is given to the EWG.
3. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					
4. Southbound  York Durham Line	WLK FDW MIN 10 EXT 5 MAX1 35 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**51**	**46**	**0**	Callable by stopbar loop Extendable by stopbar loop.	
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 10 MAX2 0 AMB 3 ALR 1 SPLIT	**14**	**14**		Callable/Extendable by Setback Loop	
6. Eastbound  Bloomington Rd	WLK FDW MIN 50 EXT 0 MAX1 50 MAX2 0 AMB 5.0 ALR 3.0 SPLIT	**60**	**65**	**0**	Fixed	
7. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound  York Durham Line	WLK FDW MIN 10 EXT 5 MAX1 35 MAX2 0 AMB 5 ALR 3.0 SPLIT	**51**	**46**	**0**	Callable by stopbar loop Extendable by stopbar loop.	
	CL	**125**	**125**	**0 (FREE)**		
	OF	**0**	**0**	**0 (FREE)**		
	VP	0	0	0 (FREE)		

NOTES:

APPENDIX B

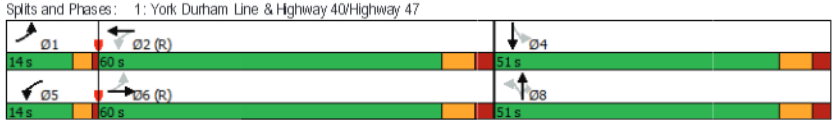
Capacity Analysis Sheets

Existing Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	330	166	530	108	139	125	36	246
Future Volume (vph)	75	330	166	530	108	139	125	36	246
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	60.0	14.0	60.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	11.2%	48.0%	11.2%	48.0%	40.8%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	65.2	52.3	67.3	55.3		43.0	43.0		43.0
Actuated g/C Ratio	0.52	0.42	0.54	0.44		0.34	0.34		0.34
v/c Ratio	0.40	0.66	0.45	0.79		0.72	0.21		0.68
Control Delay	19.0	33.6	17.3	39.9		48.4	5.4		41.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	19.0	33.6	17.3	39.9		48.4	5.4		41.7
LOS	B	C	B	D		D	A		D
Approach Delay		31.4		34.8		34.0			41.7
Approach LOS		C		C		C			D

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 34.9		Intersection LOS: C	
Intersection Capacity Utilization 103.7%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	330	98	166	530	40	108	139	125	36	246	55
Future Volume (vph)	75	330	98	166	530	40	108	139	125	36	246	55
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1210	1677		1746	1757			1811	1593		1657	
Flt Permitted	0.21	1.00		0.32	1.00			0.59	1.00		0.93	
Satd. Flow (perm)	268	1677		583	1757			1083	1593		1554	
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)	82	359	107	180	576	43	117	151	136	39	267	60
RTOR Reduction (vph)	0	9	0	0	2	0	0	0	89	0	6	0
Lane Group Flow (vph)	82	457	0	180	617	0	0	268	47	0	360	0
Heavy Vehicles (%)	50%	15%	10%	4%	10%	30%	8%	6%	2%	40%	5%	50%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	59.8	52.3		64.2	54.5			43.0	43.0		43.0	
Effective Green, g (s)	59.8	52.3		64.2	54.5			43.0	43.0		43.0	
Actuated g/C Ratio	0.48	0.42		0.51	0.44			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	184	701		389	766			372	547		534	
v/s Ratio Prot	0.03	0.27		c0.04	c0.35							
v/s Ratio Perm	0.19			0.20				c0.25	0.03		0.23	
v/c Ratio	0.45	0.65		0.46	0.81			0.72	0.09		0.67	
Uniform Delay, d1	21.6	29.1		18.4	30.6			35.8	27.7		35.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.7	4.7		0.9	8.8			11.4	0.3		6.7	
Delay (s)	23.3	33.8		19.3	39.5			47.2	28.0		41.7	
Level of Service	C	C		B	D			D	C		D	
Approach Delay (s)		32.2			34.9			40.7			41.7	
Approach LOS		C			C			D			D	

Intersection Summary					
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	103.7%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	418	690	68	13	28
Future Volume (Veh/h)	70	418	690	68	13	28
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)	76	454	750	74	14	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	824				1356	750
vC1, stage 1 conf vol					750	
vC2, stage 2 conf vol					606	
vCu, unblocked vol	824				1356	750
tC, single (s)	4.2				6.7	6.4
tC, 2 stage (s)					5.7	
tF (s)	2.3				3.8	3.5
p0 queue free %	90				96	92
cM capacity (veh/h)	789				324	383

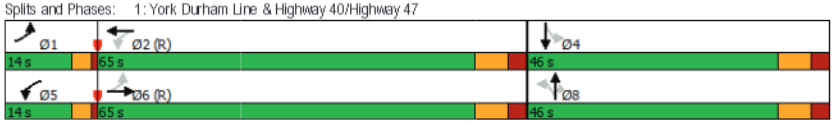
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	76	454	750	74	44
Volume Left	76	0	0	0	14
Volume Right	0	0	0	74	30
cSH	789	1700	1700	1700	362
Volume to Capacity	0.10	0.27	0.44	0.04	0.12
Queue Length 95th (m)	2.4	0.0	0.0	0.0	3.1
Control Delay (s)	10.0	0.0	0.0	0.0	16.3
Lane LOS	B				C
Approach Delay (s)	1.4		0.0		16.3
Approach LOS					C

Intersection Summary				
Average Delay		1.1		
Intersection Capacity Utilization		51.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	52	655	133	408	88	229	208	38	189
Future Volume (vph)	52	655	133	408	88	229	208	38	189
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	65.0	14.0	65.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	11.2%	52.0%	11.2%	52.0%	36.8%	36.8%	36.8%	36.8%	36.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	69.3	57.6	73.3	61.4		38.0	38.0		38.0
Actuated g/C Ratio	0.55	0.46	0.59	0.49		0.30	0.30		0.30
v/c Ratio	0.15	1.03	0.76	0.59		0.86	0.37		0.83
Control Delay	11.5	71.3	48.6	27.0		62.4	7.7		57.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	11.5	71.3	48.6	27.0		62.4	7.7		57.9
LOS	B	E	D	C		E	A		E
Approach Delay		67.6		31.9		40.7			57.9
Approach LOS		E		C		D			E

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 50.7		Intersection LOS: D	
Intersection Capacity Utilization 103.8%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	655	126	133	408	42	88	229	208	38	189	74
Future Volume (vph)	52	655	126	133	408	42	88	229	208	38	189	74
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	1787		1729	1690			1899	1547		1729	
Flt Permitted	0.38	1.00		0.07	1.00			0.69	1.00		0.73	
Satd. Flow (perm)	603	1787		120	1690			1324	1547		1264	
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)	57	712	137	145	443	46	96	249	226	41	205	80
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	143	0	9	0
Lane Group Flow (vph)	57	844	0	145	486	0	0	345	83	0	317	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	64.0	57.6		70.0	60.6			38.0	38.0		38.0	
Effective Green, g (s)	64.0	57.6		70.0	60.6			38.0	38.0		38.0	
Actuated g/C Ratio	0.51	0.46		0.56	0.48			0.30	0.30		0.30	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	355	823		188	819			402	470		384	
v/s Ratio Prot	0.01	c0.47		c0.06	0.29							
v/s Ratio Perm	0.07			0.37				c0.26	0.05		0.25	
v/c Ratio	0.16	1.03		0.77	0.59			0.86	0.18		0.83	
Uniform Delay, d1	16.2	33.7		31.8	23.3			41.0	32.0		40.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	37.9		17.6	3.2			20.5	0.8		18.0	
Delay (s)	16.4	71.6		49.4	26.5			61.5	32.8		58.4	
Level of Service	B	E		D	C			E	C		E	
Approach Delay (s)		68.1			31.7			50.1			58.4	
Approach LOS		E			C			D			E	

Intersection Summary				
HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	103.8%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	866	491	16	68	95
Future Volume (Veh/h)	38	866	491	16	68	95
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)	41	941	534	17	74	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	551				1557	534
vC1, stage 1 conf vol					534	
vC2, stage 2 conf vol					1023	
vCu, unblocked vol	551				1557	534
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.4				3.5	3.3
p0 queue free %	96				75	81
cM capacity (veh/h)	913				298	540

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	41	941	534	17	177
Volume Left	41	0	0	0	74
Volume Right	0	0	0	17	103
cSH	913	1700	1700	1700	403
Volume to Capacity	0.04	0.55	0.31	0.01	0.44
Queue Length 95th (m)	1.1	0.0	0.0	0.0	16.6
Control Delay (s)	9.1	0.0	0.0	0.0	20.7
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		20.7
Approach LOS					C

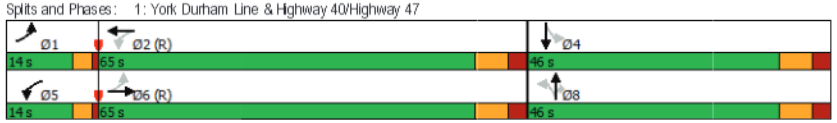
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	59.6%	ICU Level of Service	B	
Analysis Period (min)	15			

2028 Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	56	709	144	442	95	248	225	41	205
Future Volume (vph)	56	709	144	442	95	248	225	41	205
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	65.0	14.0	65.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	11.2%	52.0%	11.2%	52.0%	36.8%	36.8%	36.8%	36.8%	36.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	69.2	57.3	73.3	61.3		38.0	38.0		38.0
Actuated g/C Ratio	0.55	0.46	0.59	0.49		0.30	0.30		0.30
v/c Ratio	0.17	1.12	0.81	0.64		0.96	0.40		1.01
Control Delay	11.7	100.4	55.2	28.6		80.3	9.2		91.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	11.7	100.4	55.2	28.6		80.3	9.2		91.6
LOS	B	F	E	C		F	A		F
Approach Delay		94.8		34.7		52.1			91.6
Approach LOS		F		C		D			F

Intersection Summary		
Cycle Length: 125		
Actuated Cycle Length: 125		
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.12		
Intersection Signal Delay: 68.8	Intersection LOS: E	
Intersection Capacity Utilization 108.6%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	709	136	144	442	45	95	248	225	41	205	80
Future Volume (vph)	56	709	136	144	442	45	95	248	225	41	205	80
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	1788		1729	1690			1899	1547		1729	
Flt Permitted	0.34	1.00		0.07	1.00			0.66	1.00		0.65	
Satd. Flow (perm)	546	1788		120	1690			1279	1547		1133	
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	771	148	157	480	49	103	270	245	45	223	87
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	143	0	9	0
Lane Group Flow (vph)	61	914	0	157	526	0	0	373	102	0	346	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.8	57.3		70.2	60.5			38.0	38.0		38.0	
Effective Green, g (s)	63.8	57.3		70.2	60.5			38.0	38.0		38.0	
Actuated g/C Ratio	0.51	0.46		0.56	0.48			0.30	0.30		0.30	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	329	819		192	817			388	470		344	
v/s Ratio Prot	0.01	c0.51		c0.06	0.31							
v/s Ratio Perm	0.08			0.39				0.29	0.07		c0.31	
v/c Ratio	0.19	1.12		0.82	0.64			0.96	0.22		1.01	
Uniform Delay, d1	16.7	33.9		34.0	24.2			42.8	32.4		43.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	68.2		22.9	3.9			36.9	1.1		50.0	
Delay (s)	16.9	102.0		56.9	28.1			79.7	33.5		93.5	
Level of Service	B	F		E	C			E	C		F	
Approach Delay (s)		96.7			34.7			61.4			93.5	
Approach LOS		F			C			E			F	

Intersection Summary					
HCM 2000 Control Delay	71.9	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	108.6%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	937	531	17	74	103
Future Volume (Veh/h)	41	937	531	17	74	103
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)	45	1018	577	18	80	112
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	595				1685	577
vC1, stage 1 conf vol					577	
vC2, stage 2 conf vol					1108	
vCu, unblocked vol	595				1685	577
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.4				3.5	3.3
p0 queue free %	95				70	78
cM capacity (veh/h)	878				270	511

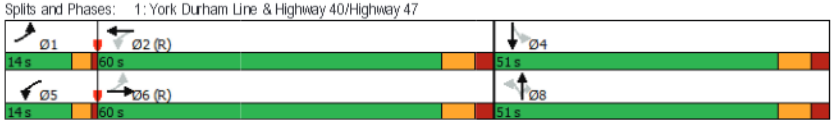
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	45	1018	577	18	192
Volume Left	45	0	0	0	80
Volume Right	0	0	0	18	112
cSH	878	1700	1700	1700	372
Volume to Capacity	0.05	0.60	0.34	0.01	0.52
Queue Length 95th (m)	1.2	0.0	0.0	0.0	21.6
Control Delay (s)	9.3	0.0	0.0	0.0	24.5
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		24.5
Approach LOS					C

Intersection Summary				
Average Delay		2.8		
Intersection Capacity Utilization		63.9%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	81	357	180	574	117	150	135	39	266
Future Volume (vph)	81	357	180	574	117	150	135	39	266
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	60.0	14.0	60.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	11.2%	48.0%	11.2%	48.0%	40.8%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	65.3	52.2	66.7	53.0		43.0	43.0		43.0
Actuated g/C Ratio	0.52	0.42	0.53	0.42		0.34	0.34		0.34
v/c Ratio	0.52	0.71	0.52	0.90		0.82	0.23		0.76
Control Delay	24.6	35.9	19.1	50.4		57.1	5.3		46.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	24.6	35.9	19.1	50.4		57.1	5.3		46.4
LOS	C	D	B	D		E	A		D
Approach Delay		34.2		43.3		39.7			46.4
Approach LOS		C		D		D			D

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 40.8		Intersection LOS: D	
Intersection Capacity Utilization 106.9%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



HCM Signalized Intersection Capacity Analysis — Weekday AM Peak Hour <2028 BKGD>
1: York Durham Line & Highway 40/Highway 47

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	357	106	180	574	43	117	150	135	39	266	60
Future Volume (vph)	81	357	106	180	574	43	117	150	135	39	266	60
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1210	1678		1746	1757			1811	1593		1657	
Flt Permitted	0.14	1.00		0.29	1.00			0.56	1.00		0.90	
Satd. Flow (perm)	182	1678		531	1757			1035	1593		1501	
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)	88	388	115	196	624	47	127	163	147	42	289	65
RTOR Reduction (vph)	0	9	0	0	2	0	0	0	96	0	6	0
Lane Group Flow (vph)	88	494	0	196	669	0	0	290	51	0	390	0
Heavy Vehicles (%)	50%	15%	10%	4%	10%	30%	8%	6%	2%	40%	5%	50%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	61.2	52.2		62.8	53.0			43.0	43.0		43.0	
Effective Green, g (s)	61.2	52.2		62.8	53.0			43.0	43.0		43.0	
Actuated g/C Ratio	0.49	0.42		0.50	0.42			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	163	700		362	744			356	547		516	
v/s Ratio Prot	0.04	0.29		c0.04	c0.38							
v/s Ratio Perm	0.23			0.23				c0.28	0.03		0.26	
v/c Ratio	0.54	0.71		0.54	0.90			0.81	0.09		0.76	
Uniform Delay, d1	23.1	30.1		19.7	33.5			37.4	27.8		36.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	3.4	5.9		1.7	15.9			18.2	0.3		9.9	
Delay (s)	26.5	36.0		21.4	49.4			55.6	28.1		46.3	
Level of Service	C	D		C	D			E	C		D	
Approach Delay (s)		34.6			43.1			46.4			46.3	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	42.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	106.9%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Weekday AM Peak Hour <2028 BKGD>
2: Highway 47 & Paisley Lane

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	452	747	74	14	30
Future Volume (Veh/h)	76	452	747	74	14	30
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)	83	491	812	80	15	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	892				1469	812
vC1, stage 1 conf vol					812	
vC2, stage 2 conf vol					657	
vCu, unblocked vol	892				1469	812
tC, single (s)	4.2				6.7	6.4
tC, 2 stage (s)					5.7	
tF (s)	2.3				3.8	3.5
p0 queue free %	89				95	91
cM capacity (veh/h)	744				297	352

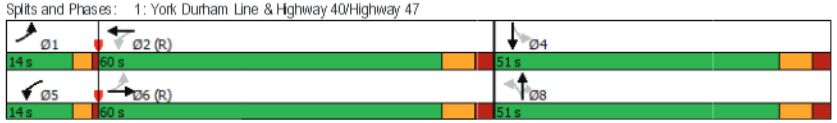
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	83	491	812	80	48
Volume Left	83	0	0	0	15
Volume Right	0	0	0	80	33
cSH	744	1700	1700	1700	333
Volume to Capacity	0.11	0.29	0.48	0.05	0.14
Queue Length 95th (m)	2.9	0.0	0.0	0.0	3.8
Control Delay (s)	10.4	0.0	0.0	0.0	17.6
Lane LOS	B				C
Approach Delay (s)	1.5		0.0		17.6
Approach LOS					C

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	54.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	81	383	184	587	117	150	148	42	266
Future Volume (vph)	81	383	184	587	117	150	148	42	266
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	60.0	14.0	60.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	11.2%	48.0%	11.2%	48.0%	40.8%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	65.3	52.2	66.7	53.0		43.0	43.0		43.0
Actuated g/C Ratio	0.52	0.42	0.53	0.42		0.34	0.34		0.34
v/c Ratio	0.55	0.75	0.56	0.92		0.82	0.25		0.79
Control Delay	26.5	37.9	20.5	53.0		57.1	5.2		48.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	26.5	37.9	20.5	53.0		57.1	5.2		48.9
LOS	C	D	C	D		E	A		D
Approach Delay		36.3		45.6		38.6			48.9
Approach LOS		D		D		D			D

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 42.4		Intersection LOS: D	
Intersection Capacity Utilization 107.3%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	383	106	184	587	44	117	150	148	42	266	60
Future Volume (vph)	81	383	106	184	587	44	117	150	148	42	266	60
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1210	1680		1746	1757			1811	1593		1653	
Flt Permitted	0.13	1.00		0.26	1.00			0.56	1.00		0.87	
Satd. Flow (perm)	164	1680		481	1757			1034	1593		1455	
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)	88	416	115	200	638	48	127	163	161	46	289	65
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	106	0	6	0
Lane Group Flow (vph)	88	523	0	200	684	0	0	290	55	0	394	0
Heavy Vehicles (%)	50%	15%	10%	4%	10%	30%	8%	6%	2%	40%	5%	50%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	61.2	52.2		62.8	53.0			43.0	43.0		43.0	
Effective Green, g (s)	61.2	52.2		62.8	53.0			43.0	43.0		43.0	
Actuated g/C Ratio	0.49	0.42		0.50	0.42			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	155	701		340	744			355	547		500	
v/s Ratio Prot	0.04	0.31		c0.05	c0.39							
v/s Ratio Perm	0.24			0.25				c0.28	0.03		0.27	
v/c Ratio	0.57	0.75		0.59	0.92			0.82	0.10		0.79	
Uniform Delay, d1	23.7	30.8		20.3	34.0			37.4	27.9		36.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	4.7	7.1		2.6	18.3			18.5	0.4		11.9	
Delay (s)	28.4	37.9		22.9	52.2			55.9	28.2		48.8	
Level of Service	C	D		C	D			E	C		D	
Approach Delay (s)		36.5			45.6			46.0			48.8	
Approach LOS		D			D			D			D	

Intersection Summary					
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	107.3%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	456	38	43	747	74	18	0	6	14	0	30
Future Volume (Veh/h)	76	456	38	43	747	74	18	0	6	14	0	30
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)	83	496	41	47	812	80	20	0	7	15	0	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	892			537			1622	1668	516	1575	1609	812
vC1, stage 1 conf vol							682	682		906	906	
vC2, stage 2 conf vol							939	986		669	703	
vCu, unblocked vol	892			537			1622	1668	516	1575	1609	812
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.4	6.5	6.4
tC, 2 stage (s)							6.1	5.5		6.4	5.5	
tF (s)	2.3			2.2			3.5	4.0	3.3	3.8	4.0	3.5
p0 queue free %	89			95			89	100	99	93	100	91
cM capacity (veh/h)	744			1031			175	204	559	213	251	352

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	83	537	859	80	27	48
Volume Left	83	0	47	0	20	15
Volume Right	0	41	0	80	7	33
cSH	744	1700	1031	1700	213	293
Volume to Capacity	0.11	0.32	0.05	0.05	0.13	0.16
Queue Length 95th (m)	2.9	0.0	1.1	0.0	3.3	4.4
Control Delay (s)	10.4	0.0	1.2	0.0	24.4	19.7
Lane LOS	B		A		C	C
Approach Delay (s)	1.4		1.1		24.4	19.7
Approach LOS					C	C

Intersection Summary					
Average Delay	2.1				
Intersection Capacity Utilization	77.9%	ICU Level of Service	D		
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	472	4	0	864	0	1
Future Volume (Veh/h)	472	4	0	864	0	1
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)	513	4	0	939	0	1
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			517		1454	515
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			517		1454	515
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		100	100
cM capacity (veh/h)			1049		143	560

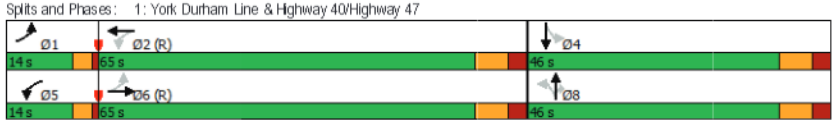
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	517	939	1
Volume Left	0	0	0
Volume Right	4	0	1
cSH	1700	1700	560
Volume to Capacity	0.30	0.55	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	11.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.4
Approach LOS			B

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	48.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	56	723	152	478	95	248	230	43	205
Future Volume (vph)	56	723	152	478	95	248	230	43	205
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	65.0	14.0	65.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	11.2%	52.0%	11.2%	52.0%	36.8%	36.8%	36.8%	36.8%	36.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	69.0	57.2	73.3	61.3		38.0	38.0		38.0
Actuated g/C Ratio	0.55	0.46	0.59	0.49		0.30	0.30		0.30
v/c Ratio	0.18	1.13	0.84	0.69		0.96	0.41		1.03
Control Delay	11.9	108.1	60.6	30.7		79.7	9.2		97.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	11.9	108.1	60.6	30.7		79.7	9.2		97.5
LOS	B	F	E	C		E	A		F
Approach Delay		102.2		37.4		51.4			97.5
Approach LOS		F		D		D			F

Intersection Summary		
Cycle Length: 125		
Actuated Cycle Length: 125		
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green		
Natural Cycle: 125		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.13		
Intersection Signal Delay: 72.3	Intersection LOS: E	
Intersection Capacity Utilization 109.9%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	723	136	152	478	50	95	248	230	43	205	80
Future Volume (vph)	56	723	136	152	478	50	95	248	230	43	205	80
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	1789		1729	1690			1899	1547		1728	
Flt Permitted	0.30	1.00		0.07	1.00			0.66	1.00		0.64	
Satd. Flow (perm)	482	1789		120	1690			1280	1547		1112	
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	786	148	165	520	54	103	270	250	47	223	87
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	146	0	9	0
Lane Group Flow (vph)	61	929	0	165	571	0	0	373	104	0	348	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.7	57.2		70.3	60.5			38.0	38.0		38.0	
Effective Green, g (s)	63.7	57.2		70.3	60.5			38.0	38.0		38.0	
Actuated g/C Ratio	0.51	0.46		0.56	0.48			0.30	0.30		0.30	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	299	818		193	817			389	470		338	
v/s Ratio Prot	0.01	c0.52		c0.07	0.34							
v/s Ratio Perm	0.09			0.41				0.29	0.07		c0.31	
v/c Ratio	0.20	1.14		0.85	0.70			0.96	0.22		1.03	
Uniform Delay, d1	17.2	33.9		35.2	25.2			42.7	32.5		43.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	75.7		28.9	4.9			36.4	1.1		56.7	
Delay (s)	17.6	109.6		64.1	30.1			79.1	33.5		100.2	
Level of Service	B	F		E	C			E	C		F	
Approach Delay (s)		103.9			37.7			60.8			100.2	
Approach LOS		F			D			E			F	

Intersection Summary					
HCM 2000 Control Delay	75.5	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	1.07				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	109.9%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	939	19	11	531	17	49	0	24	74	0	103
Future Volume (Veh/h)	41	939	19	11	531	17	49	0	24	74	0	103
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)	45	1021	21	12	577	18	53	0	26	80	0	112
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	595			1042			1834	1740	1032	1738	1733	577
vC1, stage 1 conf vol							1122	1122		601	601	
vC2, stage 2 conf vol							713	619		1137	1132	
vCu, unblocked vol	595			1042			1834	1740	1032	1738	1733	577
tC, single (s)	4.3			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			98			71	100	91	57	100	78
cM capacity (veh/h)	878			667			180	232	283	184	227	511

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	45	1042	589	18	79	192
Volume Left	45	0	12	0	53	80
Volume Right	0	21	0	18	26	112
cSH	878	1700	667	1700	205	293
Volume to Capacity	0.05	0.61	0.02	0.01	0.39	0.65
Queue Length 95th (m)	1.2	0.0	0.4	0.0	12.9	32.3
Control Delay (s)	9.3	0.0	0.5	0.0	33.2	37.8
Lane LOS	A		A		D	E
Approach Delay (s)	0.4		0.5		33.2	37.8
Approach LOS					D	E

Intersection Summary					
Average Delay	5.4				
Intersection Capacity Utilization	65.6%	ICU Level of Service	C		
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1035	2	0	559	0	8
Future Volume (Veh/h)	1035	2	0	559	0	8
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)	1125	2	0	608	0	9
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			1127		1734	1126
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1127		1734	1126
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		100	96
cM capacity (veh/h)			620		96	249

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1127	608	9
Volume Left	0	0	0
Volume Right	2	0	9
cSH	1700	1700	249
Volume to Capacity	0.66	0.36	0.04
Queue Length 95th (m)	0.0	0.0	0.9
Control Delay (s)	0.0	0.0	20.0
Lane LOS			C
Approach Delay (s)	0.0	0.0	20.0
Approach LOS			C

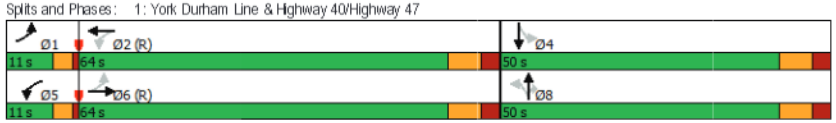
Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	64.6%	ICU Level of Service	C	
Analysis Period (min)	15			

2033 Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	90	394	198	633	129	166	149	43	294
Future Volume (vph)	90	394	198	633	129	166	149	43	294
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	11.0	64.0	11.0	64.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	8.8%	51.2%	8.8%	51.2%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	67.0	56.0	67.0	56.0		42.0	42.0		42.0
Actuated g/C Ratio	0.54	0.45	0.54	0.45		0.34	0.34		0.34
v/c Ratio	0.73	0.73	0.64	0.94		0.99	0.25		0.95
Control Delay	46.2	34.4	24.5	53.7		90.6	5.4		71.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	46.2	34.4	24.5	53.7		90.6	5.4		71.9
LOS	D	C	C	D		F	A		E
Approach Delay		36.1		47.1		62.0			71.9
Approach LOS		D		D		E			E

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 51.4		Intersection LOS: D	
Intersection Capacity Utilization 111.3%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	394	117	198	633	48	129	166	149	43	294	66
Future Volume (vph)	90	394	117	198	633	48	129	166	149	43	294	66
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1210	1677		1746	1757			1811	1593		1657	
Flt Permitted	0.11	1.00		0.27	1.00			0.52	1.00		0.81	
Satd. Flow (perm)	138	1677		498	1757			961	1593		1357	
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)	98	428	127	215	688	52	140	180	162	47	320	72
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	108	0	6	0
Lane Group Flow (vph)	98	547	0	215	738	0	0	320	54	0	433	0
Heavy Vehicles (%)	50%	15%	10%	4%	10%	30%	8%	6%	2%	40%	5%	50%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.0	56.0		63.0	56.0			42.0	42.0		42.0	
Effective Green, g (s)	63.0	56.0		63.0	56.0			42.0	42.0		42.0	
Actuated g/C Ratio	0.50	0.45		0.50	0.45			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	129	751		320	787			322	535		455	
v/s Ratio Prot	c0.04	0.33		0.04	c0.42							
v/s Ratio Perm	0.34			0.30				c0.33	0.03		0.32	
v/c Ratio	0.76	0.73		0.67	0.94			0.99	0.10		0.95	
Uniform Delay, d1	24.8	28.3		23.4	32.8			41.4	28.5		40.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	22.3	6.1		5.5	20.0			48.6	0.4		31.7	
Delay (s)	47.1	34.4		28.9	52.9			90.0	28.9		72.2	
Level of Service	D	C		C	D			F	C		E	
Approach Delay (s)		36.3			47.5			69.5			72.2	
Approach LOS		D			D			E			E	

Intersection Summary					
HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.95				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	111.3%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	500	825	81	16	33
Future Volume (Veh/h)	84	500	825	81	16	33
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	543	897	88	17	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	985				1622	897
vC1, stage 1 conf vol					897	
vC2, stage 2 conf vol					725	
vCu, unblocked vol	985				1622	897
tC, single (s)	4.2				6.7	6.4
tC, 2 stage (s)					5.7	
tF (s)	2.3				3.8	3.5
p0 queue free %	87				94	89
cM capacity (veh/h)	686				265	314

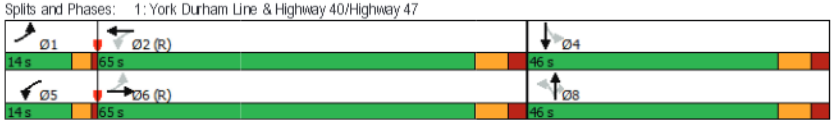
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	91	543	897	88	53
Volume Left	91	0	0	0	17
Volume Right	0	0	0	88	36
cSH	686	1700	1700	1700	296
Volume to Capacity	0.13	0.32	0.53	0.05	0.18
Queue Length 95th (m)	3.5	0.0	0.0	0.0	4.9
Control Delay (s)	11.1	0.0	0.0	0.0	19.8
Lane LOS	B				C
Approach Delay (s)	1.6		0.0		19.8
Approach LOS					C

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		59.2%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	62	783	159	488	105	274	249	45	226
Future Volume (vph)	62	783	159	488	105	274	249	45	226
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	65.0	14.0	65.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	11.2%	52.0%	11.2%	52.0%	36.8%	36.8%	36.8%	36.8%	36.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	69.1	57.0	73.2	61.2		38.0	38.0		38.0
Actuated g/C Ratio	0.55	0.46	0.59	0.49		0.30	0.30		0.30
v/c Ratio	0.21	1.24	0.87	0.70		1.11	0.44		1.29
Control Delay	12.2	148.2	66.5	31.4		120.8	11.6		188.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	12.2	148.2	66.5	31.4		120.8	11.6		188.7
LOS	B	F	E	C		F	B		F
Approach Delay		139.8		39.4		77.5			188.7
Approach LOS		F		D		E			F

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.29			
Intersection Signal Delay: 105.7		Intersection LOS: F	
Intersection Capacity Utilization 117.5%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



HCM Signalized Intersection Capacity Analysis — Weekday PM Peak Hour <2033 BKGD>
1: York Durham Line & Highway 40/Highway 47

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	783	151	159	488	50	105	274	249	45	226	88
Future Volume (vph)	62	783	151	159	488	50	105	274	249	45	226	88
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	1787		1729	1691			1899	1547		1729	
Flt Permitted	0.29	1.00		0.07	1.00			0.63	1.00		0.56	
Satd. Flow (perm)	468	1787		121	1691			1220	1547		968	
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)	67	851	164	173	530	54	114	298	271	49	246	96
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	143	0	9	0
Lane Group Flow (vph)	67	1010	0	173	581	0	0	412	128	0	382	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.6	57.0		70.4	60.4			38.0	38.0		38.0	
Effective Green, g (s)	63.6	57.0		70.4	60.4			38.0	38.0		38.0	
Actuated g/C Ratio	0.51	0.46		0.56	0.48			0.30	0.30		0.30	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	293	814		196	817			370	470		294	
v/s Ratio Prot	0.01	c0.56		c0.07	0.34							
v/s Ratio Perm	0.10			0.43				0.34	0.08		c0.39	
v/c Ratio	0.23	1.24		0.88	0.71			1.11	0.27		1.30	
Uniform Delay, d1	17.5	34.0		36.2	25.4			43.5	33.0		43.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	118.5		34.0	5.2			81.1	1.4		157.4	
Delay (s)	17.9	152.5		70.2	30.7			124.6	34.4		200.9	
Level of Service	B	F		E	C			F	C		F	
Approach Delay (s)		144.2			39.7			88.8			200.9	
Approach LOS		F			D			F			F	

Intersection Summary				
HCM 2000 Control Delay	111.7	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.23			
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	117.5%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Weekday PM Peak Hour <2033 BKGD>
2: Highway 47 & Paisley Lane

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	1035	587	19	81	114
Future Volume (Veh/h)	45	1035	587	19	81	114
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)	49	1125	638	21	88	124
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	659				1861	638
vC1, stage 1 conf vol					638	
vC2, stage 2 conf vol					1223	
vCu, unblocked vol	659				1861	638
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.4				3.5	3.3
p0 queue free %	94				63	74
cM capacity (veh/h)	829				236	471

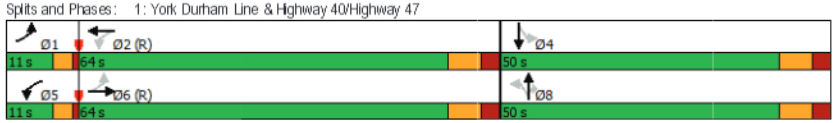
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	49	1125	638	21	212
Volume Left	49	0	0	0	88
Volume Right	0	0	0	21	124
cSH	829	1700	1700	1700	333
Volume to Capacity	0.06	0.66	0.38	0.01	0.64
Queue Length 95th (m)	1.4	0.0	0.0	0.0	31.3
Control Delay (s)	9.6	0.0	0.0	0.0	32.9
Lane LOS	A				D
Approach Delay (s)	0.4		0.0		32.9
Approach LOS					D

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	69.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	90	420	202	646	129	166	162	46	294
Future Volume (vph)	90	420	202	646	129	166	162	46	294
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	11.0	64.0	11.0	64.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	8.8%	51.2%	8.8%	51.2%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	67.0	56.0	67.0	56.0		42.0	42.0		42.0
Actuated g/C Ratio	0.54	0.45	0.54	0.45		0.34	0.34		0.34
v/c Ratio	0.78	0.77	0.70	0.96		0.99	0.27		0.98
Control Delay	56.0	36.5	28.9	57.2		90.6	5.2		79.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	56.0	36.5	28.9	57.2		90.6	5.2		79.1
LOS	E	D	C	E		F	A		E
Approach Delay		39.3		50.8		60.3			79.1
Approach LOS		D		D		E			E

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 54.4		Intersection LOS: D	
Intersection Capacity Utilization 111.6%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	420	117	202	646	49	129	166	162	46	294	66
Future Volume (vph)	90	420	117	202	646	49	129	166	162	46	294	66
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.99	
Satd. Flow (prot)	1210	1680		1746	1757			1811	1593		1654	
Flt Permitted	0.10	1.00		0.24	1.00			0.52	1.00		0.80	
Satd. Flow (perm)	122	1680		450	1757			961	1593		1326	
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)	98	457	127	220	702	53	140	180	176	50	320	72
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	117	0	5	0
Lane Group Flow (vph)	98	576	0	220	753	0	0	320	59	0	437	0
Heavy Vehicles (%)	50%	15%	10%	4%	10%	30%	8%	6%	2%	40%	5%	50%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.0	56.0		63.0	56.0			42.0	42.0		42.0	
Effective Green, g (s)	63.0	56.0		63.0	56.0			42.0	42.0		42.0	
Actuated g/C Ratio	0.50	0.45		0.50	0.45			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	122	752		299	787			322	535		445	
v/s Ratio Prot	c0.04	0.34		0.04	c0.43							
v/s Ratio Perm	0.36			0.33				c0.33	0.04		0.33	
v/c Ratio	0.80	0.77		0.74	0.96			0.99	0.11		0.98	
Uniform Delay, d1	25.5	29.0		24.9	33.3			41.4	28.6		41.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	30.5	7.3		9.1	23.1			48.6	0.4		38.3	
Delay (s)	56.0	36.3		34.0	56.4			90.0	29.0		79.4	
Level of Service	E	D		C	E			F	C		E	
Approach Delay (s)		39.2			51.4			68.4			79.4	
Approach LOS		D			D			E			E	

Intersection Summary					
HCM 2000 Control Delay	56.2	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	111.6%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	504	38	43	825	81	18	0	6	16	0	33
Future Volume (Veh/h)	84	504	38	43	825	81	18	0	6	16	0	33
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)	91	548	41	47	897	88	20	0	7	17	0	36
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	985			589			1778	1830	568	1728	1762	897
vC1, stage 1 conf vol							750	750		991	991	
vC2, stage 2 conf vol							1027	1079		737	771	
vCu, unblocked vol	985			589			1778	1830	568	1728	1762	897
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.4	6.5	6.4
tC, 2 stage (s)							6.1	5.5		6.4	5.5	
tF (s)	2.3			2.2			3.5	4.0	3.3	3.8	4.0	3.5
p0 queue free %	87			95			85	100	99	91	100	89
cM capacity (veh/h)	686			986			137	171	522	185	223	314

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	91	589	944	88	27	53
Volume Left	91	0	47	0	20	17
Volume Right	0	41	0	88	7	36
cSH	686	1700	986	1700	169	257
Volume to Capacity	0.13	0.35	0.05	0.05	0.16	0.21
Queue Length 95th (m)	3.5	0.0	1.1	0.0	4.2	5.8
Control Delay (s)	11.1	0.0	1.3	0.0	30.3	22.6
Lane LOS	B		A		D	C
Approach Delay (s)	1.5		1.2		30.3	22.6
Approach LOS					D	C

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	84.2%	ICU Level of Service	E	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	522	4	0	949	0	1
Future Volume (Veh/h)	522	4	0	949	0	1
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)	567	4	0	1032	0	1
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			571		1601	569
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			571		1601	569
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		100	100
cM capacity (veh/h)			1002		117	522

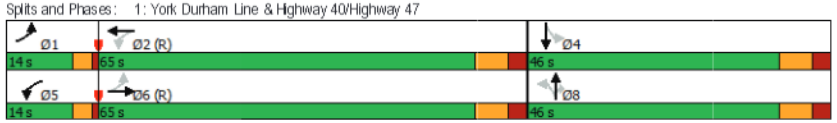
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	571	1032	1
Volume Left	0	0	0
Volume Right	4	0	1
cSH	1700	1700	522
Volume to Capacity	0.34	0.61	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	11.9
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.9
Approach LOS			B

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	62	797	167	524	105	274	254	47	226
Future Volume (vph)	62	797	167	524	105	274	254	47	226
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	65.0	14.0	65.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	11.2%	52.0%	11.2%	52.0%	36.8%	36.8%	36.8%	36.8%	36.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	69.0	57.0	73.2	61.2		38.0	38.0		38.0
Actuated g/C Ratio	0.55	0.46	0.59	0.49		0.30	0.30		0.30
v/c Ratio	0.23	1.26	0.91	0.76		1.11	0.45		1.32
Control Delay	12.5	156.2	75.2	34.0		120.8	11.6		201.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	12.5	156.2	75.2	34.0		120.8	11.6		201.9
LOS	B	F	E	C		F	B		F
Approach Delay		147.4		43.3		77.0			201.9
Approach LOS		F		D		E			F

Intersection Summary			
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.32			
Intersection Signal Delay: 110.1		Intersection LOS: F	
Intersection Capacity Utilization 118.8%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	797	151	167	524	55	105	274	254	47	226	88
Future Volume (vph)	62	797	151	167	524	55	105	274	254	47	226	88
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	1788		1729	1690			1899	1547		1729	
Flt Permitted	0.25	1.00		0.07	1.00			0.63	1.00		0.55	
Satd. Flow (perm)	403	1788		121	1690			1221	1547		949	
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)	67	866	164	182	570	60	114	298	276	51	246	96
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	146	0	9	0
Lane Group Flow (vph)	67	1025	0	182	627	0	0	412	130	0	384	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	63.6	57.0		70.4	60.4			38.0	38.0		38.0	
Effective Green, g (s)	63.6	57.0		70.4	60.4			38.0	38.0		38.0	
Actuated g/C Ratio	0.51	0.46		0.56	0.48			0.30	0.30		0.30	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	264	815		196	816			371	470		288	
v/s Ratio Prot	0.01	c0.57		c0.07	0.37							
v/s Ratio Perm	0.12			0.45				0.34	0.08		c0.40	
v/c Ratio	0.25	1.26		0.93	0.77			1.11	0.28		1.33	
Uniform Delay, d1	18.2	34.0		37.4	26.5			43.5	33.1		43.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.5	125.7		44.0	6.9			80.0	1.5		171.8	
Delay (s)	18.7	159.7		81.4	33.4			123.5	34.5		215.3	
Level of Service	B	F		F	C			F	C		F	
Approach Delay (s)		151.0			44.2			87.8			215.3	
Approach LOS		F			D			F			F	

Intersection Summary					
HCM 2000 Control Delay	115.9	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.25				
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	118.8%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1037	19	11	587	19	49	0	24	81	0	114
Future Volume (Veh/h)	45	1037	19	11	587	19	49	0	24	81	0	114
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)	49	1127	21	12	638	21	53	0	26	88	0	124
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	659			1148			2022	1918	1138	1913	1908	638
vC1, stage 1 conf vol							1236	1236		662	662	
vC2, stage 2 conf vol							786	683		1251	1246	
vCu, unblocked vol	659			1148			2022	1918	1138	1913	1908	638
tC, single (s)	4.3			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			98			65	100	89	43	100	74
cM capacity (veh/h)	829			609			150	203	245	154	198	471

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	49	1148	650	21	79	212
Volume Left	49	0	12	0	53	88
Volume Right	0	21	0	21	26	124
cSH	829	1700	609	1700	172	254
Volume to Capacity	0.06	0.68	0.02	0.01	0.46	0.84
Queue Length 95th (m)	1.4	0.0	0.5	0.0	16.4	50.7
Control Delay (s)	9.6	0.0	0.5	0.0	42.7	64.0
Lane LOS	A		A		E	F
Approach Delay (s)	0.4		0.5		42.7	64.0
Approach LOS					E	F

Intersection Summary					
Average Delay	8.2				
Intersection Capacity Utilization	71.5%	ICU Level of Service	C		
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1140	2	0	617	0	8
Future Volume (Veh/h)	1140	2	0	617	0	8
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)	1239	2	0	671	0	9
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			1241		1911	1240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1241		1911	1240
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		100	96
cM capacity (veh/h)			561		75	214

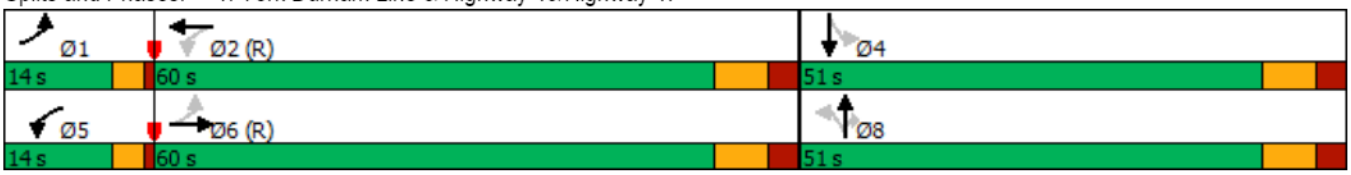
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1241	671	9
Volume Left	0	0	0
Volume Right	2	0	9
cSH	1700	1700	214
Volume to Capacity	0.73	0.39	0.04
Queue Length 95th (m)	0.0	0.0	1.0
Control Delay (s)	0.0	0.0	22.6
Lane LOS			C
Approach Delay (s)	0.0	0.0	22.6
Approach LOS			C

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	70.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	62	797	167	524	105	274	254	47	226
Future Volume (vph)	62	797	167	524	105	274	254	47	226
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		8			4
Permitted Phases	6		2		8		8	4	
Detector Phase	1	6	5	2	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	50.0	7.0	50.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	58.0	11.0	58.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	14.0	60.0	14.0	60.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	11.2%	48.0%	11.2%	48.0%	40.8%	40.8%	40.8%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	3.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.0	8.0	4.0	8.0		8.0	8.0		8.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	64.5	52.3	68.0	56.0		43.0	43.0		43.0
Actuated g/C Ratio	0.52	0.42	0.54	0.45		0.34	0.34		0.34
v/c Ratio	0.18	0.72	0.71	0.44		0.93	0.41		0.99
Control Delay	14.0	33.2	30.3	25.2		69.6	8.8		83.3
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	14.0	33.2	30.3	25.2		69.6	8.8		83.3
LOS	B	C	C	C		E	A		F
Approach Delay		32.0		26.3		45.2			83.3
Approach LOS		C		C		D			F

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 14 (11%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 40.3	Intersection LOS: D
Intersection Capacity Utilization 111.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 1: York Durham Line & Highway 40/Highway 47



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	797	151	167	524	55	105	274	254	47	226	88
Future Volume (vph)	62	797	151	167	524	55	105	274	254	47	226	88
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Lane Width	3.2	3.5	3.5	3.2	3.5	3.5	3.5	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1526	3398		1729	3210			1899	1547		1729	
Flt Permitted	0.37	1.00		0.15	1.00			0.67	1.00		0.65	
Satd. Flow (perm)	601	3398		266	3210			1284	1547		1127	
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)	67	866	164	182	570	60	114	298	276	51	246	96
RTOR Reduction (vph)	0	12	0	0	6	0	0	0	146	0	9	0
Lane Group Flow (vph)	67	1018	0	182	624	0	0	412	130	0	384	0
Heavy Vehicles (%)	19%	7%	13%	5%	15%	19%	2%	3%	5%	15%	3%	25%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	59.1	52.3		64.9	55.2			43.0	43.0		43.0	
Effective Green, g (s)	59.1	52.3		64.9	55.2			43.0	43.0		43.0	
Actuated g/C Ratio	0.47	0.42		0.52	0.44			0.34	0.34		0.34	
Clearance Time (s)	4.0	8.0		4.0	8.0			8.0	8.0		8.0	
Vehicle Extension (s)	3.0	0.2		3.0	0.2			5.0	5.0		5.0	
Lane Grp Cap (vph)	334	1421		251	1417			441	532		387	
v/s Ratio Prot	0.01	0.30		c0.06	0.19							
v/s Ratio Perm	0.08			c0.32				0.32	0.08		c0.34	
v/c Ratio	0.20	0.72		0.73	0.44			0.93	0.24		0.99	
Uniform Delay, d1	18.3	30.2		20.4	24.2			39.6	29.4		40.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	3.1		9.9	1.0			29.2	1.1		43.7	
Delay (s)	18.6	33.3		30.4	25.2			68.8	30.4		84.6	
Level of Service	B	C		C	C			E	C		F	
Approach Delay (s)		32.4			26.4			53.4			84.6	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	111.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

Level of Service Definitions

LEVEL OF SERVICE ANALYSIS AT SIGNALIZED INTERSECTIONS

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". The term Level of Service implies a qualitative measure of traffic flow at an intersection. It is dependent upon vehicle delay and vehicle queue lengths at the approaches. Specifically, Level of Service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The following table describes the characteristics of each level:

Level of Service	Features	Stopped Delay per Vehicle (sec)
A	At this level of service, almost no signal phase is fully utilized by traffic. Very seldom does a vehicle wait longer than one red indication. The approach appears open, turning movements are easily made and drivers have freedom of operation.	≤ 5.0
B	At this level, an occasional signal phase is fully utilized and many phases approach full use. Many drivers begin to feel somewhat restricted within platoons of vehicles approaching the intersection.	> 5.0 and ≤ 15.0
C	At this level, the operation is stable though with more frequent fully utilized signal phases. Drivers feel more restricted and occasionally may have to wait more than one red signal indication, and queues may develop behind turning vehicles. This level is normally employed in urban intersection design.	> 15.0 and ≤ 25.0
D	At this level, the motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough cycles with lower demand to permit occasional clearance of developing queues and prevent excessive backups.	> 25.0 and ≤ 40.0
E	At this level, capacity is reached. There are long queues of vehicles waiting upstream of the intersection and delays to vehicles may extend to several signal cycles.	> 40.0 and ≤ 60.0
F	At this level, saturation occurs, with vehicle demand exceeding the available capacity.	> 60.0

LEVEL OF SERVICE ANALYSIS AT UNSIGNALIZED INTERSECTIONS[1]

The term "level of service" implies a qualitative measure of traffic flow at an intersection. It is dependent upon the vehicle delay and vehicle queue lengths at approaches. The level of service at unsignalized intersections is often related to the delay accumulated by flows on the minor streets, caused by all other conflicting movements. The following table describes the characteristics of each level.

Level of Service	Features
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.
E	Very long traffic delays occur. Operations approach the capacity of the intersection.
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.

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(1) Highway Capacity Manual - Special Report No. 209, Transportation Research Board, 1985.

APPENDIX D

Signal Warrant Analysis

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Highway 47 at Paiseley Lane

Count Date: Total Condition 2033

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☑	RESTR. FLOW ☐	8:00	9:00	10:00	13:00	14:00	16:00	17:00	18:00		
1A	480	720	600	900	1,648	1,533	1,269	1,648	1,483	1,986	1,847	1,291		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	73	68	56	73	66	268	249	174		
	COMPLIANCE %				61	57	47	61	55	100	100	100	580	72

Free Flow Signal Justification 1:	Both 1A and 1B 100% Fulfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 1A or 1B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☑	RESTR. FLOW ☐	8:00	9:00	10:00	13:00	14:00	16:00	17:00	18:00		
2A	480	720	600	900	1,575	1,465	1,213	1,575	1,418	1,718	1,598	1,117		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
2B	50	75	50	75	34	32	26	34	31	130	121	85		
	COMPLIANCE %				68	63	52	68	61	100	100	100	613	77

Free Flow Signal Justification 2:	Both 2A and 2B 100% fulfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 2A or 2B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:00	1,575	49	115	43 %	71 %
	13:00	1,575	49	115	43 %	
	16:00	1,718	195	115	100 %	
	17:00	1,598	181	115	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Highway 47 at Paiseley Lane

Count Date: Total Condition 2033

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Highway 47 at Paiseley Lane

Count Date: Total Condition 2033

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	72	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	77	%		
3. Combination	A	Justificaton 1	72	%	☐	☑
	B	Justification 2	77	%		
4. 4-Hr Volume			71	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

APPENDIX E

Sight Line Analysis

Uxbridge - Sight Distance - Dec. 08, 2023

4.4m back from edge of pavement. Eye height: 1.08m. Distant Object height: 0.60m. Posted Speed Limit: 80 km/h

Highway 47 at Paisley Lane, access at western side of property

Looking Left (West)					Looking Right (East)				
Available Sight Distance	Reason	Criteria	Required Sight .Distance (m)	Req. Met? (Y / N)	Available Sight Distance	Reason	Criteria	Required Sight .Distance (m)	Req. Met? (Y / N)
350m	Vertical Curve (Hill)	SSD	160	Y	205m	Horizontal Curve	SSD	160	Y
		ISD	165	Y			ISD	190	Y
PHOTO TAKEN (TIME):			3:00pm		PHOTO TAKEN (TIME):			3:09pm	

Uxbridge - Sight Distance - Dec. 08, 2023

4.4m back from edge of pavement. Eye height: 1.08m. Distant Object height: 0.60m. Posted Speed Limit: 80 km/h

Access 2, access at eastern side of property									
Looking Left (West)					**Looking Right (East)**				
Available Sight Distance	Reason	Criteria	Required Sight .Distance (m)	Req. Met? (Y / N)	Available Sight Distance	Reason	Criteria	Required Sight .Distance (m)	Req. Met? (Y / N)
363m	Vertical Curve (Hill)	SSD	160	Y	350m	Vertical Curve (Hill)	SSD	160	Y
		ISD	165	Y			ISD	190	Y
PHOTO TAKEN (TIME):			2:38pm		PHOTO TAKEN (TIME):			2:30pm