



**Waterloo West Side Employment Lands,
Waterloo ON**

Traffic Impact Study

August 22, 2018

Prepared for:

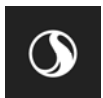
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Sign-off Sheet

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Executive Summary

The West Side Employment Lands (WSEL) comprise a total of 43.61 Hectares of land that are proposed to accommodate 8,000 employees inclusive of 6,000 Manufacturing, 1,680 Office, and 320 Retails jobs. This employment growth will be occurring simultaneously along with a growing Region that is expected to experience 1.4% annual growth in population through to the year 2031. In anticipation of this growth several transportation improvements are planned for the area including:

- **Erb Street Widening:** from 2 to 4 lanes between Wilmot Line and Erbsville Road-Ira-Needles Boulevard planned for 2019/2020;
- **Platinum Drive Extension:** north from Copper Street to intersect with Columbia Street West and Ladyslipper Drive by 2031 or in combination with the development of the subject lands; and
- **Planned New Collector Road:** opposite the Westside Marketplace signal going south to connect with Ira Needles Boulevard and the Boardwalk Plaza.

It is estimated that 1,411, and 1,571 trips in the AM and PM Peak hours, respectively will be added to the transportation network with the development of WSEL. These site generated trips are anticipated to add strain to the intersections of: Columbia Street West / Erbsville Road, Columbia Street West / Ladyslipper Drive, Erb Street West / Platinum Drive, and Copper Street / Platinum Drive. This culminates in poor operations at these intersections with planned network improvements. To address poor operations for Future Total Traffic Conditions the following additional network improvements are recommended:

- **Erb Street West / Platinum Drive:** Additional 50m auxiliary westbound right-turn lane to complement the existing through-right movement;
- **Platinum Drive:** Widen Platinum Drive from two-lanes to three between Erb Street West and Copper Street. This would include one southbound lane and two northbound lanes to integrate with the recommended westbound dual right-turn lane at the Erb Street West / Platinum Drive roundabout;
- **Platinum Drive / Copper Street:** Addition of a northbound auxiliary right-turn lane; and
- **Columbia Street West / Ladyslipper Drive:** Addition of a northbound auxiliary right-turn lane.
- **Columbia Street West / Erbsville Road:** Addition of an eastbound and southbound auxiliary right-turn lane.

While the inclusion of these measures would mitigate and alleviate Future Total operational concerns at most intersections, the eastbound left-turn at the intersection of Columbia Street West / Erbsville Road is still observed to experience poor operations as well as poor overall operations primarily due to high north-south traffic volumes. Further signal timing split improvements were attempted to address operations; however, these did not yield any noticeable operational improvements. Beyond this movement, traffic generated by the WSEL has no further negative impacts on the transportation network.

Considering the heavy costs associated with widening Platinum Drive between Copper Street and Erb Street West, it is recommended that further analysis be conducted, as detailed site plans are prepared, with regards to identifying a trigger horizon for this improvement. Currently it is difficult to assess when this roadway would need to be widened if the development was built in phases. It is important to note that the most important consideration is eliminating long northbound queues at the intersection of Platinum Drive / Copper Street which would present an unacceptable impact on the Erb Street West / Platinum Drive intersection.



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With regards to Erbsville Road, the Region's recently approved Regional Transportation Master Plan, prepared by IBI Group Ltd May 29, 2018 identifies Erbsville Road widening from two to four lanes between Erb Street West and Columbia Street West within the 2031-2041 planning horizon (Region of Waterloo, 2018). Considering observed operations within this report for Future Background 2031 and Future Total 2031 traffic, it is recommended that this widening be studied in the form of an Environmental Assessment before 2031 to further identify an appropriate trigger horizon and explore opportunities to improve operations at Columbia Street West / Erbsville Road as well as broader corridor improvements that may shift demand onto other corridors. This is estimated to be required regardless of whether the WSEL is built or not as identified by the Future Background Traffic conditions.



1.0 INTRODUCTION

1.1 SCOPE AND METHODOLOGY

This Study assesses the transportation impact of the proposed development of the West Side Employment Lands (WSEL) in the City of Waterloo, ON. The development will be greenfield in nature and involve the development of primarily employment land with a minor commercial/retail component. The Study Area is illustrated in **Figure 1**.

The study scope and terms of this Traffic Impact Study were agreed to with the Region of Waterloo at the pre-study conference. The pre-study conference form is included in **Appendix A** the scope of which is as follows:

- The Study Area comprises the following intersections:
 - Columbia Street W & Erbsville Road (Signalized);
 - Columbia Street W & Ladyslipper Drive/Platinum Drive (Roundabout - future);
 - Development Streets B/C & Platinum Drive (Roundabout – future);
 - Copper Street & Platinum Drive (Roundabout – future); and
 - Erb Street West & Platinum Drive (Roundabout).
- Internal intersections at Development Streets B/C & Platinum Drive and Copper Street & Platinum Drive have not yet been confirmed as to whether they will be constructed as Roundabouts or not. As a conservative measure, roundabouts were analysed on-site to identify the required space that would be needed to be allocated if the development were to proceed with them. A determination on whether these intersections should be controlled by roundabouts, stop signs or signals would be made later during site development analysis.
- The Erb Street West & Erbsville Road-Ira Needles Boulevard intersection was not included in our analysis since this intersection and associated improvements necessary to accommodate the addition of 8,000 employees in the WSEL were analysed as part of the West Side Waterloo Integrated Multi-Modal Transportation Study and was not deemed to be necessary for this study which is focused on identifying local transportation needs.
- Analysis was conducted, taking into consideration the weekday AM and PM peak hours;
- Peak hour traffic is forecasted for the year of 2031, which represents an appropriate build-out horizon that would capture potential build-out of the proposed development earlier as agreed to with the Region of Waterloo as per the pre-study conference form included in **Appendix A**;
- Transportation impacts and mitigation measures are assessed related to future background traffic growth forecasts and future total traffic forecasts including the trips generated by the subject development.

The following methodology is used to analyze traffic operations and recommend transportation improvements:

- Existing traffic operations are analyzed at existing major Study Area intersections during the weekday AM and PM peak hours;
- Future peak hour background traffic is estimated for future horizon years based upon anticipated build-out of the Vista Hills Residential development to the north, full build-out of the adjacent Costco site, and population forecasts. This suggests a 1.2% annual growth rate within the Study Area after taking into account mode share reductions based on Regional targets;



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- Estimates of the expected net increase in future site traffic are generated for the proposed development using model outputs and methodology identified in the Regional Transportation Model;
- The future background traffic is combined with the net increase in the subject site traffic to determine the total traffic volumes on the road network under the future horizon year; and
- The future peak hour intersection operations are analyzed for the future background and future total traffic conditions.

The methodology presented above is used to assess the net impact on operational performance of intersections within the Study Area resulting from vehicular traffic associated with background growth and the traffic generated by the development of the subject site. The Study ultimately provides recommendations for transportation improvements to mitigate the identified impacts on the transportation network.

Figure 1: Study Area



1.2 DEVELOPMENT DESCRIPTION

The proposed development will be located at the municipal addresses of 926, 960, and 980 Erb Street West and 100 Wilmot Line in the City of Waterloo. The development encompasses 24 development blocks that equate to 43.61 hectares of land of which 35.67 Ha are planned as Employment, and 1.76 Ha are planned for Employment/Commercial. The remaining 6.18 Ha is planned to be a mixture of park, roads, walkways, servicing, and reserve space. A summary of the planned block use types and sizes is shown in **Table 1**.

Table 1: Planned Block Sizing and Use Type

Block	Ha	sqft	Type
1	1.26	135,302.35	Employment
2	2.14	229,917.13	Employment
3	1.94	208,604.58	Employment
4	3.07	330,236.77	Employment
5	3.32	357,361.83	Employment
6	4.29	462,202.31	Employment
7	3.61	388,577.17	Employment
8	4.39	472,320.39	Employment
9	3.20	344,229.86	Employment
10	7.86	845,828.08	Employment
11	0.61	65,121.66	Employment
12	0.71	76,208.49	Employment/Commercial
13	1.06	113,559.25	Employment/Commercial
14	0.89	95,798.80	Park
15	0.09	9,687.52	Walkway
16	0.13	13,670.17	Walkway
17	0.08	8,395.85	Walkway
18	0.22	23,572.96	Walkway/Servicing
19	0.00	215.28	Reserve
20	0.00	215.28	Reserve
21	0.01	1,399.31	Reserve
22	0.01	538.20	Reserve
23	0.01	538.20	Reserve
24	0.01	753.47	Reserve
Roads	4.74	509,886.44	Roads
Total	43.61	4,694,141.33	

Source: Stantec, August 13, 2018

The WSEL are planned for 8,000 employees as identified in WSP's *Waterloo West Side Integrated Multi-Modal Transportation Study Operations Memo* dated April 27, 2018. The operations memo outlines an assumption of 75% of the employment related to manufacturing land uses, and 25% related to office use which would result in 6,000 manufacturing jobs and 2,000 office jobs (WSP Consulting Ltd., 2018). The *Waterloo West Side Employment Lands – Market Analysis* prepared by UrbanMetrics Inc. and dated August 10, 2018 identified the following land use categorizations based on the local context and employment land use demands:



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- **Flex Industrial Potential:**
 - Flex industrial types accommodate a mix of office, labs, warehousing, storage together with manufacturing and assembly.
- **Traditional Industrial Potential and Larger International Corporations:**
 - Have the potential to accommodate large international corporations that have recently shown interest in locating in Waterloo and provide industrial flex space that can incorporate office, labs, assembly and storage on site. These lands also provide an opportunity to accommodate traditional manufacturing that require limited outdoor storage.
- **Campus-Style Office and Commercial Potential:**
 - These lands would accommodate office and commercial uses.

Considering the differences in land use types between the various background documents it was assumed that these land uses on-site would conform with the over-arching desire to provide flexible work-spaces that would allow for a mixture of office, manufacturing, and commercial space. Based on this assumption, the employment split from the WSP operations memo was modified to account for the commercial land uses that will be provided on the north side of the development adjacent to Columbia Street W. Considering that 5% of the employment land on-site is identified as Employment/Commercial (as identified in **Table 1**), it was assumed that approximately 30% of the space on those blocks would be for commercial employment which resulted in 59,200 ft² of space. To determine the number of employees that this would account for, a ratio of 185 ft² per employee was used resulting in 320 employees and 4% of the total employment on-site (Miller, 2012). A summary of the resulting employment splits is shown in **Table 2**.

Table 2: Adjusted On-site Employment Mix

WSEL Total Employment	Employment Split (%)	Employment Type	Employees	
8,000	75%	Manufacturing	6,000	
	21%	Office	1,680	
	4%	Commercial	320	(185 sqft / employee) = 59,200 sqft

The proposed draft of subdivision will integrate with the surrounding transportation network primarily via Platinum Drive connecting with the existing unsignalized intersections at Ladyslipper Drive & Columbia Street W at the north end of the site, as well as Platinum Drive & Copper Street in the south end. There are two internal local streets that are planned for the site including:

- Street 'C' on the west side of the development which will loop between Copper Street in the south and a new internal intersection south of Ladyslipper Drive & Columbia Street W; and
- Street 'B' on the east side of the development which will loop between an unsignalized T-intersection east of Platinum Drive & Copper Street and the same internal intersection south of Ladyslipper Drive & Columbia Street W that Street 'C' connects with.

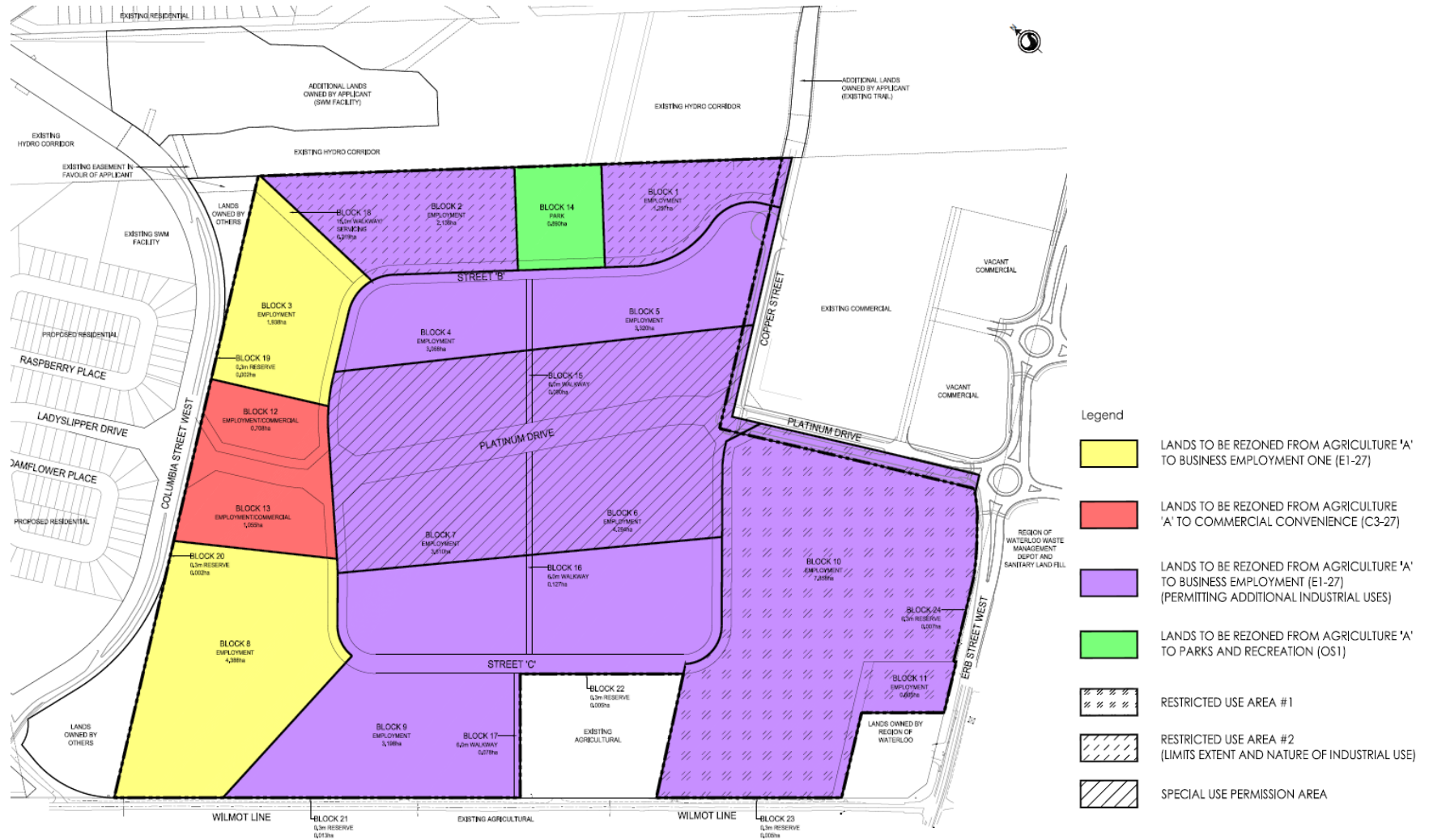
A proposed site zoning plan with the block numbering and land type category is shown in **Figure 2**.



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

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Source: Stantec Consulting Ltd. (July 2018)

Figure 2: Proposed Site Zoning



2.0 EXISTING CONDITIONS

2.1 EXISTING TRANSPORTATION SYSTEM

2.1.1 Roads and Traffic Control

The characteristics of the roads and intersections within the Study Area limits are described below and visualized in **Figure 3**.

Erbsville Road / Ira Needles Boulevard is a north-south two-lane road within the study area under the jurisdiction of Waterloo Region. The posted speed limit throughout the study area is 60 km/h.

Erb Street West is an east-west two-to-four lane road between Wilmot Line and Erbsville Road entering and exiting roundabouts, and a four-lane Regional road east of Erbsville Road under the jurisdiction of Waterloo Region with a posted speed limit of 60 km/h within the study area.

Columbia Street W is an east-west two-lane arterial road between Sundew Drive and Erbsville Road, and a four-lane arterial road east of Erbsville Road as per the recently completed road widening from two-lanes to four between Fischer-Hallman Road and Erbsville Road. The roadway operates under the jurisdiction of the City of Waterloo with a posted speed limit of 60 km/h. The proposed WSEL development proposes a public road full movement access on Columbia Street W at Ladyslipper Drive.

Ladyslipper Drive is a north-south minor collector road under the jurisdiction of the City of Waterloo with a statutory speed limit of 50 km/h. The roadway provides local access from the Vista Hills, Clair Creek, and Greyerbiehl Residential subdivisions to Columbia Street W. The WSEL development proposes having an extension of Platinum Drive meet with Ladyslipper Drive at Columbia Street W with a new roundabout intersection that would replace the existing unsignalized 'T' intersection.

Platinum Drive is currently a local street providing access to the Costco Wholesale Store at Erb Street West and Platinum Drive with a statutory speed limit of 50 km/h, however this road is planned as a Minor Collector once it is extended north to Columbia Street W. The WSEL development proposes extending Platinum Drive north to connect with Ladyslipper Drive at Columbia Street W with a new roundabout intersection.

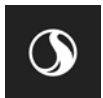
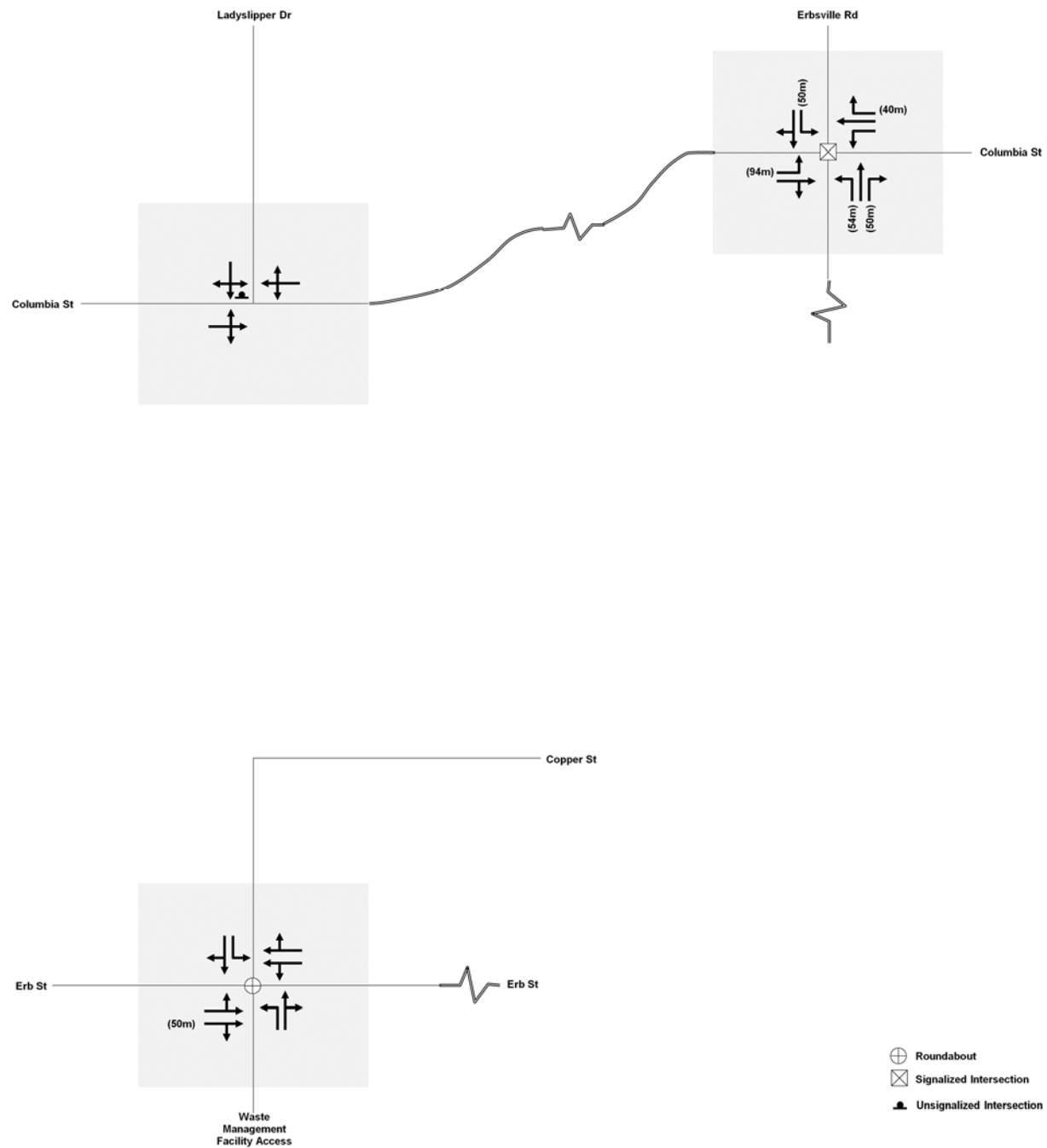


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Existing Conditions

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Figure 3: Existing Lane Configuration and Traffic Control



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Existing Conditions

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2.1.2 Public Transit

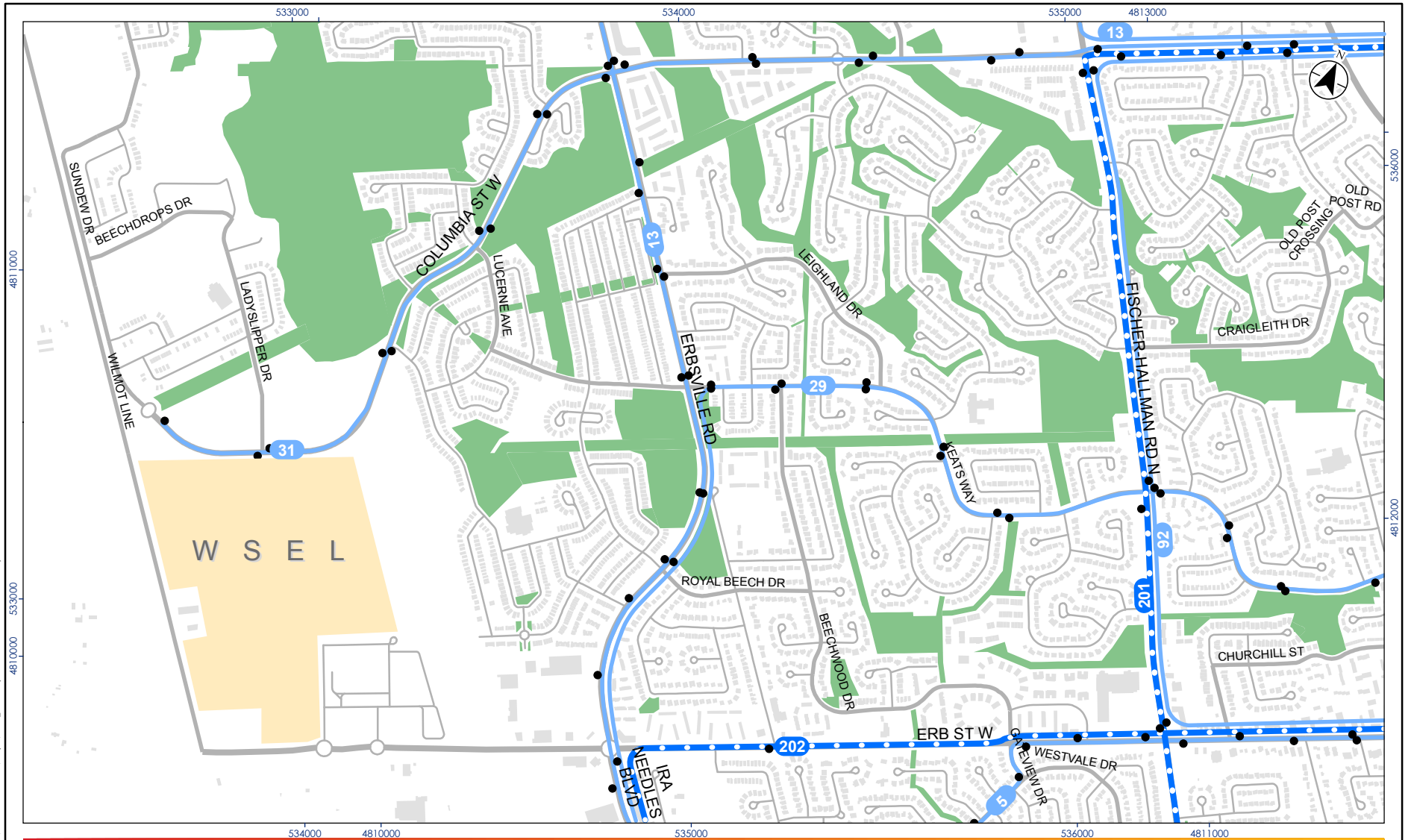
The subject area is currently directly serviced by one transit route (Route 31) along Columbia Street W that has a stop at Ladyslipper Drive. There are three (3) other existing routes within proximity of the site along Erbsville Road and Erb Street West east of the site. Transit frequencies range between 15 minutes to 30 minutes as summarized in **Table 3** with routes illustrated in **Figure 4**. These services offer local and regional transit connections throughout the City of Waterloo and the broader Waterloo Region, in particular the iXpress Route 202 which connects the area between the Boardwalk in the west via Erb Street and University Avenue to RIM Park in the east. Detailed route navigators and maps are provided in **Appendix B**.

Table 3: Transit Frequencies by Period

Route	AM Peak	PM Peak
13 – Laurelwood	15 min	15 min
29 – Keats Way	30 min	30 min
31 - Columbia	30 min	30 min
202 iXpress - University	15 min	15 min

Source: www.grt.ca





Legend

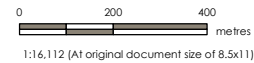
 WSEL Development

Transit Routes

 iXpress

 Conventional

 Transit Stop



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location
Municipality of
Waterloo

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Figure No.
4

Title
Existing Transit

2.1.3 Active Transportation

Pedestrian Facilities: Most major roadways within the study area have pedestrian sidewalks on both sides of the roadway, however there are a few exceptions including:

- **Erb Street West:** between Platinum Drive and Erbsville Road/Ira Needles Boulevard has sidewalks only on the north side of the road;
- **Columbia Street W:** between Ladyslipper Drive and St Moritz Avenue has sidewalks only on the north side of the road; and
- **Erbsville Road:** between Columbia Street W and Keats Way has sidewalks only on the east side of the road.

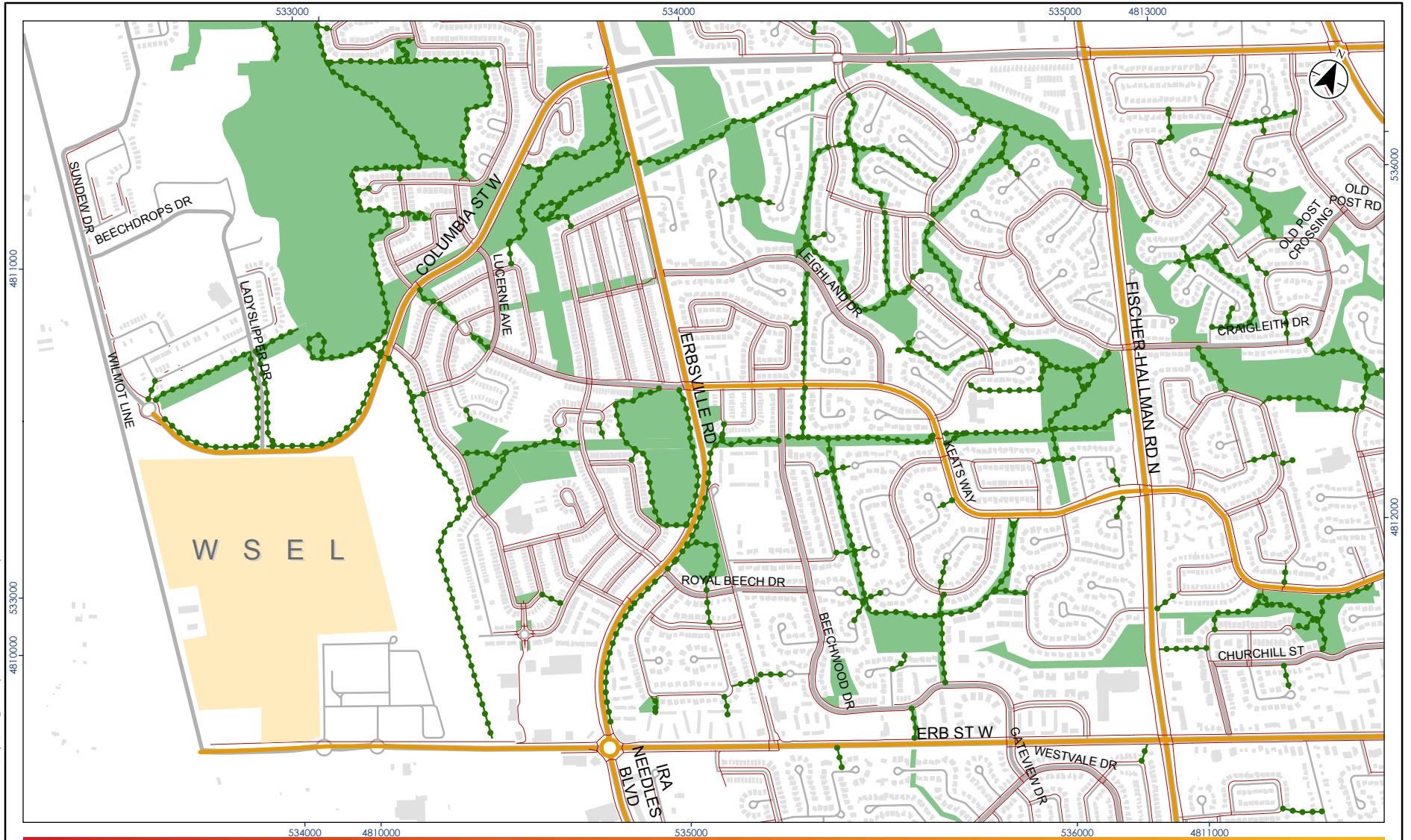
The Study Area includes an extensive network of multi-use pathways throughout parks connecting to on-street cycling facilities on the major roadways. Major active transportation facilities are summarized in **Table 4** below and the entire active transportation network is visualized in **Figure 5**. It is noted that none of the existing facilities directly connect to the proposed development, however recommendations of the West Side Waterloo Integrated Multi-Modal Transportation Study, and the design of the proposed development plan would address this and provide a well-connected active transportation system to, and within, the WSEL. These improvements and more are described in Section 3.1 of this report.

Table 4: Existing Active Transportation Facilities

Facility	Type	Description
West Connector	Multi-Use Path/ Shared Roadway	Region-wide trail beginning near King Street/Victoria Street in Kitchener utilizing the Spur Line Trail through uptown Waterloo and using a mixture of Multi-Use Paths and shared roadway sections to end at Laurel Creek Forest in the north-east part of Waterloo adjacent to Erbsville Road.
Columbia Street	Bike Lane/ Shared Roadway	On-street painted bike lane between Wilmot Line to beyond Erbsville Road in the east as recently completed as part of the Columbia Street West road widening work. The route provides connections to the University of Waterloo, the David Johnson Research Technology Park and the Forwell Trail.
Geotime Trail	Multi-Use Path	Multi-Use Paths that extend between Columbia Street W in the south up to Wideman Road in the north.
Keats Way	Bike Lane	On-street painted bike lane along Keats Way between Erbsville Road in the west and University Avenue in the east.
Erb Street	Bike Lane	On-street bike painted lane along Erb Street between Erbsville Road in the west and Westmount Road in the east.
Erbsville Road	Bike Lane	On-street painted bike lane along Erbsville Road/Ira Needles Boulevard between Woolwich Township and the City of Kitchener.

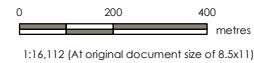
Source: <https://www.waterloo.ca/en/contentresources/resources/gettingactive/2017-cycling-map-back.jpg>





Legend

- WSEL Development
- Pedestrian Sidewalks
- Trails
- Bike Lanes



Notes
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TRAFFIC IMPACT STUDY

Figure No.
5

Title
Existing Active Transportation

Existing Conditions
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2.2 VEHICULAR TRAFFIC VOLUMES

Turning movement count (TMC) data at the intersections of Columbia Street W / Erbsville Road (May 2015), Erb Street West / Platinum Drive (March 2017), and Erb Street West / Erbsville Road (March 2017) were obtained from The Region of Waterloo's Traffic Department. Considering that the Columbia Street West / Erbsville Road intersection count was from 2015, prior to the opening of the Costco plaza adjacent to the WSEL, additional Costco Plaza, including the completed Phase 2 development, traffic was added to the intersection in the PM Peak hour. This was calculated using the West Waterloo Commercial Phase 2 and Costco Parking Expansion Study prepared by BA Group Ltd in October 2017 which identified that 24% of traffic entering/exiting the Costco site would use Erbsville road north of Erb Street West. This 24% distribution was split between traffic to/from east of the study area via Columbia Street West and north of the study area via Erbsville Road. The additional traffic added to Columbia Street West / Erbsville Road is summarised in **Table 5**.

Table 5: Additional Costco Plaza Phase 2 Traffic Applied to Columbia Street West / Erbsville Road - PM Peak Hour

Movement	Existing PM Peak Hour Volume	% split	Total Costco Trips (inbound/outbound)		% Costco Trips on Erbsville	Costco Trips on Erbsville	Additional Costco PM Peak Hour Volume	Total Combined
NBT	401	66%	870	OUT	24%	209	138	540
NBR	204	34%					70	275
SBT	428	49%	875	IN	24%	210	103	531
WBL	447	51%					107	554

Source: (BA Group Ltd., 2017)

NOTE: Total Costco Trips include Pass-By trip reductions

On-top of this, background traffic volumes in the Study Area were grown using a background growth rate of 1.2% to reflect existing 2018 conditions. This rate was calculated in the absence of historical counts based on forecasted population growth and regional mode share targets which were applied to remain consistent with background growth forecasts. The existing base year 2018 traffic volumes for the weekday AM and PM peak hours are illustrated in **Figure 6** and **Figure 7**, respectively. Turning movement count data is provided for reference in **Appendix C**.

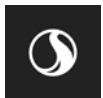
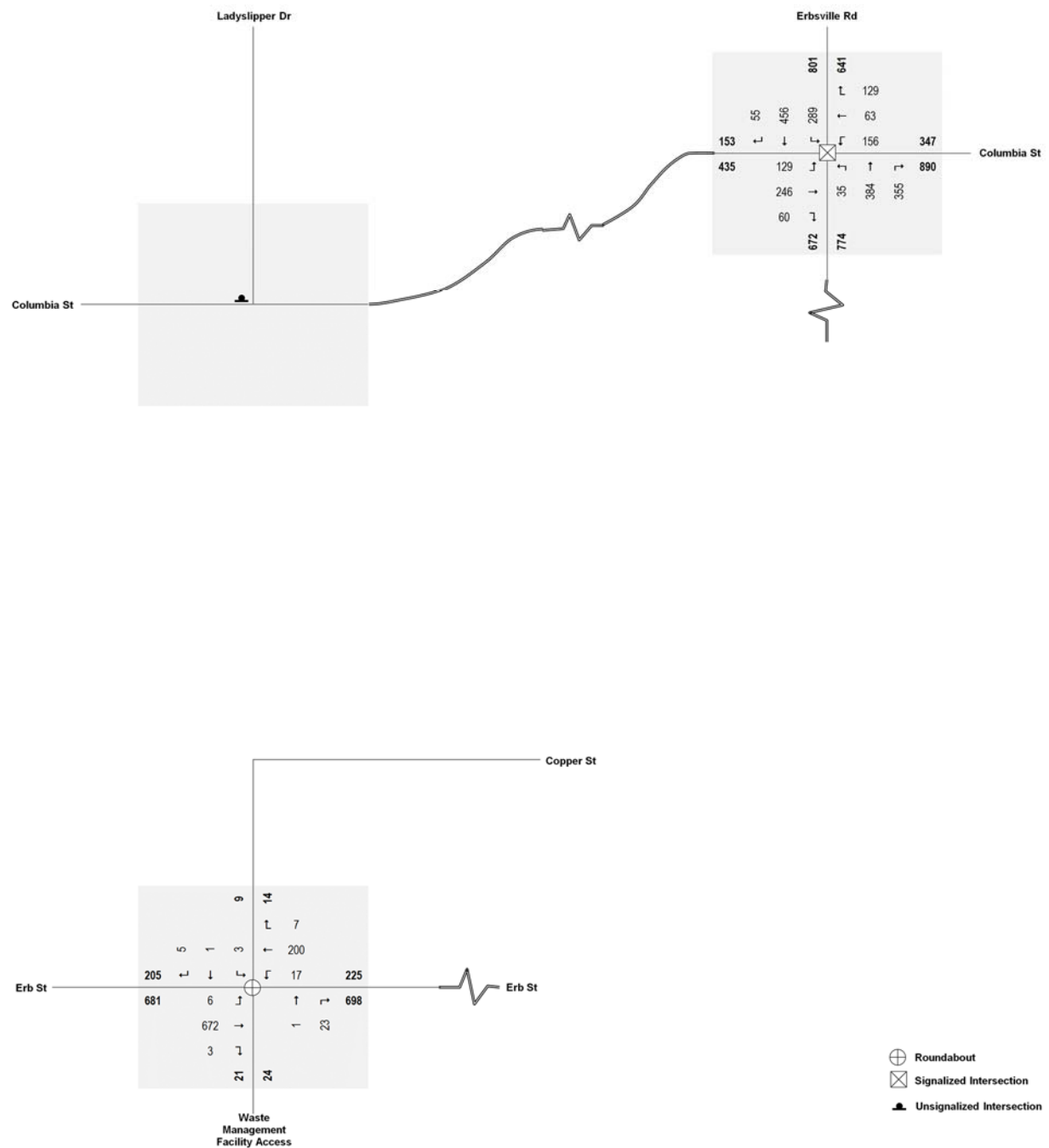


WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

Existing Conditions

August 22, 2018

Figure 6: Existing AM Peak Hour Volumes

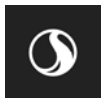
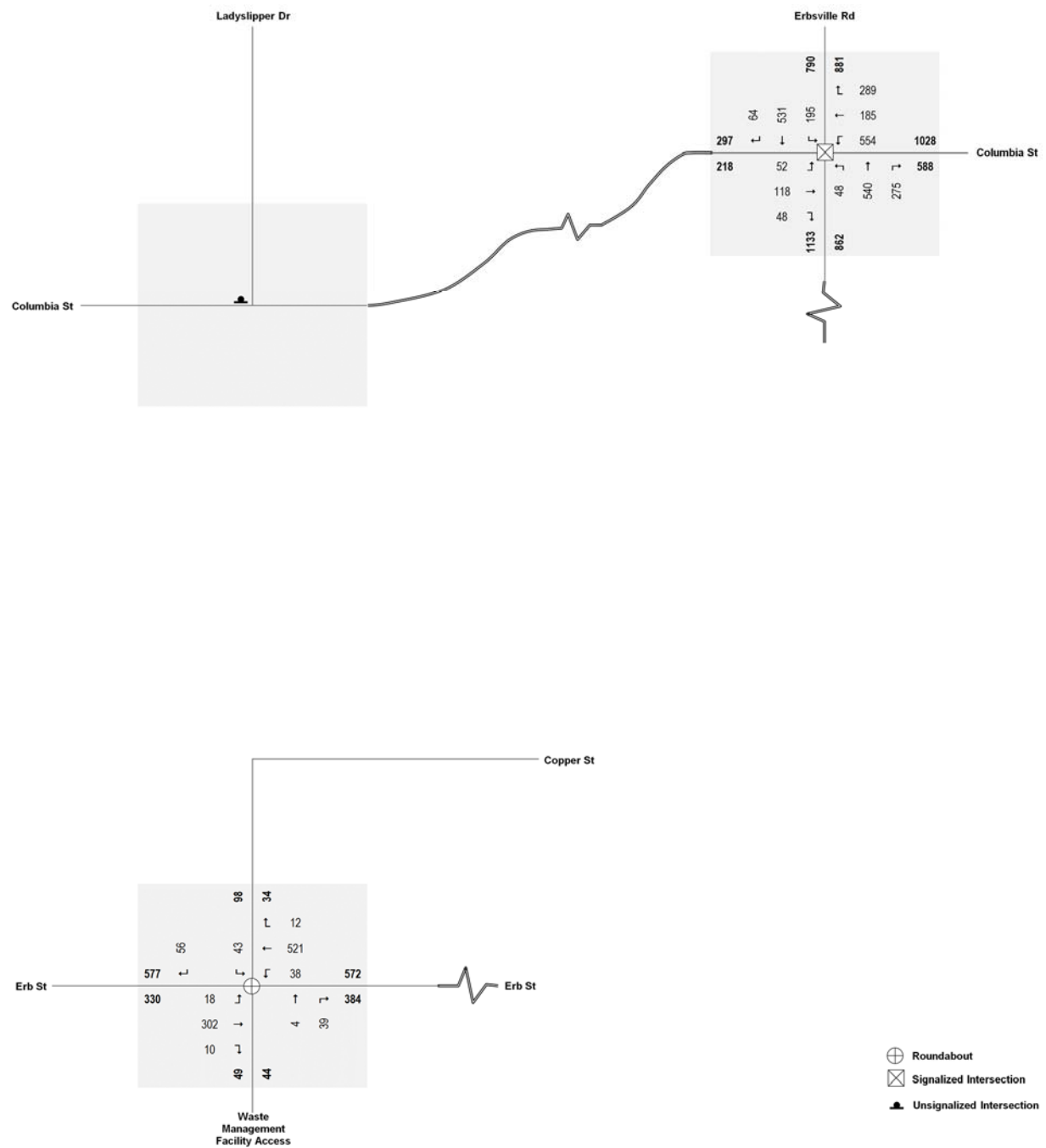


WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

Existing Conditions

August 22, 2018

Figure 7: Existing PM Peak Hour Volumes



2.3 EXISTING OPERATIONS

The quality of intersection operations at signalized and unsignalized intersections is evaluated in terms of level of service (LOS) and volume to capacity (v/c) as defined by the Highway Capacity Manual (HCM). LOS is evaluated on the basis of average control delay per vehicle and includes deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Capacity is evaluated in terms of ratio of demand flow to capacity with an at-capacity condition represented by a v/c ratio of 1.00 (i.e. volume demand equals theoretical capacity). For signalised intersections, LOS ranges from LOS 'A' for 10 seconds or less average delay to LOS 'F' for average delay greater than 80 seconds. For unsignalized intersections, the LOS ranges from LOS 'A' for 10 seconds or less average delay to LOS 'F' for average delay greater than 50 seconds (See **Table 6**).

Table 6: Intersection Level of Service Delay Criteria

Level of Service (LOS)	Signalized Intersections	Unsignalized Intersections
A	≤10s	≤10s
B	>10s and ≤20s	>10s and ≤15s
C	>20s and ≤35s	>15s and ≤25s
D	>35s and ≤55s	>25s and ≤35s
E	>55s and ≤80s	>35s and ≤50s
F	>80s	>50s

To assess the existing peak hour traffic conditions, a level of service analysis is undertaken for the Study Area intersections using the Trafficware Synchro 10 intersection capacity analysis software for the signalized intersection of Columbia Street W / Erbsville Road which implements the methodology of the 2000/2010 Highway Capacity Manual. ARCADY software was used to analyze roundabout intersections. The key parameters used in the analysis include:

Signalized Intersections:

- Existing lane configurations;
- Heavy vehicle percentages as derived from traffic count data;
- Peak Hour Factor of 1.0 as stated in the Waterloo Region Capacity Analysis Requirements;
- Lane widths as observed through Google Maps aerial photographs, for new roads 3.5m lane widths were used as per the Region's Requirements;
- Region's recommended ideal saturation flow rates per hour per lane for movements;
- Signal timing plans as obtained from the Region of Waterloo (available for reference in **Appendix C**); and
- Synchro default values for all other inputs.



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

Existing Conditions

August 22, 2018

Roundabout Intersections:

- Observed or confirmed parameters for existing roundabout intersections;
- Region of Waterloo Capacity Analysis Requirements settings for analysis software as needed; and
- Region required parameters for proposed roundabouts including:
 - o Entry Width;
 - o Effective Flare Length;
 - o Half Width;
 - o Entry Radius;
 - o Entry Angle;
 - o Inscribed Diameter; and
 - o Grade Separation.

The results of the analysis for existing conditions are summarized in **Table 7**. Detailed Synchro and Arcady report outputs including 50th percentile queues for signalized intersections and 15-minute time interval analysis for roundabouts are available in **Appendix D**. We note that the ARCADY operations for roundabout approaches represent the highest of each 15-minute analysis interval.

Under existing conditions, all intersections operate at acceptable levels of service in the AM Peak hour with all movements operating at a LOS 'C' or better.

During the PM Peak hour one intersection operates with a LOS of 'E' with four movements operating at a LOS 'F' or worse. The southbound through-right movement at Columbia Street W / Erbsville Road operates at a LOS 'F' with delays that exceed the signal's cycle length and queues that extend beyond the left-turn 50m storage length. The westbound left-turn operates at a LOS 'F', however delays are shorter than the cycle length indicating that queued vehicles will make it through the intersection and the queues associated with this movement do not have negative impacts on adjacent lane movements.



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

Existing Conditions

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Table 7: Existing Automobile | Peak Hour Level of Service Analysis

Intersection	Approach/Movement		Weekday AM Peak Hour				Weekday PM Peak Hour				Available Storage (m)
			LOS	Delay	v/c	Q	LOS	Delay	v/c	Q	
Columbia Street W / Erbsville Road <i>Signalized</i>	EB	Left	C	25.5	0.32	30.8	C	22.9	0.12	15.0	94
		Thru/Right	D	45.8	0.75	90.5	C	26.2	0.35	35.0	-
	WB	Left	D	40.8	0.68	40.7	F	86.3	>1.00	166.1	-
		Through	C	30.0	0.16	19.9	B	14.6	0.24	31.2	-
		Right	A	8.0	0.32	14.0	A	<1.0	0.00	13.2	40
	NB	Left	B	19.8	0.12	10.6	C	25.0	0.23	11.0	54
		Through	C	26.1	0.55	83.5	E	57.6	0.95	153.7	-
		Right	A	4.2	0.45	16.3	A	<1.0	0.00	25.6	50
	SB	Left	C	20.2	0.66	44.0	E	71.3	0.93	57.3	50
		Thru/Right	B	18.5	0.62	94.5	F	>90	>1.00	188.6	-
	Overall Intersection		C	22.9		-	E	78.8		-	-
Erb Street West / Platinum Drive <i>Roundabout</i>	EB		A	4.0	-	5.2	A	3.6	-	2.3	50
	WB		A	3.6	-	1.7	A	3.8	-	4.6	110
	NB		A	5.4	-	0.0	A	3.8	-	0.6	-
	SB		A	4.3	-	0.0	A	4.4	-	1.2	270
	Overall Intersection		A	4.0	-	-	A	3.8	-	-	-

*Length of Storage lane for signalized intersections and distance to next major access for roundabouts.

Signalized Intersections: Delays are in seconds, Queues are 95th percentile in metres. Overall intersection LOS 'E' or 'F' highlighted as critical intersections. Movements with LOS 'E' or 'F', delays greater than the intersection cycle length, 95th percentile queues exceeding available storage length or exclusive turning lanes blocked by queues in adjacent through lanes are highlighted as critical movements.

Roundabout Intersections: LOS E/F, and any queues that extend beyond an access upstream are highlighted as critical (if any); Delay in seconds; Queues are maximum 15-minute time segment queues in metres.



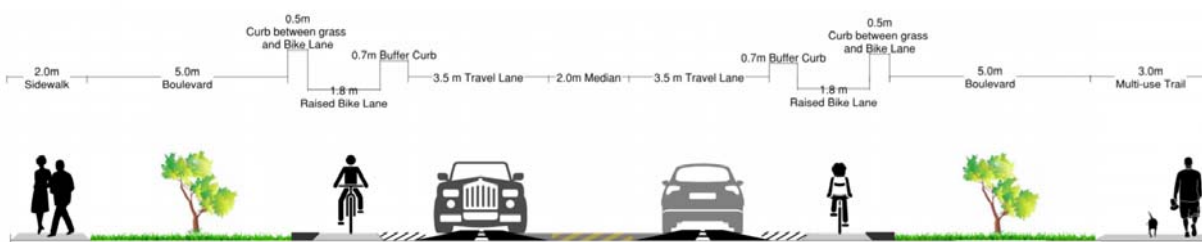
3.0 FUTURE CONDITIONS

3.1 TRANSPORTATION NETWORK IMPROVEMENTS

The following improvements are planned for the study area within the planning horizon. Roadway improvements are visualized in **Figure 9** and Active Transportation Improvements are visualized in **Figure 10**:

- **Erb Street Widening** (WSP Consulting Ltd., 2018):
 - o Construction tentatively scheduled to commence in 2019/2020
 - o Widening of Erb Street to four lanes from Fischer-Hallman Road to the roundabout at Platinum Drive;
 - o Completing the sidewalk on the south side of Erb Street between the commercial plaza west of Ira Needles Boulevard to the traffic signals at the Westside Marketplace entrance; and
 - o Construction of a multi-use trail on the north side of Erb Street between the Westside Marketplace entrance west of Ira Needles Boulevard to Platinum Drive.
- **Platinum Drive Extension** (WSP Consulting Ltd., 2018):
 - o Construction tentatively scheduled to commence prior to the full build-out of the WSEL development by 2031;
 - o Road will be extended as a two-lane roadway with bike lanes on both sides of the roadway from Copper Street in the south northward to Columbia Street W in the north to connect with Ladyslipper Drive as a roundabout (see **Figure 8**); and
 - o Internal intersections at Development Streets B/C & Platinum Drive and Copper Street & Platinum Drive have not yet been confirmed as to whether they will be constructed as Roundabouts or not. As a conservative measure, roundabouts were analysed on-site to identify the required space that would be needed to be allocated if the development were to proceed with them. These intersections were based on Region of Waterloo Standard single lane roundabout parameters (see **Figure 9** for intersection lane configurations).

Figure 8: Proposed Platinum Drive Cross-Section



Source: (WSP Consulting Ltd., 2018)



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

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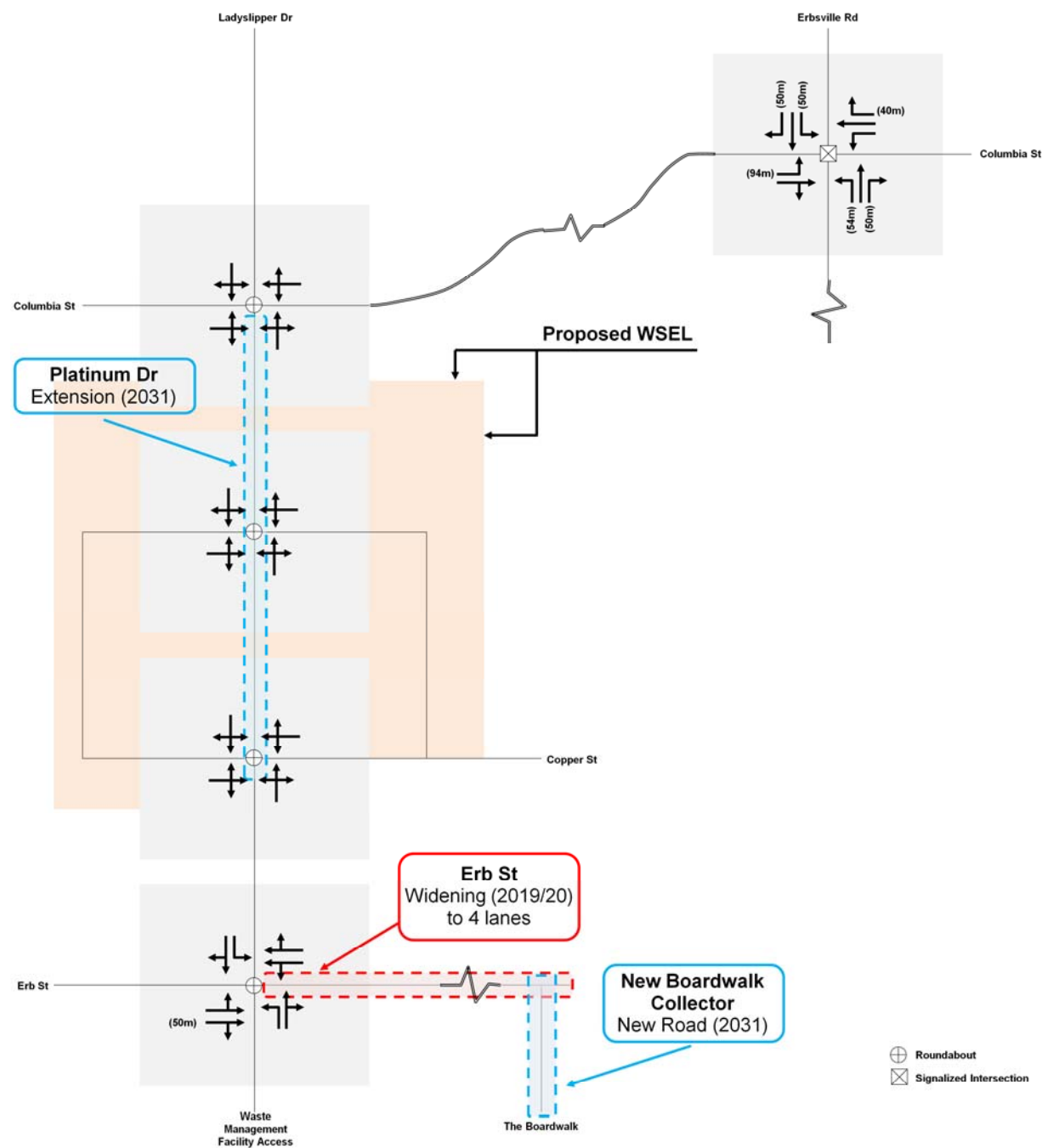
- **Erbsville Road Widening:**
 - o Construction tentatively scheduled to be completed beyond 2031 as per the Region's latest approved Draft Regional Transportation Master Plan (Region of Waterloo, 2018)
 - o Widening from two lanes to four between Columbia Street and south of Erb Street with a roundabout at Keats Way with an auxiliary right-turn lane at the southbound approach at Columbia Street W; and
 - o The intersections at Columbia Street is planned to remain signalized.
- **On-Site Multi-Use Path** (WSP Consulting Ltd., 2018):
 - o A multi-use path is planned on-site going from the western extent of the subdivision, east to connect with the existing multi-use path on Columbia Street W;
 - o Further active transportation improvements are identified in the West Side Waterloo Integrated Multi-Modal Transportation Study including:
 - New north-south off-road trail west of the WSEL between Columbia Street West and into the Boardwalk area;
 - Proposed extension of the Columbia Street West bike lanes north along Sundew Drive to connect with the existing Geotime Trail network; and
 - Trail connection from Copper Street west toward the adjacent residential subdivision.
- **GRT 2021 Transit Network:**
 - o GRT's 2021 Transit Network identifies an extension to Route 31 from Columbia Street w/Sundew Drive north to loop around Rock Elm Street in the Vista Hills subdivision;
 - o The West Side Waterloo Integrated Multi-Modal Transportation Study identifies the WSEL as a transit growth area and proposes the following recommendations:
 - Infrastructure Improvements: Assess and create an inventory of transit infrastructure, including bus stops to determine the best improvement to enhance the customer experience;
 - Connectivity: Continue expanding on GRT's three key principles:
 - Completing the iXpress network of limited-stop bus route;
 - Realigning routes to more of a grid network, focused on iON LRT stations;
 - Provide frequent service on high ridership routes
 - Alternative Delivery: Explore alternative service delivery models for isolated transit-dependent facilities, this includes retrofitting sidewalk, roadway and walkway links that improve access to transit services. Proposed alternative service delivery models to analyze include:
 - Community Bus Route;
 - o Flexible route using smaller vehicles to serve local needs and that can deviate from the route alignment when needed.
 - Subsidized Taxi/Ridesharing;
 - o Subsidize use of taxis to provide service in areas where conventional bus service cannot be provided cost-effectively.
 - Home to Hub; and
 - o Use Mobility PLUS service to provide trips from riders' homes in low-density areas to the nearest transit hub. This can be modified to work for employment use as well.



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Future Conditions
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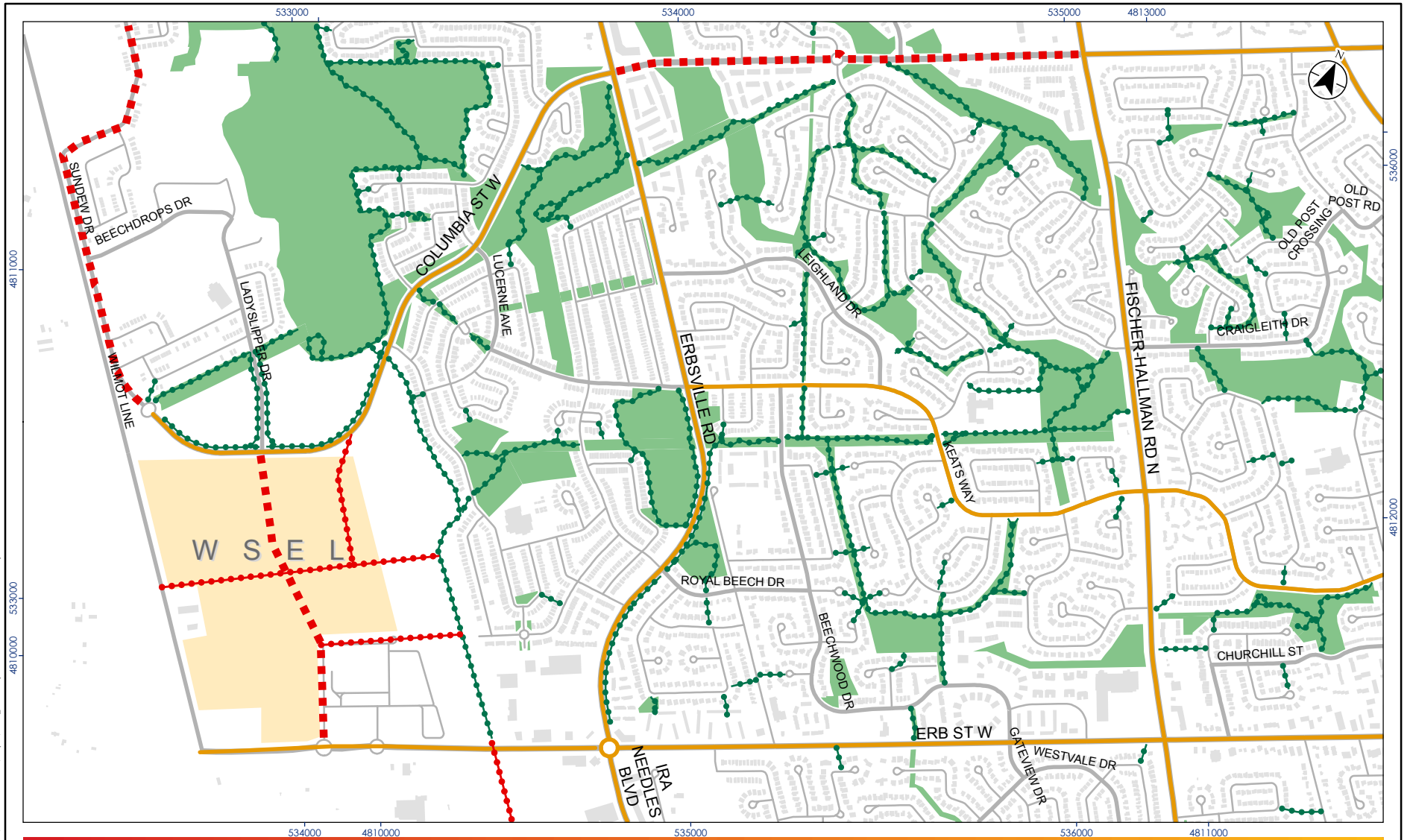
Figure 9: Future Lane Configuration and Traffic Control



Source: (WSP Consulting Ltd., 2018)



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Legend

- WSEL Development
- Trails (Existing)
- Bike Lanes (Existing)
- Trails (Expansion)
- Bike Lanes (Expansion)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.



Project Location
Municipality of
Waterloo
Prepared by Brandon Orr on 2018-08-16

Client/Project
WEST SIDE EMPLOYMENT LANDS
TRAFFIC IMPACT STUDY

Figure No.

10

Title

**Future Active Transportation
Improvements**

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3.2 MODE SPLIT

Review of data derived from the TTS reveals that between 0%-10% of all trips to/from the zone corresponding to the Study Area are made using alternative modes of transportation (see **Figure 11**) (University of Toronto - Data Management Group, 2016). The PM peak period mode split (see **Figure 12**) shows a significantly lower active transportation proportion than is shown in the AM peak period. The estimated auto mode split for the combined cities of Kitchener-Waterloo is 84%, indicating that auto dependency in the Study Area is above average within the City. As per the *Regional Transportation Master Plan*, the Region's 2031 mode split target aims to reduce auto trips by 14%. The existing mode splits and 2031 target mode splits for the Cities and Region are illustrated in **Figure 13** and **Figure 14**, respectively.

Figure 11: AM Peak Mode Split for Study Area (TTS zone 7252/7266)

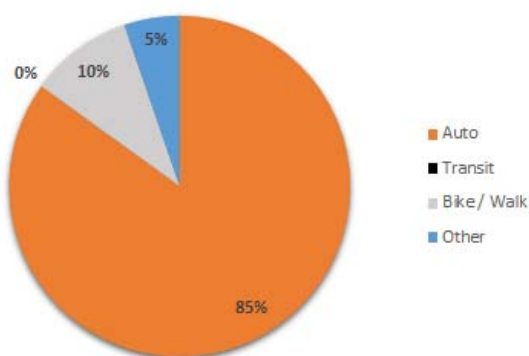
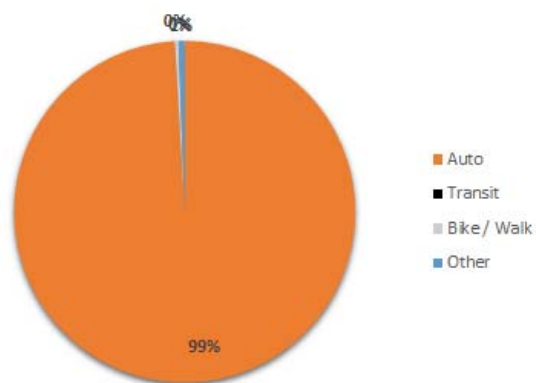


Figure 12: PM Peak Mode Split for Study Area (TTS zone 7252/7266)



Source: (University of Toronto - Data Management Group, 2016)

Source: (University of Toronto - Data Management Group, 2016)

Figure 13: Kitchener-Waterloo Existing Mode Split

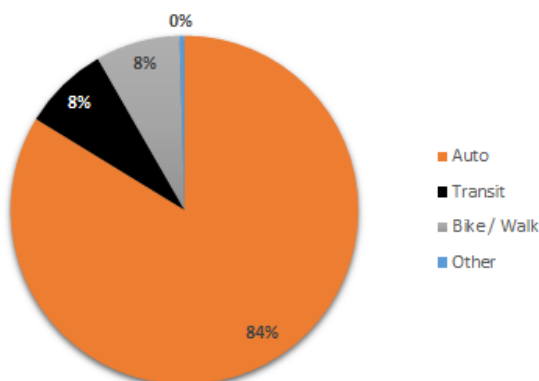
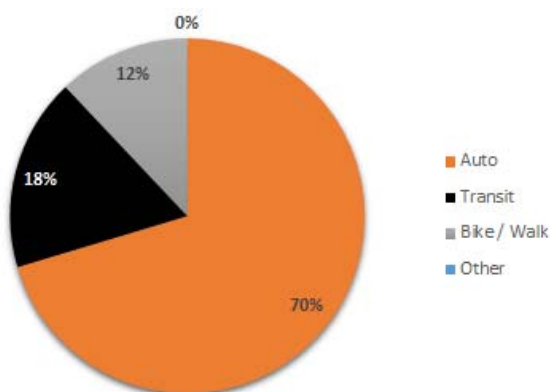


Figure 14: Waterloo Region 2031 Target Mode Split



Source: (University of Toronto - Data Management Group, 2016)

Source: (Region of Waterloo, 2011)



3.3 FUTURE BACKGROUND TRAFFIC

3.3.1 Future Background Growth and Development

3.3.1.1 Population Growth

Based on the population forecasts provided in the *Waterloo West Side Integrated Multi-Modal Transportation Study – 2031 Traffic Operations memo* prepared by WSP it is anticipated that there will be a 1.42% annual growth adding approximately 99,200 people to the Region by 2031 as summarized in **Table 8**.

Table 8: Region of Waterloo Population Forecast

Year	Population	% annual growth
2017	499,731	1.42%
2031 Base Case	599,003	
Growth	+99,272	

Source: (WSP Consulting Ltd., 2018)

Considering that this growth rate is based on Regional Growth, much of which will be directed along the King Street Corridor and other intensification areas, it was adjusted to account for the Region's mode share reduction targets, in particular the auto mode share reductions by 14% by 2031. This culminated in a reduced background growth rate of 1.2% as summarized in **Table 9**. This growth rate was applied to the major roadways of Columbia Street West, Erbsville Road/Ira Needles Boulevard, and Erb Street West.

Table 9: Adjusted Background Growth Rate

Mode	Existing	2031	Background Growth Rate
Auto	84%	70%	$1.42 - (1.42 \times 0.14) = 1.21$
Transit	8%	18%	
Bike / Walk	8%	12%	
Other	0%	0%	

Sources: (University of Toronto - Data Management Group, 2016) and (Region of Waterloo, 2011)

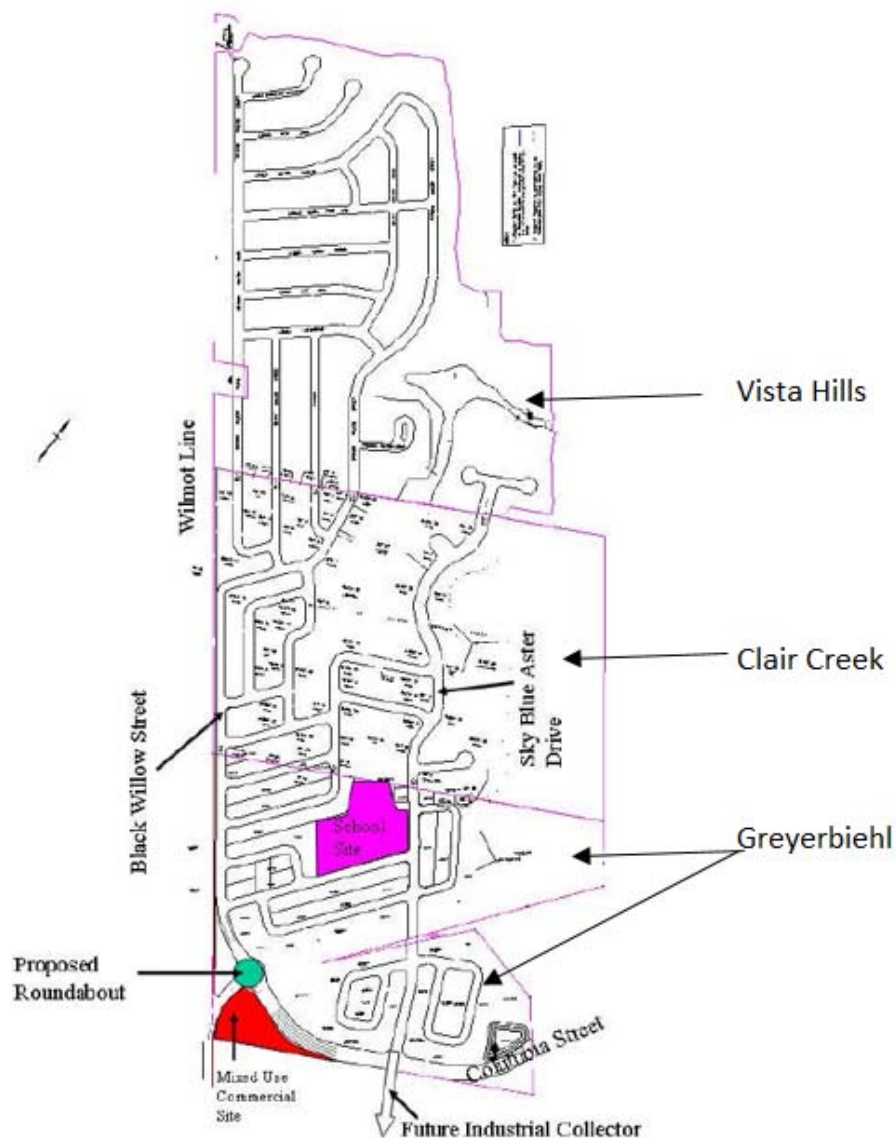
3.3.1.2 Development

A review of the *Traffic Impact Study for the Waterloo Westside Development* prepared by Paradigm Transportation Solutions Ltd. in May 2005 was reviewed to take into account the future development build-out of the Greyerbiehl, Clair Creek Meadows and Vista Hills subdivisions north of the WSEL development site (visualized in **Figure 15**).



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Figure 15: Waterloo Westside Development Residential Subdivisions



Source: (Paradigm Transportation Solutions Ltd., 2005)

The study assumes that Columbia Street West would connect to Wilnot Line at Sundew Drive (previously referred to as Black Willow Street). Considering that the majority of the residential subdivision remains to be built and this connection was never built, nor is it still planned, the site trips identified in the TIS were re-distributed and applied to our network as part of the background growth. As a conservative measure, and with regard to the minor transit expansion being added to the subdivision, no reduction for mode share was applied to this volume.



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

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A summary of AM and PM Peak hour re-distributed development traffic volumes are shown in **Table 10** below and are based off of the trip distribution values in **Table 11** that were calculated based on trip distribution shown in the original TIS (as visualized in **Figure 16**).

Table 10: Waterloo West Side Development Peak Hour Trip Generation at Ladyslipper / Platinum Dr

Approach / Movement		AM Peak Hour	PM Peak Hour
EB	Left	-	-
	Through	495	330
	Right	278	186
WB	Left	-	-
	Through	190	517
	Right	47	129
NB	Left	107	291
	Through	27	73
	Right	-	-
SB	Left	124	83
	Through	70	46
	Right	-	-
TOTAL		1,338	1,654

NOTE: Re-distributed from Estimated TIS volumes

Source: (Paradigm Transportation Solutions Ltd., 2005)

Table 11: Estimated Trip Distribution of Vista Hills Development

Roadway	% of Traffic
East via Columbia	64%
East via Erb	23%
West via Erb	13%

NOTE: Calculated based on re-distribution of trips originally using Columbia Street W and Commercial Plaza connection to Wilmot Line as identified in Figure 16.

The subsequent follow-through of traffic movement to Columbia Street West / Erbville Road assumed that 3% of traffic would percolate through the adjacent neighbourhood east of WSEL, and that the existing 2015 count at the intersection already accounted for 30% of the development's traffic based on an estimate of subdivision completion. Therefore, 67% of the Vista Hills Subdivision development traffic would proceed to Columbia Street West / Erbville Road and be split based on existing volume distribution at the relevant movements.

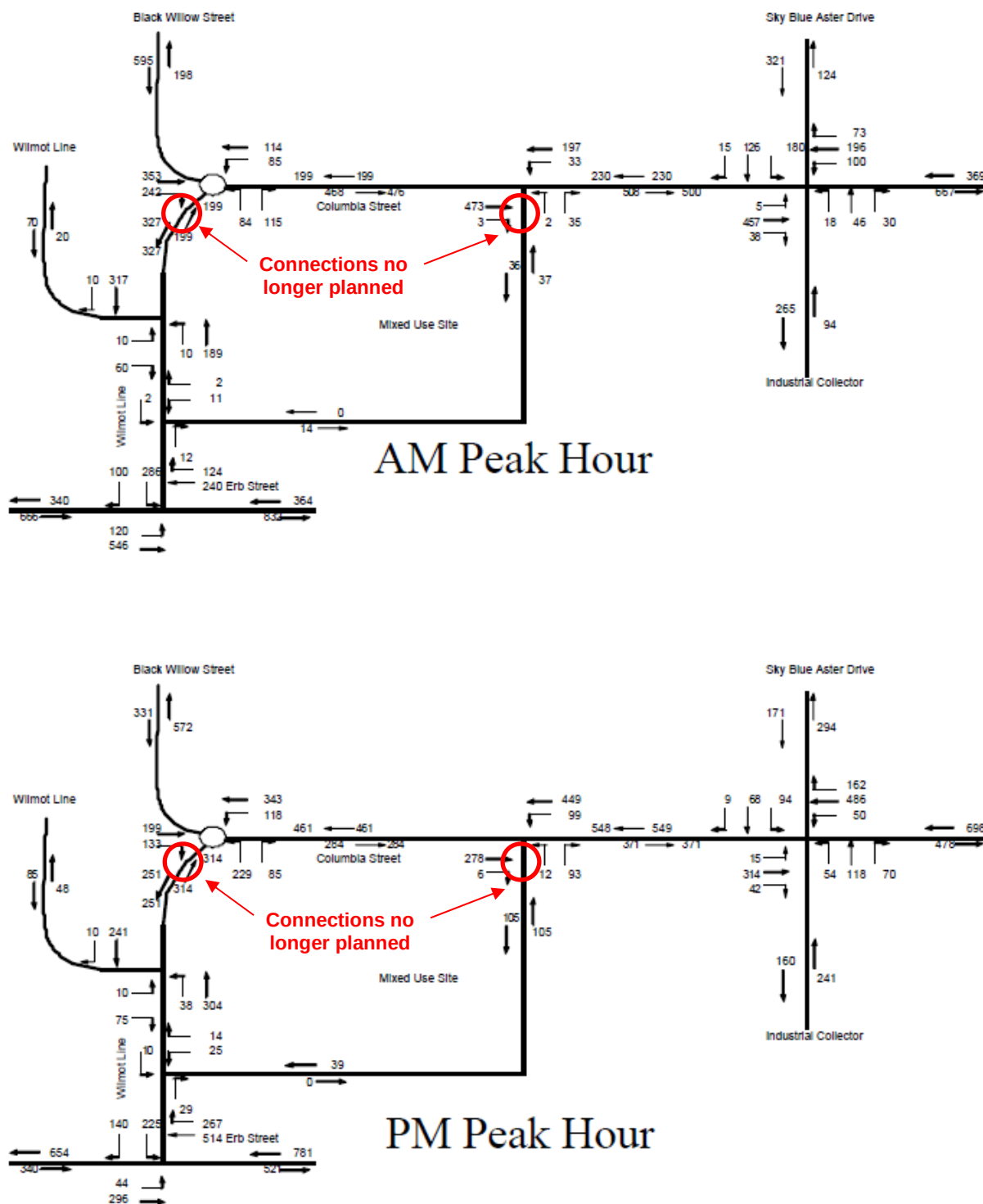


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Figure 16: Previously Analyzed Peak Hour Total Traffic Volumes



Source: (Paradigm Transportation Solutions Ltd., 2005)



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3.3.1.3 Costco Redistribution

Due to the site's proximity to the Costco Wholesale centre on Erb Street West, background traffic was adjusted to reflect new background trips that would be attracted to the retail centre. The Costco was completed in 2016 which was reflected in the existing traffic counts obtained by the Region of Waterloo at Platinum Drive and Erbsville Road, however considering the relatively new operation of the retail centre the following was done to account for future re-distribution impacts on background traffic volumes:

- Proportion of vehicles entering the Costco Plaza between Platinum Drive and Erbsville Road-Ira Needles Boulevard was calculated to be approximately 30% in the weekday PM Peak Hour based on the West Waterloo Commercial Phase 2 and Costco Parking Expansion Study prepared by BA Group Ltd in October 2017;
- 30% trip re-distribution into Costco was applied to background traffic from the Vista Hills Residential Subdivision, north of the WSEL, passing by Platinum Drive;
- Some existing Costco Traffic using the Columbia Street West / Erbsville Road intersection was re-distributed via Platinum Drive. An assumption of 10% of traffic to/from Erbsville Road north would be diverted to Platinum Drive and 50% to/from Columbia Street West. As a conservative measure this traffic was grown at the background growth rate of 1.2% to account for other potential developments that would contribute to Costco Traffic (see **Table 12**); and

Table 12: Re-Distributed Costco Traffic from Columbia Street West / Erbsville Road

Re-Distribution (%)	Movement	Re-Distributed Existing PM Peak Hour	Background Growth Rate	Background 2031 PM Peak Hour
10%	From NBT ->	14	1.2%	16
50%	From NBR ->	35		41
10%	From SBT ->	10		12
50%	From WBL ->	54		63

- This was only applied to the PM Peak hour considering the hours of operation of the Costco Centre are 10 a.m. to 8:30 p.m.¹

¹ Source: <https://www.costco.ca/warehouse-locations/waterloo-on-1248.html>



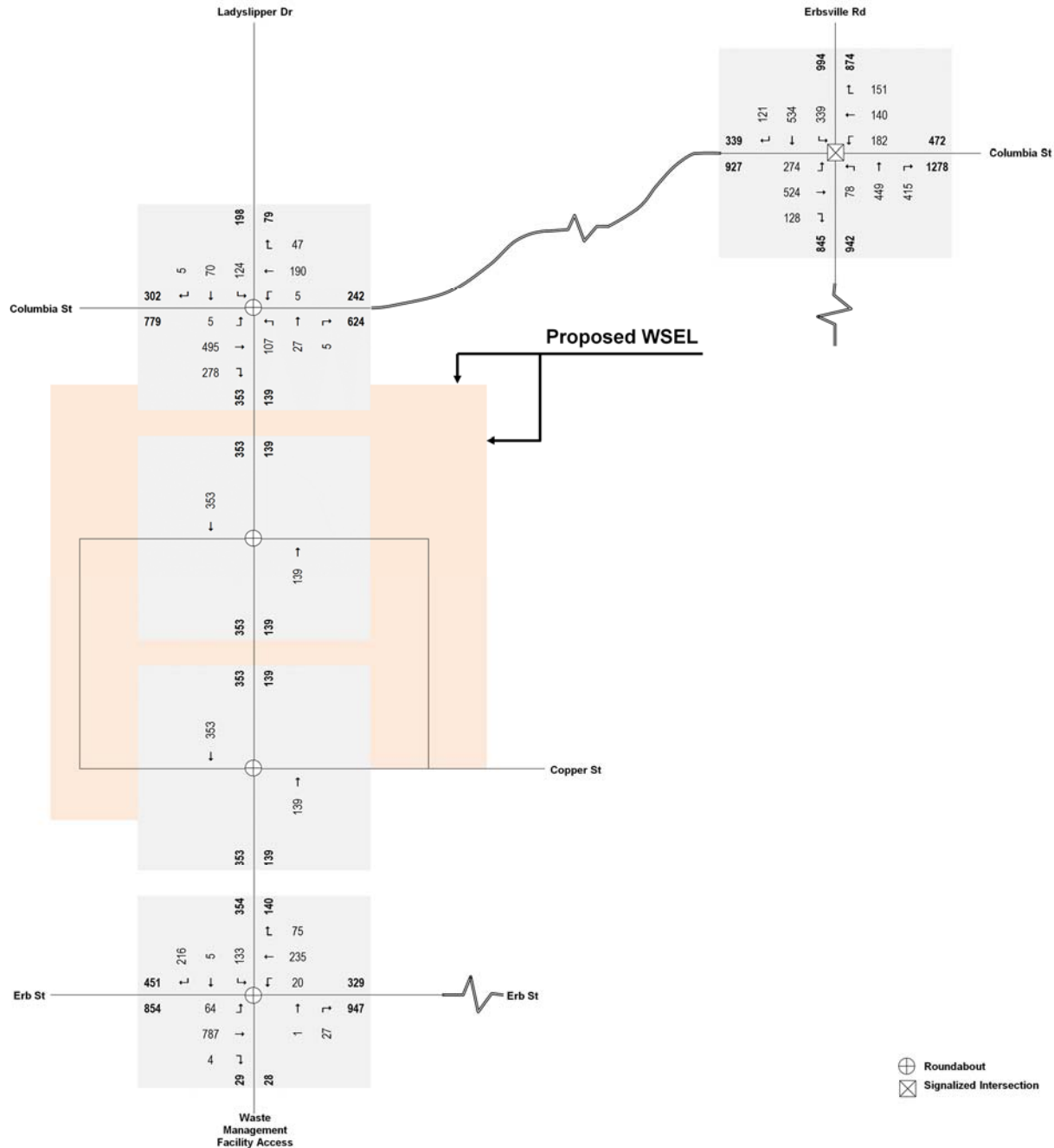
WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

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3.3.2 Future Background Traffic Volumes

The background traffic volumes including identified background developments and the estimated fixed annual background traffic growth were applied to the base year traffic volumes along major roadways. The volumes are shown in **Figure 17** and **Figure 18** for the 2031 horizon year.

Figure 17: Future Background 2031 AM Peak Hour Volumes

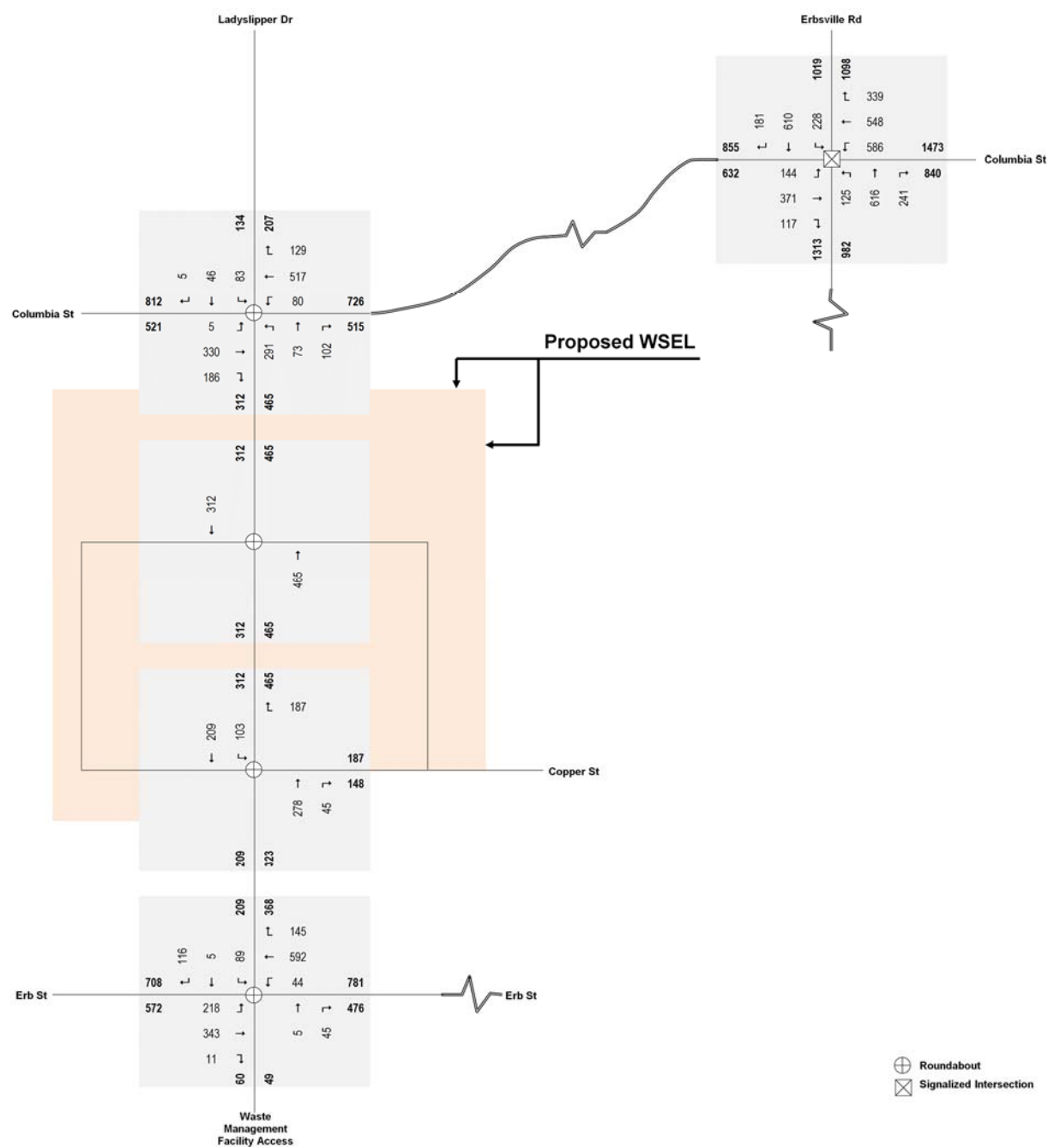


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Figure 18: Future Background 2031 PM Peak Hour Volumes



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3.3.3 Future Background 2031 Operations

Future background traffic operations for the horizon year 2031 were analyzed with the planned road network improvements identified in Section 3.1 and summarized in **Table 13**. Detailed Synchro and Arcady report outputs including 50th percentile queues for signalized intersections and 15-minute time segment interval analyses for roundabouts are available in **Appendix D**.

AM Peak Hour:

Under future background traffic conditions all intersections except for Columbia Street West / Erbsville Road operate at acceptable levels of service with a LOS of 'C' or better in the AM Peak hour with all movements operating at a LOS 'C' or better. At Columbia Street West / Erbsville Road additional background traffic adds strain to the eastbound approach as there is a shared through/right movement which operates at a LOS 'F' with queues extending beyond the adjacent left-turn storage lane. Volume at this approach also impacts the westbound left-turn which operates at a LOS 'F'.

PM Peak Hour:

Under PM Peak hour conditions, all intersections except Columbia Street West / Erbsville Road continue to operate at acceptable levels of service with a LOS of 'D' or better. The Columbia Street West / Erbsville Road intersection operates at a LOS 'F' with five movements operating at a LOS 'F'. Similar to AM Peak Hour operations, the eastbound shared through/right movement operates poorly due to high volumes which impacts the westbound left-turn movement on the opposite approach. Additionally, the northbound through movement is observed to experience delays that exceed the cycle length and queues that impact the adjacent auxiliary turn lanes. Conversely, all movements at the southbound approach operate poorly with LOS 'F' and delays that exceed the intersection cycle length.



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Table 13: Background Traffic 2031 | Peak Hour Level of Service Analysis

Intersection	Approach/Movement		Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Available (m)*
			LOS	Delay	v/c	Q	LOS	Delay	v/c	Q	
Columbia Street W / Erbsville Road <i>Signalized</i>	EB	Left	D	47.8	0.75	72.9	D	35.8	0.49	43.4	94
		Thru/Right	F	>100	>1.00	249.1	F	76.0	>1.00	145.0	-
	WB	Left	F	>100	>1.00	64.0	F	>90	>1.00	209.5	-
		Through	C	31.4	0.30	38.2	C	20.6	0.62	100.8	-
		Right	A	<1.00	0.00	14.5	A	<1.00	0.00	18.1	40
	NB	Left	D	41.0	0.38	23.1	C	35.0	0.59	24.2	54
		Through	C	27.8	0.63	101.3	F	>90	>1.00	183.8	-
		Right	A	<1.00	0.00	51.3	A	<1.00	0.00	27.5	54
	SB	Left	D	38.1	0.83	72.9	F	>90	>1.00	72.5	50
		Thru/Right	C	25.3	0.79	145.3	F	>90	>1.00	266.9	-
Overall Intersection		F	>100	-	-	F	>90	-	-	-	
Columbia Street W / Ladyslipper-Platinum Drive <i>Roundabout</i>	EB		C	23.0	-	31.1	A	8.3	-	8.6	340
	WB		A	4.9	-	2.3	D	30.7	-	43.1	516
	NB		A	6.1	-	1.7	A	9.6	-	7.5	150
	SB		A	5.0	-	1.7	A	8.7	-	1.7	310
	Overall Intersection		C	15.5	-	-	C	17.5	-	-	-
Platinum Drive / Street 'C'-'B' <i>Roundabout</i>	EB		A	0.0	-	0.0	A	0.0	-	0.0	-
	WB		A	0.0	-	0.0	A	0.0	-	0.0	-
	NB		A	3.7	-	1.2	A	5.6	-	4.6	360
	SB		A	4.9	-	4.0	A	4.6	-	2.9	150
	Overall Intersection		A	4.6	-	-	A	5.2	-	-	-
Platinum Drive / Copper Street <i>Roundabout</i>	EB		A	0.0	-	0.0	A	0.0	-	0.0	-
	WB		A	0.0	-	0.0	A	4.9	-	3.5	-
	NB		A	3.7	-	1.2	A	5.0	-	2.3	270
	SB		A	4.9	-	4.0	A	4.7	-	1.9	360
	Overall Intersection		A	4.6	-	-	A	4.9	-	-	-
Erb Street West / Platinum Drive <i>Roundabout</i>	EB		A	4.8	-	6.9	A	4.6	-	5.8	50
	WB		A	3.9	-	2.3	A	5.0	-	7.5	110
	NB		A	6.9	-	0.0	A	5.1	-	0.6	-
	SB		A	4.7	-	2.9	A	5.0	-	2.3	270
	Overall Intersection		A	4.6	-	-	A	4.9	-	-	-

*Length of Storage lane for signalized intersections and distance to next major access for roundabouts.

Signalized Intersections: Delays are in seconds, Queues are 95th percentile in metres. Overall intersection LOS 'E' or 'F' highlighted as critical intersections. Movements with LOS 'E' or 'F', delays greater than the intersection cycle length, 95th percentile queues exceeding available storage length or exclusive turning lanes blocked by queues in adjacent through lanes are highlighted as critical movements.

Roundabout Intersections: LOS E/F, and any queues that extend beyond an access upstream are highlighted as critical (if any); Delay in seconds; Queues are maximum 15-minute time segment queues in metres.



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3.3.3.1 Recommended Improvements

To address poor operations at the Columbia Street West / Erbsville Road intersection the following improvements were added and resulting operations are summarized in in **Table 14** below:

- Eastbound Auxiliary Right-Turn lane (70m) based on 50th percentile queues of the through movement;
- Southbound Auxiliary Right-Turn Lane (90m) based on 50th percentile queues of the through movement.

Table 14: Background Traffic 2031 with improvements | Peak Hour Level of Service Analysis

Intersection	Approach/Movement		Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Available (m)*
			LOS	Delay	v/c	Q	LOS	Delay	v/c	Q	
Columbia Street W / Erbsville Road <i>Signalized</i>	EB	Left	D	47.8	0.75	72.9	D	35.8	0.49	43.4	94
		Through	F	>100	>1.00	189.4	D	37.5	0.74	97.2	-
		Right	D	36.3	0.41	14.7	C	26.9	0.29	9.0	70
	WB	Left	F	>100	>1.00	64.0	F	>90	>1.00	208.8	-
		Through	C	31.4	0.40	38.2	C	20.6	0.62	100.8	-
		Right	A	<1.00	0.00	14.5	A	<1.00	0.00	18.1	40
	NB	Left	C	28.8	0.28	21.2	C	35.0	0.59	24.2	54
		Through	C	27.8	0.63	101.3	F	>90	>1.00	183.8	-
		Right	A	<1.00	0.00	51.3	A	<1.00	0.00	27.5	54
	SB	Left	D	38.1	0.83	72.9	F	>90	>1.00	72.5	50
		Through	B	18.5	0.63	101.7	F	>90	>1.00	192.1	-
		Right	B	12.3	0.17	7.9	C	30.6	0.47	21.8	90
	Overall Intersection		E	62	-	-	F	>90	-	-	-

*Length of Storage lane for signalized intersections and distance to next major access for roundabouts.

Signalized Intersections: Delays are in seconds, Queues are 95th percentile in metres. Overall intersection LOS 'E' or 'F' highlighted as critical intersections. Movements with LOS 'E' or 'F', delays greater than the intersection cycle length, 95th percentile queues exceeding available storage length or exclusive turning lanes blocked by queues in adjacent through lanes are highlighted as critical movements.

Roundabout Intersections: LOS E/F, and any queues that extend beyond an access upstream are highlighted as critical (if any); Delay in seconds; Queues are maximum 15-minute time segment queues in metres.

The intersection improvements had minor improvements in both peak hours with the two main differences being the improved overall intersection operations from a LOS 'F' to 'E' in the AM Peak Hour and the improved eastbound through movement in the PM Peak Hour which improves from a LOS 'F' to 'D'. Despite this, these improvements have minor impacts on alleviating operations at the intersection.



3.4 FUTURE TOTAL TRAFFIC

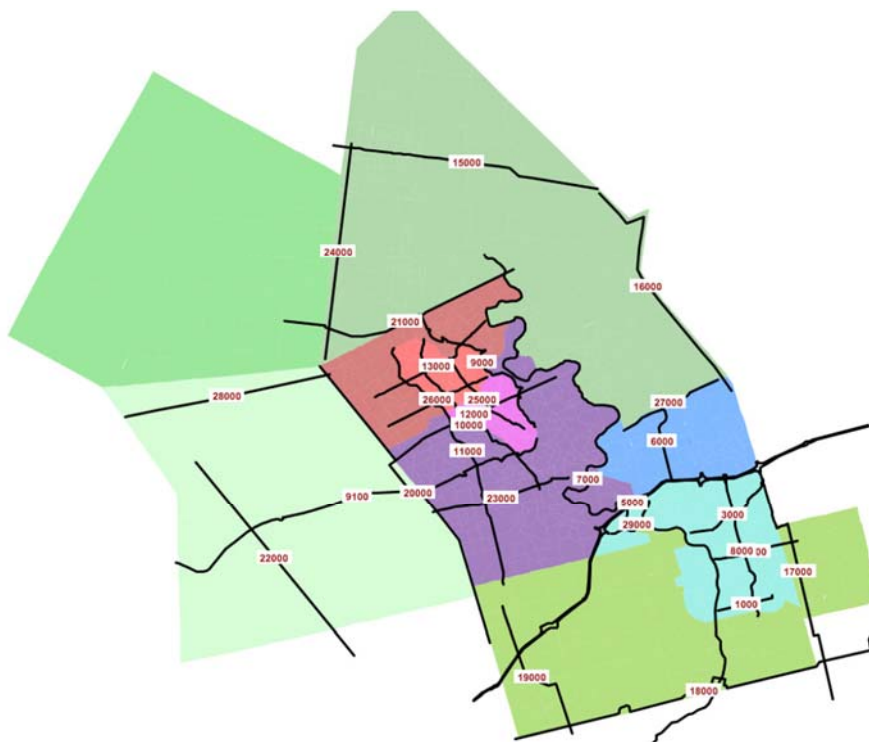
3.4.1 Site Trip Generation

The auto trips generated at the WSEL site were developed using inputs from the Region's Travel Demand Forecasting Model. The site trip generation process involved applying model rates and factors on the employment estimates of the development described in **Section 1.2**. ITE trip generation rates and trip rates derived from proxy zones using 2016 Transportation Tomorrow Survey (TTS) data were also reviewed for comparison.

Site Trip Generation - Region of Waterloo Travel Demand Forecasting Model

The Region's Travel Demand Forecasting Model used for this analysis was initially developed in March 2016. The model was later updated in 2017 as part of the Region's ION LRT Stage 2 study. The model is implemented as a traditional four-step model, which consists of the following modules: Trip Generation, Trip Distribution, Mode Choice, and Trip Assignment. The model was calibrated to 2011 Transportation Tomorrow Survey (TTS) data and validated to traffic volume screenlines for auto trip assignment and to transit boardings for transit trip assignment. The auto screenlines are illustrated in **Figure 19**. **Table 15** presents the validation results at the three screenlines closest to the WSEL site – 13000, 20000 and 26000. The validation result shows an excellent goodness-of-fit between the modelled PM peak hour traffic volumes and the observed volumes at the designated screenlines, which suggests that the model inputs and calibration factors are reasonably representative of the area around the WSEL site.

Figure 19: Auto Screenlines in the Region's Model



Source: (HDR Corporation, 2016)



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Table 15: Screenline Validation of the Region's Travel Demand Forecasting Model

ID	Screenline Name	Inbound				Outbound			
		Observed	Modelled	% Diff	GEH*	Observed	Modelled	% Diff	GEH*
13000	North of Columbia Street	7,378	7,438	1%	1	7,491	7,286	-3%	2
20000	East of Wilmot and West of Truseller Road	1,681	1,801	7%	3	2,447	2,718	11%	5
26000	South of Erb St/Bridgeport	5,768	5,702	-1%	1	6,342	6,553	3%	3

Source: (HDR Corporation, 2016)

* GEH is a formula used to compare two sets of traffic volumes. A GEH of less than 5.0 is considered a good match between the modelled and observed hourly volumes.

Note that Stantec was not provided with AM model validation results. It is assumed that the goodness-of-fit at the designated screenlines are acceptable during the AM peak hour.

For the purpose of this study, only the attraction end of the model generated trips was considered – a typical trip (e.g. home to work) consists of a production end and an attraction end. The production end of a home-based trip is at home, and the attraction end is the non-home end of a trip (e.g. at work). Hence, a development such as the WSEL that consists solely of employment would only yield trip attractions.

The following methodology was used to develop auto site trips in the AM and PM peak hours:

1. Apply the daily trip generation rates as incorporated in the Region's model to obtain the number of daily trips generated (i.e. attracted) at the WSEL site. The daily trip generation rates at the point of attraction – by trip type, employment type and age group – are shown in **Table 16**. Trips generated from these three trip types are considered: Home-based work (HBW), Home-based other (HBO) and Non home-based (NHB). Home-based school (HBS) trips were also generated as part of the model but not used. Daily trips were generated by multiplying the trip attraction rates by the number of forecasted employees in the WSEL development described in **Table 2** for each respective employment category.

Table 16: Daily Trip Attraction Rates

Daily Trip Attraction Rate (Trips per Employee)	Age Group				Trip Gen Calculated
	10-19	20-29	30-64	65+	
Home-Based Work (HBW)					
Industrial - Manufacturing	0.010	0.141	0.895	0.013	6,354
Office	-	0.133	0.607	0.012	1,263
Retail/Commercial	0.141	0.397	0.494	0.027	339
Home-Based Other (HBO)					
Retail/Commercial	0.281	0.599	2.936	1.087	1,569
Non Home-Based (NHB)					
Industrial - Manufacturing	-	-	0.057	-	342
Office	-	0.014	0.140	-	259
Retail/Commercial	0.120	0.057	1.125	0.330	522
TOTAL					10,648

Source: (HDR Corporation, 2016)



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2. Apply the trip attraction calibration factors as incorporated in the Region's model to obtain the number of model-adjusted daily trips generated. The trip attraction calibration factors applied are specific to the area that encompasses the City of Waterloo, outside of Downtown. The trip attraction calibration factors by trip type and age group are shown in **Table 17**.

Table 17: Trip Attraction Calibration Factors for City of Waterloo, outside of Downtown

Trip Attraction Calibration Factors	Age Group			
	10-19	20-29	30-64	65+
Home-Based Work (HBW)	1.458	1.206	1.143	1.195
Home-Based Other (HBO)	1.250	1.172	1.147	0.984
Non Home-Based (NHB)	1.229	1.138	1.270	1.214

Source: (HDR Corporation, 2016)

3. Apply the auto driver mode share targets in the Region's model to obtain the number of daily vehicles generated as auto drive mode trips are assigned as vehicles in the model's Trip Assignment module. The auto drive mode share by trip type and age group are shown in **Table 18**.

Table 18: Auto Driver Mode Share Targets

Auto Drive Mode Share	Age Group			
	10-19	20-29	30-64	65+
Home-Based Work (HBW)	34%	70%	85%	85%
Home-Based Other (HBO)	12%	71%	81%	81%
Non Home-Based (NHB)	12%	74%	85%	85%

Source: (HDR Corporation, 2016)

4. Apply the auto drive daily-to-peak-hour factors as incorporated in the Region's model to obtain the number of auto vehicles generated at the WSEL site during the AM and PM peak hours. The daily-to-peak-hour factors by trip type are shown in **Table 19**.

Table 19: Auto Drive Daily-to-Peak-Hour Factors

Auto Drive Daily-to-Peak-Hour Factors	AM	PM
Home-Based Work (HBW)	0.163	0.152
Home-Based Other (HBO)	0.065	0.077
Non Home-Based (NHB)	0.080	0.103

Source: (HDR Corporation, 2016)

5. Apply the peak hour directionality factors as incorporated in the Region's model to obtain the number of inbound and outbound auto vehicles generated at the WSEL site during the AM and PM peak hours. The directionality factors by trip type are shown in **Table 20**.



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Table 20: Auto Drive Peak Hour Directionality Factors

Auto Drive Peak Hour Directionality Factors	AM		PM	
	In	Out	In	Out
Home-Based Work (HBW)	97.8%	2.2%	5.7%	94.3%
Home-Based Other (HBO)	81.8%	18.2%	38.4%	61.6%
Non Home-Based (NHB)	50%	50%	50%	50%

Source: (HDR Corporation, 2016)

6. Apply the peak hour auto demand adjustment factors as incorporated in the Region's model. The demand adjustment factors were applied in the model largely to offset a perceived under-representation in discretionary travel in the PM peak period in the 2011 TTS, which were used to develop the model's trip generation rates. The peak hour auto demand adjustment factors by trip type are shown in **Table 21**.

Table 21: Peak Hour Auto Demand Adjustment Factors

Peak Hour Auto Demand Adjustment Factors	AM	PM
Home-Based Work (HBW)	1	1.115
Home-Based Other (HBO)	1	1.3
Non Home-Based (NHB)	1	1.3

Source: (HDR Corporation, 2016)

Using the methodology indicated, the number of peak hour auto vehicle trips generated at the WSEL are shown in **Table 22**.

Table 22: Peak Hour Auto Vehicle Trips Generated by WSEL

Peak Hour Auto Vehicle Trips Generated	AM			PM		
	In	Out	Total	In	Out	Total
Home-Based Work (HBW)	1,201	27	1,228	73	1,204	1,277
Home-Based Other (HBO)	74	16	90	53	86	139
Non Home-Based (NHB)	46	46	93	78	78	156
Total	1,321	90	1,411	204	1,367	1,571

Note that Stantec was not provided with updated model documentation following the 2017 update. However, based on the *Waterloo West Side Integrated Multi-Modal Transportation Study – 2031 Traffic Operations memo* prepared by WSP, the 2017 model update mainly involved a redesign of the mode choice model with the ION LRT in place. It is expected that the auto mode share would decrease as a result of this update, hence the site auto vehicle trip generation results above would be considered a conservative estimate. The results of this trip generation are generally consistent with trip generation rates prepared for the site within the *WSP Operations memo*.



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Site Trip Generation – ITE Trip Generation Manual, 10th Edition

Table 23 shows the number of auto trips generated using the average trip rates obtained from the ITE's *Trip Generation Manual, 10th Edition*. The following ITE land use categories were assigned to the proposed employment mix listed in **Table 2**:

- Manufacturing: Industrial – 140 | Manufacturing
- Office: Office – 750 | Office Park
- Commercial: Retail – 880 | Pharmacy/Drugstore without Drive-Through

Table 23: ITE Average Trip Rates and Trip Generated

ITE Category	AM Peak Hour				PM Peak Hour			
	Rate	In	Out	Total	Rate	In	Out	Total
140 Manufacturing	0.43 / employee	2,089	490	2,579	0.45 / employee	1,188	1,512	2,700
750 Office Park	0.39 / employee	602	52	654	0.37 / employee	93	528	621
880 Pharmacy/Drugstore without Drive-Through*	2.94 / 1,000 sqft	113	60	173	8.51 / 1,000 sqft	246	256	502
Total		2,804	602	3,406		1,527	2,296	3,823

Source: (Institute of Transportation Engineers, 2017)

Site Trip Generation – Proxy Analysis, 2016 Transportation Tomorrow Survey

A proxy analysis was conducted using the 2016 TTS data, based on two proxy TTS zones (zones 7003 and 7008) in the Northfield Industrial Area. These two adjoining TTS zones have a similar land use and development density as the WSEL development, and similar to the WSEL site, are both situated along the City's boundary away from the urban core. **Table 24** shows the auto vehicle trips made in the AM and PM peak hours in the proxy zones and their respective trip rates based on employment totals.

Table 24: Derived Auto Vehicle Trip Rates at Proxy Zones - 2016 TTS

Zone	Employment	AM Peak Hour		PM Peak Hour	
		Auto Drive Trips	Trip Rate (/employee)	Auto Drive Trips	Trip Rate (/employee)
7003	5,411	588	0.11	701	0.13
7008	1,907	722	0.38	890	0.47
Total	7,318	1,310	0.18	1,591	0.22

Source: (University of Toronto - Data Management Group, 2016)



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Trip Generation - Comparison

Table 25 shows a comparison between generated trips and trip rates using the Region's model inputs and using the ITE Trip Generation Manual. The comparison also includes the trip rates derived from the proxy analysis using TTS data.

Table 25: Trip Generation Comparison Summary

Auto Vehicle Trips Generated	AM				PM			
	In	Out	Total	Trip Rate (/employee)	In	Out	Total	Trip Rate (/employee)
Model	1,321	90	1,411	0.18	204	1,367	1,571	0.20
ITE	2,804	602	3,406	0.43	1,527	2,296	3,823	0.48
TTS (Proxy)	N/A			0.18	N/A			0.22

Upon review of the comparison summary, it was determined that the Region's model provides the more reliable estimate of future trips generated by the WSEL site and used as the methodology for site trip generation. The rationale behind the recommendation is as follows:

- The ITE's trip generation rates show significant variability in the land use categories allocated to the WSEL development – e.g. trip generation rate for Manufacturing employment in the AM peak hour ranges from 0.25 to 1.27, with a standard deviation of 0.15. In addition, the trip generation rate for Office Park (LU code 750) was developed based on three sample data points. The high variability of trip rates and limited number of samples in the assigned categories suggest that additional input on trip rates is warranted;
- The Region's model is customized to local trip-making behaviour in the Region, with specific trip generation calibration factors assigned to the general area surrounding the WSEL site as described earlier in this section;
- The proxy analysis demonstrates that the trips generated through the Region's model is consistent with the trips generated in the proxy zones using 2016 TTS data.



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3.4.2 Site Trip Distribution and Assignment

The 2011 Transportation Tomorrow Survey was used as the basis for trip distribution in the Region's Travel Demand Forecasting Model. As 2016 Transportation Tomorrow Survey data is available, trip distribution and assignment were developed using the updated 2016 data for a more trip assignment more reflective of changed travel patterns. Considering that the WSEL site is not yet developed, nearby proxy TTS zones for the Boardwalk Commercial Plaza and West Side Marketplace Plaza (zones 7252, and 7266) were used to determine trip distribution for the site. The summary of the AM and PM peak hour trip distributions are summarized in **Table 26**. Considering the proposed plan of subdivision does not provide detailed information on individual block driveways and accesses, trips were distributed to Streets 'B' and 'C' at the first roundabout upon entering the WSEL as a conservative measure to represent the worst-case scenario for traffic distribution. As the WSEL is developed, this distribution can be further refined. These trip distributions are also illustrated in **Figure 20** through **Figure 23**. AM and PM peak hour site trips are shown in **Figure 24** and **Figure 25**.

Table 26: Trip Distribution (TTS Zones 7252, 7266)

Direction	Via	AM Peak Hour				PM Peak Hour			
		IN	OUT	IN	OUT	IN	OUT	IN	OUT
North	Erbsville	2%	5%	27	5	11%	10%	23	137
South	Ira Needles	42%	26%	555	24	7%	36%	15	492
East	Columbia	2%	40%	27	36	34%	9%	70	124
East	Erb	25%	11%	331	10	28%	19%	57	260
West	Erb	20%	7%	265	7	6%	14%	13	192
Internal from adjacent neighbourhoods		9%	11%	117	8	14%	13%	26	162
TOTAL		100%	100%	1,321	90	100%	100%	204	1,367

Source: (University of Toronto - Data Management Group, 2016)

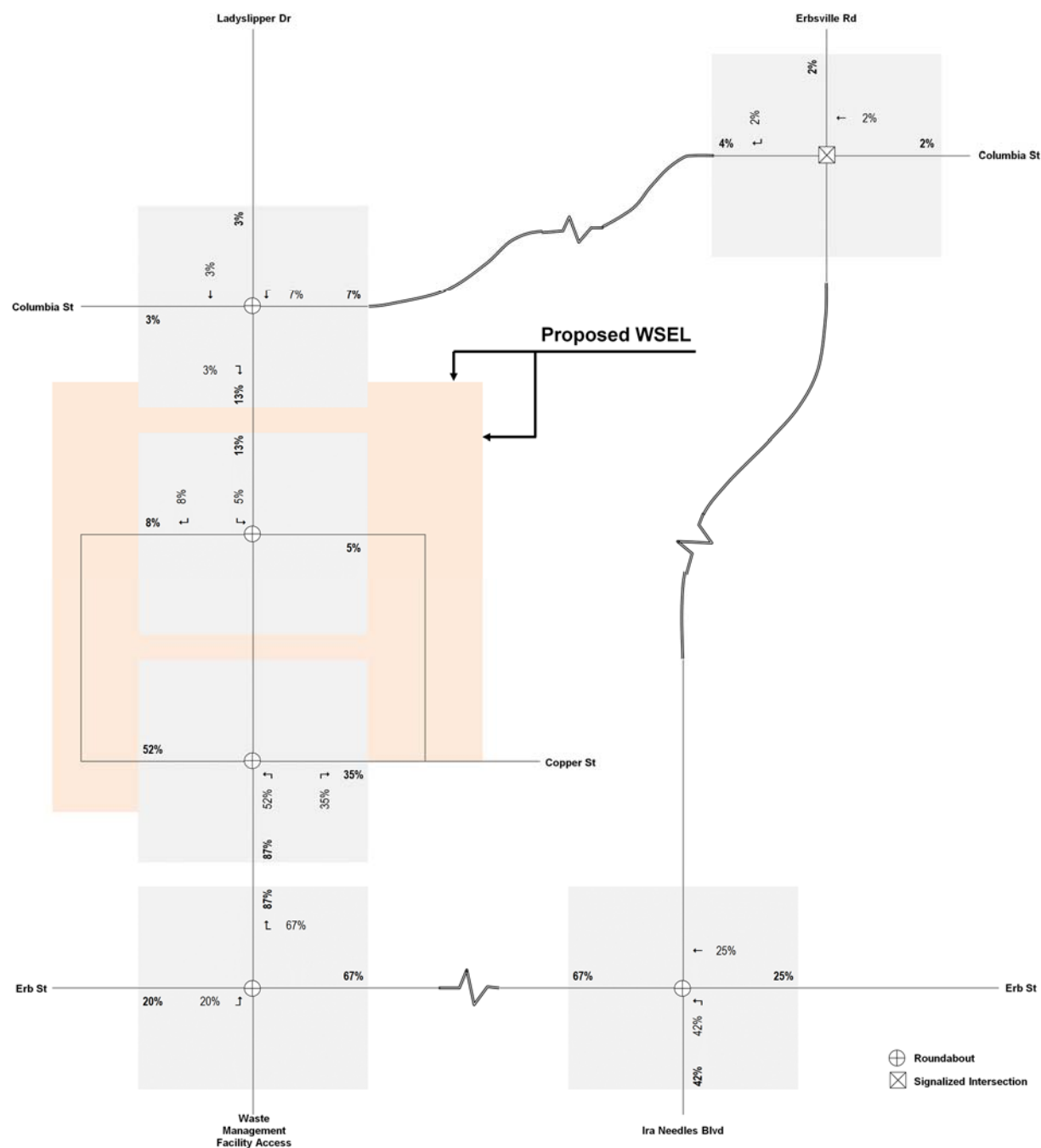


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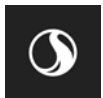
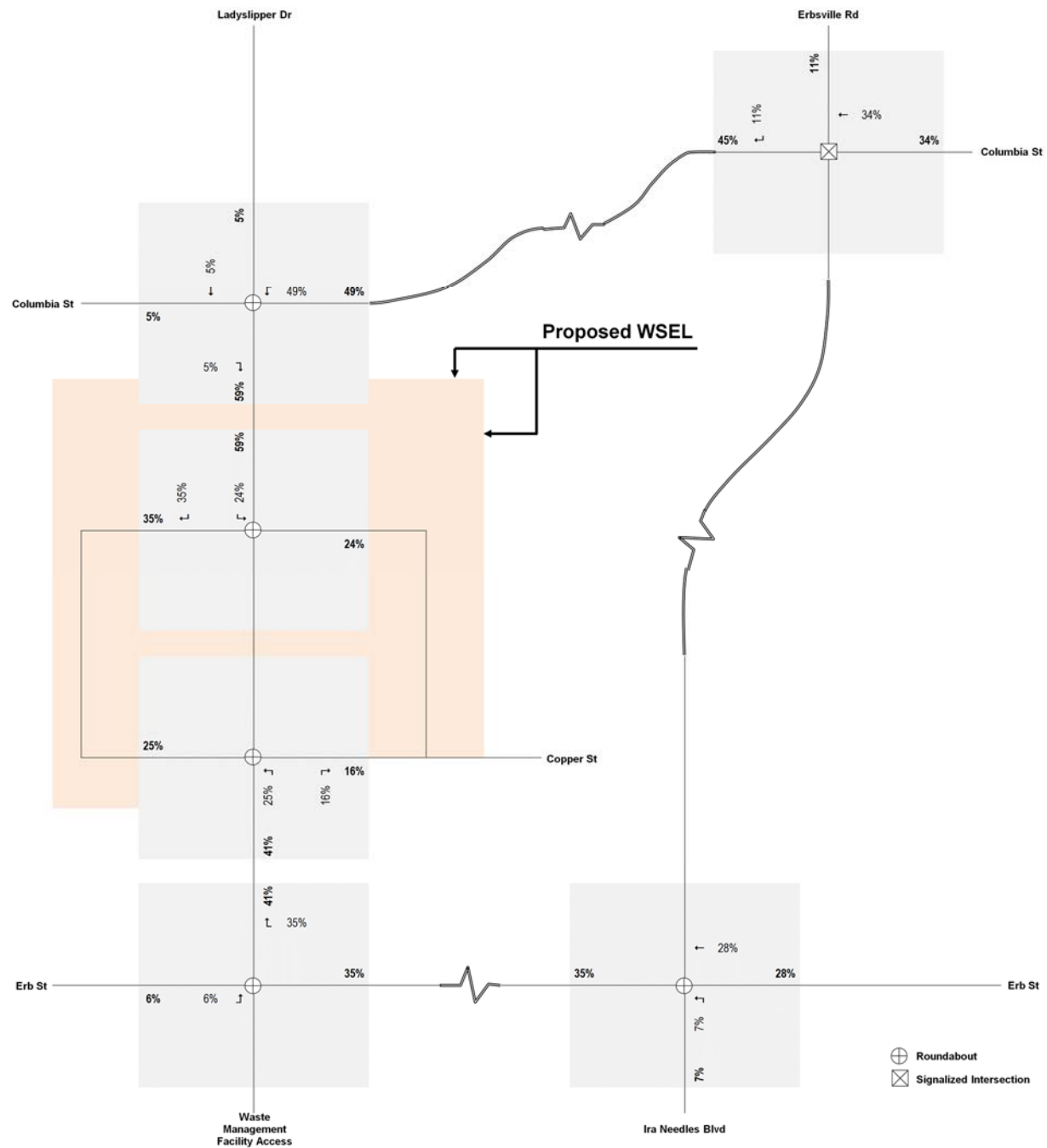
Figure 20: Site Trip Distribution – AM Peak Hour Inbound



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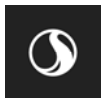
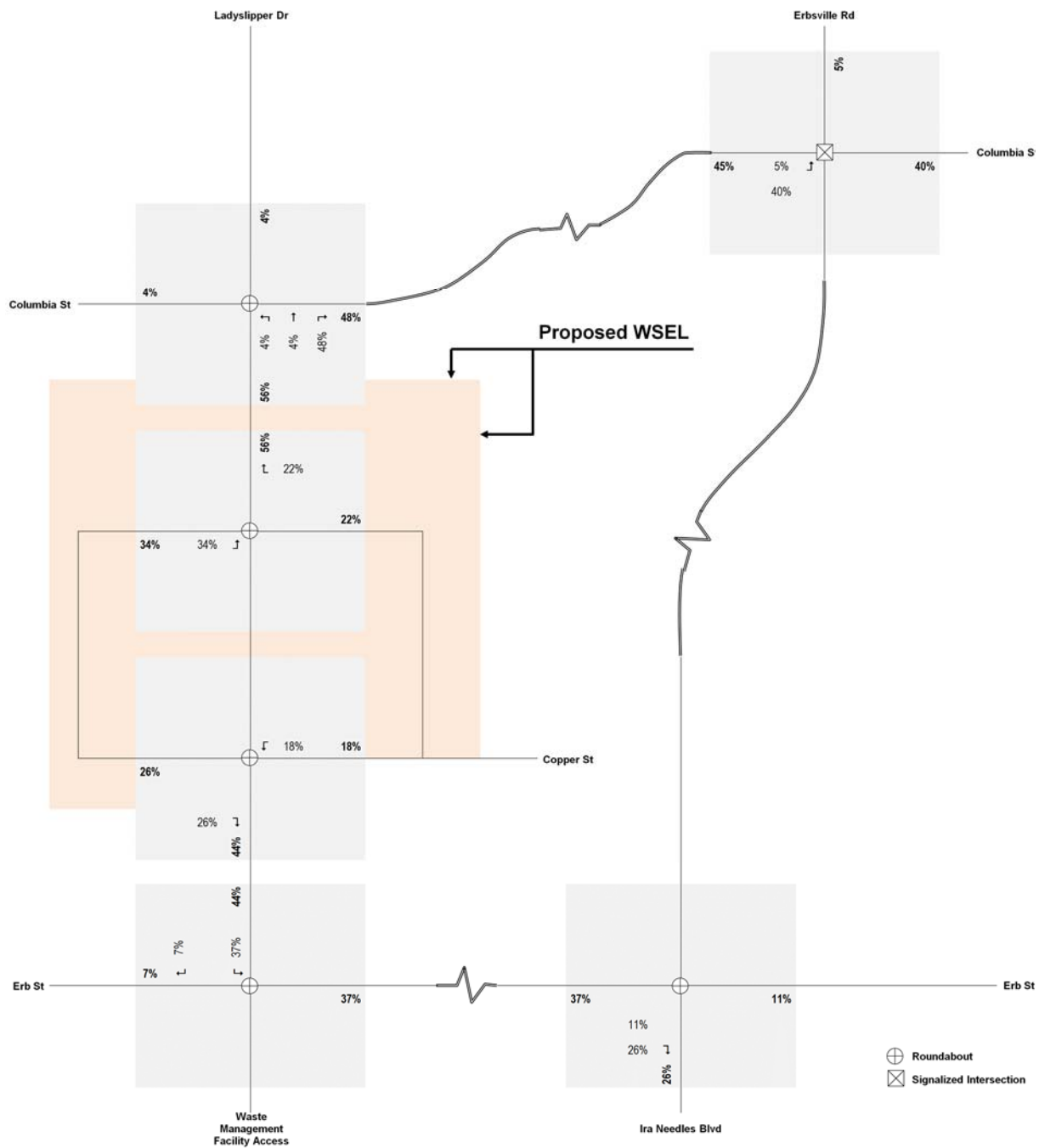
Figure 21: Site Trip Distribution – PM Peak Hour Inbound



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Figure 22: Site Trip Distribution – AM Peak Hour Outbound

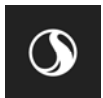
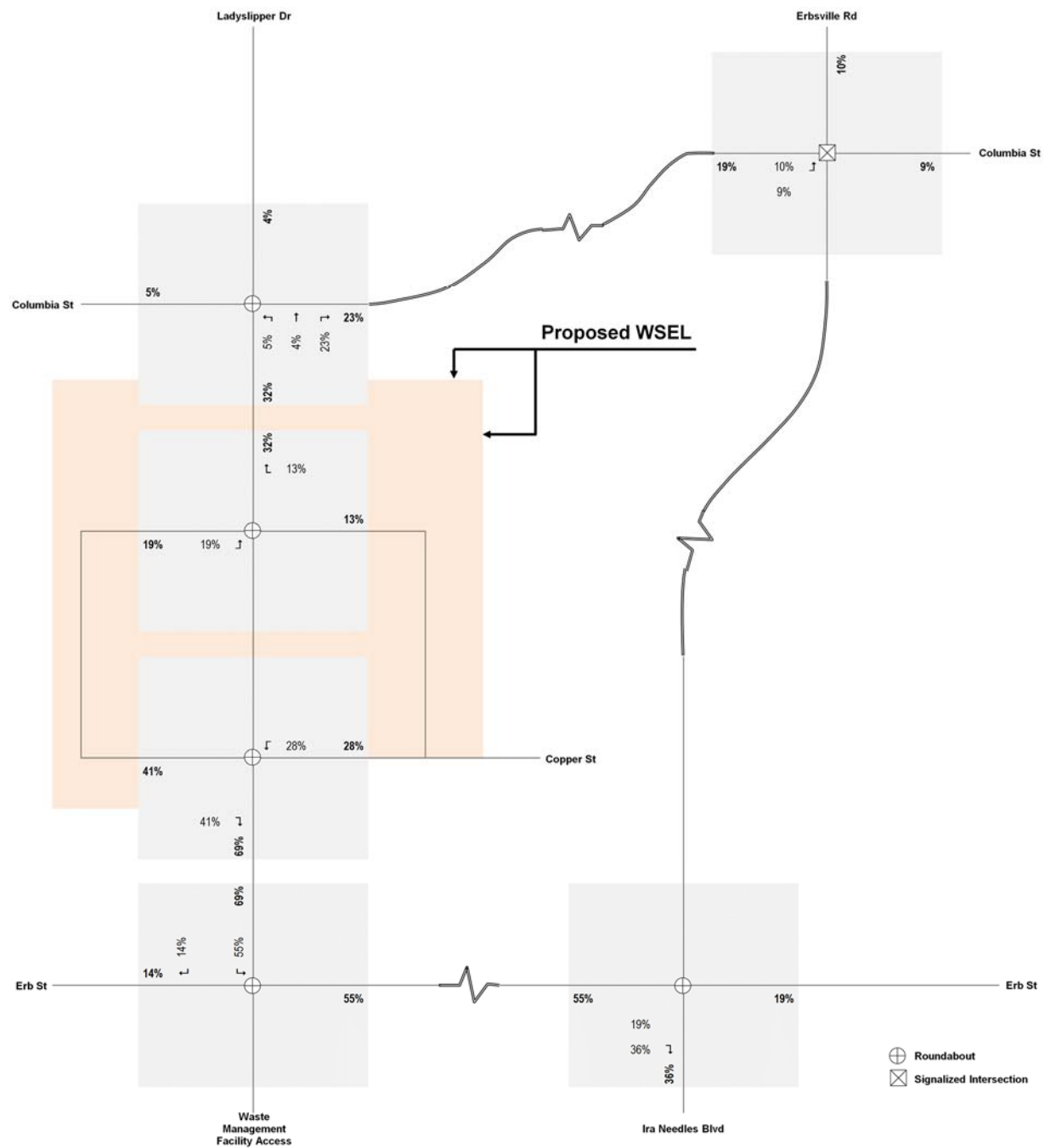


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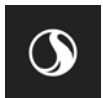
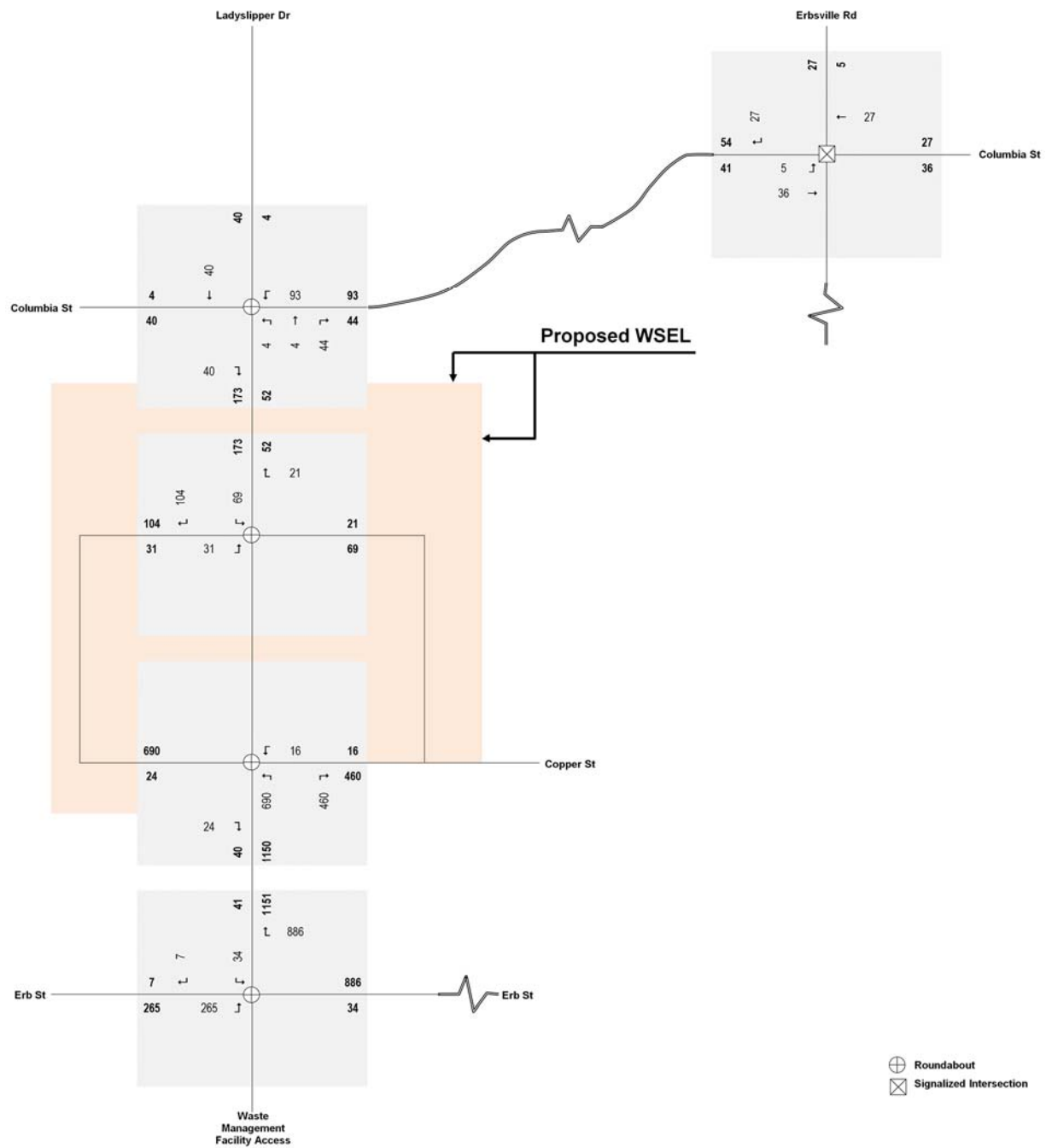
Figure 23: Site Trip Distribution – PM Peak Hour Outbound



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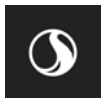
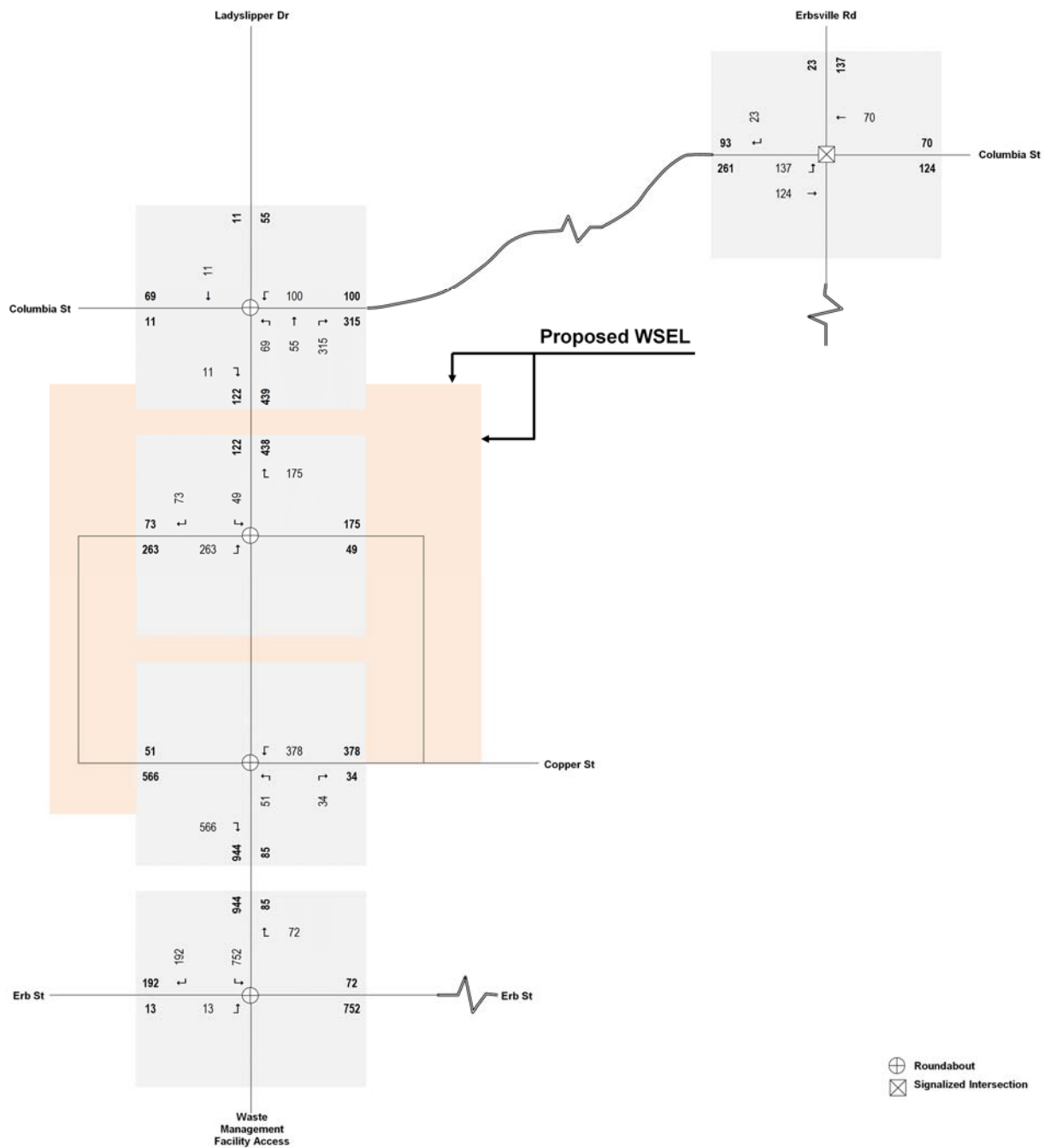
Figure 24: AM Peak Hour Site Traffic



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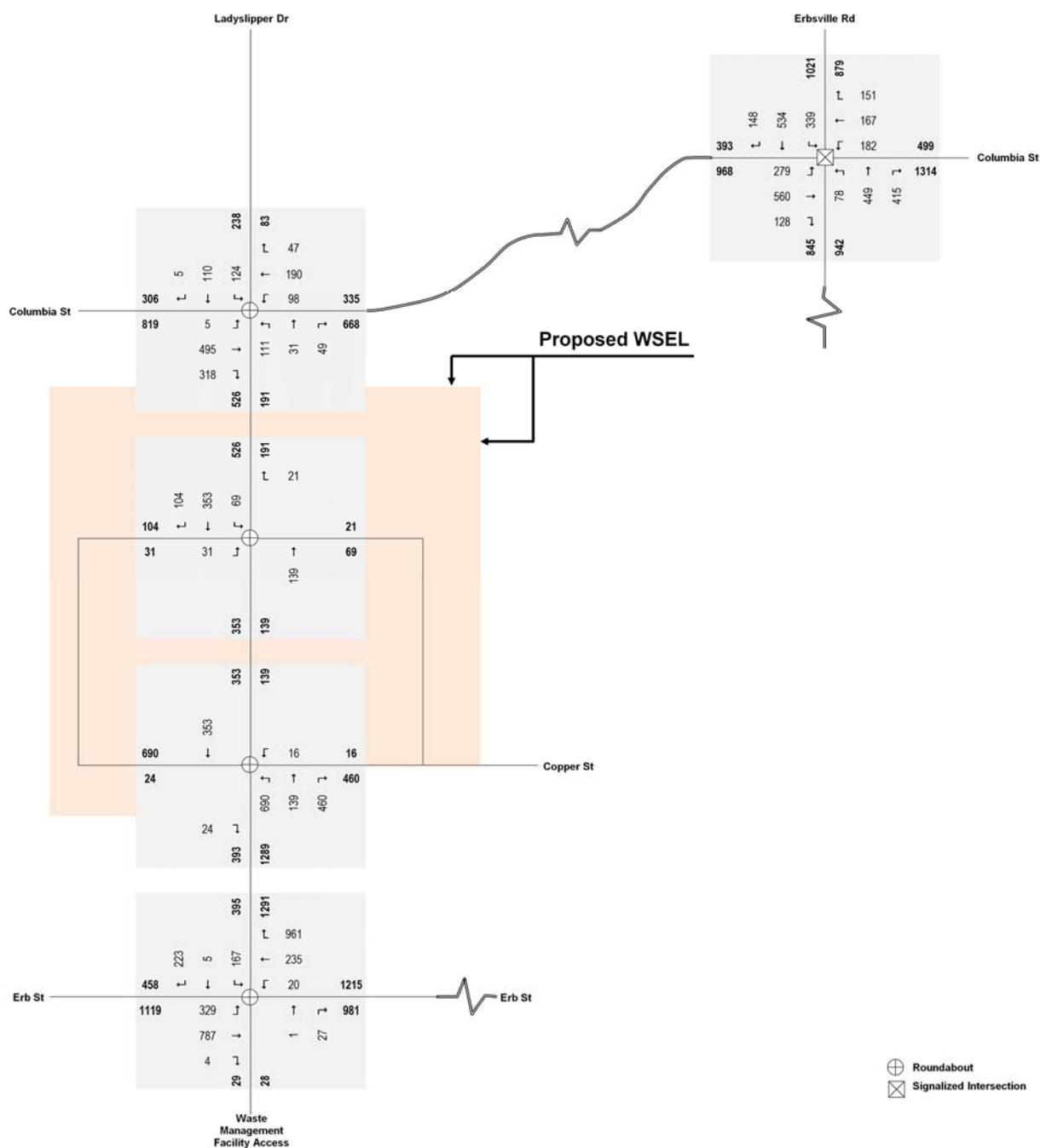
Figure 25: PM Peak Hour Site Traffic



3.4.3 Forecasted Total Traffic Volumes

Future total traffic volumes including the estimated background traffic growth and the estimated trip generation for the WSEL development are shown in **Figure 26** and **Figure 27** for the AM and PM peak hours, respectively.

Figure 26: Future Total 2031 - AM Peak Hour Volumes

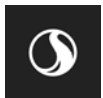
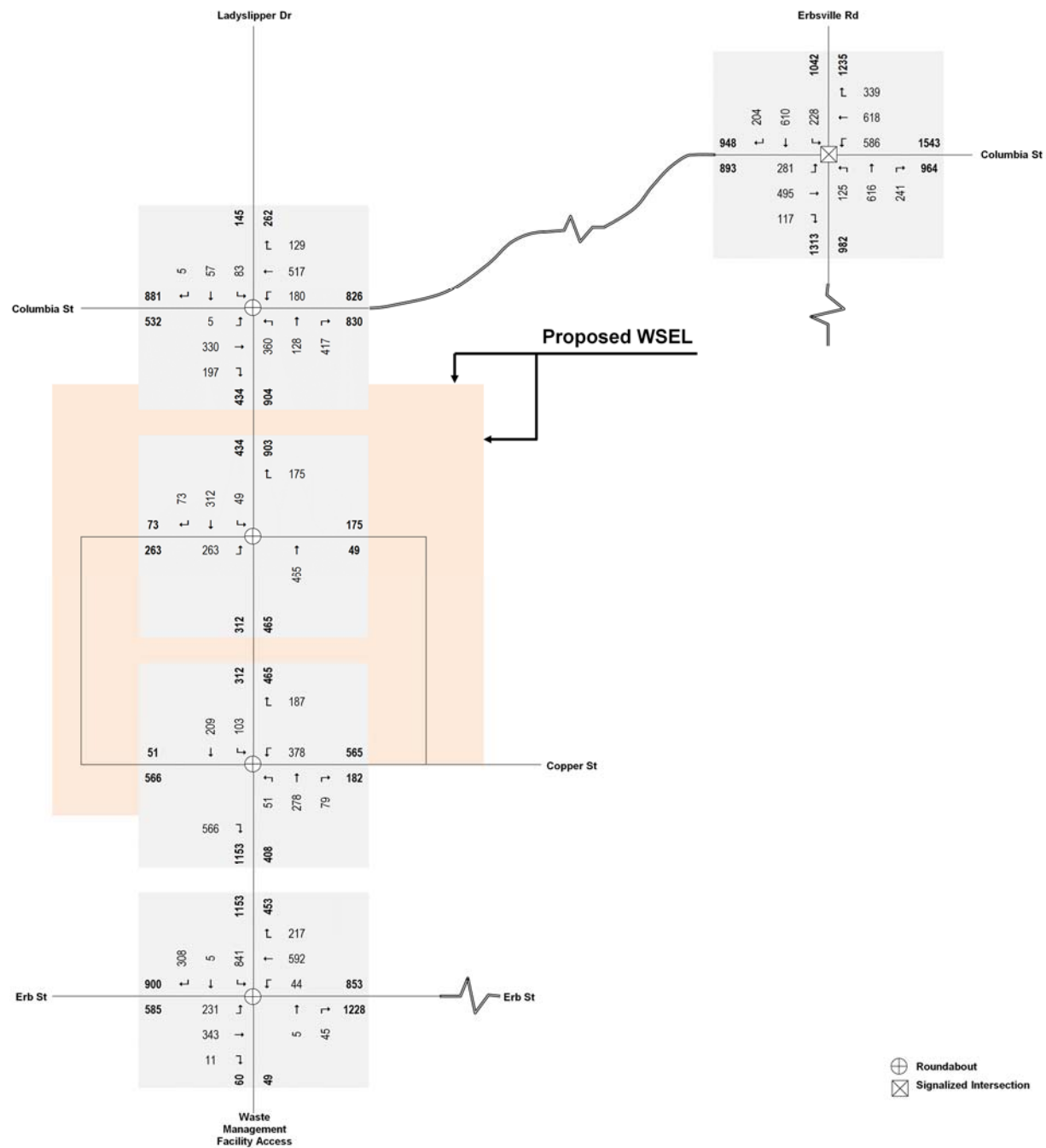


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Figure 27: Future Total 2031 - PM Peak Hour Volumes



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3.4.4 Future Total 2031 Operations

Future Total traffic operations were assessed using the same planned road network improvements analyzed for the Future Background 2031 growth conditions and are summarized in **Table 17**. Detailed Synchro and ARCADY report outputs including 50th percentile queues for signalized intersections and 15-minute time segment interval analyses for roundabouts are available in **Appendix D**.

AM Peak Hour:

Under Future Total 2031 AM peak hour conditions two intersections operate poorly with LOS 'F'. These intersections are: Erb Street West / Platinum Drive, and Platinum Drive / Copper Street. Poor operations stem from the large volume of WSEL site generated traffic which is primarily expected to pass through the Erb Street West / Platinum Drive intersection to enter the subject site. The high volume of traffic passing through this intersection causes deteriorated operations for the westbound approach at Erb Street West / Platinum Drive due to right-turning vehicles which causes queuing. This in turn also creates queuing downstream at the Platinum Drive / Copper Street intersection's northbound approach. These operations represent the worst 15-minute segment analyzed out of a 90-minute peak period. When we analyze the individual 15-minute segments we see the following:

- Erb Street West / Platinum Drive:
 - o All but two 15-minute segments show a LOS 'F' for the westbound approach
- Platinum Drive / Copper Street:
 - o All but two 15-minute segments show a LOS 'F' for the northbound approach

The results of the 15-minute segment analysis identifies that improvements are needed to address poor operations at these movements to address poor overall intersection LOS. The intersection of Columbia Street W / Erbsville Road operates poorly with a LOS 'E' stemming from continued high volumes of traffic going eastbound through the intersection providing few opportunities for westbound left-turning vehicles to proceed on the permissible phase. Both of these movements experience delays that exceed the intersection's cycle length. It is important to note that while poor operations are observed at two movements at this intersection, the only poorly operating movement that is associated with WSEL-generated traffic is the eastbound through movement which was observed to operate poorly in background traffic conditions.

PM Peak Hour:

Under PM peak hour conditions two intersections operate poorly with a LOS 'F'. These intersections are Columbia Street W / Ladyslipper Drive, and Columbia Street W / Erbsville Road, respectively. The high volume of traffic exiting the WSEL presents deteriorated operations at the northbound approach to Columbia Street W / Ladyslipper Drive as vehicles make a northbound right-turn to connect to the broader regional road network. This results in queues of 144m which is equivalent to approximately 21 vehicles and would present issues with potential spillback toward the internal Platinum Drive / Street 'B' - 'C' roundabout. The intersection of Columbia Street W / Erbsville Road experiences five movements operating at a LOS 'F', three of which are at the northbound and southbound approaches. This is due to high northbound and southbound through volumes exceeding 600 vehicles creating delays and queues that exceed the intersection cycle length and adjacent storage lengths. On the eastbound and westbound approaches poor operations are observed at the left-turns which both experience delays and queues that exceed the cycle length and available storage lengths. It is important to note that while poor operations are observed at five movements at this intersection, the only poorly operating movement that is associated with WSEL-generated traffic is the eastbound left-turn movement which has deteriorated from a LOS 'D' in Future Background operations to a LOS 'F'.



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Table 27: Future Total Traffic 2031 | Peak Hour Level of Service Analysis

Intersection	Approach/Movement		Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Available (Q)
			LOS	Delay	v/c	Q	LOS	Delay	v/c	Q	
Columbia Street W / Erbsville Road <i>Signalized</i>	EB	Left	D	54.0	0.81	82.0	F	>90	>1.00	114.8	94
		Through	F	>100	>1.00	205.6	D	53.8	0.91	132.1	-
		Right	D	36.3	0.41	14.7	C	26.9	0.29	9	70
	WB	Left	F	>100	>1.00	64.0	F	>90	>1.00	206.9	-
		Through	C	32.4	0.36	45.0	C	22.8	0.69	119.5	-
		Right	A	<1.00	0.00	14.5	A	<1.00	0.00	23.0	40
	NB	Left	C	29.0	0.29	21.2	C	35.0	0.59	24.2	54
		Through	C	27.8	0.63	101.3	F	>90	>1.00	183.8	-
		Right	A	<1.00	0.00	52.7	A	<1.00	0.00	31.2	54
	SB	Left	D	38.1	0.83	72.9	F	>90	>1.00	72.5	50
		Through	B	18.5	0.63	101.7	F	>90	>1.00	192.1	-
		Right	B	12.8	0.21	8.6	C	32.2	0.53	15.4	90
	Overall Intersection		E	70	-	-	F	>90	-	-	-
Columbia Street W / Ladyslipper-Platinum Drive <i>Roundabout</i>	EB		F	68.0	-	110.4	B	10.1	-	9.8	340
	WB		A	5.7	-	3.5	F	127.7	-	204.0	516
	NB		A	6.6	-	2.3	F	210.0	-	366.9	150
	SB		A	5.9	-	2.9	A	9.9	-	2.9	310
	Overall Intersection		E	38.2	-	-	F	125.4	-	-	-
Platinum Drive / Street 'C'-B' <i>Roundabout</i>	EB		A	4.3	-	0.0	A	6.0	-	2.9	-
	WB		A	3.8	-	0.0	A	7.4	-	2.3	-
	NB		A	4.1	-	1.2	A	8.7	-	8.1	360
	SB		A	6.6	-	5.8	A	5.5	-	3.5	150
	Overall Intersection		A	5.9	-	-	A	7.0	-	-	-
Platinum Drive / Copper Street <i>Roundabout</i>	EB		A	4.3	-	0.0	E	45.1	-	47.2	-
	WB		A	5.3	-	0.0	B	12.0	-	14.4	-
	NB		F	496.4	-	912.5	A	5.7	-	4.0	270
	SB		A	9.7	-	5.8	A	6.9	-	3.5	360
	Overall Intersection		F	382.2	-	-	C	19.9	-	-	-
Erb Street West / Platinum Drive <i>Roundabout</i>	EB		A	6.8	-	12.7	A	7.8	-	8.1	50
	WB		F	140.3	-	333.5	A	5.3	-	8.1	110
	NB		B	10.2	-	0.6	C	15.7	-	1.7	-
	SB		A	4.8	-	2.9	C	16.5	-	35.1	270
	Overall Intersection		F	65.4	-	-	B	10.9	-	-	-

*Length of Storage lane for signalized intersections and distance to next major access for roundabouts.

Signalized Intersections: Delays are in seconds, Queues are 95th percentile in metres. Overall intersection LOS 'E' or 'F' highlighted as critical intersections. Movements with LOS 'E' or 'F', delays greater than the intersection cycle length, 95th percentile queues exceeding available storage length or exclusive turning lanes blocked by queues in adjacent through lanes are highlighted as critical movements.

Roundabout Intersections: LOS E/F, and any queues that extend beyond an access upstream are highlighted as critical (if any); Delay in seconds; Queues are maximum 15-minute time segment queues in metres.

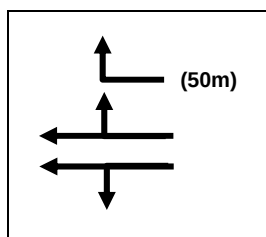


3.4.5 Recommended Network Improvements

Based on Future Total 2031 traffic operations several road network improvements are recommended to address poor operations. These improvements are detailed below and visualized in **Figure 28**:

- **Erb Street West / Platinum Drive:**

- o Additional 50m auxiliary westbound right-turn lane to complement the existing through-right movement. This would result in the following westbound approach: through-left + through-right + auxiliary-right.



- **Platinum Drive**

- o Widen Platinum Drive from two-lanes to three between Erb Street West and Copper Street. This would include one southbound lane and two northbound lanes to integrate with the recommended westbound dual right-turn lane at the Erb Street West / Platinum Drive roundabout.

- **Platinum Drive / Copper Street:**

- o Addition of a northbound auxiliary right-turn lane connected directly to the widened Platinum Drive.

- **Columbia Street W / Ladyslipper Drive:**

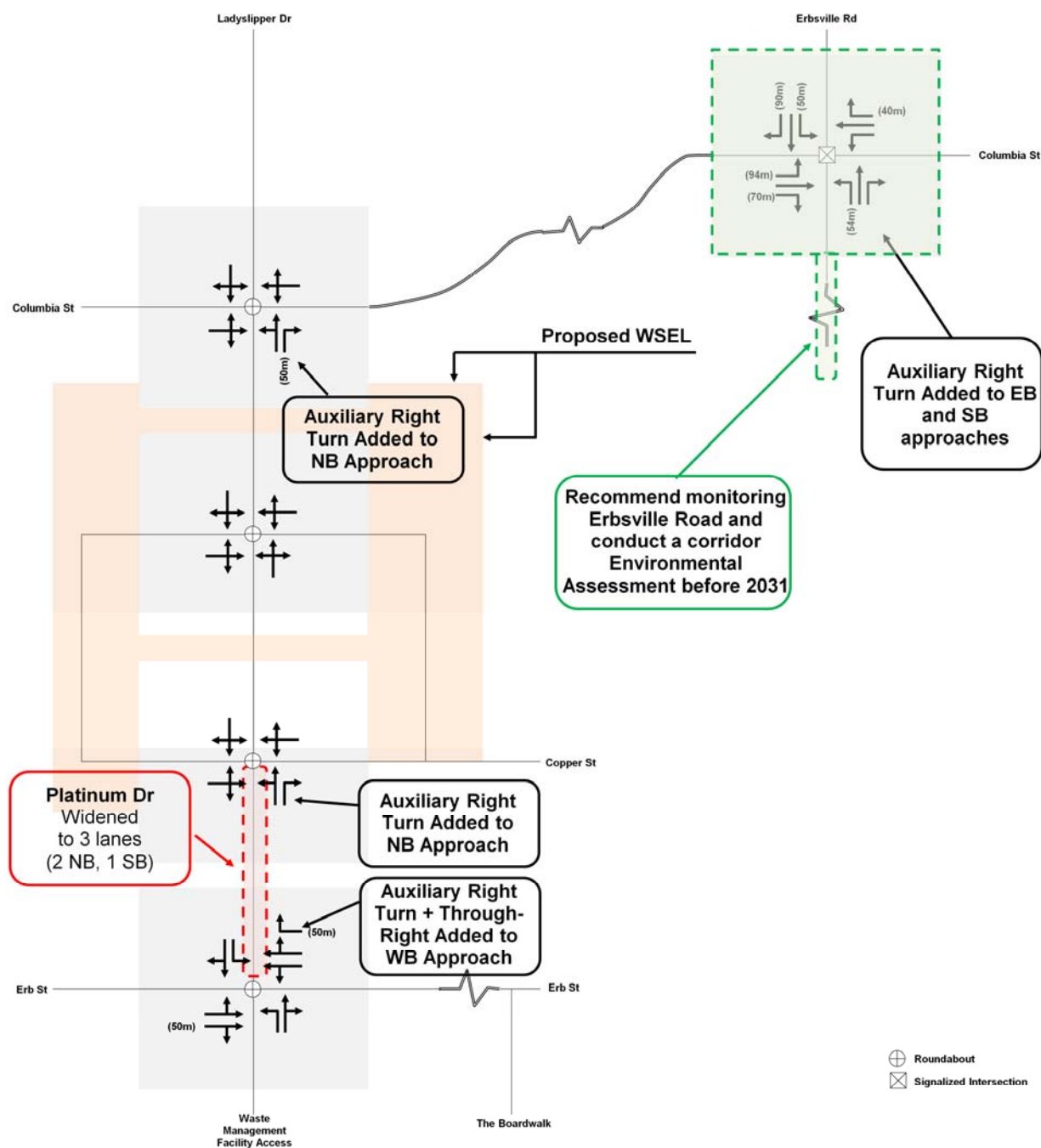
- o Addition of a 50m northbound auxiliary right-turn lane.

- **Columbia Street W / Erbsville Road:**

- o Addition of a 70m eastbound auxiliary right-turn lane and a 90m southbound auxiliary right-turn lane;
- o Future Background operations identified poor operations at this intersection. Considering the operations and the nature of this intersection as a coordinated one with intersections upstream no changes to signal timing were recommended here. The Region's recently approved Regional Transportation Master Plan, prepared by IBI Group Ltd May 29, 2018 identifies Erbsville Road widening from two to four lanes between Erb Street West and Columbia Street West within the 2031-2041 planning horizon (Region of Waterloo, 2018). Considering observed operations within this report for Future Background 2031 and Future Total 2031 traffic, it is recommended that this widening be studied in the form of an Environmental Assessment before 2031 to further identify an appropriate trigger horizon and explore opportunities to improve operations at Columbia Street West / Erbsville Road as well as broader corridor improvements that may shift demand onto other corridors.



Figure 28: Additional Recommended Road Network Improvements



WEST SIDE EMPLOYMENT LANDS TRAFFIC IMPACT STUDY

Future Conditions
August 22, 2018

The resulting peak hour intersection operations with the recommended improvements are summarized in **Table 17**. Detailed Synchro and Arcady report outputs including 50th percentile queues for signalized intersections and 15-minute time segment interval analyses for roundabouts are available in **Appendix D**.

With the recommended improvements all intersections operate at acceptable levels of service with a LOS of 'E' or better in both peak hours. The intersection of Platinum Drive / Copper Street operates at a LOS of 'E' in the AM peak hour, however when reviewing the 15-minute segments for the intersection all but the worst 15-minute segment operate at a LOS 'C' or better.

Table 28: Future Total Traffic 2031 with improvements | Peak Hour Level of Service Analysis

Intersection	Approach/Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Available (m)
		LOS	Delay	v/c	Q	LOS	Delay	v/c	Q	
Columbia Street W / Ladyslipper-Platinum Drive <i>Roundabout</i>	EB	A	4.2	-	5.8	A	3.0	-	2.9	340
	WB	A	5.9	-	4.0	E	47.9	-	69.6	516
	NB	A	5.8	-	1.7	B	13.4	-	23.0	150
	SB	A	5.8	-	2.9	B	11.9	-	3.5	310
	Overall Intersection	A	5.0	-	-	C	22.9	-	-	-
Platinum Drive / Copper Street <i>Roundabout</i>	EB	A	4.4	-	0	E	38.7	-	39.1	-
	WB	A	6.0	-	0	B	12.0	-	10.9	-
	NB	E	46.7	-	119.6	A	5.6	-	4.6	270
	SB	B	11.6	-	66.4	A	6.7	-	4.0	360
	Overall Intersection	E	38.3	-	-	C	17.9	-	-	-
Erb Street West / Platinum Drive <i>Roundabout</i>	EB	A	6.9	-	13.2	A	7.6	-	8.1	50
	WB	A	6.5	-	14.4	A	4.7	-	7.5	110
	NB	B	10.6	-	0.6	C	15.3	-	1.7	-
	SB	A	4.8	-	3.5	C	16.3	-	32.2	270
	Overall Intersection	A	6.4	-	-	B	10.6	-	-	-

Signalized Intersections: v/c equal to or greater than 0.75 for ramp terminals, 0.85 for through and shared/through movements, 0.95 for exclusive turn movements, LOS E/F, and any queues that are longer than the storage length are highlighted (if any); Delay in seconds; Queues are 95th percentile in metres.

Roundabout Intersections: LOS E/F, and any queues that extend beyond an access upstream are highlighted (if any); Delay in seconds; Queues are 95th percentile in metres.

Considering the heavy costs associated with widening Platinum Drive between Copper Street and Erb Street West, it is recommended that further analysis be conducted, as detailed site plans are prepared, with regards to identifying a trigger horizon for this improvement. Currently it is difficult to assess when this roadway would need to be widened if the development was built in phases. It is important to note that the most important consideration is eliminating long northbound queues at the intersection of Platinum Drive / Copper Street which would present an unacceptable impact on the Erb Street West / Platinum Drive intersection.



4.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is an important consideration for site developments. To achieve the sustainability goals of the Regional Transportation Master Plan and local Municipal Official Plans, developments are required to employ the highest standard of urban design, consistent with Waterloo Region's TDM Checklist. These measures are recommended as a means to reduce automobile dependence by enhancing opportunities for residents and employees to walk, cycle, take transit and rideshare. The WSEL development has not yet been designed to detail as to accurately estimate what degree or rate of automobile reductions can be achieved on-site which affects the ability to fill out the Region's TDM checklist as identified in the Region's Transportation Impact Study Guidelines – Appendix G and I. However, in addition to Regional requirements to fill out and submit a TDM checklist, this section recommends industry best-practice measures that should be considered into developments on the WSEL as they occur.

4.1 TRANSIT AND ACTIVE TRANSPORTATION

All transit trips start and end with a walk or bike ride, often called “the last mile”. Therefore, improvements in active transportation are an important complement to transit expansion to promote public transit usage. Active transportation improvements support reductions in parking requirements and trip generation by improving connections to existing active transportation infrastructure, thereby allowing a variety of trips to be shifted away from single occupant vehicles and to foster improved connections with public transit for longer trips.

Based on the site's location nestled between regionally significant corridors, with good access to existing and future biking facilities, there are opportunities to leverage active transportation to reduce vehicular traffic and parking demand at the site. To enhance cycling TDM opportunities, visible, well-lit, short-term bicycle parking should be added on site within 15 m of building entrances. Bicycle parking rates shall use the Region's most recent bike parking rates or industry best-practice rates to determine site-specific bike parking requirements for short-term and long-term parking.

Visitor/short-term bicycle parking should be placed at grade with high visibility and that at least one (1) short-term bicycle parking space shall be provided adjacent to each of the public entrances to the employment and commercial uses.

More specifically, the short-term parking area should be:

1. Located near all, if not most, building entrances to limit walking and inappropriate parking;
2. Clearly identified as visitors might be unfamiliar with the site;
3. Separated from automobile and pedestrian traffic to avoid accidents; and
4. Off roadways for convenient access.

Long-term parking is intended for use over several hours for employees. The area must be designed to protect bicycles parked for longer periods of time. It must be secured with controlled access or individual secure enclosures like bicycle lockers. Where the long-term parking area is located within an underground parking garage, signage is required and shall be strategically placed so that they are visible and easily direct users to the bicycle parking area.



4.2 SUSTAINABLE TRANSPORTATION INFORMATION

To bring awareness and encourage the use of alternative modes of transportation, the site should provide electronic-displays in public areas (such as the main office or factory lobby) to display transportation information for employees and visitors. This information may include: location of bike parking facilities on-site, car share options and other transit related information such as next bus arrival times.

Employers on the site may also prepare and distribute a travel information package to their employees. The package may include the information presented on the electronic displays, as well as the following:

- Local transit schedule/services (GRT, iON LRT, GO Transit);
- Waterloo Region, and City of Waterloo Cycling and trails/active transportation route maps;
- Details about the local Smart Commute Program;
- Local car-share programs; and
- Bike and Walk safety information.

It is recommended that Employers provide a completed travel information package prior to distribution to employees for City staff review. This package should be regularly updated and provided to new employees to the site.

4.3 CAR-SHARE PARKING SPACES

Car-sharing presents an opportunity to reduce on-site parking demand, and reduce vehicular trips generated by the site, and encouraging residents to use alternate modes of transportation for regular use, while also maintaining the availability of an automobile for less frequent car-dependent trips. To encourage this, it is recommended development sites utilize Region of Waterloo accepted car-share rates or industry best-practice rates to reduce on-site parking and encourage rideshare/car-sharing. These car-share parking spaces should be given priority for preferential locations easily accessible by employees and ground-floor commercial visitors and signed accordingly.

4.4 PARKING CONSIDERATIONS

Parking is a key component of transportation demand management that has a direct correlation with automobile use. Development proposals should identify the required and proposed vehicular parking spaces and provide recommendations regarding the most appropriate parking rate based on the site's local context and the applicable parking supply reduction identified in the Region's Transportation Impact Study Guidelines – Appendix I.



5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this traffic impact study identify that under background traffic operations for the 2031 horizon year and in conjunction with planned road network improvements, all intersections operate at acceptable levels of service with the exception of Columbia Street West / Erbsville Road whose capacity and operations are constrained at left-turning movements and north-south approaches due to high volumes. Newly generated traffic related to the WSEL development would only moderately impact this intersection through the eastbound left-turn movement as well as add strain to on-site roundabouts within the WSEL development that were initially proposed as single-lane roundabouts.

To address operations under the Future 2031 Total Traffic Conditions the following mitigation measures are recommended:

- **Erb Street West / Platinum Drive:** Additional 50m auxiliary westbound right-turn lane to complement the existing through-right movement.
- **Platinum Drive:** Widen Platinum Drive from two-lanes to three between Erb Street West and Copper Street. This would include one southbound lane and two northbound lanes to integrate with the recommended westbound dual right-turn lane at the Erb Street West / Platinum Drive roundabout.
- **Platinum Drive / Copper Street:** Addition of a northbound auxiliary right-turn lane.
- **Columbia Street W / Ladyslipper Drive:** Addition of a northbound auxiliary right-turn lane.
- **Columbia Street West / Erbsville Road:** Addition of an eastbound and southbound auxiliary right-turn lane.

While the inclusion of these measures would mitigate and alleviate Future Total operational concerns at most intersections, the eastbound left-turn at the intersection of Columbia Street West / Erbsville Road is still observed to experience poor operations as well as poor overall operations primarily due to north-south traffic volumes. Further signal timing split improvements were attempted to address operations; however, these did not yield any noticeable operational improvements. Beyond this movement, traffic generated by the WSEL has no further negative impacts on the transportation network.

Considering the heavy costs associated with widening Platinum Drive between Copper Street and Erb Street West, it is recommended that further analysis be conducted, as detailed site plans are prepared, with regards to identifying a trigger horizon for this improvement. Currently it is difficult to assess when this roadway would need to be widened if the development was built in phases. It is important to note that the most important consideration is eliminating long northbound queues at the intersection of Platinum Drive / Copper Street which would present an unacceptable impact on the Erb Street West / Platinum Drive intersection.

The Region's recently approved Regional Transportation Master Plan, prepared by IBI Group Ltd May 29, 2018 identifies Erbsville Road widening from two to four lanes between Erb Street West and Columbia Street West within the 2031-2041 planning horizon (Region of Waterloo, 2018). Considering observed operations within this report for Future Background 2031 and Future Total 2031 traffic, it is recommended that this widening be studied in the form of an Environmental Assessment before 2031 to further identify an appropriate trigger horizon and explore opportunities to improve operations at Columbia Street West / Erbsville Road as well as broader corridor improvements that may shift demand onto other corridors. This is estimated to be required regardless of whether the WSEL is built or not as identified by the Future Background Traffic conditions.



References

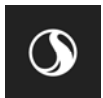
August 22, 2018

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Appendix A PRE-STUDY CONFERENCE FORM



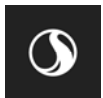
PRE-STUDY CONFERENCE FORM

Item	Description	Details
INTRODUCTION		
1	Nature of application (Attach a drawing)	☒ Official Plan Amendment ☒ Zoning Amendment ☐ Site Plan Control Application ☒ Plan of Subdivision ☐ Community Plan ☐ Other
2	TIS process, and relevant policies, procedures and approvals	☒ Guidelines for the preparation of Transportation Impact Studies in Support of Development Applications ☒ Transportation Impact Studies Requirements for Capacity Analysis, Roundabouts, Turn Lanes ☐ Safety Analysis Checklist ☐ Policy and Procedures for Access onto Regional Roads
3	Public Meeting	☒ Required ☐ Not Required
CONTEXT		
4	Study intersections (intersections to be analyzed) NOTE: the consultant is responsible to identify any further intersections impacted as the study progresses	☒ Columbia/Platinum
		☒ Erb/Platinum
		☒ Platinum/North Street (B/C)
		☒ Platinum/South Street (B/C)
		☒ Erbsville/Columbia
		☐
		☐
		☐
		☐
5	Size and number of phases of development	☒ 8000 jobs
		☒ Comment on phasing of any road improvements that are needed to support the proposal and the widening of Erbsville Road
		☐
		☐
6	Approved and pending approval development applications	☒ Included in Region's model and work done by WSP for the IMMTS
7	Planned transportation system improvements	☒ Erb Street widening ☒ Platinum Drive extension to Columbia
8	Horizon years	☐ 5 years from date of TIS ☐ 5 years after full occupancy ☐ Transportation Plan horizon for large scale projects ☐ Interim years ☒ 2031

9	Peak hour determination	✓ AM weekday peak hour of adjacent roadway ✓ PM weekday peak hour of adjacent roadway - o Saturday peak of adjacent roadway - o AM weekday peak hour of development - o PM weekday peak hour of development - o Saturday peak of development
10	Background	- o Historical traffic/transit counts ✓ ROW travel demand forecasts - o Approved and pending approval development applications - o Other...
11	Trip Generation	✓ ITE average rates (for comparison) ✓ ITE fitted equation (for comparison) - o Rates published elsewhere - o Observed rates for similar areas - o Observed rates for similar developments in the local area ✓ Regional travel demand model forecasts
12	Trip reductions (TDM, internal, pass-by)	✓ Transportation Demand Management Checklist - o Published Travel Demand Management reductions - o Observed Travel demand Management reductions - o ITE internal capture reductions for mixed-use developments - o Observed internal capture reductions for mixed-use developments - o ITE pass-by reductions - o Observed [pass-by reductions for similar developments ✓ Regional travel demand model considerations
13	Trip distribution	- o ITE trip distribution IN/OUT split ✓ Regional travel demand - o Population and employment distribution - o Market analysis of catchment area - o Other...
14	Trip assignment	- o Local traffic pattern - o Site layout and access design - o Existing turning movements ✓ Regional travel demand model
EVALUATION OF IMPACTS		
15	Traffic impact analysis (use approved software)	✓ Unsignalized intersections ✓ Left turn warrant analysis ✓ Signal warrant analysis ✓ Signalized intersections ✓ LOS, v/c, delay, queuing ✓ ROW saturation flow rates ✓ Existing signal timings for existing conditions ✓ Optimize signal timings for future conditions ✓ Queuing analysis ✓ Roundabouts - o Other...

16	Roundabout feasibility (use approved software)	✓ Initial screening (as needed) - o Intersection control study (10 year horizon)
17	Transit assessment	- o Frequency and hours of service - o Presence of bus stops - o Reliability of service - o Passenger loads - o Travel time ✓ Reference to City's IMMTS work
18	Pedestrian assessment	✓ Presence, connectivity and width of sidewalks ✓ Barriers and buffers from traffic ✓ Crossing opportunities at intersections - o Delay at intersections - o Number of driveways and traffic volumes at the driveways - o Presence of illumination ✓ Reference to City's IMMTS work
19	Cycling assessment	✓ Presence of a dedicated facility ✓ Network connectivity - o Number and width of travel lanes adjacent to the route - o Volume and speed of traffic - o Percentage of trucks and buses encountered - o Pavement condition - o Presence of parking/showers/change rooms ✓ Reference to City's IMMTS work
20	Safety analysis	- o Road safety review - o Collision risk analysis - o Access conflict evaluation
21	Site access and circulation	- o Review sight distances at all new access points ✓ Internal traffic controls - o Loading facilities and access - o Service/maintenance vehicle access ✓ Emergency vehicle access

Appendix B TRANSIT ROUTE NAVIGATORS



Sunday/Holiday Schedule

To The Boardwalk					To UW				
UW - Needles Hall (Depart)	Columbia / Fischer-Hallman	Laurelwood / Erbsville	Erbsville / Keats Way	The Boardwalk (Arrive)	The Boardwalk (Depart)	Erbsville / Keats Way	Laurelwood / Erbsville	Columbia / Fischer-Hallman	UW - Davis Centre (Arrive)
A	B	C	D	E	E	D	C	B	F
8:00	8:05	8:11	8:17	8:23	7:50	7:55	8:01	8:07	8:12
8:47	8:52	8:58	9:04	9:10	8:40	8:45	8:51	8:57	9:02
9:32	9:37	9:43	9:49	9:55	9:25	9:30	9:37	9:43	9:48
10:20	10:25	10:31	10:37	10:43	10:10	10:16	10:23	10:29	10:34
11:05	11:10	11:16	11:22	11:28	10:55	11:01	11:08	11:14	11:19
11:50	11:55	12:01	12:07	12:13	11:40	11:46	11:53	11:59	12:04
12:35	12:40	12:46	12:52	12:58	12:25	12:31	12:38	12:44	12:49
1:20	1:25	1:31	1:37	1:43	1:10	1:16	1:23	1:29	1:34
2:05	2:10	2:16	2:22	2:28	1:55	2:01	2:08	2:14	2:19
2:50	2:55	3:01	3:07	3:13	2:40	2:46	2:53	2:59	3:04
3:35	3:40	3:46	3:52	3:58	3:25	3:31	3:38	3:44	3:49
4:20	4:25	4:31	4:37	4:43	4:10	4:16	4:23	4:29	4:34
5:05	5:10	5:16	5:22	5:28	4:55	5:01	5:08	5:14	5:19
5:50	5:55	6:01	6:07	6:13	5:40	5:46	5:53	5:59	6:04
6:33	6:38	6:44	6:50	6:56	6:25	6:30	6:36	6:42	6:47
7:18	7:23	7:29	7:35	7:41	7:10	7:15	7:21	7:27	7:32
8:03	8:08	8:14	8:20	8:26	7:55	8:00	8:06	8:12	8:17
8:48	8:53	8:59	9:05	9:11	8:40	8:45	8:51	8:57	9:02
9:37	9:42	9:48	9:54	10:00	9:25	9:30	9:36	9:42	9:47
10:18	10:23	10:29	10:35	10:41	10:10	10:15	10:21	10:27	10:32
11:03	11:08	11:14	11:20	11:26	11:00	11:05	11:11	11:17	11:22
11:48	11:53	11:59	12:05	12:11					

Fares and schedules are subject to change without notice.
Weather and road conditions may cause schedule delays.

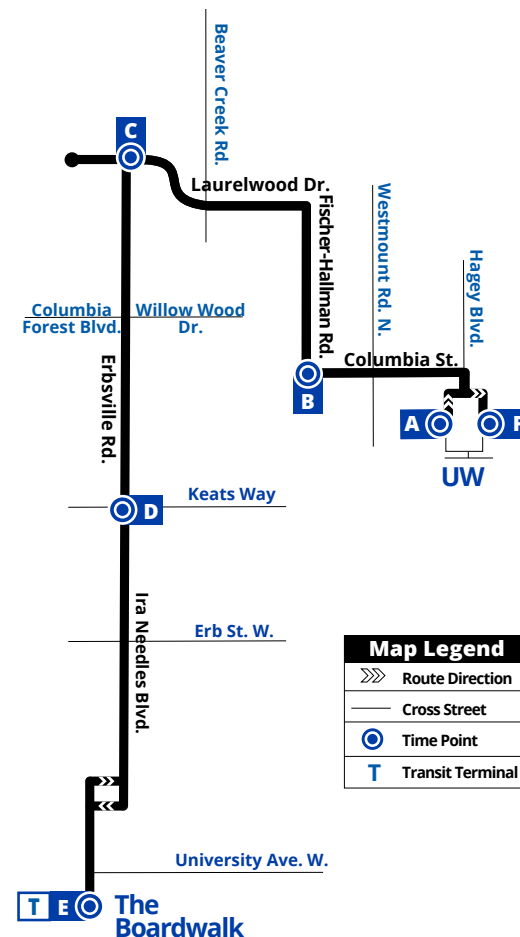
EasyGO Stops

To The Boardwalk		To UW	
A UW - Needles Hall	2517	E The Boardwalk	4002
Columbia / Hagey	2531	The Boardwalk / Lifestyle Way	1040
Columbia / Village 1	1096	The Boardwalk Medical Centre	1037
Columbia / Ron Eydtt Village	1097	Ira Needles / Thorndale	3903
Columbia / Old Post	1098	Ira Needles / Erb	3905
Columbia / Beechlaw	1099	Erbsville / Erb	3689
B Columbia / Fischer-Hallman	4026	Erbsville / Royal Beech	3690
Fischer-Hallman / Gatestone	4076	Path To Erbsville	3691
Path To Laurel Gate	4077	D Erbsville / Keats Way	3451
Fischer-Hallman / Laurelwood	4078	Erbsville / Leighland	3452
Laurelwood / Beaver Creek	4079	Erbsville / Cornridge	4088
Laurelwood / Brookmill	4080	Erbsville / Columbia	3453
Laurelwood / Holly View	4081	Erbsville / Willow Wood	1106
Laurelwood / Birchmount	4082	Erbsville / White Elm	3392
C Laurelwood / Erbsville	4083	Erbsville / Path To Blue Beech	4085
Laurelwood / Blue Beech	4014	Laurelwood / Blue Beech	4014
Erbsville / Path To Blue Beech	4084	C Laurelwood / Erbsville	1107
Erbsville / White Elm	4086	Laurelwood / Birchmount	1108
Erbsville / Columbia Forest	3454	Laurelwood / Brookmill	1109
Erbsville / Columbia	3455	Laurelwood / Beaver Crk. Cr.	1110
Erbsville /	4087	Laurelwood / Beaver Crk. Rd.	1111
Brandenburg	3456	Laurelwood / Laurel Gate	1112
D Erbsville / Keats Way	3446	Laurelwood / Bearinger	3949
Path To Lausanne	1979	Path To Laurel Gate	1113
Erbsville / Brandenburg	1980	Fischer-Hallman / Gatestone	1114
Erbsville / Chablis	1981	B Fischer-Hallman / Columbia	1115
Erbsville / Erb	3685	Columbia / Fischer-Hallman	1116
Ira Needles / Erb	3906	Columbia / Beechlaw	1117
Ira Needles / Thorndale	3904	Columbia / Old Post	1118
Boardwalk Medical Centre	1293	Columbia / Ron Eydtt Village	1119
The Boardwalk / Lifestyle Way	3901	Columbia / Village 1	1120
E The Boardwalk	4002	Columbia / UW	3899
		F UW - Davis Centre	4003

Laurelwood



Effective: January 2, 2017



519-585-7555 www.grt.ca TTY: 519-575-4608
Text: 57555 & key in your bus stop number

Weekday Schedule

To The Boardwalk					To UW				
UW - Needles Hall (Depart)	Columbia / Fischer-Hallman	Laurelwood / Erbsville	Erbsville / Keats Way	The Boardwalk (Arrive)	The Boardwalk (Depart)	Erbsville / Keats Way	Laurelwood / Erbsville	Columbia / Fischer-Hallman	UW - Davis Centre (Arrive)
A	B	C	D	E	E	D	C	B	F
6:16	6:21	6:27	6:34	6:40		5:40	5:47	5:53	5:58
6:46	6:51	6:57	7:04	7:10	6:05	6:11	6:19	6:25	6:30
7:16	7:21	7:27	7:34	7:40	6:45	6:51	6:59	7:05	7:10
7:36	7:41	7:47	7:54	8:00	7:15	7:22	7:30	7:37	7:42
7:51	7:56	8:02	8:09	8:15	7:30	7:37	7:45	7:52	7:57
8:08	8:13	8:19	8:26	8:32	7:45	7:52	8:00	8:07	8:12
8:23	8:28	8:34	8:41	8:47	7:50	7:57	8:05	8:12	8:17
8:38	8:43	8:49	8:56	9:02	7:55	8:02	8:10	8:17	8:22
8:53	8:58	9:04	9:11	9:17	8:15	8:22	8:30	8:37	8:42
9:08	9:13	9:19	9:26	9:32	8:25	8:32	8:40	8:47	8:52
9:28	9:33	9:39				8:42	8:50	8:57	9:02
9:38	9:43	9:49	9:56	10:02	8:45	8:52	9:00	9:07	9:12
9:58	10:03	10:09			8:55	9:02	9:10	9:17	9:22
10:06	10:11	10:17	10:24	10:30	9:15	9:21	9:29	9:36	9:41
10:28	10:33	10:39			9:20	9:26	9:34	9:41	9:46
10:36	10:41	10:47	10:54	11:00			9:39	9:48	9:53
10:58	11:03	11:09			9:45	9:51	9:59	10:06	10:11
11:06	11:11	11:17	11:24	11:30			10:09	10:18	10:23
11:28	11:33	11:39			10:15	10:21	10:29	10:36	10:41
11:36	11:41	11:47	11:54	12:00			10:39	10:48	10:53
11:58	12:03	12:09			10:45	10:51	10:59	11:06	11:11
12:06	12:11	12:17	12:24	12:30			11:09	11:18	11:23
12:28	12:33	12:39			11:15	11:21	11:29	11:36	11:41
12:36	12:41	12:47	12:54	1:00			11:39	11:48	11:53
12:58	1:03	1:09			11:45	11:51	11:59	12:06	12:11
1:06	1:11	1:17	1:24	1:30			12:09	12:18	12:23
1:28	1:33	1:39			12:15	12:21	12:29	12:36	12:41
1:36	1:41	1:47	1:54	2:00			12:39	12:48	12:53
1:58	2:03	2:09			12:45	12:51	12:59	1:06	1:11
2:06	2:11	2:17	2:24	2:30			1:09	1:18	1:23
2:30	2:35	2:42			1:15	1:21	1:29	1:36	1:41
	2:40	2:48	2:57	3:03			1:39	1:48	1:53
2:36	2:43	2:51	3:00	3:06	1:45	1:51	1:59	2:06	2:11
2:51	2:57	3:04	3:11	3:17			2:09	2:18	2:23
3:07	3:13	3:20	3:27	3:33	2:15	2:21	2:29	2:36	2:42
3:22	3:28	3:35	3:42	3:48			2:42	2:51	2:57
3:37	3:43	3:50	3:57	4:03	2:45	2:52	3:00	3:07	3:13
3:52	3:58	4:05	4:12	4:18	3:00	3:07	3:15	3:22	3:28
4:07	4:13	4:20	4:27	4:33	3:15	3:22	3:30	3:37	3:43
4:22	4:28	4:35	4:42	4:48	3:30	3:37	3:45	3:52	3:58
4:37	4:43	4:50	4:57	5:03	3:45	3:52	4:00	4:07	4:13
4:52	4:58	5:05	5:12	5:18	4:00	4:07	4:15	4:22	4:28
5:07	5:13	5:20	5:27	5:33	4:15	4:22	4:30	4:37	4:43
5:22	5:28	5:35	5:42	5:48	4:30	4:37	4:45	4:52	4:58
5:37	5:43	5:50	5:57	6:03	4:45	4:52	5:00	5:07	5:13
5:52	5:58	6:05	6:12	6:18	5:00	5:07	5:15	5:22	5:28
6:07	6:13	6:20	6:27	6:33	5:15	5:22	5:30	5:37	5:43
6:22	6:28	6:34	6:41	6:47	5:30	5:37	5:45	5:52	5:58
6:37	6:42	6:48	6:55	7:01	5:45	5:52	6:00	6:07	6:13
7:05	7:10	7:16	7:23	7:29	6:00	6:07	6:15	6:22	6:28
7:35	7:40	7:46	7:53	7:59	6:15	6:22	6:30	6:36	6:41
8:05	8:10	8:16	8:23	8:29	6:45	6:51	6:58	7:04	7:09
8:35	8:40	8:46	8:53	8:59	7:15	7:21	7:28	7:34	7:39
9:05	9:10	9:16	9:23	9:29	7:45	7:51	7:58	8:04	8:09
9:40	9:45	9:51	9:58	10:04	8:15	8:21	8:28	8:34	8:39
10:05	10:10	10:16	10:23	10:29	8:45	8:51	8:58	9:04	9:09
10:33	10:38	10:44	10:51	10:57	9:15	9:21	9:28	9:34	9:39
11:03	11:08	11:14	11:21	11:27	9:40	9:46	9:53	9:59	10:04
11:43	11:48	11:54	12:01	12:07	10:10	10:16	10:23	10:29	10:34
12:18	12:23	12:29	12:36	12:42	10:40	10:46	10:53	10:59	11:04
					11:10	11:16	11:23	11:29	11:34
					12:15	12:21	12:28	12:34	12:39

Saturday Schedule

To The Boardwalk					To UW				
UW - Needles Hall (Depart)	Columbia / Fischer-Hallman	Laurelwood / Erbsville	Erbsville / Keats Way	The Boardwalk (Arrive)	The Boardwalk (Depart)	Erbsville / Keats Way	Laurelwood / Erbsville	Columbia / Fischer-Hallman	UW - Davis Centre (Arrive)
A	B	C	D	E	E	D	C	B	F
6:47	6:52	6:58	7:04	7:10	7:05	7:10	7:16	7:22	7:27
7:47	7:52	7:58	8:04	8:10	7:35	7:40	7:46	7:52	7:57
8:47	8:52	8:58	9:04	9:10	8:05	8:10	8:16	8:22	8:27
9:19	9:24	9:30	9:36	9:42	8:35	8:40	8:46	8:52	8:57
9:51	9:56	10:02	10:08	10:14	9:05	9:11	9:18	9:24	9:29
10:21	10:26	10:32	10:38	10:44	9:35	9:41	9:48	9:54	9:59
10:51	10:56	11:02	11:08	11:14	10:10	10:16	10:23	10:29	10:34
11:21	11:26	11:32	11:38	11:44	10:40	10:46	10:53	10:59	11:04
11:51	11:56	12:02	12:08	12:14	11:10	11:16	11:23	11:29	11:34
12:21	12:26	12:32	12:38	12:44	11:40	11:46	11:53	11:59	12:04
12:51	12:56	1:02	1:08	1:14	12:10	12:16	12:23	12:29	12:34
1:21	1:26	1:32	1:38	1:44	12:40	12:46	12:53	12:59	1:04
1:51	1:56	2:02	2:08	2:14	1:10	1:16	1:23	1:29	1:34
2:21	2:26	2:32	2:38	2:44	1:40	1:46	1:53	1:59	2:04
2:51	2:56	3:02	3:08	3:14	2:10	2:16	2:23	2:29	2:34
3:21	3:26	3:32	3:38	3:44	2:40	2:46	2:53	2:59	3:04
3:51	3:56	4:02	4:08	4:14	3:10	3:16	3:23	3:29	3:34
4:21	4:26	4:32	4:38	4:44	3:40	3:46	3:53	3:59	4:04
4:51	4:56	5:02	5:08	5:14	4:10	4:16	4:23	4:29	4:34
5:21	5:26	5:32	5:38	5:44	4:40	4:46	4:53	4:59	5:04
5:51	5:56	6:02	6:08	6:14	5:10	5:16	5:23	5:29	5:34
6:19	6:24	6:30	6:36	6:42	5:40	5:46	5:53	5:59	6:04
6:48	6:53	6:59	7:05	7:11	6:10	6:15	6:21	6:27	6:32
7:18	7:23	7:29	7:35	7:41	6:35	6:40	6:46	6:52	6:57
7:48	7:53	7:59	8:05	8:11	7:05	7:10	7:16	7:22	7:27
8:18	8:23	8:29	8:35	8:41	7:35	7:40	7:46	7:52	7:57
8:48	8:53	8:59	9:05	9:11	8:05	8:10	8:16	8:22	8:27
9:18	9:23	9:29	9:35	9:41	8:35	8:40	8:46	8:52	8:57
9:48	9:53	9:59	10:05	10:11	9:05	9:10	9:16	9:22	9:27
10:18	10:23	10:29	10:35	10:41	9:35	9:40	9:46	9:52	9:57
10:48	10:53	10:59	11:05	11:11	10:05	10:10	10:16	10:22	10:27
11:18	11:23	11:29	11:35	11:41	10:35	10:40	10:46	10:52	10:57
11:48	11:53	11:59	12:05	12:11	11:10	11:15	11:21	11:27	11:32
12:18	12:23	12:29	12:35	12:41	12:15	12:20	12:26	12:32	12:37

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These trips only operate during Fall and Winter schedule

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These trips do not operate during Summer or Christmas

Sunday/Holiday Schedule

To King/ University					To The Boardwalk				
The Boardwalk (Depart)	Erb / Ira Needles	Fischer-Hallman / Keats Way	UW / Seagram	King / University (Arrive)	King / University (Depart)	UW / Seagram	Fischer-Hallman / Keats Way	Erb / Ira Needles	The Boardwalk (Arrive)
A	B	C	D	E	E	D	C	B	A
10:30	10:34	10:39	10:45	10:51	10:55	11:00	11:05	11:10	11:14
11:15	11:19	11:24	11:30	11:36	11:40	11:45	11:50	11:55	11:59
12:00	12:04	12:09	12:15	12:21	12:25	12:30	12:35	12:40	12:44
12:45	12:49	12:54	1:00	1:06	1:10	1:15	1:20	1:25	1:29
1:30	1:34	1:39	1:45	1:51	1:55	2:00	2:05	2:10	2:14
2:15	2:19	2:24	2:30	2:36	2:40	2:45	2:50	2:55	2:59
3:00	3:04	3:09	3:15	3:21	3:25	3:30	3:35	3:40	3:44
3:45	3:49	3:54	4:00	4:06	4:10	4:15	4:20	4:25	4:29
4:30	4:34	4:39	4:45	4:51	4:55	5:00	5:05	5:10	5:14
5:15	5:19	5:24	5:30	5:36	5:40	5:45	5:50	5:55	5:59

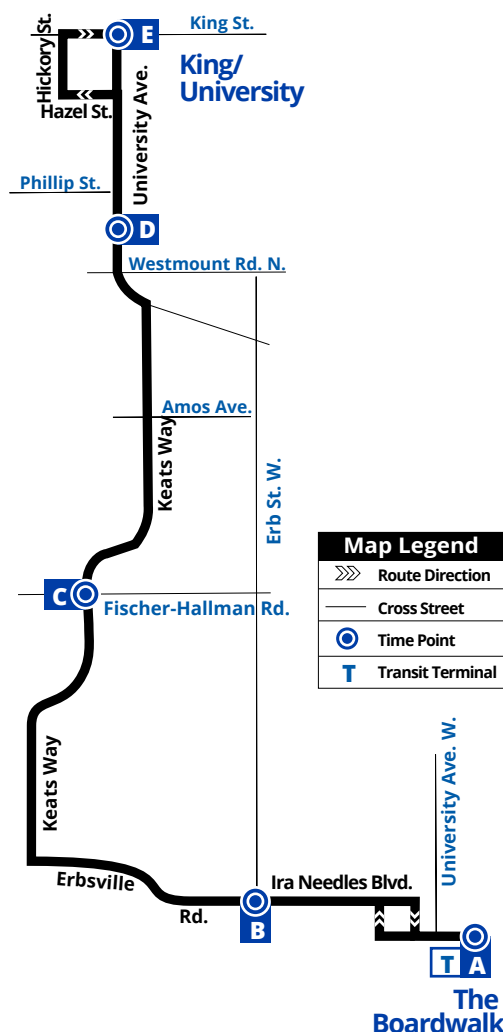
EasyGO Stops

To King/ University		To The Boardwalk	
A	The Boardwalk 4003	E	University / King 1166
The Boardwalk / Lifestyle Way	1040	Laurier (WLU)	3619
The Boardwalk Medical Centre	1037	University / Hemlock	2673
Ira Needles / Thorndale	3903	University / Sunview	2674
		University / Phillip	2675
B	Ira Needles / Erb 3905	D	UW / Seagram 2676
656 Erb St.	3689	University / Ring Road Exit	2677
Erbsville / Royal Beech	3690	University / Westmount	3589
Path to Erbsville	3691	Keats Way / McDougall	3156
Keats Way / Keatswood	3692	Keats Way / Amos	3158
Keats Way / Beechwood	3693	Keats Way / Midwood	3159
Keats Way / Leighland	3694	Keats Way / Candlewood	3160
Keats Way / Brynhurst	3695	C	Keats Way / Fischer-Hallman 3907
Keats Way / Sandford Fleming	3463	Keats Way / Sandford Fleming	1974
C	Keats Way / Fischer-Hallman 3464	Keats Way / Sandford Fleming	1975
Keats Way / Midwood	3149	Keats Way / Leighland	1976
Keats Way / Midwood	3150	Keats Way / Beechwood	1977
Keats Way / Amos	3151	Keats Way / Erbsville	1978
Keats Way / McDougall	3153	Erbsville / Path to Lausanne	1979
University / Westmount	3631	Erbsville / Brandenburg	1980
University / Ring Road Exit	2780	Erbsville / Chablis	1981
D	UW / Seagram 1090	Erbsville / Erb	3685
University / Phillip	3943	B	Ira Needles / Erb 3906
University / Sunview	3945	Ira Needles / Thorndale	3904
University / Hemlock	2783	Boardwalk Medical Centre	1293
Laurier (WLU)	1167	The Boardwalk / Lifestyle Way	3901
Hickory / King	1164	A	The Boardwalk 4003

Keats Way



Effective: January 2, 2017



Fares and schedules are subject to change without notice.
Weather and road conditions may cause schedule delays.



519-585-7555 www.grt.ca TTY: 519-575-4608
Text: 57555 & key in your bus stop number

Weekday Schedule

To King / University					To The Boardwalk				
The Boardwalk (Depart)	Erb / Ira Needles	Fischer-Hallman / Keats Way	UW / Seagram	King / University (Arrive)	King / University (Depart)	UW / Seagram	Fischer-Hallman / Keats Way	Erb / Ira Needles	The Boardwalk (Arrive)
A	B	C	D	E	E	D	C	B	A
6:00	6:04	6:11	6:18	6:24	6:27	6:31	6:37	6:44	6:48
6:30	6:34	6:41	6:48	6:54	6:57	7:01	7:07	7:14	7:18
7:00	7:04	7:11	7:18	7:24	7:27	7:31	7:37	7:44	7:48
7:30	7:34	7:41	7:49	7:55	7:57	8:01	8:07	8:14	8:18
7:45	7:49	7:54	8:02	8:07	8:27	8:31	8:37	8:44	8:48
		8:07	8:15	8:20	8:57	9:01	9:08	9:14	9:18
8:00	8:04	8:11	8:19	8:25	9:27	9:32	9:39	9:45	9:49
		8:26	8:34	8:39	9:56	10:01	10:08	10:14	10:18
8:30	8:34	8:41	8:49	8:55	10:26	10:31	10:38	10:44	10:48
		8:56	9:04	9:09	10:56	11:01	11:08	11:14	11:18
9:00	9:04	9:10	9:17	9:24	11:26	11:31	11:38	11:44	11:48
		9:25	9:33	9:38	11:56	12:01	12:08	12:14	12:18
9:30	9:34	9:40	9:47	9:54	12:26	12:31	12:38	12:44	12:48
		9:55	10:03	10:08	12:56	1:01	1:08	1:14	1:18
10:00	10:04	10:10	10:17	10:24	1:26	1:31	1:38	1:44	1:48
10:30	10:34	10:40	10:47	10:54	1:56	2:01	2:08	2:14	2:18
11:00	11:04	11:10	11:17	11:24	2:26	2:32	2:39	2:46	2:50
11:30	11:34	11:40	11:47	11:54	3:00	3:06	3:13	3:20	3:24
12:00	12:04	12:10	12:17	12:24	3:30	3:36	3:43	3:50	3:54
12:30	12:34	12:40	12:47	12:54	4:00	4:06	4:13	4:20	4:24
1:00	1:04	1:10	1:17	1:24	4:30	4:36	4:43	4:50	4:54
1:30	1:34	1:40	1:47	1:54	5:00	5:06	5:13	5:20	5:24
2:00	2:04	2:10	2:17	2:25	5:30	5:36	5:43	5:50	5:54
2:30	2:34	2:40	2:47	2:55	6:00	6:05	6:12	6:18	6:21
3:00	3:04	3:10	3:17	3:25	6:30	6:35	6:42	6:48	6:51
3:30	3:34	3:40	3:47	3:55	7:00	7:05	7:12	7:18	7:21
4:00	4:04	4:10	4:17	4:25	7:30	7:35	7:42	7:48	7:51
4:30	4:34	4:40	4:47	4:55	8:00	8:05	8:12	8:18	8:21
5:00	5:04	5:10	5:17	5:25	8:30	8:35	8:42	8:48	8:51
5:30	5:34	5:40	5:47	5:55	9:00	9:05	9:12	9:18	9:21
6:00	6:04	6:10	6:17	6:23	9:30	9:35	9:42	9:48	9:51
6:30	6:34	6:40	6:47	6:53	10:00	10:05	10:12	10:18	10:21
7:00	7:04	7:10	7:17	7:23	10:30	10:35	10:42	10:48	10:51
7:30	7:34	7:40	7:47	7:53	11:00	11:05	11:12	11:18	11:21
8:00	8:04	8:10	8:17	8:23	12:00	12:05	12:12	12:18	12:21
8:30	8:34	8:40	8:47	8:53					
9:00	9:04	9:10	9:17	9:23					
9:30	9:34	9:40	9:47	9:53					
10:00	10:04	10:10	10:17	10:23					
10:30	10:34	10:40	10:47	10:53					
11:30	11:34	11:40	11:47	11:53					

XX:XX

These trips do not operate during Summer or Christmas

Saturday Schedule

To King / University					To The Boardwalk				
The Boardwalk (Depart)	Erb / Ira Needles	Fischer-Hallman / Keats Way	UW / Seagram	King / University (Arrive)	King / University (Depart)	UW / Seagram	Fischer-Hallman / Keats Way	Erb / Ira Needles	The Boardwalk (Arrive)
A	B	C	D	E	E	D	C	B	F
6:50	6:54	7:00	7:06	7:12	7:15	7:19	7:25	7:31	7:35
7:20	7:24	7:30	7:36	7:42	7:45	7:49	7:55	8:01	8:05
7:50	7:54	8:00	8:06	8:12	8:15	8:19	8:25	8:31	8:35
8:20	8:24	8:30	8:36	8:42	8:45	8:49	8:55	9:01	9:05
8:50	8:54	9:00	9:07	9:13	9:15	9:19	9:25	9:31	9:35
9:20	9:24	9:30	9:37	9:43	9:45	9:50	9:57	10:03	10:07
9:50	9:54	10:00	10:07	10:13	10:15	10:20	10:27	10:33	10:37
10:20	10:24	10:30	10:37	10:43	10:45	10:50	10:57	11:03	11:07
10:50	10:54	11:00	11:07	11:13	11:15	11:20	11:27	11:33	11:37
11:20	11:24	11:30	11:37	11:43	11:45	11:50	11:57	12:03	12:07
11:50	11:54	12:00	12:07	12:13	12:15	12:20	12:27	12:33	12:37
12:20	12:24	12:30	12:37	12:43	12:45	12:50	12:57	1:03	1:07
12:50	12:54	1:00	1:07	1:13	1:15	1:20	1:27	1:33	1:37
1:20	1:24	1:30	1:37	1:43	1:45	1:50	1:57	2:03	2:07
1:50	1:54	2:00	2:07	2:13	2:15	2:20	2:27	2:33	2:37
2:20	2:24	2:30	2:37	2:43	2:45	2:50	2:57	3:03	3:07
2:50	2:54	3:00	3:07	3:13	3:15	3:20	3:27	3:33	3:37
3:20	3:24	3:30	3:37	3:43	3:45	3:50	3:57	4:03	4:07
3:50	3:54	4:00	4:07	4:13	4:15	4:20	4:27	4:33	4:37
4:20	4:24	4:30	4:37	4:43	4:45	4:50	4:57	5:03	5:07
4:50	4:54	5:00	5:07	5:13	5:15	5:20	5:27	5:33	5:37
5:20	5:24	5:30	5:37	5:43	5:45	5:50	5:57	6:03	6:07
5:50	5:54	6:00	6:07	6:13	6:15	6:20	6:27	6:33	6:36
6:50	6:54	7:00	7:06	7:12	7:15	7:20	7:26	7:32	7:35
7:50	7:54	8:00	8:06	8:12	8:15	8:20	8:26	8:32	8:35
8:50	8:54	9:00	9:06	9:12	9:15	9:20	9:26	9:32	9:35
9:50	9:54	10:00	10:06	10:12	10:15	10:20	10:26	10:32	10:35
10:50	10:54	11:00	11:06	11:12	11:15	11:20	11:26	11:32	11:35

Fares and schedules are subject to change without notice.
Weather and road conditions may cause schedule delays.

Bus Stops

To Clair Hills

To Conestoga Mall

A Conestoga Mall 4005

Davenport / Old Abbey	1205
Davenport / Northfield	1206
Frobisher / Davenport	1208
Frobisher / 100s Block	1209
Frobisher / McMurray	1210
Frobisher / Superior	3760
Bridge / Frobisher	3593

B Bridge / Northfield 4051

Chesapeake / Brigantine	3781
Chesapeake / Seawind	1133
Chesapeake / Seawind	3780
Chesapeake / Sandy Cove	3782
New Bedford / Starboard	3594
New Bedford / Eastbridge	3595
Path To St. Luke	2038
Eastbridge / Windjammer	2039
Eastbridge / Mayflower	2040
Eastbridge / Bridge	2041
Bridge / Whitmore	3783

C Lexington / Bridge 3768

Lexington / Lee	3764
Lexington / Dunvegan	2803
Lexington / Davenport	3900
Lexington / Dearborn	3769
Lexington / Dearborn	3770
Columbia / Marsland	3771
Columbia / Weber	3772

D Columbia / King 4072

Columbia / Holly	2511
Columbia / Hazel	2512
Columbia / Albert	2513
Columbia / Lester	2514
Columbia / Phillip	1093
Columbia / U.W. Optometry	1094

E Columbia / UW 3898

Columbia / Village 1	1096
Columbia / Ron Eydtt Village	1097
Columbia / Old Post	1098
Columbia / Beechlawn	1099

F Columbia / Fischer-Hallman 4027

Columbia / Fischer-Hallman	1100
Columbia / Gatestone	1102
Columbia / Cavendish	1104
Columbia / Erbsville	1105
Columbia / Salzburg	4017
Columbia / Zurich	4022
Columbia / St. Moritz	4020
Columbia / Ladyslipper	1213

G Columbia / Sundew 4023

G Columbia / Sundew 4023

Columbia / Ladyslipper	1214
Columbia / St. Moritz	4019
Columbia / Lucerne	4021
Columbia / Salzburg	4018
Columbia / Erbsville	4012
Columbia / Cavendish	4013
Columbia / Bennington	4024
Columbia / Gatestone	4025

F Columbia / Fischer-Hallman 1116

Columbia / Beechlawn	1117
Columbia / Old Post	1118
Columbia / Ron Eydtt Village	1119
Columbia / Village 1	1120

E Columbia / UW 3899

Columbia / U.W. Optometry	2520
Columbia / Phillip	2521
Columbia / Lester	2522
Columbia / Albert	2523
Columbia / Hazel	2524
Columbia / Holly	2525

D Columbia / King 2526

Columbia / Weber	3773
Columbia / Marsland	3747
Lexington / Dearborn	3622
Lexington / Dearborn	3748
Lexington / Davenport	2817
Lexington / Dunvegan	3677
Lexington / Lee	2819

C Lexington / Bridge 3749

Bridge / Whitmore	3790
Eastbridge / Acadia	1925
Eastbridge / Cabot	1926
Eastbridge / Bonavista	1927
Eastbridge / Bonavista	1928
Eastbridge / New Bedford	1929
New Bedford / Starboard	3598
New Bedford / Chesapeake	3599
Chesapeake / Seawind	3443
Chesapeake / Chesapeake Cr.	1121
Bridge / Chesapeake	4016

B Bridge / Northfield 4050

Frobisher / Bridge	3757
Frobisher / Superior	3758
Frobisher / McMurray	3759
Frobisher / Davenport	2067
Davenport / Northfield	1204
Davenport / Old Abbey	3393

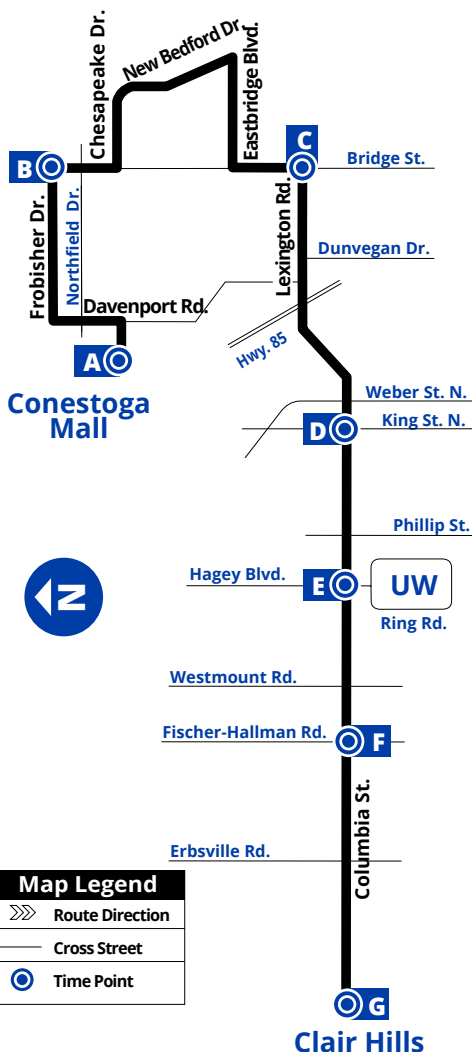
A Conestoga Mall 4005

Columbia

GRT
GRAND RIVER TRANSIT

Route 31

Effective: April 24, 2017



Map Legend

➤➤➤	Route Direction
—	Cross Street
⊙	Time Point



Weekday Schedule

(No Saturday, Sunday or Holiday Service)

To Clair Hills

Conestoga Mall (Depart)	Bridge / Northfield	Bridge / Lexington	Columbia / King	Columbia / U.W.	Columbia / Fischer-Hallman	Columbia / Sundew (Arrive)
A	B	C	D	E	F	G
6:15	6:22	6:31	6:38	6:43	6:46	6:52
6:45	6:52	7:01	7:08	7:13	7:17	7:23
7:15	7:22	7:31	7:38	7:43	7:47	7:53
7:45	7:52	8:01	8:08	8:13	8:17	8:23
8:15	8:22	8:31	8:38	8:43	8:47	8:53
8:45	8:52	9:01	9:07	9:12	9:15	9:22
9:15	9:22	9:30	9:36	9:41	9:44	9:51
9:45	9:52	10:00	10:06	10:11	10:14	10:21
10:15	10:22	10:30	10:36	10:41	10:44	10:51
10:45	10:52	11:00	11:06	11:11	11:14	11:21
11:15	11:22	11:30	11:36	11:41	11:44	11:51
11:45	11:52	12:00	12:06	12:11	12:14	12:21
12:15	12:22	12:30	12:36	12:41	12:44	12:51
12:45	12:52	1:00	1:06	1:11	1:14	1:21
1:15	1:22	1:30	1:36	1:41	1:44	1:51
1:45	1:52	2:00	2:06	2:11	2:14	2:21
2:15	2:22	2:30	2:36	2:42	2:45	2:52
2:45	2:52	3:01	3:07	3:13	3:16	3:23
3:15	3:22	3:31	3:37	3:43	3:46	3:53
3:45	3:52	4:01	4:07	4:13	4:16	4:23
4:15	4:22	4:31	4:37	4:43	4:46	4:53
4:45	4:52	5:01	5:07	5:13	5:16	5:23
5:15	5:22	5:31	5:37	5:43	5:46	5:53
5:45	5:52	6:01	6:06	6:11	6:14	6:20
6:15	6:22	6:30	6:35	6:40	6:43	6:49
6:45	6:52	7:00	7:05	7:10	7:13	7:19
7:15	7:22	7:30	7:35	7:40	7:43	7:49
7:45	7:52	8:00	8:05	8:10	8:13	8:19
8:15	8:22	8:30	8:35	8:40	8:43	8:49
8:45	8:52	9:00	9:05	9:10	9:13	9:19
9:15	9:22	9:30	9:35	9:40	9:43	9:49
9:45	9:52	10:00	10:05	10:10	10:13	10:19
10:15	10:22	10:30	10:35	10:40	10:43	10:49

To Conestoga Mall

Columbia / Sundew (Depart)	Columbia / Fischer-Hallman	Columbia / U.W.	Columbia / King	Bridge / Lexington	Bridge / Northfield	Conestoga Mall (Arrive)
G	F	E	D	C	B	A
6:00	6:07	6:11	6:16	6:21	6:29	6:35
6:30	6:37	6:41	6:46	6:51	6:59	7:05
6:52	6:59	7:03	7:08	7:13	7:21	7:27
7:24	7:31	7:35	7:40	7:45	7:53	8:01
7:54	8:01	8:05	8:10	8:15	8:23	8:32
8:24	8:31	8:35	8:40	8:45	8:53	9:02
8:54	9:01	9:04	9:09	9:14	9:22	9:31
9:23	9:30	9:33	9:38	9:43	9:51	9:59
9:52	9:59	10:02	10:07	10:12	10:20	10:29
10:22	10:29	10:32	10:37	10:42	10:50	10:59
10:52	10:59	11:02	11:07	11:12	11:20	11:29
11:22	11:29	11:32	11:37	11:42	11:50	11:59
11:52	11:59	12:02	12:07	12:12	12:20	12:29
12:22	12:29	12:32	12:37	12:42	12:50	12:59
12:52	12:59	1:02	1:07	1:12	1:20	1:29
1:22	1:29	1:32	1:37	1:42	1:50	1:59
1:52	1:59	2:02	2:07	2:12	2:20	2:29
2:22	2:29	2:33	2:39	2:45	2:54	3:04
2:53	2:59	3:03	3:09	3:15	3:24	3:33
3:24	3:30	3:34	3:40	3:46	3:55	4:03
3:54	4:00	4:04	4:10	4:16	4:25	4:33
4:24	4:30	4:34	4:40	4:46	4:55	5:03
4:54	5:00	5:04	5:10	5:16	5:25	5:33
5:24	5:30	5:34	5:40	5:46	5:55	6:03
5:54	6:00	6:03	6:09	6:14	6:22	6:29
6:21	6:27	6:30	6:36	6:41	6:49	6:57
6:50	6:56	6:59	7:05	7:10	7:18	7:27
7:20	7:26	7:29	7:35	7:40	7:48	7:56
7:50	7:56	7:59	8:05	8:10	8:18	8:26
8:20	8:26	8:29	8:35	8:40	8:48	8:56
8:50	8:56	8:59	9:05	9:10	9:18	9:26
9:20	9:26	9:29	9:35	9:40	9:48	9:56
9:50	9:56	9:59	10:05	10:10	10:18	10:26

Sunday/Holiday Schedule

202 University to The Boardwalk

Conestoga Mall (Depart)	Blackberry Northfield	University/Bridge	Laurier	University/ Seagram	Erb/ Fischer-Hallman	The Boardwalk (Arrive)
A	B	C	D	E	F	G
7:50	7:55	8:02	8:08	8:11	8:17	8:23
8:20	8:25	8:32	8:38	8:41	8:47	8:53
8:50	8:55	9:02	9:08	9:11	9:17	9:23
9:21	9:26	9:33	9:39	9:42	9:48	9:54
9:51	9:56	10:03	10:10	10:14	10:20	10:26
10:23	10:29	10:36	10:43	10:47	10:53	10:59
10:55	11:01	11:08	11:15	11:19	11:25	11:31
11:25	11:31	11:38	11:45	11:49	11:55	12:01
11:55	12:01	12:08	12:15	12:19	12:25	12:31
12:25	12:31	12:38	12:45	12:49	12:55	1:01
12:55	1:01	1:08	1:15	1:19	1:25	1:31
1:25	1:31	1:38	1:45	1:49	1:55	2:01
1:55	2:01	2:08	2:15	2:19	2:25	2:31
2:25	2:31	2:38	2:45	2:49	2:55	3:01
2:55	3:01	3:08	3:15	3:19	3:25	3:31
3:25	3:31	3:38	3:45	3:49	3:55	4:01
3:55	4:01	4:08	4:15	4:19	4:25	4:31
4:25	4:31	4:38	4:45	4:49	4:55	5:01
4:55	5:01	5:08	5:15	5:19	5:25	5:31
5:25	5:31	5:38	5:45	5:49	5:55	6:01
5:55	6:01	6:08	6:14	6:18	6:24	6:30
6:21	6:26	6:33	6:39	6:43	6:49	6:55
6:51	6:56	7:03	7:09	7:13	7:19	7:25
7:21	7:26	7:33	7:39	7:43	7:49	7:55
7:51	7:56	8:03	8:09	8:13	8:19	8:25
8:21	8:26	8:33	8:39	8:43	8:49	8:55
8:51	8:56	9:03	9:09	9:13	9:19	9:25
9:21	9:26	9:33	9:39	9:43	9:49	9:55
9:51	9:56	10:03	10:09	10:13	10:19	10:25
10:21	10:26	10:33	10:39	10:43	10:49	10:55
10:51	10:56	11:03	11:09	11:13	11:19	11:25
11:21	11:26	11:33	11:39	11:43	11:49	11:55
11:51	11:56	12:03	12:09	12:13	12:19	12:25

202 University to Conestoga Mall

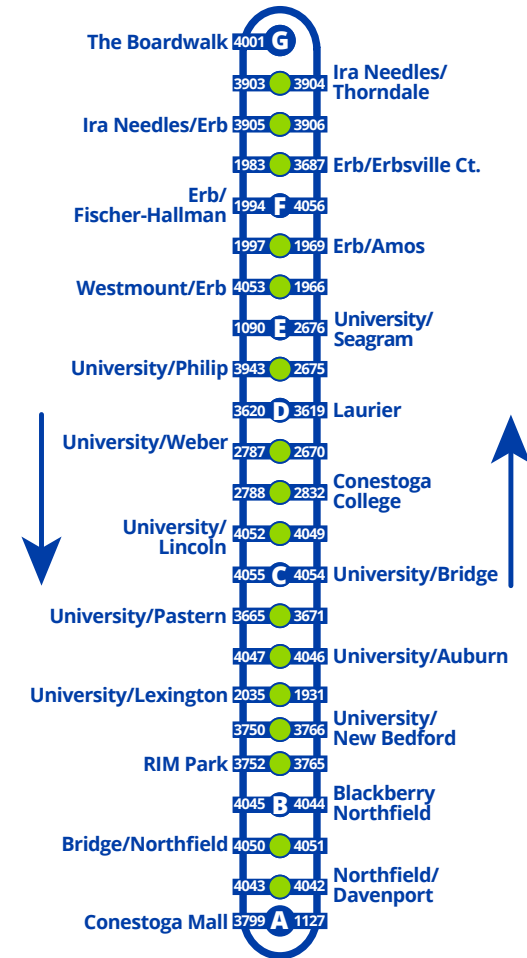
The Boardwalk (Depart)	Erb/ Fischer-Hallman	University/ Seagram	Laurier	University/Bridge	Blackberry Northfield	Conestoga Mall (Arrive)
G	F	E	D	C	B	A
8:00	8:06	8:12	8:15	8:21	8:27	8:32
8:30	8:36	8:42	8:45	8:51	8:57	9:02
9:00	9:06	9:12	9:15	9:21	9:27	9:32
9:30	9:36	9:42	9:45	9:51	9:57	10:02
10:05	10:12	10:18	10:22	10:29	10:35	10:41
10:40	10:47	10:53	10:57	11:04	11:10	11:16
11:15	11:22	11:28	11:32	11:39	11:45	11:51
11:45	11:52	11:58	12:02	12:09	12:15	12:21
12:15	12:22	12:28	12:32	12:39	12:45	12:51
12:45	12:52	12:58	1:02	1:09	1:15	1:21
1:15	1:22	1:28	1:32	1:39	1:45	1:51
1:45	1:52	1:58	2:02	2:09	2:15	2:21
2:15	2:22	2:28	2:32	2:39	2:45	2:51
2:45	2:52	2:58	3:02	3:09	3:15	3:21
3:15	3:22	3:28	3:32	3:39	3:45	3:51
3:45	3:52	3:58	4:02	4:09	4:15	4:21
4:15	4:22	4:28	4:32	4:39	4:45	4:51
4:45	4:52	4:58	5:02	5:09	5:15	5:21
5:15	5:22	5:28	5:32	5:39	5:45	5:51
5:45	5:52	5:58	6:02	6:09	6:15	6:21
6:10	6:16	6:21	6:25	6:32	6:38	6:44
6:30	6:36	6:41	6:45	6:52	6:58	7:04
7:00	7:06	7:11	7:15	7:22	7:28	7:34
7:30	7:36	7:41	7:45	7:52	7:58	8:04
8:00	8:06	8:11	8:15	8:22	8:28	8:34
8:30	8:36	8:41	8:45	8:52	8:58	9:04
9:00	9:06	9:11	9:15	9:22	9:28	9:34
9:30	9:36	9:41	9:45	9:52	9:58	10:04
10:00	10:06	10:11	10:15	10:22	10:28	10:34
10:30	10:36	10:41	10:45	10:52	10:58	11:04
11:00	11:06	11:11	11:15	11:22	11:28	11:34
11:30	11:36	11:41	11:45	11:52	11:58	12:04

University

GRT
iXpress

202

Summer Schedule
Effective: January 8, 2018



Fares and schedules are subject to change without notice.
Weather and road conditions may cause schedule delays.



519-585-7555 www.grt.ca TTY: 519-575-4608
Text: 57555 & key in your bus stop number

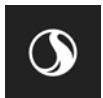
Weekday Schedule

202 University to The Boardwalk							202 University to Conestoga Mall						
Conestoga Mall (Depart)	Blackberry Northfield	University/Bridge	Laurier	University/ Seagram	Erb/ Fischer-Hallman	The Boardwalk (Arrive)	The Boardwalk (Depart)	Erb/ Fischer-Hallman	University/ Seagram	Laurier	University/Bridge	Blackberry Northfield	Conestoga Mall (Arrive)
A	B	C	D	E	F	G	G	F	E	D	C	B	A
5:53	5:58	6:06	6:12	6:15	6:21	6:27	6:00	6:06	6:11	6:14	6:20	6:28	6:33
6:23	6:28	6:36	6:42	6:45	6:51	6:57	6:30	6:36	6:41	6:44	6:50	6:58	7:03
6:53	6:58	7:06	7:12	7:15	7:21	7:27	7:00	7:06	7:11	7:14	7:20	7:28	7:34
7:23	7:28	7:37	7:44	7:48	7:54	8:00	7:15	7:21	7:26	7:29	7:36	7:43	7:50
7:38	7:44	7:53	8:00	8:04	8:10	8:16	7:30	7:37	7:44	7:48	7:55	8:02	8:09
7:55	8:01	8:10	8:17	8:21	8:27	8:33	7:45	7:52	7:59	8:03	8:10	8:17	8:24
8:16	8:22	8:31	8:38	8:42	8:48	8:54	8:00	8:07	8:14	8:18	8:25	8:32	8:39
8:31	8:37	8:46	8:53	8:57	9:03	9:09	8:15	8:22	8:29	8:33	8:40	8:47	8:54
8:46	8:52	9:01	9:08	9:12	9:18	9:24	8:30	8:37	8:44	8:48	8:55	9:02	9:09
9:01	9:07	9:16	9:23	9:27	9:33	9:39	8:45	8:52	8:59	9:03	9:10	9:17	9:24
9:16	9:22	9:31	9:39	9:43	9:49	9:55	9:00	9:07	9:14	9:18	9:25	9:32	9:39
9:31	9:37	9:45	9:53	9:57	10:03	10:09	9:15	9:22	9:29	9:33	9:40	9:47	9:54
9:46	9:52	10:00	10:08	10:12	10:18	10:24	9:30	9:36	9:43	9:47	9:54	10:01	10:08
10:01	10:07	10:15	10:23	10:27	10:33	10:39	9:45	9:51	9:58	10:02	10:09	10:16	10:23
10:13	10:19	10:27	10:35	10:39	10:45	10:51	10:15	10:21	10:28	10:32	10:39	10:46	10:53
10:28	10:34	10:42	10:50	10:54	11:00	11:06	10:45	10:51	10:58	11:02	11:09	11:16	11:23
10:58	11:04	11:12	11:20	11:24	11:30	11:36	11:15	11:21	11:28	11:32	11:39	11:46	11:53
11:28	11:34	11:42	11:50	11:54	12:00	12:06	11:45	11:51	11:58	12:02	12:09	12:16	12:23
11:58	12:04	12:12	12:20	12:24	12:30	12:36	12:15	12:21	12:28	12:32	12:39	12:46	12:53
12:28	12:34	12:42	12:50	12:54	1:00	1:06	12:45	12:51	12:58	1:02	1:09	1:16	1:23
12:58	1:04	1:12	1:20	1:24	1:30	1:36	1:15	1:21	1:28	1:32	1:39	1:46	1:53
1:28	1:34	1:42	1:50	1:54	2:00	2:06	1:45	1:51	1:58	2:02	2:09	2:16	2:23
1:58	2:04	2:12	2:20	2:24	2:30	2:37	2:15	2:21	2:28	2:33	2:43	2:50	2:57
2:28	2:35	2:43	2:51	2:56	3:04	3:11	2:30	2:36	2:43	2:48	2:58	3:05	3:12
2:44	2:51	2:59	3:07	3:12	3:20	3:27	2:45	2:51	2:58	3:03	3:13	3:20	3:27
2:59	3:06	3:14	3:22	3:27	3:35	3:42	3:00	3:06	3:13	3:18	3:28	3:35	3:42
3:13	3:20	3:28	3:36	3:41	3:49	3:56	3:15	3:21	3:28	3:33	3:43	3:50	3:57
3:25	3:32	3:40	3:48	3:53	4:01	4:08	3:30	3:36	3:43	3:48	3:58	4:05	4:12
3:40	3:47	3:55	4:03	4:08	4:16	4:23	3:45	3:51	3:58	4:03	4:13	4:20	4:27
3:55	4:02	4:10	4:18	4:23	4:31	4:38	4:00	4:06	4:13	4:18	4:28	4:35	4:42
4:10	4:17	4:25	4:33	4:38	4:46	4:53	4:15	4:21	4:28	4:33	4:43	4:50	4:57
4:25	4:32	4:40	4:48	4:53	5:01	5:08	4:30	4:36	4:43	4:48	4:58	5:05	5:12
4:40	4:47	4:55	5:03	5:08	5:16	5:23	4:45	4:51	4:58	5:03	5:13	5:20	5:27
4:55	5:02	5:10	5:18	5:23	5:31	5:38	5:00	5:06	5:13	5:18	5:28	5:35	5:42
5:10	5:17	5:25	5:33	5:38	5:46	5:53	5:15	5:21	5:28	5:33	5:43	5:50	5:57
5:25	5:32	5:40	5:48	5:53	6:01	6:07	5:30	5:36	5:43	5:48	5:58	6:05	6:11
5:40	5:47	5:55	6:03	6:07	6:13	6:19	5:45	5:51	5:58	6:02	6:09	6:16	6:22
5:55	6:02	6:09	6:16	6:20	6:26	6:32	6:00	6:06	6:12	6:16	6:23	6:30	6:36
6:09	6:15	6:22	6:29	6:33	6:39	6:45	6:15	6:21	6:27	6:31	6:38	6:45	6:51
6:22	6:28	6:35	6:42	6:46	6:52	6:58	6:30	6:36	6:42	6:46	6:53	7:00	7:06
6:49	6:55	7:02	7:09	7:13	7:19	7:25	6:45	6:51	6:57	7:01	7:08	7:15	7:21
7:24	7:30	7:37	7:44	7:48	7:54	8:00	7:15	7:21	7:27	7:31	7:38	7:45	7:51
7:54	8:00	8:07	8:14	8:18	8:24	8:30	7:45	7:51	7:57	8:01	8:08	8:15	8:21
8:24	8:30	8:37	8:44	8:48	8:54	9:00	8:15	8:21	8:27	8:31	8:38	8:45	8:51
8:54	9:00	9:07	9:14	9:18	9:24	9:30	8:45	8:51	8:57	9:01	9:08	9:15	9:21
9:24	9:30	9:37	9:43	9:46	9:52	9:58	9:15	9:21	9:27	9:31	9:37	9:45	9:50
9:53	9:58	10:05	10:11	10:14	10:20	10:26	9:45	9:51	9:56	9:59	10:05	10:13	10:18
10:22	10:27	10:34	10:40	10:43	10:49	10:55	10:10	10:16	10:21	10:24	10:30	10:38	10:43
10:52	10:57	11:04	11:10	11:13	11:19	11:25	10:30	10:36	10:41	10:44	10:50	10:58	11:03
11:22	11:27	11:34	11:40	11:43	11:49	11:55	11:00	11:06	11:11	11:14	11:20	11:28	11:33
11:52	11:57	12:04	12:10	12:13	12:19	12:25	11:30	11:36	11:41	11:44	11:50	11:58	12:03
12:22	12:27	12:34	12:40	12:43	12:49	12:55	12:00	12:06	12:11	12:14	12:20	12:28	12:33

Saturday Schedule

202 University to The Boardwalk							202 University to Conestoga Mall						
Conestoga Mall (Depart)	Blackberry Northfield	University/Bridge	Laurier	University/ Seagram	Erb/ Fischer-Hallman	The Boardwalk (Arrive)	The Boardwalk (Depart)	Erb/ Fischer-Hallman	University/ Seagram	Laurier	University/Bridge	Blackberry Northfield	Conestoga Mall (Arrive)
A	B	C	D	E	F	G	G	F	E	D	C	B	A
6:55	7:01	7:08	7:14	7:17	7:23	7:29	6:25	6:31	6:36	6:39	6:45	6:52	6:58
7:25	7:31	7:38	7:44	7:47	7:53	7:59	6:55	7:01	7:06	7:09	7:15	7:22	7:28
7:55	8:01	8:08	8:14	8:17	8:23	8:29	7:25	7:31	7:36	7:39	7:45	7:52	7:58
8:25	8:31	8:38	8:44	8:47	8:53	8:59	7:55	8:01	8:06	8:09	8:15	8:22	8:28
8:55	9:01	9:08	9:14	9:17	9:23	9:29	8:23	8:29	8:34	8:37	8:43	8:50	8:56
9:28	9:34	9:42	9:49	9:53	10:00	10:07	8:53	8:59	9:04	9:07	9:13	9:20	9:26
9:58	10:04	10:12	10:19	10:23	10:30	10:37	9:20	9:26	9:31	9:35	9:43	9:50	9:56
10:28	10:34	10:42	10:49	10:53	11:00	11:07	9:50	9:57	10:03	10:07	10:15	10:22	10:28
10:58	11:04	11:12	11:19	11:23	11:30	11:37	10:20	10:27	10:33	10:37	10:45	10:52	10:58
11:28	11:34	11:42	11:49	11:53	12:00	12:07	10:50	10:57	11:03	11:07	11:15	11:22	11:28
11:58	12:04	12:12	12:19	12:23	12:30	12:37	11:20	11:27	11:33	11:37	11:45	11:52	11:58
12:28	12:34	12:42	12:49	12:53	1:00	1:07	11:50	11:57	12:03	12:07	12:15	12:22	12:28
12:58	1:04	1:12	1:19	1:23	1:30	1:37	12:20	12:27	12:33	12:37	12:45	12:52	12:58
1:28	1:34	1:42	1:49	1:53	2:00	2:07	12:50	12:57	1:03	1:07	1:15	1:22	1:28
1:58	2:04	2:12	2:19	2:23	2:30	2:37	1:20	1:27	1:33	1:37	1:45	1:52	1:58
2:28	2:34	2:42	2:49	2:53	3:00	3:07	1:50	1:57	2:03	2:07	2:15	2:22	2:28
2:58	3:04	3:12	3:19	3:23	3:30	3:37	2:20	2:27	2:33	2:37	2:45	2:52	2:58
3:28	3:34	3:42	3:49	3:53	4:00	4:07	2:50	2:57	3:03	3:07	3:15	3:22	3:28
3:58	4:04	4:12	4:19	4:23	4:30	4:37	3:20	3:27	3:33	3:37	3:45	3:52	3:58
4:28	4:34	4:42	4:49	4:53	5:00	5:07	3:50	3:57	4:03	4:07	4:15	4:22	4:28
4:58	5:04	5:12	5:19	5:23	5:30	5:37	4:20	4:27	4:33	4:37	4:45	4:52	4:58
5:28	5:34	5:42	5:49	5:53	5:59	6:05	4:50	4:57	5:03	5:07	5:15	5:22	5:28
5:55	6:01	6:08	6:14	6:18	6:24	6:30	5:20	5:27	5:33	5:37	5:45	5:52	5:58
6:25	6:31	6:38	6:44	6:48	6:54	7:00	5:55	6:02	6:08	6:11	6:18	6:25	6:31
6:55	7:01	7:08	7:14	7:18	7:24	7:30	6:25	6:31	6:37	6:40	6:47	6:54	7:00
7:25	7:31	7:38	7:44	7:48	7:54	8:00	6:55	7:01	7:07	7:10	7:17	7:24	7:30
7:55	8:01	8:08	8:14	8:18	8:24	8:30	7:25	7:31	7:37	7:40	7:47	7:54	8:00
8:25	8:31	8:38	8:44	8:48	8:54	9:00	7:55	8:01	8:07	8:10	8:17	8:24	8:30
8:55	9:01	9:08	9:14	9:18	9:24	9:30	8:25	8:31	8:37	8:40	8:47	8:54	9:00
9:25	9:31	9:38	9:44	9:48	9:54	10:00	8:55	9:01	9:07	9:10	9:17	9:24	9:30
9:55	10:01	10:08	10:14	10:18	10:24	10:30	9:25	9:31	9:37	9:40	9:47	9:54	10:00
10:25	10:31	10:38	10:44	10:48	10:54	11:00	9:55	10:01	10:07	10:10	10:17	10:24	10:30
10:55	11:01	11:08	11:14	11:18	11:24	11:30	10:25	10:31	10:37	10:40	10:47	10:54	11:00
11:25	11:31	11:38	11:44	11:48	11:54	12:00	10:55	11:01	11:07	11:10	11:17	11:24	11:30

Appendix C TRAFFIC COUNTS AND SIGNAL TIMING PLANS



REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 8:00 AM
To: 9:00 AM

Municipality: Waterloo
Intersection: Erbsville Rd & Columbia St
Control: Signalized
Major Road: Erbsville Rd

Weather conditions:
Sunny
Person(s) who counted:
AT23-UT

GeoID: 48
Count Date: Thursday, 21-May-15

North Leg Total:	1,390	% Trks	4%	9%	2%	
North Entering:	772	Heavys	1	36	4	41
North Peds:	0	Trucks	1	3	1	5
Peds Cross:	⌂	Cars	51	401	274	726
		Total	53	440	279	

Heavys	46
Trucks	6
Cars	566
Total	618

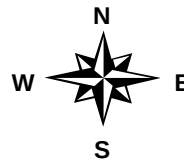
East Leg Total:	1,193
East Entering:	335
East Peds:	0
Peds Cross:	⌂

Heavys	5
Trucks	6
Cars	137
Total	148

Columbia St

% Trks	Heavys	Trucks	Cars	Total
5%	6	0	118	124
2%	3	1	233	237
7%	3	1	54	58
	12	2	405	

Erbsville Rd



Total	Cars	Trucks	Heavys	% Trks
124	114	1	9	8%
61	57	2	2	7%
150	145	0	5	3%
	316	3	16	

Columbia St

Cars	Trucks	Heavys	Total
831	2	25	858

Erbsville Rd

Total	34	370	342	
Cars	29	334	324	687
Trucks	3	5	0	8
Heavys	2	31	18	51
% Trks	15%	10%	5%	

Peds Cross: ⌂

West Peds: 8
West Entering: 419
West leg Total: 567

Heavys	44
Trucks	4
Cars	600
Total	648

Peds Cross: ⌂

South Peds: 1
South Entering: 746
South leg Total: 1,394

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,272**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **419**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Waterloo
Intersection: Erbsville Rd & Columbia St
Control: Signalized
Major Road: Erbsville Rd

Weather conditions:
 Sunny
Person(s) who counted:
 AT23-UT

GeoID: 48
Count Date: Thursday, 21-May-15

North Leg Total:	807	% Trks	6%	8%	5%	
North Entering:	419	Heavys	1	18	2	21
North Peds:	0	Trucks	1	3	4	8
Peds Cross:	⌂	Cars	33	231	126	390
		Total	35	252	132	

Heavys	27
Trucks	6
Cars	355
Total	388

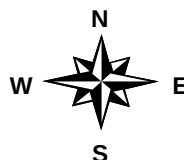
East Leg Total:	866
East Entering:	429
East Peds:	0
Peds Cross:	⌂

Heavys	5
Trucks	4
Cars	127
Total	136

Columbia St

% Trks	4%	Heavys	0	Trucks	1	Cars	23	Total	24
	5%		3		1		80		84
	14%		5		0		30		35
			8		2		133		

Erbsville Rd



Erbsville Rd

Total	134	Cars	129	Trucks	2	Heavys	3	% Trks	4%
	68		64		2		2		6%
	227		214		5		8		6%
			407		9		13		

Columbia St

Cars	403	Trucks	9	Heavys	25	Total	437
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Peds Cross:	⌂
West Peds:	7
West Entering:	143
West leg Total:	279

Heavys	31
Trucks	8
Cars	475
Total	514

Total	33	230	221	
Cars	30	203	197	430
Trucks	1	3	4	8
Heavys	2	24	20	46
% Trks	9%	12%	11%	

Peds Cross:	⌂
South Peds:	0
South Entering:	484
South leg Total:	998

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **1,475**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **143**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 5:00 PM
To: 6:00 PM

Municipality: Waterloo
Intersection: Erbsville Rd & Columbia St
Control: Signalized
Major Road: Erbsville Rd

Weather conditions:
Sunny
Person(s) who counted:
AT23-UT

GeoID: 48
Count Date: Thursday, 21-May-15

North Leg Total:	1,379	% Trks	2%	1%	1%	
North Entering:	663	Heavys	0	6	0	6
North Peds:	1	Trucks	1	0	2	3
Peds Cross:	⌂	Cars	61	407	186	654
		Total	62	413	188	

Heavys	14
Trucks	5
Cars	697
Total	716

East Leg Total:	1,387
East Entering:	888
East Peds:	0
Peds Cross:	⌂

Heavys	3
Trucks	2
Cars	281
Total	286

Columbia St

% Trks	0%	Heavys	0	Trucks	0	Cars	50	Total	50
	3%		3		0		111		114
	0%		0		0		46		46
			3		0		207		

Erbsville Rd



Total	279	Cars	275	Trucks	0	Heavys	4	% Trks	1%
	178		174		1		3		2%
	431		431		0		0		0%
	880				1		7		

Columbia St

Cars	487	Trucks	3	Heavys	9	Total	499
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Erbsville Rd



Total	46	387	197	
Cars	46	372	190	608
Trucks	0	5	1	6
Heavys	0	10	6	16
% Trks	0%	4%	4%	

Peds Cross:	⌂
West Peds:	7
West Entering:	210
West leg Total:	496

Heavys	6
Trucks	0
Cars	884
Total	890

Peds Cross:	⌂
South Peds:	2
South Entering:	630
South leg Total:	1,520

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,391**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **210**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Waterloo
Intersection: Erbsville Rd & Columbia St
Control: Signalized
Major Road: Erbsville Rd

Weather conditions:
Sunny

Person(s) who counted:
AT23-UT

GeoID: 48
Count Date: Thursday, 21-May-15

North Leg Total: 8,298
North Entering: 4,253
North Peds: 17
Peds Cross: X
Bicycles Entering: 21
Buggies Entering: 0

% Trks	3%	7%	4%	
Heavys	5	166	33	204
Trucks	3	23	17	43
Cars	262	2,406	1,338	4,006
Total	270	2,595	1,388	

Heavys	246
Trucks	33
Cars	3,766
Total	4,045

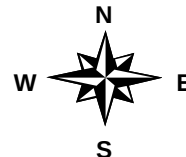
East Leg Total: 8,343
East Entering: 4,120
East Peds: 7
Peds Cross: X
Bicycles Entering: 3
Buggies Entering: 0

Heavys	42
Trucks	16
Cars	1,228
Total	1,286

Columbia St

% Trks	5%	Heavys	16	Trucks	1	Cars	321	Total	338
	4%		26		8		902		936
	4%		11		3		312		326
			53		12		1,535		

Erbsville Rd



Total	1,284	Cars	1,237	Trucks	9	Heavys	38	% Trks	4%
	747		712		8		27		5%
	2,089		2,022		15		52		3%
			3,971		32		117		

Columbia St

Cars	4,013	Trucks	48	Heavys	162	Total	4,223
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Erbsville Rd

Total	269	2,423	1,899	
Cars	254	2,208	1,773	4,235
Trucks	5	23	23	51
Heavys	10	192	103	305
% Trks	6%	9%	7%	

Peds Cross: X
West Peds: 61
West Entering: 1,600
West leg Total: 2,886
Bicycles Entering: 3
Buggies Entering: 0

Heavys	229
Trucks	41
Cars	4,740
Total	5,010

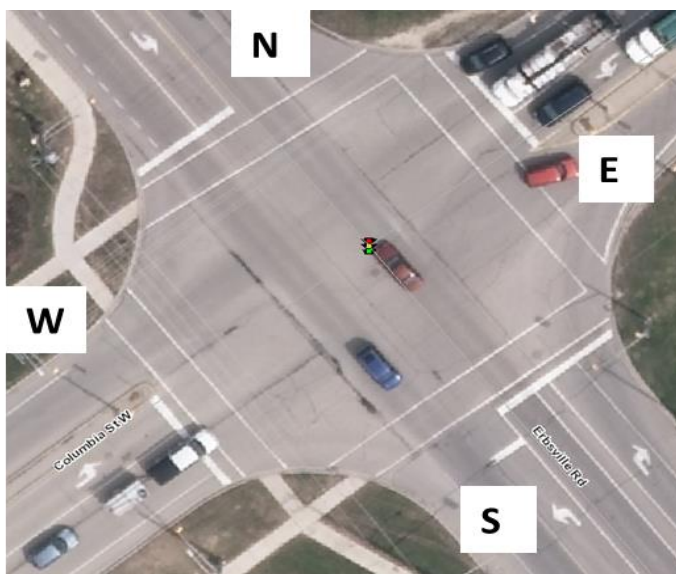
Peds Cross: X
South Peds: 9
South Entering: 4,591
South leg Total: 9,601
Bicycles Entering: 17
Buggies Entering: 0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **14,564**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,600**



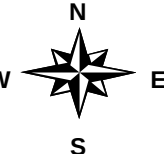
Notes: None

Region of Waterloo

Total Factor =	Monthly Factor	1	x	Daily Factor	1	x	24 Hour Factor	1.74	=	1.740000
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GeolD: 48
Count Date: Thursday, 21-May-15

East Leg Total:	14,517
East Entering:	7,169
East Peds:	N/A
Peds Cross:	∅



To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two. This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 25,341

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Waterloo
Intersection: Erbsville Rd & Columbia St
Control: Signalized
Major Road: Erbsville Rd

Weather conditions:
Sunny
Person(s) who counted:
AT23-UT

GeoID: 48
Count Date: Thursday, 21-May-15

North Approach PHF

AM Peak: 0.91
Mid-day Peak: 0.80
PM Peak: 0.90

East Approach PHF

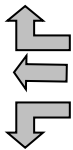
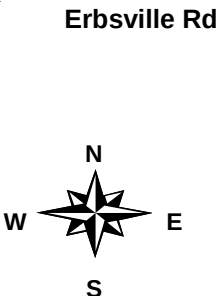
AM Peak: 0.92
Mid-day Peak: 0.88
PM Peak: 0.94

Movement			
PM	0.67	0.96	0.87
MID	0.58	0.84	0.80
AM	0.70	0.87	0.81

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

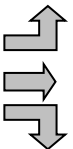
Columbia St

Movement	PM	MID	AM
	0.66	0.55	0.63
	0.66	0.84	0.79
	0.77	0.67	0.76



AM	MID	PM	Movement
0.82	0.91	0.91	
0.90	0.68	0.89	
0.82	0.81	0.92	

Columbia St



Erbsville Rd



West Approach PHF

AM Peak: 0.84
Mid-day Peak: 0.87
PM Peak: 0.68

0.71	0.82	0.79	AM
0.83	0.86	0.85	MID
0.88	0.90	0.85	PM
Movement			

South Approach PHF

AM Peak: 0.94
Mid-day Peak: 0.95
PM Peak: 0.94

Comments

Intersection: Erbsville Rd & Columbia St
 GeoID: 48
 Municipality: Waterloo
 Major Road: Erbsville Rd

Intersection Control: Signalized
 Date: Thursday, 21-May-15
 Name: AT23-UT
 Weather: Sunny

Approach Control Movement Approach Lanes			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
			Signalized			Signalized			Signalized			Signalized				
			LT 1	THRU 1	RT <	LT 1	THRU 1	RT <	LT 1	THRU 1	RT 1	LT 1	THRU 0	RT LANES		
7:30 to 7:45	9	47	16	25	6	18	4	58	79	58	70	3	393	2,007 2,217 2,272 2,103 1,913 1,646 1,484 1,389 1,299		
7:45 to 8:00	11	45	10	39	10	29	9	60	91	60	86	3	453			
8:00 to 8:15	49	65	11	33	17	38	9	106	74	58	109	9	578			
8:15 to 8:30	43	48	19	25	15	34	6	113	67	67	127	19	583			
8:30 to 8:45	16	75	12	46	12	33	7	84	108	86	106	18	603			
8:45 to 9:00	16	49	16	46	17	19	12	67	93	68	98	7	508			
9:00 to 9:15	14	40	12	42	15	21	3	73	76	48	63	2	409			
9:15 to 9:30	10	35	12	50	8	23	8	72	55	37	76	7	393			
9:30 to 9:45	5	19	6	40	12	24	4	57	57	51	59	2	336			
9:45 to 10:00	7	30	12	45	12	24	5	66	52	36	55	2	346			
10:00 to 10:15	3	15	8	36	19	32	10	49	44	33	61	4	314			
10:15 to 10:30	3	16	17	44	13	23	10	53	43	30	48	3	303			
AM Peak Hour 8:00 to 9:00	124	237	58	150	61	124	34	370	342	279	440	53	2,272			
# of trucks in peak	0	1	1	0	2	1	3	5	0	1	3	1	18			
# of heavies in peak	6	3	3	5	2	9	2	31	18	4	36	1	120			
% heavies (Total)	5%	2%	7%	3%	7%	8%	15%	10%	5%	2%	9%	4%	6%			
12:00 to 12:15	11	17	13	70	15	32	10	67	50	25	59	5	374	1,475 1,439 1,425 1,387 1,400		
12:15 to 12:30	4	21	7	60	25	37	7	48	65	31	56	8	369			
12:30 to 12:45	4	21	8	54	17	28	6	58	48	41	75	15	375			
12:45 to 13:00	5	25	7	43	11	37	10	57	58	35	62	7	357			
13:00 to 13:15	4	19	4	48	13	29	7	50	60	27	73	4	338			
13:15 to 13:30	1	19	14	51	22	40	4	55	45	29	73	2	355			
13:30 to 13:45	3	21	3	55	21	28	6	68	50	29	48	5	337			
13:45 to 14:00	5	14	4	62	19	45	11	62	47	29	69	3	370			
Midday Peak Hour 12:00 to 13:00	24	84	35	227	68	134	33	230	221	132	252	35	1,475			
# of trucks in peak	1	1	0	5	2	2	1	3	4	4	3	1	27			
# of heavies in peak	0	3	5	8	2	3	2	24	20	2	18	1	88			
% heavies (Total)	4%	5%	14%	6%	6%	4%	9%	12%	11%	5%	8%	6%	8%			
15:00 to 15:15	7	21	15	75	27	53	14	79	55	48	98	15	507	1,958 1,984 2,047 2,077 2,121 2,174 2,268 2,355 2,391		
15:15 to 15:30	5	17	8	70	33	51	8	99	49	40	75	4	459			
15:30 to 15:45	11	19	10	83	30	58	11	72	72	43	85	7	501			
15:45 to 16:00	10	18	7	91	26	53	12	82	57	42	80	13	491			
16:00 to 16:15	7	19	6	88	36	51	8	112	48	43	106	9	533			
16:15 to 16:30	9	26	4	110	31	41	11	101	60	35	86	8	522			
16:30 to 16:45	11	29	9	109	37	54	6	91	39	46	90	10	531			
16:45 to 17:00	5	32	10	118	50	50	5	77	60	25	89	14	535			
17:00 to 17:15	6	22	11	117	50	62	11	103	36	46	108	14	586			
17:15 to 17:30	16	20	12	113	50	74	13	107	47	46	105	13	616			
17:30 to 17:45	19	43	15	101	43	66	11	78	58	54	107	23	618			
17:45 to 18:00	9	29	8	100	35	77	11	99	56	42	93	12	571			
PM Peak Hour 17:00 to 18:00	50	114	46	431	178	279	46	387	197	188	413	62	2,391			
# of trucks in peak	0	0	0	0	1	0	0	5	1	2	0	1	10			
# of heavies in peak	0	3	0	0	3	4	0	10	6	0	6	0	32			
% heavies (Total)	0%	3%	0%	0%	2%	1%	0%	4%	4%	1%	1%	2%	2%			

Intersection: Erbsville Rd & Columbia St
GeoID: 48
Municipality: Waterloo
Major Road: Erbsville Rd

Intersection Control: Signalized
Date: Thursday, 21-May-15
Name: AT23-UT
Weather: Sunny

PEDESTRIAN CROSSING								
Time			Crossing Approach					TOTAL HOUR
			East App.	West App.	North App.	South App.	TOTAL	
7:30	to	7:45	0	1	0	0	1	15 15 9 10 9 10 8 5
7:45	to	8:00	0	5	2	0	7	
8:00	to	8:15	0	3	0	0	3	
8:15	to	8:30	0	3	0	1	4	
8:30	to	8:45	0	1	0	0	1	
8:45	to	9:00	0	1	0	0	1	
9:00	to	9:15	2	0	2	0	4	
9:15	to	9:30	1	0	1	1	3	
9:30	to	9:45	0	1	1	0	2	
9:45	to	10:00	0	1	0	0	1	
10:00	to	10:15	0	2	0	0	2	
10:15	to	10:30	0	0	0	0	0	
AM Peak Hour 8:00 to 9:00			0	8	0	1	9	
12:00	to	12:15	0	1	0	0	1	7 6 7 3 4
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	6	0	0	6	
12:45	to	13:00	0	0	0	0	0	
13:00	to	13:15	0	0	0	0	0	
13:15	to	13:30	0	1	0	0	1	
13:30	to	13:45	0	2	0	0	2	
13:45	to	14:00	1	0	0	0	1	
Midday Peak Hour 12:00 to 13:00			0	7	0	0	7	
15:00	to	15:15	0	15	2	2	19	31 17 15 12 13 10 6 12 10
15:15	to	15:30	1	2	4	0	7	
15:30	to	15:45	0	4	0	0	4	
15:45	to	16:00	0	1	0	0	1	
16:00	to	16:15	2	2	0	1	5	
16:15	to	16:30	0	0	3	2	5	
16:30	to	16:45	0	1	0	0	1	
16:45	to	17:00	0	1	1	0	2	
17:00	to	17:15	0	2	0	0	2	
17:15	to	17:30	0	0	1	0	1	
17:30	to	17:45	0	5	0	2	7	
17:45	to	18:00	0	0	0	0	0	
PM Peak Hour 17:00 to 18:00			0	7	1	2	10	

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 8:00 AM
To: 9:00 AM

Municipality: Waterloo
Intersection: Erb St & Ira Needles Blvd/Erbville Rd
Control: Non Signalized
Major Road: Erb St

Weather conditions:
Sunny
Person(s) who counted:
AT06-NS

GeoID: 29541
Count Date: Thursday, 23-Mar-17

North Leg Total: 1,693
North Entering: 909
North Peds: 0
Peds Cross: X

	% Trks	5%	3%	1%	
Heavys	1	13	2	16	
Trucks	2	5	1	8	
Cars	52	606	227	885	
Total		55	624	230	

Heavys 17
Trucks 8
Cars 759
Total 784

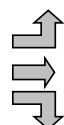
East Leg Total: 1,124
East Entering: 366
East Peds: 10
Peds Cross: X

Heavys 11
Trucks 6
Cars 347
Total 364



Erb St

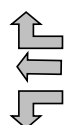
% Trks	Heavys	Trucks	Cars	Total
3%	2	2	140	144
2%	3	5	388	396
2%	4	1	223	228
	9	8	751	



Ira Needles Blvd



Erbville Rd



Total	Cars	Trucks	Heavys	% Trks
107	104	0	3	3%
146	139	3	4	5%
113	107	2	4	5%
	350	5	11	

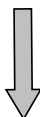
Erb St



Cars 742
Trucks 6
Heavys 10
Total 758

Peds Cross: X
West Peds: 3
West Entering: 768
West leg Total: 1,132

Heavys 21
Trucks 8
Cars 936
Total 965



Total	163	533	132	
Cars	156	515	127	798
Trucks	1	6	0	7
Heavys	6	12	5	23
% Trks	4%	3%	4%	

Peds Cross: X
South Peds: 7
South Entering: 828
South leg Total: 1,793

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,871**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **768**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:45 PM
To: 1:45 PM

Municipality: Waterloo
Intersection: Erb St & Ira Needles Blvd/Erbsville Rd
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny
Person(s) who counted:
 AT06-NS

GeoID: 29541
Count Date: Thursday, 23-Mar-17

North Leg Total: 1,403
North Entering: 710
North Peds: 0
Peds Cross: X

	% Trks	1%	3%	1%	
Heavys	0	8	0	8	
Trucks	1	7	1	9	
Cars	79	449	165	693	
Total		80	464	166	

Heavys 23
Trucks 6
Cars 664
Total 693

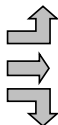
East Leg Total: 1,123
East Entering: 590
East Peds: 4
Peds Cross: X

Heavys 13
Trucks 9
Cars 737
Total 759



Erb St

% Trks	Heavys	Trucks	Cars	Total
4%	5	2	170	177
4%	2	10	260	272
8%	13	10	281	304
	20	22	711	



Ira Needles Blvd



Erbsville Rd



Total	Cars	Trucks	Heavys	% Trks
101	97	1	3	4%
340	327	6	7	4%
149	142	3	4	5%
	566	10	14	

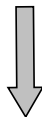
Erb St



Cars	Trucks	Heavys	Total
515	12	6	533

Peds Cross: X
West Peds: 0
West Entering: 753
West leg Total: 1,512

Heavys 25
Trucks 20
Cars 872
Total 917



Total	339	415	95	
Cars	331	397	90	818
Trucks	2	3	1	6
Heavys	6	15	4	25
% Trks	2%	4%	5%	

Peds Cross: X
South Peds: 4
South Entering: 849
South leg Total: 1,766

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **2,902**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **753**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period

From: 3:00 PM
To: 6:00 PM

Peak Hour

From: 4:15 PM
To: 5:15 PM

Municipality: Waterloo

Intersection: Erb St & Ira Needles Blvd/Erbsville Rd

Control: Non Signalized

Major Road: Erb St

Weather conditions:

Sunny

Person(s) who counted:

AT06-NS

GeoID: 29541

Count Date: Thursday, 23-Mar-17

North Leg Total: 2,190
North Entering: 1,011
North Peds: 0
Peds Cross: X

% Trks	1%	2%	2%	
Heavys	1	10	1	12
Trucks	1	3	2	6
Cars	149	661	183	993
Total	151	674	186	

Heavys	12
Trucks	3
Cars	1,164
Total	1,179

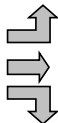
East Leg Total: 1,454
East Entering: 856
East Peds: 3
Peds Cross: X

Heavys	3
Trucks	9
Cars	1,004
Total	1,016



Erb St

% Trks	Heavys	Trucks	Cars	Total
1%	0	2	217	219
0%	1	0	267	268
3%	3	8	336	347
	4	10	820	



Ira Needles Blvd



Erbsville Rd



Total	Cars	Trucks	Heavys	% Trks
141	140	0	1	1%
528	522	5	1	1%
187	180	2	5	4%
842	7	7		

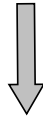
Erb St



Cars	589
Trucks	3
Heavys	6
Total	598

Peds Cross: X
West Peds: 10
West Entering: 834
West leg Total: 1,850

Heavys	18
Trucks	13
Cars	1,177
Total	1,208



Total	337	819	144
Cars	333	807	139
Trucks	3	1	1
Heavys	1	11	4
% Trks	1%	1%	3%
			16
			5
			1,279

Peds Cross: X
South Peds: 8
South Entering: 1,300
South leg Total: 2,508

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **4,001**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **834**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Waterloo
Intersection: Erb St & Ira Needles Blvd/Erbsville Rd
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny
Person(s) who counted:
 AT06-NS

GeoID: 29541
Count Date: Thursday, 23-Mar-17

North Leg Total: 13,124
North Entering: 6,703
North Peds: 3
Peds Cross: X
Bicycles Entering: 2
Buggies Entering: 0

% Trks	2%	3%	2%	
Heavys	7	82	8	97
Trucks	13	31	13	57
Cars	801	4,401	1,347	6,549
Total	821	4,514	1,368	

Heavys	125
Trucks	61
Cars	6,235
Total	6,421

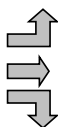
East Leg Total: 8,887
East Entering: 4,458
East Peds: 43
Peds Cross: X
Bicycles Entering: 1
Buggies Entering: 0

Heavys	81
Trucks	100
Cars	5,469
Total	5,650



Erb St

% Trks	Heavys	Trucks	Cars	Total
3%	17	20	1,344	1,381
3%	17	38	2,056	2,111
4%	40	44	2,186	2,270
	74	102	5,586	



Ira Needles Blvd



Erbsville Rd



Total	Cars	Trucks	Heavys	% Trks
838	823	4	11	2%
2,480	2,414	39	27	3%
1,140	1,095	9	36	4%
	4,332	52	74	

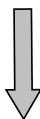
Erb St



Cars	Trucks	Heavys	Total
4,307	57	65	4,429

Peds Cross: X
West Peds: 42
West Entering: 5,762
West leg Total: 11,412
Bicycles Entering: 0
Buggies Entering: 0

Heavys	158
Trucks	84
Cars	7,682
Total	7,924



Total	2,349	4,202	950
Cars	2,254	4,068	904
Trucks	48	37	6
Heavys	47	97	40
% Trks	4%	3%	5%
	7,226	91	184

Peds Cross: X
South Peds: 50
South Entering: 7,501
South leg Total: 15,425
Bicycles Entering: 0
Buggies Entering: 0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **24,424**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **5,762**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Waterloo
Intersection: Erb St & Ira Needles Blvd/Erbsville Rd
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny
Person(s) who counted:
 AT06-NS

GeoID: 29541
Count Date: Thursday, 23-Mar-17

North Leg Total: 22,836
North Entering: 11,663
North Peds: N/A
Peds Cross: X

% Trks	2%	3%	2%	
Heavys	12	143	14	169
Trucks	23	54	23	99
Cars	1,394	7,658	2,344	11,395
Total	1,429	7,854	2,380	

Heavys 218
Trucks 106
Cars 10,849
Total 11173

East Leg Total: 15,463
East Entering: 7,757
East Peds: N/A
Peds Cross: X

Heavys 141
Trucks 174
Cars 9,516
Total 9,831

Erbsville Rd

Total	Cars	Trucks	Heavys	% Trks
1,458	1,432	7	19	2%
4,315	4,200	68	47	3%
1,984	1,905	16	63	4%
7,538	90	129		

Erb St

% Trks	Heavys	Trucks	Cars	Total
3%	30	35	2,339	2,403
3%	30	66	3,577	3,673
4%	70	77	3,804	3,950
	129	177	9,720	



Erb St

Cars	Trucks	Heavys	Total
7,494	99	113	7,706

Ira Needles Blvd

Total	4,087	7,311	1,653
Cars	3,922	7,078	1,573
Trucks	84	64	10
Heavys	82	169	70
% Trks	4%	3%	5%

Peds Cross: X
West Peds: N/A
West Entering: 10,026
West leg Total: 19,857

Heavys 275
Trucks 146
Cars 13,367
Total 13,788

Peds Cross: X
South Peds: N/A
South Entering: 13,052
South leg Total: 26,840

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
 This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 42,498

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Waterloo
Intersection: Erb St & Ira Needles Blvd/Erbsville Rd
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny

Person(s) who counted:
 AT06-NS

GeoID: 29541
Count Date: Thursday, 23-Mar-17

North Approach PHF

AM Peak: 0.88
 Mid-day Peak: 0.89
 PM Peak: 0.93

Movement			
PM	0.84	0.92	0.86
MID	0.77	0.86	0.86
AM	0.86	0.86	0.87

East Approach PHF

AM Peak: 0.87
 Mid-day Peak: 0.93
 PM Peak: 0.85

AM AM Peak Hour
 MID Mid-day Peak Hour
 PM PM Peak Hour

Erb St

Erbsville Rd



AM	MID	PM	Movement
0.72	0.84	0.73	
0.83	0.91	0.88	
0.81	0.85	0.87	

Erb St

Movement	PM	MID	AM
	0.93	0.89	0.69
	0.81	0.93	0.87
	0.86	0.88	0.90

Ira Needles Blvd

West Approach PHF

AM Peak: 0.84
 Mid-day Peak: 0.94
 PM Peak: 0.88

0.87	0.92	0.69	AM
0.83	0.93	0.88	MID
0.85	0.93	0.77	PM
Movement			

South Approach PHF

AM Peak: 0.95
 Mid-day Peak: 0.90
 PM Peak: 0.92

Comments

Intersection: Erb St & Ira Needles Blvd/Erbville F
GeoID: 29541
Municipality: Waterloo
Major Road: Erb St

Intersection Control: Non Signalized
Date: Thursday, 23-Mar-17
Name: AT06-NS
Weather: Sunny

Approach Control Movement Approach Lanes	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
	Yield Control			Yield Control			Yield Control			Yield Control				
	LT >	THRU 2	RT <	LT >	THRU 2	RT <	LT LANES	THRU 1	RT 1	LT LANES	THRU 1	RT 1		
7:30 to 7:45	31	53	56	16	20	17	30	101	18	26	122	21	511	2,623 2,828 2,871 2,807 2,640 2,457 2,261 2,228 2,235
7:45 to 8:00	32	80	68	22	28	19	31	137	36	54	158	21	686	
8:00 to 8:15	31	94	62	25	28	22	36	145	25	50	131	13	662	
8:15 to 8:30	52	114	63	29	34	37	42	137	33	52	158	13	764	
8:30 to 8:45	33	99	50	24	40	22	47	118	26	62	182	13	716	
8:45 to 9:00	28	89	53	35	44	26	38	133	48	66	153	16	729	
9:00 to 9:15	25	57	72	36	42	24	43	87	19	46	127	20	598	
9:15 to 9:30	20	46	46	28	42	26	57	104	12	38	150	28	597	
9:30 to 9:45	22	54	47	31	47	12	51	78	21	57	99	14	533	
9:45 to 10:00	17	47	42	24	50	17	73	79	27	33	100	24	533	
10:00 to 10:15	30	45	63	26	53	23	72	63	20	26	124	20	565	
10:15 to 10:30	37	39	69	30	51	11	86	81	32	30	113	25	604	
AM Peak Hour 8:00 to 9:00	144	396	228	113	146	107	163	533	132	230	624	55	2,871	
# of trucks in peak	2	5	1	2	3	0	1	6	0	1	5	2	28	
# of heavies in peak	2	3	4	4	4	3	6	12	5	2	13	1	59	
% heavies (Total)	3%	2%	2%	5%	5%	3%	4%	3%	4%	1%	3%	5%	3%	
12:00 to 12:15	52	41	60	39	68	20	100	125	36	43	100	12	696	2,832 2,830 2,871 2,902 2,857
12:15 to 12:30	55	53	83	39	87	17	82	100	27	52	127	13	735	
12:30 to 12:45	44	63	61	30	75	10	100	99	22	28	130	16	678	
12:45 to 13:00	50	65	86	40	87	27	63	112	23	38	116	16	723	
13:00 to 13:15	42	73	73	35	77	22	89	92	26	48	103	14	694	
13:15 to 13:30	47	67	69	44	93	22	102	106	27	40	135	24	776	
13:30 to 13:45	38	67	76	30	83	30	85	105	19	40	110	26	709	
13:45 to 14:00	57	65	66	34	57	27	83	91	27	42	103	26	678	
Midday Peak Hour 12:45 to 13:45	177	272	304	149	340	101	339	415	95	166	464	80	2,902	
# of trucks in peak	2	10	10	3	6	1	2	3	1	1	7	1	47	
# of heavies in peak	5	2	13	4	7	3	6	15	4	0	8	0	67	
% heavies (Total)	4%	4%	8%	5%	4%	4%	2%	4%	5%	1%	3%	1%	4%	
15:00 to 15:15	53	57	69	57	72	35	89	132	24	52	134	29	803	3,451 3,537 3,687 3,780 3,827 4,001 3,988 3,939 3,959
15:15 to 15:30	68	73	63	35	99	28	80	148	38	36	148	35	851	
15:30 to 15:45	51	69	95	46	91	29	94	133	35	34	184	31	892	
15:45 to 16:00	46	73	88	46	119	33	104	125	38	31	177	25	905	
16:00 to 16:15	37	56	83	34	107	30	88	179	41	47	162	25	889	
16:15 to 16:30	59	73	91	37	131	39	72	211	44	39	170	35	1,001	
16:30 to 16:45	54	83	101	45	128	28	79	193	34	54	141	45	985	
16:45 to 17:00	51	57	80	51	119	26	99	195	19	44	179	32	952	
17:00 to 17:15	55	55	75	54	150	48	87	220	47	49	184	39	1,063	
17:15 to 17:30	48	65	87	38	144	31	91	195	28	30	175	56	988	
17:30 to 17:45	55	61	96	34	119	37	61	197	43	39	150	44	936	
17:45 to 18:00	61	78	77	46	95	43	95	181	35	42	169	50	972	
PM Peak Hour 16:15 to 17:15	219	268	347	187	528	141	337	819	144	186	674	151	4,001	
# of trucks in peak	2	0	8	2	5	0	3	1	1	2	3	1	28	
# of heavies in peak	0	1	3	5	1	1	1	11	4	1	10	1	39	
% heavies (Total)	1%	0%	3%	4%	1%	1%	1%	1%	3%	2%	2%	1%	2%	

Intersection: Erb St & Ira Needles Blvd/Erbsville R

GeoID: 29541

Municipality: Waterloo

Major Road: Erb St

Intersection Control: Non Signalized

Date: Thursday, 23-Mar-17

Name: AT06-NS

Weather: Sunny

PEDESTRIAN CROSSING							
Time	Crossing Approach						TOTAL HOUR
	East App.	West App.	North App.	South App.	TOTAL		
7:30 to 7:45	0	3	0	3	6	18 19 20 23 22 17 21 16 22	
7:45 to 8:00	3	0	0	2	5		
8:00 to 8:15	0	2	0	1	3		
8:15 to 8:30	1	0	0	3	4		
8:30 to 8:45	4	1	0	2	7		
8:45 to 9:00	5	0	0	1	6		
9:00 to 9:15	3	0	0	3	6		
9:15 to 9:30	1	1	0	1	3		
9:30 to 9:45	0	0	0	2	2		
9:45 to 10:00	6	1	1	2	10		
10:00 to 10:15	0	1	0	0	1		
10:15 to 10:30	4	0	0	5	9		
AM Peak Hour 8:00 to 9:00	10	3	0	7	20		
12:00 to 12:15	0	0	0	0	0	5 7 9 8 7	
12:15 to 12:30	0	0	0	1	1		
12:30 to 12:45	1	0	0	0	1		
12:45 to 13:00	2	0	0	1	3		
13:00 to 13:15	1	0	0	1	2		
13:15 to 13:30	1	0	0	2	3		
13:30 to 13:45	0	0	0	0	0		
13:45 to 14:00	1	0	0	1	2		
Midday Peak Hour 12:45 to 13:45	4	0	0	4	8		
15:00 to 15:15	5	6	2	0	13	29 17 20 16 14 21 20 19 21	
15:15 to 15:30	0	1	0	2	3		
15:30 to 15:45	2	2	0	3	7		
15:45 to 16:00	0	4	0	2	6		
16:00 to 16:15	0	1	0	0	1		
16:15 to 16:30	2	3	0	1	6		
16:30 to 16:45	0	0	0	3	3		
16:45 to 17:00	1	2	0	1	4		
17:00 to 17:15	0	5	0	3	8		
17:15 to 17:30	0	4	0	1	5		
17:30 to 17:45	0	0	0	2	2		
17:45 to 18:00	0	5	0	1	6		
PM Peak Hour 16:15 to 17:15	3	10	0	8	21		

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Waterloo
Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr
Control: Non Signalized
Major Road: Erb St

Weather conditions:
Sunny
Person(s) who counted:
AT15-GR

GeoID: 35451
Count Date: Thursday, 23-Mar-17

North Leg Total: 23
North Entering: 9
North Peds: 0
Peds Cross: X

	% Trks	0%	0%	33%	
Heavys	0	0	1	1	
Trucks	0	0	0	0	
Cars	5	1	2	8	
Total		5	1	3	

Heavys: 0
Trucks: 1
Cars: 13
Total: 14

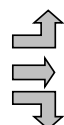
East Leg Total: 912
East Entering: 222
East Peds: 0
Peds Cross: X

Heavys: 6
Trucks: 2
Cars: 195
Total: 203



Erb St

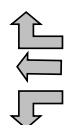
% Trks	Heavys	Trucks	Cars	Total
0%	0	0	6	6
1%	6	1	657	664
0%	0	0	3	3
	6	1	666	



Landfill Gate 2



Platinum Dr



Total	Cars	Trucks	Heavys	% Trks
7	6	1	0	14%
198	190	2	6	4%
17	14	3	0	18%
	210	6	6	

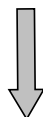
Erb St



Cars: 679
Trucks: 4
Heavys: 7
Total: 690

Peds Cross: X
West Peds: 0
West Entering: 673
West leg Total: 876

Heavys: 0
Trucks: 3
Cars: 18
Total: 21



Total	0	1	23	
Cars	0	1	20	21
Trucks	0	0	3	3
Heavys	0	0	0	0
% Trks	0%	0%	13%	

Peds Cross: X
South Peds: 0
South Entering: 24
South leg Total: 45

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **928**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **673**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Mid-day Peak Diagram

Count Period

From: 12:00 PM
To: 2:00 PM

Peak Hour

From: 1:00 PM
To: 2:00 PM

Municipality: Waterloo

Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr

Control: Non Signalized

Major Road: Erb St

Weather conditions:

Sunny

Person(s) who counted:

AT15-GR

GeoID: 35451

Count Date: Thursday, 23-Mar-17

North Leg Total: 141
North Entering: 94
North Peds: 0
Peds Cross: X

% Trks	0%	0%	0%	
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	36	2	56	94
Total	36	2	56	

Heavys: 1
Trucks: 0
Cars: 46
Total: 47

East Leg Total: 675
East Entering: 327
East Peds: 0
Peds Cross: X

Erb St

Heavys	Trucks	Cars	Total
5	1	313	319

Platinum Dr

Total	Cars	Trucks	Heavys	% Trks
15	14	0	1	7%
271	265	1	5	2%
41	40	1	0	2%
319	2	6		



% Trks	Heavys	Trucks	Cars	Total
0%	0	0	27	27
5%	8	5	237	250
0%	0	0	9	9
	8	5	273	

Erb St

Cars	Trucks	Heavys	Total
334	6	8	348

Landfill Gate 2

Peds Cross: X
West Peds: 0
West Entering: 286
West leg Total: 605

Heavys	0
Trucks	1
Cars	51
Total	52

Total	12	5	42	
Cars	12	5	41	58
Trucks	0	0	1	1
Heavys	0	0	0	0
% Trks	0%	0%	2%	

Peds Cross: X
South Peds: 0
South Entering: 59
South leg Total: 111

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **766**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **286**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Afternoon Peak Diagram

Count Period

From: 3:00 PM
To: 6:00 PM

Peak Hour

From: 4:30 PM
To: 5:30 PM

Municipality: Waterloo

Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr

Control: Non Signalized

Major Road: Erb St

Weather conditions:

Sunny

Person(s) who counted:

AT15-GR

GeoID: 35451

Count Date: Thursday, 23-Mar-17

North Leg Total: 131
North Entering: 97
North Peds: 0
Peds Cross: X

% Trks	0%	0%	0%	
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	55	0	42	97
Total	55	0	42	

Heavys 0
Trucks 0
Cars 34
Total 34

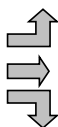
East Leg Total: 944
East Entering: 565
East Peds: 0
Peds Cross: X

Heavys 1
Trucks 0
Cars 569
Total 570



Erb St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	18	18
1%	2	2	294	298
0%	0	0	10	10
	2	2	322	



Landfill Gate 2



Platinum Dr



Total	Cars	Trucks	Heavys	% Trks
12	12	0	0	0%
515	514	0	1	0%
38	37	1	0	3%
	563	1	1	

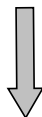
Erb St



Cars 374
Trucks 3
Heavys 2
Total 379

Peds Cross: X
West Peds: 0
West Entering: 326
West leg Total: 896

Heavys 0
Trucks 1
Cars 47
Total 48



Total	0	4	39
Cars	0	4	38
Trucks	0	0	1
Heavys	0	0	0
% Trks	0%	0%	3%

Peds Cross: X
South Peds: 0
South Entering: 43
South leg Total: 91

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,031**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **326**

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Total Count Diagram

Municipality: Waterloo
Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny
Person(s) who counted:
 AT15-GR

GeoID: 35451
Count Date: Thursday, 23-Mar-17

North Leg Total: 824
North Entering: 526
North Peds: 1
Peds Cross: X
Bicycles Entering: 0
Buggies Entering: 0

% Trks	1%	0%	3%	
Heavys	0	0	4	4
Trucks	3	0	5	8
Cars	240	11	263	514
Total	243	11	272	

Heavys 3
 Trucks 7
 Cars 288
 Total 298

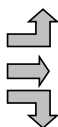
East Leg Total: 5,966
East Entering: 2,636
East Peds: 0
Peds Cross: X
Bicycles Entering: 0
Buggies Entering: 0

Heavys 42
 Trucks 16
 Cars 2,486
 Total 2,544



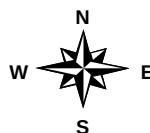
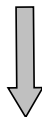
Erb St

% Trks	Heavys	Trucks	Cars	Total
1%	0	2	172	174
2%	40	22	2,710	2,772
0%	0	0	62	62
	40	24	2,944	



Landfill Gate 2

Heavys 1
 Trucks 7
 Cars 336
 Total 344



Platinum Dr



Total	Cars	Trucks	Heavys	% Trks
102	94	5	3	8%
2,263	2,209	12	42	2%
271	263	7	1	3%
	2,566	24	46	

Erb St



Cars 3,250
 Trucks 33
 Heavys 47
 Total 3,330

Peds Cross: X
West Peds: 0
West Entering: 3,008
West leg Total: 5,552
Bicycles Entering: 0
Buggies Entering: 0

Total 38
 Cars 37
 Trucks 1
 Heavys 0
 % Trks 3%
 22
 0
 0
 0%

Peds Cross: X
South Peds: 0
South Entering: 346
South leg Total: 690
Bicycles Entering: 0
Buggies Entering: 0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
 Therefore, total vehicles entering intersection = **6,516**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
 Therefore, vehicles entering from the west = **3,008**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Waterloo
Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny
Person(s) who counted:
 AT15-GR

GeoID: 35451
Count Date: Thursday, 23-Mar-17

North Leg Total: 1,434
North Entering: 915
North Peds: N/A
Peds Cross: X

% Trks	1%	0%	3%	
Heavys	0	0	7	7
Trucks	5	0	9	14
Cars	418	19	458	894
Total	423	19	473	

Heavys	5
Trucks	12
Cars	501
Total	519

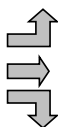
East Leg Total: 10,381
East Entering: 4,587
East Peds: N/A
Peds Cross: X

Heavys	73
Trucks	28
Cars	4,326
Total	4,427



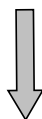
Erb St

% Trks	Heavys	Trucks	Cars	Total
1%	0	3	299	303
2%	70	38	4,715	4,823
0%	0	0	108	108
	70	42	5,123	



Landfill Gate 2

Heavys	2
Trucks	12
Cars	585
Total	599



Peds Cross: X
West Peds: N/A
West Entering: 5,234
West leg Total: 9,660

Platinum Dr



Total	Cars	Trucks	Heavys	% Trks
177	164	9	5	8%
3,938	3,844	21	73	2%
472	458	12	2	3%
	4,465	42	80	

Erb St



Cars	Trucks	Heavys	Total
5,655	57	82	5,794

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
 This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example:
$$\frac{(\text{West leg total} + \text{South leg total} + \text{East leg total} + \text{North leg total})}{2}$$
 EDT = 11,338

REGIONAL MUNICIPALITY OF WATERLOO

TURNING MOVEMENT COUNT



Peak Hour Factor By Movement

Municipality: Waterloo
Intersection: Erb St & Wat. Landfill Gate Two/Platinum Dr
Control: Non Signalized
Major Road: Erb St

Weather conditions:
 Sunny

Person(s) who counted:
 AT15-GR

GeoID: 35451
Count Date: Thursday, 23-Mar-17

North Approach PHF

AM Peak: 0.56
 Mid-day Peak: 0.84
 PM Peak: 0.78

	Movement		
PM	0.76	0.00	0.81
MID	0.82	0.50	0.78
AM	0.42	0.25	0.38

East Approach PHF

AM Peak: 0.88
 Mid-day Peak: 0.92
 PM Peak: 0.94

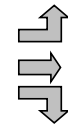
AM AM Peak Hour
 MID Mid-day Peak Hour
 PM PM Peak Hour

Erb St

Platinum Dr



	PM	MID	AM
Movement	0.90	0.75	0.50
	0.86	0.88	0.89
	0.63	0.56	0.38



Landfill Gate 2



	AM	MID	PM	
	0.35	0.75	0.60	Movement
	0.87	0.92	0.95	
	0.53	0.85	0.86	

Erb St



West Approach PHF

AM Peak: 0.89
 Mid-day Peak: 0.86
 PM Peak: 0.88

0.00	0.25	0.72	AM
0.60	0.63	0.75	MID
0.00	0.33	0.70	PM
Movement			

South Approach PHF

AM Peak: 0.75
 Mid-day Peak: 0.78
 PM Peak: 0.72

Comments

Intersection: Erb St & Wat. Landfill Gate Two/Plat
GeoID: 35451
Municipality: Waterloo
Major Road: Erb St

Intersection Control: Non Signalized
Date: Thursday, 23-Mar-17
Name: AT15-GR
Weather: Sunny

Approach Control Movement Approach Lanes			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
			Yield Control			Yield Control			Yield Control			Yield Control				
			LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT		
			>	2	<	>	2	<	0	1	0	0	1	0		
7:30 to 7:45	3	135	0	8	54	1	0	1	7	2	1	1	213	928		
7:45 to 8:00	1	171	2	4	51	5	0	0	8	0	0	0	242			
8:00 to 8:15	1	171	1	2	36	0	0	0	4	0	0	3	218			
8:15 to 8:30	1	187	0	3	57	1	0	0	4	1	0	1	255			
8:30 to 8:45	1	150	1	4	47	2	0	1	3	1	0	1	211			
8:45 to 9:00	4	142	1	7	56	2	0	0	4	1	0	0	217			
9:00 to 9:15	3	96	4	9	42	3	2	0	10	0	0	1	170			
9:15 to 9:30	4	76	5	5	36	4	2	0	8	0	0	3	143			
9:30 to 9:45	11	65	3	7	37	3	0	0	9	1	0	1	137			
9:45 to 10:00	10	87	1	4	35	7	2	0	5	4	0	2	157			
10:00 to 10:15	13	69	2	18	31	2	3	1	5	6	0	3	153			
10:15 to 10:30	7	55	5	6	29	5	0	2	14	5	0	5	133			
AM Peak Hour 7:30 to 8:30	6	664	3	17	198	7	0	1	23	3	1	5	928			
# of trucks in peak	0	1	0	3	2	1	0	0	3	0	0	0	10			
# of heavies in peak	0	6	0	0	6	0	0	0	0	1	0	0	13			
% heavies (Total)	0%	1%	0%	18%	4%	14%	0%	0%	13%	33%	0%	0%	2%			
12:00 to 12:15	8	48	2	11	46	4	1	2	12	11	0	11	156	722		
12:15 to 12:30	5	57	3	9	58	6	0	1	15	16	0	7	177			
12:30 to 12:45	4	62	1	14	72	4	5	1	8	15	1	10	197			
12:45 to 13:00	10	67	4	16	48	2	1	1	17	20	0	6	192			
13:00 to 13:15	6	51	1	11	51	3	5	2	11	16	1	6	164			
13:15 to 13:30	5	65	1	9	74	3	2	1	8	12	0	9	189			
13:30 to 13:45	7	63	4	12	73	4	2	0	9	18	0	10	202			
13:45 to 14:00	9	71	3	9	73	5	3	2	14	10	1	11	211			
Midday Peak Hour 13:00 to 14:00	27	250	9	41	271	15	12	5	42	56	2	36	766			
# of trucks in peak	0	5	0	1	1	0	0	0	1	0	0	0	8			
# of heavies in peak	0	8	0	0	5	1	0	0	0	0	0	0	14			
% heavies (Total)	0%	5%	0%	2%	2%	7%	0%	0%	2%	0%	0%	0%	3%			
15:00 to 15:15	2	67	1	9	71	4	1	0	9	11	1	8	184	854		
15:15 to 15:30	8	67	1	9	88	2	1	0	10	11	0	10	207			
15:30 to 15:45	9	86	5	8	81	6	4	0	12	11	0	7	229			
15:45 to 16:00	3	76	1	9	103	7	1	1	10	14	1	8	234			
16:00 to 16:15	1	82	0	10	105	1	0	2	8	3	0	15	227			
16:15 to 16:30	5	65	0	9	117	1	2	0	9	8	4	17	237			
16:30 to 16:45	4	87	2	10	125	3	0	3	9	13	0	17	273			
16:45 to 17:00	5	67	1	11	136	3	0	0	8	13	0	18	262			
17:00 to 17:15	5	74	3	8	130	5	0	0	8	7	0	14	254			
17:15 to 17:30	4	70	4	9	124	1	0	1	14	9	0	6	242			
17:30 to 17:45	2	69	0	6	85	1	0	0	8	14	1	12	198			
17:45 to 18:00	13	74	0	5	92	2	1	0	6	19	0	20	232			
PM Peak Hour 16:30 to 17:30	18	298	10	38	515	12	0	4	39	42	0	55	1,031			
# of trucks in peak	0	2	0	1	0	0	0	0	1	0	0	0	4			
# of heavies in peak	0	2	0	0	1	0	0	0	0	0	0	0	3			
% heavies (Total)	0%	1%	0%	3%	0%	0%	0%	0%	3%	0%	0%	0%	1%			

Intersection: Erb St & Wat. Landfill Gate Two/Platir

GeoID: 35451

Municipality: Waterloo

Major Road: Erb St

Intersection Control: Non Signalized

Date: Thursday, 23-Mar-17

Name: AT15-GR

Weather: Sunny

PEDESTRIAN CROSSING							
Time	Crossing Approach						
	East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR	
7:30 to 7:45	0	0	0	0	0	0	
7:45 to 8:00	0	0	0	0	0		
8:00 to 8:15	0	0	0	0	0		
8:15 to 8:30	0	0	0	0	0		
8:30 to 8:45	0	0	0	0	0		
8:45 to 9:00	0	0	1	0	1		
9:00 to 9:15	0	0	0	0	0		
9:15 to 9:30	0	0	0	0	0		
9:30 to 9:45	0	0	0	0	0		
9:45 to 10:00	0	0	0	0	0		
10:00 to 10:15	0	0	0	0	0	0	
10:15 to 10:30	0	0	0	0	0	0	
AM Peak Hour 7:30 to 8:30	0	0	0	0	0		
12:00 to 12:15	0	0	0	0	0	0	
12:15 to 12:30	0	0	0	0	0		
12:30 to 12:45	0	0	0	0	0		
12:45 to 13:00	0	0	0	0	0		
13:00 to 13:15	0	0	0	0	0		
13:15 to 13:30	0	0	0	0	0		
13:30 to 13:45	0	0	0	0	0		
13:45 to 14:00	0	0	0	0	0		
Midday Peak Hour 13:00 to 14:00	0	0	0	0	0		
15:00 to 15:15	0	0	0	0	0	0	
15:15 to 15:30	0	0	0	0	0		
15:30 to 15:45	0	0	0	0	0		
15:45 to 16:00	0	0	0	0	0		
16:00 to 16:15	0	0	0	0	0		
16:15 to 16:30	0	0	0	0	0		
16:30 to 16:45	0	0	0	0	0		
16:45 to 17:00	0	0	0	0	0		
17:00 to 17:15	0	0	0	0	0		
17:15 to 17:30	0	0	0	0	0		
17:30 to 17:45	0	0	0	0	0		
17:45 to 18:00	0	0	0	0	0		
PM Peak Hour 16:30 to 17:30	0	0	0	0	0		

TRAFFIC SIGNAL TIMING

ERBSVILLE ROAD & COLUMBIA STREET - #626

1. Fixed time mode of control, co-ordinated with signals on Erbsville Road
2. Offsets are a percentage of the cycle length and are referenced to the start of Erbsville Road green

Signal timing in effect: (07:00 - 08:15, 08:45 – 09:00 Monday to Friday)

ERBSVILLE ROAD OFFSET – 49%

SBL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 12.0 seconds	
SB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 24.6 seconds	Walk – 15.6 seconds
Amber		- 3.7 seconds	FDW - 9.0 seconds
All Red		- 2.7 seconds	

COLUMBIA STREET

EWL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 6.0 seconds	
SB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 26.7 seconds	Walk – 19.7 seconds
Amber		- 3.3 seconds	FDW - 7.0 seconds
All Red		- 3.0 seconds	
TOTAL		90.0 seconds	

Signal timing in effect: (08:15 - 08:45, Monday to Friday)

ERBSVILLE ROAD OFFSET – 50%

SBL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 11.0 seconds	
SB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 27.6 seconds	Walk - 18.6 seconds
Amber		- 3.7 seconds	FDW - 9.0 seconds
All Red		- 2.7 seconds	

COLUMBIA STREET

EWL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 6.0 seconds	
WB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 23.7 seconds	Walk - 16.7 seconds
Amber		- 3.3 seconds	FDW - 7.0 seconds
All Red		- 3.0 seconds	
TOTAL		100.0 seconds	

Signal timing in effect: 09:00 - 15:00 Monday to Friday
08:30 – 18:00 Saturday
11:00 – 18:00 Sunday

ERBSVILLE ROAD

OFFSET – 0%

SBL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 8.0 seconds	
SB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 28.6 seconds	Walk - 19.6 seconds
Amber		- 3.7 seconds	FDW - 9.0 seconds
All Red		- 2.7 seconds	

COLUMBIA STREET

WBL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 6.0 seconds	
WB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 26.7 seconds	Walk - 19.7 seconds
Amber		- 3.3 seconds	FDW - 7.0 seconds
All Red		- 3.0 seconds	
TOTAL		90.0 seconds	

Signal timing in effect: 15:00 – 19:00 Monday to Friday

ERBSVILLE ROAD

OFFSET – 70%

NSL Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 7.0 seconds	
SB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 25.6 seconds	Walk - 16.6 seconds
Amber		- 3.7 seconds	FDW - 9.0 seconds
All Red		- 2.7 seconds	

COLUMBIA STREET

WB Green Arrow	Min.	- 5.0 seconds	
	Ext.	- 3.0 seconds	
	Max.	- 11.0 seconds	
WB Amber Arrow		- 3.0 seconds	
All Red		- 1.0 seconds	
Green		- 25.7 seconds	Walk - 18.7 seconds
Amber		- 3.3 seconds	FDW - 7.0 seconds
All Red		- 3.0 seconds	
TOTAL		90.0 seconds	

Signal timing in effect: All other times

ERBSVILLE ROAD

OFFSET – 0%

Green - 32.6 seconds
Amber - 3.7 seconds
All Red - 2.7 seconds

Walk - 23.6 seconds
FDW - 9.0 seconds

COLUMBIA STREET

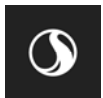
Green - 19.7 seconds
Amber - 3.3 seconds
All Red - 3.0 seconds

Walk - 12.0 seconds
FDW - 7.0 seconds

TOTAL 65.0 seconds

June 2018 MAL

Appendix D OPERATIONS ANALYSIS REPORTS



Existing 2018

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 770558 software@trl.co.uk www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: 2018 Existing - Erb & Platinum.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\1. Existing (2018)

Report generation date: 8/9/2018 2:44:07 PM

»2018 Existing, AM

»2018 Existing, PM

Summary of junction performance

	AM						PM					
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2018 Existing												
1 - Erb (W)	0.9	4.02		A	3.96	A	0.4	3.64		A	3.83	A
2 - Platinum (S)	0.0	5.35		A			0.1	3.83		A		
3 - Erb (E)	0.3	3.59		A			0.8	3.83		A		
4 - Platinum (N)	0.0	4.34		A			0.2	4.41		A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

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Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75	✓			0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	637135276	101	4.01

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2018 Existing	AM	ONE HOUR	08:00	09:30	15	✓
D2	2018 Existing	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2018 Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	4.02	0.9	3.0	A	628	941
2 - Platinum (S)	5.35	0.0	~1	A	22	32
3 - Erb (E)	3.59	0.3	2.0	A	207	310
4 - Platinum (N)	4.34	0.0	~1	A	9	14

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	513	128	15	513	158	0.0	0.5	3.605	A
2 - Platinum (S)	20	5	515	20	13	0.0	0.0	4.376	A
3 - Erb (E)	173	43	5	170	529	0.0	0.3	3.593	A
4 - Platinum (N)	9	2	165	8	11	0.0	0.0	3.710	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	611	153	19	611	191	0.5	0.7	3.737	A
2 - Platinum (S)	21	5	610	21	21	0.0	0.0	5.034	A
3 - Erb (E)	210	52	7	210	624	0.3	0.2	3.553	A
4 - Platinum (N)	7	2	203	7	14	0.0	0.0	3.937	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	767	192	22	767	227	0.7	0.9	4.025	A
2 - Platinum (S)	27	7	768	27	21	0.0	0.0	4.938	A
3 - Erb (E)	245	61	8	246	787	0.2	0.2	3.566	A
4 - Platinum (N)	11	3	238	11	16	0.0	0.0	3.828	A

08:45 - 09:00

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Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	738	185	23	740	221	0.9	0.6	3.955	A
2 - Platinum (S)	23	6	740	23	23	0.0	0.0	5.346	A
3 - Erb (E)	243	61	7	241	757	0.2	0.3	3.512	A
4 - Platinum (N)	12	3	232	12	17	0.0	0.0	4.337	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	612	153	19	614	185	0.6	0.6	3.779	A
2 - Platinum (S)	20	5	614	20	19	0.0	0.0	4.735	A
3 - Erb (E)	200	50	5	201	628	0.3	0.1	3.463	A
4 - Platinum (N)	9	2	195	9	11	0.0	0.0	4.321	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	525	131	18	524	152	0.6	0.5	3.680	A
2 - Platinum (S)	18	5	524	18	18	0.0	0.0	4.518	A
3 - Erb (E)	170	42	4	171	538	0.1	0.1	3.539	A
4 - Platinum (N)	6	1	165	6	10	0.0	0.0	3.662	A

Queue Variation Results for each time segment**08:00 - 08:15**

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.50	0.00	0.00	0.96	1.66
2 - Platinum (S)	0.03	0.00	0.00	0.00	0.00
3 - Erb (E)	0.30	0.00	0.00	0.70	0.91
4 - Platinum (N)	0.02	0.00	0.00	0.00	0.00

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.70	0.00	0.00	1.39	1.90
2 - Platinum (S)	0.03	0.00	0.00	0.00	0.00
3 - Erb (E)	0.25	0.00	0.00	0.63	0.89
4 - Platinum (N)	0.00	0.00	0.00	0.00	0.00

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.90	0.00	0.08	1.78	2.98
2 - Platinum (S)	0.03	0.00	0.00	0.00	0.00
3 - Erb (E)	0.25	0.00	0.00	0.66	2.00
4 - Platinum (N)	0.00	0.00	0.00	0.00	0.00

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.61	0.00	0.00	1.27	1.99
2 - Platinum (S)	0.03	0.00	0.00	0.00	0.00
3 - Erb (E)	0.31	0.00	0.00	0.73	0.95
4 - Platinum (N)	0.01	0.00	0.00	0.00	0.00

09:00 - 09:15

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Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.57	0.00	0.00	0.99	1.62
2 - Platinum (S)	0.01	0.00	0.00	0.00	0.00
3 - Erb (E)	0.09	0.00	0.00	0.00	1.00
4 - Platinum (N)	0.00	0.00	0.00	0.00	0.00

09:15 - 09:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.47	0.00	0.00	2.00	2.00
2 - Platinum (S)	0.05	0.00	0.00	0.00	0.00
3 - Erb (E)	0.11	0.00	0.00	-0.01	0.55
4 - Platinum (N)	0.01	0.00	0.00	0.00	0.00

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	259	1091	0.237	258	0.0	0.3	3.647	A
			2	1, 3, 4	254	1091	0.233	254	0.0	0.2	3.564	A
	Exit	2	1	(1, 2, 3, 4)	513			513	0.0	0.0	0.000	A
			1		158			158	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	20	924	0.022	20	0.0	0.0	4.376	A
	Exit	1	1		13			13	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	86	1094	0.079	85	0.0	0.1	3.605	A
			2	1, 2, 3	86	1094	0.079	86	0.0	0.1	3.582	A
	Exit	1	1		529			529	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	7	1037	0.007	7	0.0	0.0	3.596	A
			2	3, 4	1	1037	0.001	1	0.0	0.0	4.321	A
		2	1	(1, 2, 3, 4)	9			9	0.0	0.0	0.000	A
	Exit	1	1		11			11	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	297	1089	0.273	298	0.3	0.4	3.812	A
			2	1, 3, 4	314	1089	0.288	313	0.2	0.3	3.664	A
	Exit	2	1	(1, 2, 3, 4)	611			611	0.0	0.0	0.000	A
			1		191			191	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	21	869	0.025	21	0.0	0.0	5.034	A
	Exit	1	1		21			21	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	102	1094	0.093	101	0.1	0.2	3.432	A
			2	1, 2, 3	108	1094	0.099	109	0.1	0.1	3.670	A
	Exit	1	1		624			624	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	6	1023	0.006	6	0.0	0.0	3.774	A
			2	3, 4	1	1023	0.001	1	0.0	0.0	4.823	A
		2	1	(1, 2, 3, 4)	7			7	0.0	0.0	0.000	A
	Exit	1	1		14			14	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
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1 - Erb (W)	Entry	1	1	2, 3	382	1088	0.351	382	0.4	0.5	4.022	A
			2	1, 3, 4	384	1088	0.353	385	0.3	0.4	4.027	A
	Exit	1	1	(1, 2, 3, 4)	767			767	0.0	0.0	0.000	A
			1		227			227	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	27	777	0.034	27	0.0	0.0	4.938	A
	Exit	1	1		21			21	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	117	1093	0.107	116	0.2	0.1	3.564	A
			2	1, 2, 3	129	1093	0.118	129	0.1	0.1	3.568	A
	Exit	1	1		787			787	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	8	1010	0.008	9	0.0	0.0	3.833	A
			2	3, 4	3	1010	0.003	3	0.0	0.0	3.801	A
		2	1	(1, 2, 3, 4)	11			11	0.0	0.0	0.000	A
	Exit	1	1		16			16	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	366	1088	0.336	367	0.5	0.3	3.956	A
			2	1, 3, 4	372	1088	0.342	373	0.4	0.3	3.954	A
	Exit	1	1	(1, 2, 3, 4)	738			738	0.0	0.0	0.000	A
			1		221			221	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	23	793	0.029	23	0.0	0.0	5.346	A
	Exit	1	1		23			23	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	119	1094	0.108	118	0.1	0.1	3.436	A
			2	1, 2, 3	124	1094	0.114	123	0.1	0.2	3.585	A
	Exit	1	1		757			757	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	10	1012	0.009	10	0.0	0.0	4.008	A
			2	3, 4	3	1012	0.003	3	0.0	0.0	6.469	A
		2	1	(1, 2, 3, 4)	12			12	0.0	0.0	0.000	A
	Exit	1	1		17			17	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	299	1089	0.274	300	0.3	0.3	3.764	A
			2	1, 3, 4	313	1089	0.287	314	0.3	0.3	3.794	A
	Exit	1	1	(1, 2, 3, 4)	612			612	0.0	0.0	0.000	A
			1		185			185	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	20	867	0.023	20	0.0	0.0	4.735	A
	Exit	1	1		19			19	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	95	1094	0.086	95	0.1	0.0	3.425	A
			2	1, 2, 3	106	1094	0.097	106	0.2	0.1	3.499	A
	Exit	1	1		628			628	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	8	1026	0.008	8	0.0	0.0	4.127	A
			2	3, 4	2	1026	0.002	2	0.0	0.0	5.687	A
		2	1	(1, 2, 3, 4)	9			9	0.0	0.0	0.000	A
	Exit	1	1		11			11	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	262	1090	0.241	262	0.3	0.2	3.712	A
			2	1, 3, 4	263	1090	0.241	263	0.3	0.2	3.648	A
	Exit	1	1	(1, 2, 3, 4)	525			525	0.0	0.0	0.000	A
			1		152			152	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	18	918	0.020	18	0.0	0.0	4.518	A
	Exit	1	1		18			18	0.0	0.0	0.000	A

3 - Erb (E)	Entry	1	1	1, 4	83	1095	0.076	84	0.0	0.1	3.455	A
			2	1, 2, 3	87	1095	0.079	87	0.1	0.0	3.619	A
	Exit	1	1		538			538	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	5	1037	0.005	5	0.0	0.0	3.343	A
			2	3, 4	0.95	1037	0.001	0.95	0.0	0.0	5.540	A
		2	1	(1, 2, 3, 4)	6			6	0.0	0.0	0.000	A
	Exit	1	1		10			10	0.0	0.0	0.000	A

Lanes: Queue Variation Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.28	0.00	0.00	0.66	0.90
			2	0.22	0.00	0.00	0.55	0.83
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.03	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.15	0.00	0.00	0.30	0.69
			2	0.15	0.00	0.00	0.30	0.69
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.02	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

08:15 - 08:30

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.37	0.00	0.00	0.78	0.96
			2	0.34	0.00	0.00	0.75	0.96
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.03	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.19	0.00	0.00	0.46	0.76
			2	0.06	0.00	0.00	0.00	1.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.00	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

08:30 - 08:45

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.47	0.00	0.00	0.87	1.24
			2	0.44	0.00	0.00	0.88	1.49
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.03	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.12	0.00	0.00	-0.01	0.62
			2	0.13	0.00	0.00	0.17	0.63
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.00	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

08:45 - 09:00

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.29	0.00	0.00	0.69	0.91
			2	0.33	0.00	0.00	0.74	0.92
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.03	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.15	0.00	0.00	0.30	0.69
			2	0.16	0.00	0.00	0.35	0.71
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.01	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

09:00 - 09:15

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.29	0.00	0.00	0.68	0.88
			2	0.29	0.00	0.00	0.66	0.85
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.01	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.03	0.00	0.00	0.00	0.00
			2	0.06	0.00	0.00	0.00	1.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.00	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

09:15 - 09:30

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.23	0.00	0.00	0.57	0.84
			2	0.24	0.00	0.00	1.00	1.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.05	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.06	0.00	0.00	0.00	1.00
			2	0.05	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.01	0.00	0.00	0.00	0.00
			2	0.00	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

2018 Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	3.64	0.4	1.6	A	301	451
2 - Platinum (S)	3.83	0.1	1.0	A	39	58
3 - Erb (E)	3.83	0.8	2.4	A	526	789
4 - Platinum (N)	4.41	0.2	1.0	A	90	135

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	248	62	65	249	434	0.0	0.2	3.547	A
2 - Platinum (S)	32	8	275	32	39	0.0	0.0	3.496	A
3 - Erb (E)	433	108	17	434	290	0.0	0.4	3.592	A
4 - Platinum (N)	74	19	425	75	27	0.0	0.1	3.860	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	297	74	76	296	524	0.2	0.4	3.543	A
2 - Platinum (S)	36	9	324	36	47	0.0	0.0	3.690	A
3 - Erb (E)	524	131	21	524	339	0.4	0.5	3.638	A
4 - Platinum (N)	88	22	511	88	33	0.1	0.1	4.211	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	352	88	89	351	624	0.4	0.4	3.642	A
2 - Platinum (S)	46	11	388	46	52	0.0	0.0	3.834	A
3 - Erb (E)	619	155	21	618	413	0.5	0.7	3.816	A
4 - Platinum (N)	107	27	605	108	35	0.1	0.1	4.414	A

17:45 - 18:00

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Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	367	92	91	368	642	0.4	0.4	3.614	A
2 - Platinum (S)	49	12	404	49	55	0.0	0.1	3.833	A
3 - Erb (E)	641	160	24	640	428	0.7	0.8	3.834	A
4 - Platinum (N)	109	27	626	108	38	0.1	0.2	4.146	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	305	76	79	304	507	0.4	0.4	3.552	A
2 - Platinum (S)	39	10	335	39	48	0.1	0.0	3.611	A
3 - Erb (E)	507	127	18	506	356	0.8	0.6	3.714	A
4 - Platinum (N)	90	22	497	89	28	0.2	0.1	4.113	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	235	59	57	237	441	0.4	0.1	3.518	A
2 - Platinum (S)	30	8	259	30	35	0.0	0.0	3.207	A
3 - Erb (E)	433	108	15	434	274	0.6	0.4	3.543	A
4 - Platinum (N)	71	18	426	72	23	0.1	0.1	4.372	A

Queue Variation Results for each time segment**17:00 - 17:15**

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.21	0.00	0.00	0.52	0.79
2 - Platinum (S)	0.01	0.00	0.00	0.00	0.00
3 - Erb (E)	0.38	0.00	0.00	0.90	1.42
4 - Platinum (N)	0.08	0.00	0.00	0.00	1.00

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.41	0.00	0.00	0.99	1.62
2 - Platinum (S)	0.05	0.00	0.00	0.00	1.00
3 - Erb (E)	0.47	0.00	0.00	0.96	1.49
4 - Platinum (N)	0.08	0.00	0.00	0.00	1.00

17:30 - 17:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.43	0.00	0.00	1.09	1.60
2 - Platinum (S)	0.04	0.00	0.00	0.00	0.00
3 - Erb (E)	0.66	0.00	0.00	1.54	1.98
4 - Platinum (N)	0.15	0.00	0.00	0.30	0.69

17:45 - 18:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.36	0.00	0.00	0.80	0.99
2 - Platinum (S)	0.07	0.00	0.00	0.00	1.00
3 - Erb (E)	0.80	0.00	0.09	1.69	2.39
4 - Platinum (N)	0.16	0.00	0.00	0.33	0.75

18:00 - 18:15

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Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.37	0.00	0.00	0.86	1.33
2 - Platinum (S)	0.03	0.00	0.00	0.00	0.00
3 - Erb (E)	0.56	0.00	0.00	1.24	1.66
4 - Platinum (N)	0.14	0.00	0.00	0.00	0.59

18:15 - 18:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	0.15	0.00	0.00	0.26	0.72
2 - Platinum (S)	0.04	0.00	0.00	0.00	0.00
3 - Erb (E)	0.43	0.00	0.00	0.84	0.99
4 - Platinum (N)	0.06	0.00	0.00	0.00	1.00

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	121	1073	0.113	121	0.0	0.1	3.485	A
			2	1, 3, 4	127	1073	0.119	127	0.0	0.1	3.606	A
	Exit	2	1	(1, 2, 3, 4)	248			248	0.0	0.0	0.000	A
			1		434			434	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	32	1063	0.030	32	0.0	0.0	3.496	A
	Exit	1	1		39			39	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	209	1090	0.192	210	0.0	0.2	3.620	A
			2	1, 2, 3	224	1090	0.206	224	0.0	0.2	3.564	A
	Exit	1	1		290			290	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	58	943	0.061	58	0.0	0.1	3.870	A
			2	3, 4	17	943	0.018	17	0.0	0.0	3.814	A
		2	1	(1, 2, 3, 4)	74			74	0.0	0.0	0.003	A
	Exit	1	1		27			27	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	145	1069	0.136	144	0.1	0.2	3.550	A
			2	1, 3, 4	152	1069	0.142	152	0.1	0.2	3.536	A
	Exit	2	1	(1, 2, 3, 4)	297			297	0.0	0.0	0.000	A
			1		524			524	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	36	1034	0.035	36	0.0	0.0	3.690	A
	Exit	1	1		47			47	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	253	1089	0.233	254	0.2	0.2	3.640	A
			2	1, 2, 3	270	1089	0.248	270	0.2	0.2	3.636	A
	Exit	1	1		339			339	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	67	912	0.073	67	0.1	0.1	4.356	A
			2	3, 4	21	912	0.023	21	0.0	0.0	3.734	A
		2	1	(1, 2, 3, 4)	88			88	0.0	0.0	0.000	A
	Exit	1	1		33			33	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
-----	------	------------	------	------------------	-----------------------	-------------------	-----	---------------------	-------------------	-----------------	-----------	-----

1 - Erb (W)	Entry	1	1	2, 3	172	1064	0.162	172	0.2	0.2	3.612	A
			2	1, 3, 4	180	1064	0.169	179	0.2	0.2	3.671	A
	Exit	1	1	(1, 2, 3, 4)	352			352	0.0	0.0	0.000	A
			1		624			624	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	46	997	0.046	46	0.0	0.0	3.834	A
	Exit	1	1		52			52	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	299	1089	0.275	298	0.2	0.3	3.764	A
			2	1, 2, 3	320	1089	0.294	320	0.2	0.3	3.865	A
	Exit	1	1		413			413	0.0	0.0	0.000	A
			1									
4 - Platinum (N)	Entry	1	1	1, 2, 3	83	878	0.095	84	0.1	0.1	4.512	A
			2	3, 4	24	878	0.027	24	0.0	0.0	4.056	A
	Exit	1	1	(1, 2, 3, 4)	107			107	0.0	0.0	0.005	A
			1		35			35	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	179	1063	0.168	178	0.2	0.2	3.571	A
			2	1, 3, 4	189	1063	0.178	190	0.2	0.1	3.655	A
	Exit	1	1	(1, 2, 3, 4)	367			367	0.0	0.0	0.000	A
			1		642			642	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	49	988	0.050	49	0.0	0.1	3.833	A
	Exit	1	1		55			55	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	308	1088	0.283	307	0.3	0.4	3.867	A
			2	1, 2, 3	333	1088	0.306	333	0.3	0.4	3.804	A
	Exit	1	1		428			428	0.0	0.0	0.000	A
			1									
4 - Platinum (N)	Entry	1	1	1, 2, 3	85	870	0.098	85	0.1	0.1	4.165	A
			2	3, 4	23	870	0.027	23	0.0	0.0	4.072	A
	Exit	1	1	(1, 2, 3, 4)	109			109	0.0	0.0	0.001	A
			1		38			38	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	147	1068	0.138	146	0.2	0.2	3.484	A
			2	1, 3, 4	158	1068	0.148	158	0.1	0.2	3.616	A
	Exit	1	1	(1, 2, 3, 4)	305			305	0.0	0.0	0.000	A
			1		507			507	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	39	1028	0.038	39	0.1	0.0	3.611	A
	Exit	1	1		48			48	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	245	1090	0.225	245	0.4	0.3	3.636	A
			2	1, 2, 3	262	1090	0.240	261	0.4	0.3	3.787	A
	Exit	1	1		356			356	0.0	0.0	0.000	A
			1									
4 - Platinum (N)	Entry	1	1	1, 2, 3	69	917	0.076	69	0.1	0.1	4.224	A
			2	3, 4	20	917	0.022	21	0.0	0.0	3.704	A
	Exit	1	1	(1, 2, 3, 4)	90			90	0.0	0.0	0.003	A
			1		28			28	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	121	1076	0.113	122	0.2	0.1	3.527	A
			2	1, 3, 4	114	1076	0.106	115	0.2	0.1	3.510	A
	Exit	1	1	(1, 2, 3, 4)	235			235	0.0	0.0	0.000	A
			1		441			441	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	30	1072	0.028	30	0.0	0.0	3.207	A
	Exit	1	1		35			35	0.0	0.0	0.000	A

3 - Erb (E)	Entry	1	1	1, 4	207	1091	0.190	208	0.3	0.2	3.551	A
			2	1, 2, 3	226	1091	0.207	226	0.3	0.2	3.535	A
	Exit	1	1		274			274	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	57	942	0.060	57	0.1	0.0	4.458	A
			2	3, 4	15	942	0.016	15	0.0	0.0	4.073	A
		2	1	(1, 2, 3, 4)	71			71	0.0	0.0	0.000	A
	Exit	1	1		23			23	0.0	0.0	0.000	A

Lanes: Queue Variation Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.11	0.00	0.00	1.00	1.00
			2	0.10	0.00	0.00	0.00	0.49
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.01	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.17	0.00	0.00	0.33	0.75
			2	0.21	0.00	0.00	0.52	0.79
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.06	0.00	0.00	0.00	1.00
			2	0.02	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

17:15 - 17:30

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.23	0.00	0.00	0.59	0.93
			2	0.18	0.00	0.00	0.42	0.78
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.05	0.00	0.00	0.00	1.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.23	0.00	0.00	0.57	0.81
			2	0.24	0.00	0.00	0.57	0.84
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.06	0.00	0.00	0.00	1.00
			2	0.02	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

17:30 - 17:45

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.21	0.00	0.00	0.52	0.82
			2	0.22	0.00	0.00	0.55	0.80
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
			1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.04	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.35	0.00	0.00	0.79	0.99
			2	0.32	0.00	0.00	0.75	0.96
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.11	0.00	0.00	-0.01	0.55
			2	0.04	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

17:45 - 18:00

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.22	0.00	0.00	0.55	0.83
			2	0.14	0.00	0.00	1.00	1.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.07	0.00	0.00	0.00	1.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.39	0.00	0.00	0.87	1.33
			2	0.42	0.00	0.00	0.86	2.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.11	0.00	0.00	-0.01	0.55
			2	0.05	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

18:00 - 18:15

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.19	0.00	0.00	0.46	0.76
			2	0.18	0.00	0.00	0.43	0.75
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.03	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.28	0.00	0.00	0.65	0.84
			2	0.29	0.00	0.00	0.68	0.88
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.12	0.00	0.00	0.00	0.49
			2	0.01	0.00	0.00	0.00	0.00
		2	1	0.01	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

18:15 - 18:30

Arm	Side	Lane level	Lane	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)
1 - Erb (W)	Entry	1	1	0.08	0.00	0.00	0.00	1.00
			2	0.07	0.00	0.00	0.00	1.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
2 - Platinum (S)	Entry	1	2	0.04	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
3 - Erb (E)	Entry	1	1	0.18	0.00	0.00	1.00	1.00
			2	0.25	0.00	0.00	0.60	0.82
	Exit	1	1	0.00	0.00	0.00	0.00	0.00
4 - Platinum (N)	Entry	1	1	0.04	0.00	0.00	0.00	0.00
			2	0.02	0.00	0.00	0.00	0.00
		2	1	0.00	0.00	0.00	0.00	0.00
	Exit	1	1	0.00	0.00	0.00	0.00	0.00

Queues

3: Erbsville Rd & Columbia St W

08/17/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	129	306	156	63	129	35	384	355	289	511
v/c Ratio	0.32	0.75	0.68	0.16	0.32	0.12	0.55	0.45	0.66	0.62
Control Delay	25.5	45.8	40.8	30.0	8.0	19.8	26.1	4.2	20.2	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	45.8	40.8	30.0	8.0	19.8	26.1	4.2	20.2	18.5
Queue Length 50th (m)	17.2	52.6	21.2	9.5	0.0	4.1	55.5	0.0	28.2	61.4
Queue Length 95th (m)	30.8	#90.5	#40.7	19.9	14.0	10.6	83.5	16.3	44.0	94.5
Internal Link Dist (m)		183.2		225.1			181.1			157.5
Turn Bay Length (m)	94.0		90.0		40.0	54.0		50.0	50.0	
Base Capacity (vph)	406	407	231	396	402	295	700	783	438	830
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.75	0.68	0.16	0.32	0.12	0.55	0.45	0.66	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	246	60	156	63	129	35	384	355	289	456	55
Future Volume (veh/h)	129	246	60	156	63	129	35	384	355	289	456	55
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1690	1602	1650	1723	1542	1528	1543	1727	1667	1740	1521	1650
Adj Flow Rate, veh/h	129	246	60	156	63	0	35	384	0	289	456	55
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	2	2	3	7	8	15	10	5	2	9	9
Cap, veh/h	417	324	79	224	401	308	313	708	581	456	745	90
Arrive On Green	0.06	0.26	0.24	0.06	0.26	0.00	0.41	0.41	0.00	0.11	0.56	0.54
Sat Flow, veh/h	1610	1244	304	1641	1542	1299	731	1727	1417	1657	1331	161
Grp Volume(v), veh/h	129	0	306	156	63	0	35	384	0	289	0	511
Grp Sat Flow(s),veh/h/ln	1610	0	1548	1641	1542	1299	731	1727	1417	1657	0	1492
Q Serve(g_s), s	6.0	0.0	18.3	6.0	3.2	0.0	3.4	16.9	0.0	10.2	0.0	23.0
Cycle Q Clear(g_c), s	6.0	0.0	18.3	6.0	3.2	0.0	11.4	16.9	0.0	10.2	0.0	23.0
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	417	0	402	224	401	308	313	708	581	456	0	835
V/C Ratio(X)	0.31	0.00	0.76	0.70	0.16	0.00	0.11	0.54	0.00	0.63	0.00	0.61
Avail Cap(c_a), veh/h	417	0	402	224	401	308	313	708	581	456	0	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	34.3	32.2	28.5	0.0	23.6	22.4	0.0	16.8	0.0	14.8
Incr Delay (d2), s/veh	1.9	0.0	12.7	16.4	0.8	0.0	0.7	3.0	0.0	6.6	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	9.3	2.6	1.4	0.0	0.7	8.6	0.0	5.4	0.0	10.2
LnGrp Delay(d),s/veh	28.9	0.0	47.0	48.6	29.4	0.0	24.3	25.3	0.0	23.3	0.0	18.2
LnGrp LOS	C		D	D	C		C	C		C		B
Approach Vol, veh/h		435			219			419			800	
Approach Delay, s/veh		41.7			43.1			25.3			20.0	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		60.0	10.0	30.0	15.0	45.0	10.0	30.0				
Change Period (Y+Rc), s		6.4	4.0	* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s		53.6	6.0	* 24	11.0	38.6	6.0	* 24				
Max Q Clear Time (g_c+I1), s		25.0	8.0	5.2	12.2	18.9	8.0	20.3				
Green Ext Time (p_c), s		9.6	0.0	0.6	0.0	6.0	0.0	1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			28.9									
HCM 2010 LOS			C									
Notes												

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Queues

3: Erbsville Rd & Columbia St W

08/17/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	52	166	554	185	289	48	540	275	195	595
v/c Ratio	0.15	0.34	1.06	0.24	0.38	0.22	0.96	0.46	0.92	1.20
Control Delay	23.9	22.6	79.4	15.0	3.5	17.7	61.7	8.6	66.5	137.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	22.6	79.4	15.0	3.5	17.7	61.7	8.6	66.5	137.1
Queue Length 50th (m)	6.5	18.5	~79.3	18.1	0.0	4.7	91.1	6.3	21.0	~125.8
Queue Length 95th (m)	15.0	35.0	#166.1	31.2	13.2	11.0	#153.7	25.6	#57.3	#188.6
Internal Link Dist (m)		183.2		225.1			181.1			157.5
Turn Bay Length (m)	94.0		90.0		40.0	54.0		50.0	50.0	
Base Capacity (vph)	349	489	523	764	765	214	562	594	212	497
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.34	1.06	0.24	0.38	0.22	0.96	0.46	0.92	1.20

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	118	48	554	185	289	48	540	275	195	531	64
Future Volume (veh/h)	52	118	48	554	185	289	48	540	275	195	531	64
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1775	1616	1650	1775	1618	1634	1775	1827	1683	1757	1632	1650
Adj Flow Rate, veh/h	52	118	48	554	185	0	48	540	0	195	531	64
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	3	3	0	2	1	0	4	4	1	1	1
Cap, veh/h	433	340	138	519	773	628	211	568	445	210	444	54
Arrive On Green	0.31	0.31	0.29	0.12	0.48	0.00	0.08	0.31	0.00	0.08	0.31	0.28
Sat Flow, veh/h	1135	1091	444	1690	1618	1389	1690	1827	1430	1674	1427	172
Grp Volume(v), veh/h	52	0	166	554	185	0	48	540	0	195	0	595
Grp Sat Flow(s),veh/h/ln	1135	0	1535	1690	1618	1389	1690	1827	1430	1674	0	1599
Q Serve(g_s), s	3.0	0.0	7.6	11.0	6.1	0.0	1.7	26.0	0.0	7.0	0.0	28.0
Cycle Q Clear(g_c), s	3.0	0.0	7.6	11.0	6.1	0.0	1.7	26.0	0.0	7.0	0.0	28.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	433	0	478	519	773	628	211	568	445	210	0	497
V/C Ratio(X)	0.12	0.00	0.35	1.07	0.24	0.00	0.23	0.95	0.00	0.93	0.00	1.20
Avail Cap(c_a), veh/h	433	0	478	519	773	628	211	568	445	210	0	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	24.2	27.7	13.9	0.0	22.5	30.3	0.0	25.6	0.0	31.1
Incr Delay (d2), s/veh	0.6	0.0	2.0	58.6	0.7	0.0	2.5	27.2	0.0	45.7	0.0	106.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.5	16.2	2.8	0.0	0.9	17.4	0.0	4.3	0.0	27.0
LnGrp Delay(d),s/veh	22.9	0.0	26.2	86.3	14.6	0.0	25.0	57.6	0.0	71.3	0.0	137.6
LnGrp LOS	C		C	F	B		C	E		E		F
Approach Vol, veh/h	218			739			588			790		
Approach Delay, s/veh	25.4			68.3			54.9			121.3		
Approach LOS	C			E			D			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	32.0		47.0	11.0	32.0	15.0	32.0				
Change Period (Y+Rc), s	4.0	6.4		* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s	7.0	25.6		* 41	7.0	25.6	11.0	* 26				
Max Q Clear Time (g_c+I1), s	3.7	30.0		8.1	9.0	28.0	13.0	9.6				
Green Ext Time (p_c), s	0.0	0.0		2.9	0.0	0.0	0.0	2.3				
Intersection Summary												
HCM 2010 Ctrl Delay				78.8								
HCM 2010 LOS				E								
Notes												

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Future Background 2031

Junctions 9							
ARCADY 9 - Roundabout Module							
Version: 9.0.2.5947 © Copyright TRL Limited, 2017							
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 770558 software@trl.co.uk www.trlsoftware.co.uk							
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution							

Filename: 2031 FBG - Copper & Platinum 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\2. Future Background (2031)

Report generation date: 8/17/2018 3:35:22 PM

»2031 Future Background, AM

»2031 Future Background, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
[Lane Simulation] - 2031 Future Background								
1 - Copper (W)	0.0	0.00		A	0.0	0.00		A
2 - Platinum (S)	0.2	3.70		A	0.6	5.02		A
3 - Copper (E)	0.0	0.00		A	0.2	4.90		A
4 - Platinum (N)	0.7	5.02		A	0.5	4.65		A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

--	--	--	--	--	--	--	--

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	154665342	101	1.55

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Background	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Background	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Background, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	0.00	0.0	A	0	0
2 - Platinum (S)	3.70	0.2	A	129	194
3 - Copper (E)	0.00	0.0	A	0	0
4 - Platinum (N)	5.02	0.7	A	322	482

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	258	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	101	25	0	101	258	0.0	0.1	3.545	A
3 - Copper (E)	0	0	101	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	259	65	0	258	101	0.0	0.3	4.057	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	318	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	128	32	0	129	318	0.1	0.1	3.451	A
3 - Copper (E)	0	0	129	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	316	79	0	318	129	0.3	0.3	4.346	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	388	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	162	41	0	163	388	0.1	0.1	3.619	A
3 - Copper (E)	0	0	163	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	390	97	0	388	163	0.3	0.7	4.756	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Copper (W)	0	0	397	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	158	39	0	158	397	0.1	0.1	3.701	A
3 - Copper (E)	0	0	158	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	398	100	0	397	158	0.7	0.7	5.022	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	303	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	123	31	0	122	303	0.1	0.2	3.585	A
3 - Copper (E)	0	0	122	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	305	76	0	303	122	0.7	0.5	4.405	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	261	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	104	26	0	105	261	0.2	0.1	3.482	A
3 - Copper (E)	0	0	105	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	262	65	0	261	105	0.5	0.3	3.980	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	1004	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	101	1154	0.088	101	0.0	0.1	3.545	A
	Exit	1	1		258			258	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1096	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	259	1154	0.224	258	0.0	0.3	4.057	A
	Exit	1	1		101			101	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	970	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	128	1154	0.111	129	0.1	0.1	3.451	A
	Exit	1	1		318			318	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1079	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	316	1154	0.274	318	0.3	0.3	4.346	A
	Exit	1	1		129			129	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	0	929	0.000	0	0.0	0.0	0.000	A

1 - Copper (W)	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	162	1154	0.140	163	0.1	0.1	3.619	A
	Exit	1	1		388			388	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1060	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	390	1154	0.338	388	0.3	0.7	4.756	A
	Exit	1	1		163			163	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	924	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	158	1154	0.137	158	0.1	0.1	3.701	A
	Exit	1	1		397			397	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1063	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	398	1154	0.345	397	0.7	0.7	5.022	A
	Exit	1	1		158			158	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	978	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	123	1154	0.106	122	0.1	0.2	3.585	A
	Exit	1	1		303			303	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1083	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	305	1154	0.264	303	0.7	0.5	4.405	A
	Exit	1	1		122			122	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	1003	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	104	1154	0.090	105	0.2	0.1	3.482	A
	Exit	1	1		261			261	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	0	1093	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	262	1154	0.227	261	0.5	0.3	3.980	A
	Exit	1	1		105			105	0.0	0.0	0.000	A

2031 Future Background, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	0.00	0.0	A	0	0
2 - Platinum (S)	5.02	0.6	A	296	444
3 - Copper (E)	4.90	0.2	A	169	254
4 - Platinum (N)	4.65	0.5	A	285	428

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	241	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	242	61	76	240	166	0.0	0.4	4.216	A
3 - Copper (E)	136	34	208	137	108	0.0	0.1	4.010	A
4 - Platinum (N)	241	60	0	241	344	0.0	0.2	4.024	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	276	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	289	72	94	289	183	0.4	0.3	4.474	A
3 - Copper (E)	165	41	248	165	134	0.1	0.2	4.313	A
4 - Platinum (N)	277	69	0	276	413	0.2	0.4	4.245	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	342	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	355	89	110	355	232	0.3	0.4	4.967	A
3 - Copper (E)	207	52	306	208	159	0.2	0.2	4.902	A
4 - Platinum (N)	342	85	0	342	514	0.4	0.4	4.435	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Copper (W)	0	0	349	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	353	88	115	351	234	0.4	0.6	5.023	A
3 - Copper (E)	197	49	301	198	166	0.2	0.2	4.619	A
4 - Platinum (N)	350	87	0	349	499	0.4	0.5	4.650	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	273	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	285	71	92	286	181	0.6	0.3	4.593	A
3 - Copper (E)	168	42	243	169	134	0.2	0.1	4.359	A
4 - Platinum (N)	273	68	0	273	412	0.5	0.3	4.237	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	0	0	229	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	253	63	78	253	151	0.3	0.3	4.364	A
3 - Copper (E)	140	35	218	139	113	0.1	0.2	4.078	A
4 - Platinum (N)	229	57	0	229	357	0.3	0.2	3.930	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	1014	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	242	1110	0.218	240	0.0	0.4	4.216	A
	Exit	1	1		166			166	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	136	1034	0.132	137	0.0	0.1	4.010	A
	Exit	1	1		108			108	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	241	1154	0.209	241	0.0	0.2	4.024	A
	Exit	1	1		344			344	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	994	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	289	1100	0.263	289	0.4	0.3	4.474	A
	Exit	1	1		183			183	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	165	1010	0.164	165	0.1	0.2	4.313	A
	Exit	1	1		134			134	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	277	1154	0.240	276	0.2	0.4	4.245	A
	Exit	1	1		413			413	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	0	956	0.000	0	0.0	0.0	0.000	A

1 - Copper (W)	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	355	1090	0.325	355	0.3	0.4	4.967	A
	Exit	1	1		232			232	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	207	977	0.212	208	0.2	0.2	4.902	A
	Exit	1	1		159			159	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	342	1154	0.296	342	0.4	0.4	4.435	A
	Exit	1	1		514			514	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	952	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	353	1087	0.325	351	0.4	0.6	5.023	A
	Exit	1	1		234			234	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	197	980	0.201	198	0.2	0.2	4.619	A
	Exit	1	1		166			166	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	350	1154	0.303	349	0.4	0.5	4.650	A
	Exit	1	1		499			499	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	996	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	285	1100	0.259	286	0.6	0.3	4.593	A
	Exit	1	1		181			181	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	168	1013	0.166	169	0.2	0.1	4.359	A
	Exit	1	1		134			134	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	273	1154	0.237	273	0.5	0.3	4.237	A
	Exit	1	1		412			412	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	0	1021	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	253	1109	0.228	253	0.3	0.3	4.364	A
	Exit	1	1		151			151	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	140	1028	0.136	139	0.1	0.2	4.078	A
	Exit	1	1		113			113	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	229	1154	0.199	229	0.3	0.2	3.930	A
	Exit	1	1		357			357	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 770558 software@trl.co.uk www.trlsoftware.co.uk
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Filename: 2031 FBG - Erb & Platinum.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\2. Future Background (2031)

Report generation date: 8/9/2018 2:48:39 PM

»2031 Future Background, AM

»2031 Future Background, PM

Summary of junction performance

	AM						PM					
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Background												
1 - Erb (W)	1.2	4.78		A	4.62	A	1.0	4.58		A	4.86	A
2 - Platinum (S)	0.0	6.87		A			0.1	5.12		A		
3 - Erb (E)	0.4	3.92		A			1.3	5.02		A		
4 - Platinum (N)	0.5	4.71		A			0.4	4.96		A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	2059612688	101	6.40

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Background	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Background	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Background, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	4.78	1.2	A	776	1165
2 - Platinum (S)	6.87	0.0	A	27	40
3 - Erb (E)	3.92	0.4	A	304	456
4 - Platinum (N)	4.71	0.5	A	327	491

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	623	156	120	622	345	0.0	0.9	4.105	A
2 - Platinum (S)	18	4	720	18	23	0.0	0.0	4.231	A
3 - Erb (E)	252	63	53	252	685	0.0	0.2	3.672	A
4 - Platinum (N)	271	68	195	270	110	0.0	0.3	4.199	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	773	193	141	774	417	0.9	0.9	4.371	A
2 - Platinum (S)	26	7	888	26	27	0.0	0.0	5.189	A
3 - Erb (E)	313	78	63	314	851	0.2	0.3	3.793	A
4 - Platinum (N)	317	79	242	316	135	0.3	0.5	4.363	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	936	234	171	937	509	0.9	1.2	4.763	A
2 - Platinum (S)	31	8	1077	31	31	0.0	0.0	6.871	A
3 - Erb (E)	371	93	72	370	1036	0.3	0.4	3.924	A
4 - Platinum (N)	394	98	288	393	155	0.5	0.5	4.560	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	931	233	172	932	484	1.2	1.2	4.781	A
2 - Platinum (S)	31	8	1072	31	32	0.0	0.0	5.997	A
3 - Erb (E)	352	88	69	352	1034	0.4	0.4	3.900	A
4 - Platinum (N)	387	97	271	385	151	0.5	0.5	4.714	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	768	192	145	768	408	1.2	0.9	4.269	A
2 - Platinum (S)	29	7	889	29	24	0.0	0.0	5.576	A
3 - Erb (E)	293	73	60	294	857	0.4	0.3	3.779	A
4 - Platinum (N)	327	82	226	327	128	0.5	0.4	4.333	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	626	157	118	628	344	0.9	0.6	4.068	A
2 - Platinum (S)	25	6	725	25	21	0.0	0.0	4.622	A
3 - Erb (E)	245	61	46	245	704	0.3	0.3	3.699	A
4 - Platinum (N)	268	67	193	269	98	0.4	0.3	4.230	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	292	1053	0.277	291	0.0	0.4	4.009	A
			2	1, 3, 4	332	1053	0.315	331	0.0	0.5	4.192	A
	Exit	1	1		345			345	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	18	805	0.022	18	0.0	0.0	4.231	A
	Exit	1	1		23			23	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	147	1077	0.136	147	0.0	0.1	3.717	A
			2	1, 2, 3	104	1077	0.097	105	0.0	0.1	3.611	A
	Exit	1	1		685			685	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	215	1026	0.209	213	0.0	0.3	4.296	A
			2	3, 4	57	1026	0.055	57	0.0	0.0	3.713	A
		2	1	(1, 2, 3, 4)	271			271	0.0	0.0	0.027	A
	Exit	1	1		110			110	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	374	1045	0.357	374	0.4	0.4	4.279	A
			2	1, 3, 4	400	1045	0.382	400	0.5	0.5	4.458	A
	Exit	1	1		417			417	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	26	708	0.037	26	0.0	0.0	5.189	A
	Exit	1	1		27			27	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	178	1074	0.166	179	0.1	0.2	3.944	A
			2	1, 2, 3	135	1074	0.126	135	0.1	0.1	3.596	A
	Exit	1	1		851			851	0.0	0.0	0.000	A
	Entry	1	1	1, 2, 3	251	1009	0.249	250	0.3	0.4	4.509	A
			2	3, 4	66	1009	0.065	66	0.0	0.1	3.545	A

4 - Platinum (N)		2	1	(1, 2, 3, 4)	317			317	0.0	0.0	0.064	A
	Exit	1	1		135			135	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	456	1034	0.441	456	0.4	0.6	4.684	A
			2	1, 3, 4	480	1034	0.464	481	0.5	0.6	4.838	A
	Exit	1	1		509			509	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	31	598	0.052	31	0.0	0.0	6.871	A
	Exit	1	1		31			31	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	207	1070	0.194	207	0.2	0.3	3.997	A
			2	1, 2, 3	163	1070	0.153	163	0.1	0.2	3.829	A
	Exit	1	1		1036			1036	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	304	992	0.306	303	0.4	0.4	4.702	A
			2	3, 4	89	992	0.090	90	0.1	0.1	3.744	A
		2	1	(1, 2, 3, 4)	394			394	0.0	0.0	0.083	A
	Exit	1	1		155			155	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	449	1034	0.434	449	0.6	0.6	4.678	A
			2	1, 3, 4	482	1034	0.466	483	0.6	0.6	4.877	A
	Exit	1	1		484			484	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	31	601	0.052	31	0.0	0.0	5.997	A
	Exit	1	1		32			32	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	199	1071	0.185	199	0.3	0.2	3.971	A
			2	1, 2, 3	153	1071	0.143	153	0.2	0.2	3.808	A
	Exit	1	1		1034			1034	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	295	998	0.296	293	0.4	0.4	4.902	A
			2	3, 4	92	998	0.092	92	0.1	0.1	3.716	A
		2	1	(1, 2, 3, 4)	387			387	0.0	0.0	0.092	A
	Exit	1	1		151			151	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	367	1044	0.351	366	0.6	0.4	4.195	A
			2	1, 3, 4	401	1044	0.384	402	0.6	0.4	4.336	A
	Exit	1	1		408			408	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	29	707	0.040	29	0.0	0.0	5.576	A
	Exit	1	1		24			24	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	168	1075	0.156	168	0.2	0.2	3.847	A
			2	1, 2, 3	125	1075	0.117	126	0.2	0.1	3.686	A
	Exit	1	1		857			857	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	252	1015	0.249	253	0.4	0.3	4.439	A
			2	3, 4	75	1015	0.073	75	0.1	0.1	3.777	A
		2	1	(1, 2, 3, 4)	327			327	0.0	0.0	0.047	A
	Exit	1	1		128			128	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	300	1054	0.284	301	0.4	0.2	4.057	A
			2	1, 3, 4	327	1054	0.310	327	0.4	0.3	4.079	A

	Exit	1	1		344			344	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	25	802	0.031	25	0.0	0.0	4.622	A
	Exit	1	1		21			21	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	140	1080	0.130	141	0.2	0.1	3.722	A
			2	1, 2, 3	105	1080	0.097	105	0.1	0.1	3.669	A
	Exit	1	1		704			704	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	211	1027	0.206	212	0.3	0.3	4.367	A
			2	3, 4	57	1027	0.055	57	0.1	0.0	3.596	A
		2	1	(1, 2, 3, 4)	268			268	0.0	0.0	0.032	A
	Exit	1	1		98			98	0.0	0.0	0.000	A

2031 Future Background, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	4.58	1.0	A	527	790
2 - Platinum (S)	5.12	0.1	A	46	68
3 - Erb (E)	5.02	1.3	A	716	1074
4 - Platinum (N)	4.96	0.4	A	192	288

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	437	109	106	437	525	0.0	0.4	3.880	A
2 - Platinum (S)	39	10	497	39	47	0.0	0.0	4.035	A
3 - Erb (E)	587	147	173	590	363	0.0	0.6	4.191	A
4 - Platinum (N)	159	40	474	158	289	0.0	0.2	4.321	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	519	130	126	519	635	0.4	0.6	4.227	A
2 - Platinum (S)	45	11	591	45	54	0.0	0.0	4.294	A
3 - Erb (E)	699	175	196	701	439	0.6	0.8	4.504	A
4 - Platinum (N)	190	47	571	189	326	0.2	0.3	4.581	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	646	161	146	646	778	0.6	1.0	4.580	A
2 - Platinum (S)	52	13	724	51	67	0.0	0.1	4.507	A
3 - Erb (E)	861	215	256	861	520	0.8	1.1	4.880	A
4 - Platinum (N)	225	56	699	224	418	0.3	0.4	4.964	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	619	155	155	621	783	1.0	0.7	4.576	A
2 - Platinum (S)	52	13	707	52	69	0.1	0.1	5.123	A
3 - Erb (E)	856	214	247	853	511	1.1	1.3	5.020	A
4 - Platinum (N)	236	59	701	237	400	0.4	0.3	4.884	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	510	128	118	511	642	0.7	0.5	4.274	A
2 - Platinum (S)	47	12	580	48	48	0.1	0.0	4.590	A
3 - Erb (E)	704	176	194	704	434	1.3	0.9	4.313	A
4 - Platinum (N)	185	46	575	185	323	0.3	0.3	4.666	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	431	108	107	430	537	0.5	0.6	4.055	A
2 - Platinum (S)	39	10	490	38	47	0.0	0.1	4.358	A
3 - Erb (E)	588	147	169	589	359	0.9	0.7	4.134	A
4 - Platinum (N)	158	39	487	157	271	0.3	0.2	4.429	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	153	1058	0.144	153	0.0	0.1	3.585	A
			2	1, 3, 4	284	1058	0.268	285	0.0	0.2	4.041	A
	Exit	1	1		525			525	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	39	934	0.042	39	0.0	0.0	4.035	A
	Exit	1	1		47			47	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	322	1034	0.312	325	0.0	0.3	4.305	A
			2	1, 2, 3	265	1034	0.256	265	0.0	0.3	4.056	A
	Exit	1	1		363			363	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	121	925	0.131	120	0.0	0.2	4.369	A
			2	3, 4	38	925	0.041	38	0.0	0.1	4.109	A
		2	1	(1, 2, 3, 4)	159			159	0.0	0.0	0.013	A
	Exit	1	1		289			289	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	182	1051	0.174	182	0.1	0.2	3.865	A
			2	1, 3, 4	336	1051	0.320	337	0.2	0.3	4.430	A
	Exit	1	1		635			635	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	45	880	0.051	45	0.0	0.0	4.294	A
	Exit	1	1		54			54	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	376	1025	0.366	375	0.3	0.5	4.670	A
			2	1, 2, 3	323	1025	0.315	326	0.3	0.3	4.311	A
	Exit	1	1		439			439	0.0	0.0	0.000	A
	Entry	1	1	1, 2, 3	148	890	0.166	146	0.2	0.3	4.707	A
			2	3, 4	42	890	0.047	43	0.1	0.0	4.085	A

4 - Platinum (N)		2	1	(1, 2, 3, 4)	190			190	0.0	0.0	0.016	A
	Exit	1	1		326			326	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	238	1044	0.228	239	0.2	0.3	4.032	A
			2	1, 3, 4	408	1044	0.391	407	0.3	0.7	4.907	A
	Exit	1	1		778			778	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	52	802	0.065	51	0.0	0.1	4.507	A
	Exit	1	1		67			67	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	463	1004	0.461	462	0.5	0.6	5.045	A
			2	1, 2, 3	398	1004	0.397	399	0.3	0.4	4.691	A
	Exit	1	1		520			520	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	170	844	0.201	169	0.3	0.3	5.147	A
			2	3, 4	55	844	0.066	55	0.0	0.1	4.356	A
		2	1	(1, 2, 3, 4)	225			225	0.0	0.0	0.005	A
	Exit	1	1		418			418	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	224	1040	0.216	225	0.3	0.3	3.967	A
			2	1, 3, 4	394	1040	0.379	397	0.7	0.5	4.934	A
	Exit	1	1		783			783	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	52	813	0.064	52	0.1	0.1	5.123	A
	Exit	1	1		69			69	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	456	1007	0.453	455	0.6	0.7	5.085	A
			2	1, 2, 3	400	1007	0.397	399	0.4	0.6	4.943	A
	Exit	1	1		511			511	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	180	843	0.214	181	0.3	0.2	5.032	A
			2	3, 4	56	843	0.067	55	0.1	0.1	4.307	A
		2	1	(1, 2, 3, 4)	236			236	0.0	0.0	0.029	A
	Exit	1	1		400			400	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	189	1054	0.180	189	0.3	0.2	3.838	A
			2	1, 3, 4	321	1054	0.305	321	0.5	0.3	4.529	A
	Exit	1	1		642			642	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	47	886	0.053	48	0.1	0.0	4.590	A
	Exit	1	1		48			48	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	379	1026	0.369	379	0.7	0.5	4.405	A
			2	1, 2, 3	325	1026	0.317	325	0.6	0.4	4.204	A
	Exit	1	1		434			434	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	142	889	0.160	142	0.2	0.2	4.759	A
			2	3, 4	43	889	0.049	43	0.1	0.1	4.317	A
		2	1	(1, 2, 3, 4)	185			185	0.0	0.0	0.011	A
	Exit	1	1		323			323	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	155	1058	0.146	155	0.2	0.2	3.683	A
			2	1, 3, 4	276	1058	0.261	275	0.3	0.4	4.262	A

	Exit	1	1		537			537	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	39	938	0.041	38	0.0	0.1	4.358	A
	Exit	1	1		47			47	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	315	1035	0.304	314	0.5	0.4	4.269	A
			2	1, 2, 3	274	1035	0.264	274	0.4	0.3	3.977	A
	Exit	1	1		359			359	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	119	920	0.129	119	0.2	0.1	4.528	A
			2	3, 4	39	920	0.042	38	0.1	0.1	4.079	A
		2	1	(1, 2, 3, 4)	158			158	0.0	0.0	0.005	A
	Exit	1	1		271			271	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 FBG - Ladyslipper & Columbia 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\2. Future Background (2031)

Report generation date: 8/17/2018 3:36:41 PM

»2031 Future Background, AM

»2031 Future Background, PM

Summary of junction performance

	AM						PM					
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Background												
1 - Columbia (W)	5.4	23.09		C	15.48	C	1.5	8.34		A	17.48	C
2 - Ladyslipper (S)	0.3	6.08		A			1.3	9.63		A		
3 - Columbia (E)	0.4	4.89		A			7.5	30.69		D		
4 - Ladyslipper (N)	0.3	4.98		A			0.3	8.70		A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	331839041	891	38.25

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Background	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Background	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Background, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	23.09	5.4	C	714	1071
2 - Ladyslipper (S)	6.08	0.3	A	127	191
3 - Columbia (E)	4.89	0.4	A	221	332
4 - Ladyslipper (N)	4.98	0.3	A	181	271

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	585	146	147	585	229	0.0	1.3	7.638	A
2 - Ladyslipper (S)	105	26	468	105	264	0.0	0.1	4.556	A
3 - Columbia (E)	182	45	105	182	468	0.0	0.2	4.237	A
4 - Ladyslipper (N)	147	37	229	147	59	0.0	0.1	4.121	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	699	175	177	698	268	1.3	2.1	10.566	B
2 - Ladyslipper (S)	123	31	561	123	314	0.1	0.2	5.179	A
3 - Columbia (E)	215	54	123	215	561	0.2	0.3	4.514	A
4 - Ladyslipper (N)	177	44	268	177	70	0.1	0.2	4.471	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	854	214	217	848	333	2.1	5.4	19.504	C
2 - Ladyslipper (S)	154	39	680	154	385	0.2	0.3	6.014	A
3 - Columbia (E)	264	66	155	264	680	0.3	0.4	4.839	A
4 - Ladyslipper (N)	218	55	332	218	87	0.2	0.3	4.860	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	860	215	217	864	332	5.4	5.4	23.094	C
2 - Ladyslipper (S)	153	38	690	153	391	0.3	0.3	6.083	A
3 - Columbia (E)	268	67	152	267	691	0.4	0.4	4.890	A
4 - Ladyslipper (N)	217	54	333	217	86	0.3	0.3	4.981	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	697	174	178	698	272	5.4	2.0	12.143	B
2 - Ladyslipper (S)	124	31	559	124	317	0.3	0.2	5.373	A
3 - Columbia (E)	220	55	124	220	559	0.4	0.3	4.546	A
4 - Ladyslipper (N)	178	44	272	178	72	0.3	0.2	4.539	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	589	147	150	588	224	2.0	1.3	7.996	A
2 - Ladyslipper (S)	105	26	471	105	266	0.2	0.1	4.805	A
3 - Columbia (E)	178	45	104	179	472	0.3	0.2	4.274	A
4 - Ladyslipper (N)	149	37	224	149	59	0.2	0.2	4.263	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	585	1069	0.547	585	0.0	1.3	7.638	A
	Exit	1	1		229			229	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	105	883	0.119	105	0.0	0.1	4.556	A
	Exit	1	1		264			264	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	182	1093	0.166	182	0.0	0.2	4.237	A
	Exit	1	1		468			468	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	147	1021	0.144	147	0.0	0.1	4.121	A
	Exit	1	1		59			59	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	699	1051	0.665	698	1.3	2.1	10.566	B
	Exit	1	1		268			268	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	123	829	0.148	123	0.1	0.2	5.179	A
	Exit	1	1		314			314	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	215	1082	0.198	215	0.2	0.3	4.514	A
	Exit	1	1		561			561	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	177	999	0.177	177	0.1	0.2	4.471	A
	Exit	1	1		70			70	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	854	1028	0.831	848	2.1	5.4	19.504	C

1 - Columbia (W)	Exit	1	1		333			333	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	154	760	0.203	154	0.2	0.3	6.014	A
	Exit	1	1		385			385	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	264	1064	0.248	264	0.3	0.4	4.839	A
	Exit	1	1		680			680	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	218	961	0.227	218	0.2	0.3	4.860	A
	Exit	1	1		87			87	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	860	1028	0.837	864	5.4	5.4	23.094	C
	Exit	1	1		332			332	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	153	755	0.203	153	0.3	0.3	6.083	A
	Exit	1	1		391			391	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	268	1066	0.252	267	0.4	0.4	4.890	A
	Exit	1	1		691			691	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	217	961	0.226	217	0.3	0.3	4.981	A
	Exit	1	1		86			86	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	697	1051	0.663	698	5.4	2.0	12.143	B
	Exit	1	1		272			272	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	124	830	0.150	124	0.3	0.2	5.373	A
	Exit	1	1		317			317	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	220	1082	0.203	220	0.4	0.3	4.546	A
	Exit	1	1		559			559	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	178	996	0.178	178	0.3	0.2	4.539	A
	Exit	1	1		72			72	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	589	1067	0.552	588	2.0	1.3	7.996	A
	Exit	1	1		224			224	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	105	881	0.119	105	0.2	0.1	4.805	A
	Exit	1	1		266			266	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	178	1093	0.163	179	0.3	0.2	4.274	A
	Exit	1	1		472			472	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	149	1024	0.146	149	0.2	0.2	4.263	A
	Exit	1	1		59			59	0.0	0.0	0.000	A

2031 Future Background, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	8.34	1.5	A	476	715
2 - Ladyslipper (S)	9.63	1.3	A	428	642
3 - Columbia (E)	30.69	7.5	D	666	999
4 - Ladyslipper (N)	8.70	0.3	A	123	184

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	392	98	155	392	603	0.0	0.6	5.390	A
2 - Ladyslipper (S)	354	89	309	351	238	0.0	0.8	5.712	A
3 - Columbia (E)	538	135	274	537	386	0.0	1.3	7.820	A
4 - Ladyslipper (N)	100	25	657	100	154	0.0	0.2	5.178	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	455	114	187	458	728	0.6	0.8	6.191	A
2 - Ladyslipper (S)	420	105	368	420	277	0.8	0.9	6.966	A
3 - Columbia (E)	656	164	335	653	454	1.3	2.5	11.662	B
4 - Ladyslipper (N)	121	30	795	121	193	0.2	0.2	6.164	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	585	146	229	583	903	0.8	1.5	8.338	A
2 - Ladyslipper (S)	516	129	471	519	340	0.9	1.3	9.483	A
3 - Columbia (E)	805	201	410	797	580	2.5	6.9	25.898	D
4 - Ladyslipper (N)	149	37	983	149	225	0.2	0.3	8.245	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	568	142	229	573	884	1.5	1.1	8.106	A
2 - Ladyslipper (S)	509	127	462	506	340	1.3	1.3	9.625	A
3 - Columbia (E)	808	202	403	795	565	6.9	7.5	30.694	D
4 - Ladyslipper (N)	147	37	966	147	232	0.3	0.3	8.704	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	468	117	189	467	723	1.1	0.9	6.540	A
2 - Ladyslipper (S)	418	104	379	418	278	1.3	0.8	7.205	A
3 - Columbia (E)	646	161	331	644	466	7.5	2.2	15.727	C
4 - Ladyslipper (N)	122	30	791	122	184	0.3	0.2	6.743	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	390	98	151	389	605	0.9	0.6	5.393	A
2 - Ladyslipper (S)	351	88	309	349	231	0.8	0.7	5.967	A
3 - Columbia (E)	543	136	277	537	381	2.2	1.6	8.367	A
4 - Ladyslipper (N)	97	24	659	96	155	0.2	0.2	5.710	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	392	1064	0.369	392	0.0	0.6	5.390	A
	Exit	1	1		603			603	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	354	975	0.363	351	0.0	0.8	5.712	A
	Exit	1	1		238			238	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	538	995	0.541	537	0.0	1.3	7.820	A
	Exit	1	1		386			386	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	100	773	0.130	100	0.0	0.2	5.178	A
	Exit	1	1		154			154	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	455	1045	0.435	458	0.6	0.8	6.191	A
	Exit	1	1		728			728	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	420	941	0.447	420	0.8	0.9	6.966	A
	Exit	1	1		277			277	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	656	960	0.684	653	1.3	2.5	11.662	B
	Exit	1	1		454			454	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	121	694	0.174	121	0.2	0.2	6.164	A
	Exit	1	1		193			193	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	585	1021	0.573	583	0.8	1.5	8.338	A

1 - Columbia (W)	Exit	1	1		903			903	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	516	881	0.586	519	0.9	1.3	9.483	A
	Exit	1	1		340			340	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	805	916	0.879	797	2.5	6.9	25.898	D
	Exit	1	1		580			580	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	149	585	0.255	149	0.2	0.3	8.245	A
	Exit	1	1		225			225	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	568	1021	0.557	573	1.5	1.1	8.106	A
	Exit	1	1		884			884	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	509	887	0.574	506	1.3	1.3	9.625	A
	Exit	1	1		340			340	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	808	921	0.878	795	6.9	7.5	30.694	D
	Exit	1	1		565			565	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	147	595	0.247	147	0.3	0.3	8.704	A
	Exit	1	1		232			232	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	468	1044	0.448	467	1.1	0.9	6.540	A
	Exit	1	1		723			723	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	418	935	0.447	418	1.3	0.8	7.205	A
	Exit	1	1		278			278	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	646	962	0.671	644	7.5	2.2	15.727	C
	Exit	1	1		466			466	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	122	696	0.175	122	0.3	0.2	6.743	A
	Exit	1	1		184			184	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	390	1067	0.366	389	0.9	0.6	5.393	A
	Exit	1	1		605			605	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	1, 2, 3, 4	351	975	0.359	349	0.8	0.7	5.967	A
	Exit	1	1		231			231	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	543	993	0.546	537	2.2	1.6	8.367	A
	Exit	1	1		381			381	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	97	772	0.125	96	0.2	0.2	5.710	A
	Exit	1	1		155			155	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 FBG - Street BC & Platinum 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\2. Future Background (2031)

Report generation date: 8/17/2018 3:38:04 PM

»2031 Future Background, AM

»2031 Future Background, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
[Lane Simulation] - 2031 Future Background								
1 - Street B/C (W)	0.0	0.00		A	0.0	0.00		A
2 - Platinum (S)	0.2	3.71		A	0.8	5.59		A
3 - Street B/C (E)	0.0	0.00		A	0.0	0.00		A
4 - Platinum (N)	0.7	4.92		A	0.5	4.55		A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

--	--	--	--	--	--	--	--

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	343449365	101	1.61

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Background	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Background	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Background, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Street B/C (W)	0.00	0.0	A	0	0
2 - Platinum (S)	3.71	0.2	A	128	192
3 - Street B/C (E)	0.00	0.0	A	0	0
4 - Platinum (N)	4.92	0.7	A	317	476

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	272	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	109	27	0	108	272	0.0	0.0	3.422	A
3 - Street B/C (E)	0	0	108	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	271	68	0	272	108	0.0	0.3	3.980	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	317	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	125	31	0	125	317	0.0	0.1	3.582	A
3 - Street B/C (E)	0	0	125	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	314	79	0	317	125	0.3	0.3	4.367	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	378	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	151	38	0	149	378	0.1	0.2	3.696	A
3 - Street B/C (E)	0	0	149	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	379	95	0	378	149	0.3	0.7	4.916	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Street B/C (W)	0	0	379	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	148	37	0	149	379	0.2	0.1	3.713	A
3 - Street B/C (E)	0	0	149	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	377	94	0	379	149	0.7	0.3	4.788	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	304	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	127	32	0	127	304	0.1	0.1	3.535	A
3 - Street B/C (E)	0	0	127	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	306	76	0	304	127	0.3	0.4	4.316	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	255	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	110	28	0	111	255	0.1	0.1	3.515	A
3 - Street B/C (E)	0	0	111	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	257	64	0	255	111	0.4	0.4	4.029	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	996	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	109	1154	0.094	108	0.0	0.0	3.422	A
	Exit	1	1		272			272	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1091	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	271	1154	0.235	272	0.0	0.3	3.980	A
	Exit	1	1		108			108	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	970	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	125	1154	0.109	125	0.0	0.1	3.582	A
	Exit	1	1		317			317	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1082	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	314	1154	0.272	317	0.3	0.3	4.367	A
	Exit	1	1		125			125	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	0	935	0.000	0	0.0	0.0	0.000	A

1 - Street B/C (W)	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	151	1154	0.131	149	0.1	0.2	3.696	A
	Exit	1	1		378			378	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1068	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	379	1154	0.328	378	0.3	0.7	4.916	A
	Exit	1	1		149			149	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	934	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	148	1154	0.128	149	0.2	0.1	3.713	A
	Exit	1	1		379			379	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1068	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	377	1154	0.327	379	0.7	0.3	4.788	A
	Exit	1	1		149			149	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	978	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	127	1154	0.110	127	0.1	0.1	3.535	A
	Exit	1	1		304			304	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1081	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	306	1154	0.265	304	0.3	0.4	4.316	A
	Exit	1	1		127			127	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	1006	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	110	1154	0.096	111	0.1	0.1	3.515	A
	Exit	1	1		255			255	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	1090	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	257	1154	0.223	255	0.4	0.4	4.029	A
	Exit	1	1		111			111	0.0	0.0	0.000	A

2031 Future Background, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Street B/C (W)	0.00	0.0	A	0	0
2 - Platinum (S)	5.59	0.8	A	426	639
3 - Street B/C (E)	0.00	0.0	A	0	0
4 - Platinum (N)	4.55	0.5	A	287	431

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	244	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	352	88	0	353	244	0.0	0.4	4.474	A
3 - Street B/C (E)	0	0	353	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	244	61	0	244	353	0.0	0.3	4.027	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	283	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	421	105	0	418	283	0.4	0.8	5.050	A
3 - Street B/C (E)	0	0	418	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	281	70	0	283	418	0.3	0.3	4.397	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	341	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	500	125	0	500	341	0.8	0.8	5.552	A
3 - Street B/C (E)	0	0	500	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	341	85	0	341	500	0.3	0.5	4.544	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Street B/C (W)	0	0	348	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	511	128	0	512	348	0.8	0.6	5.588	A
3 - Street B/C (E)	0	0	512	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	348	87	0	348	512	0.5	0.4	4.546	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	282	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	417	104	0	417	282	0.6	0.6	4.955	A
3 - Street B/C (E)	0	0	417	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	280	70	0	282	417	0.4	0.3	4.125	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	0	0	231	0	0	0.0	0.0	0.000	A
2 - Platinum (S)	356	89	0	355	231	0.6	0.5	4.657	A
3 - Street B/C (E)	0	0	355	0	0	0.0	0.0	0.000	A
4 - Platinum (N)	230	58	0	231	355	0.3	0.2	4.119	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	1013	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	352	1154	0.305	353	0.0	0.4	4.474	A
	Exit	1	1		244			244	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	950	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	244	1154	0.211	244	0.0	0.3	4.027	A
	Exit	1	1		353			353	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	990	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	421	1154	0.365	418	0.4	0.8	5.050	A
	Exit	1	1		283			283	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	912	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	281	1154	0.243	283	0.3	0.3	4.397	A
	Exit	1	1		418			418	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	0	956	0.000	0	0.0	0.0	0.000	A

1 - Street B/C (W)	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	500	1154	0.433	500	0.8	0.8	5.552	A
	Exit	1	1		341			341	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	865	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	341	1154	0.295	341	0.3	0.5	4.544	A
	Exit	1	1		500			500	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	953	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	511	1154	0.443	512	0.8	0.6	5.588	A
	Exit	1	1		348			348	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	857	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	348	1154	0.302	348	0.5	0.4	4.546	A
	Exit	1	1		512			512	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	991	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	417	1154	0.361	417	0.6	0.6	4.955	A
	Exit	1	1		282			282	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	912	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	280	1154	0.243	282	0.4	0.3	4.125	A
	Exit	1	1		417			417	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	0	1020	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	356	1154	0.309	355	0.6	0.5	4.657	A
	Exit	1	1		231			231	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	0	949	0.000	0	0.0	0.0	0.000	A
	Exit	1	1		0			0	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	230	1154	0.200	231	0.3	0.2	4.119	A
	Exit	1	1		355			355	0.0	0.0	0.000	A

Queues

3: Erbsville Rd & Columbia St W

08/17/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	274	652	182	140	151	78	449	415	339	655
v/c Ratio	0.77	1.60	1.06	0.31	0.32	0.36	0.64	0.58	0.87	0.79
Control Delay	43.9	310.2	114.7	32.0	7.0	26.3	28.8	12.1	38.1	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	310.2	114.7	32.0	7.0	26.3	28.8	12.1	38.1	25.8
Queue Length 50th (m)	40.6	~182.0	~27.3	21.9	0.0	10.2	68.2	22.0	34.3	92.3
Queue Length 95th (m)	#72.9	#249.1	#64.0	38.2	14.5	23.1	101.3	51.3	#72.9	145.3
Internal Link Dist (m)		183.2		225.1			181.1			157.5
Turn Bay Length (m)	94.0		90.0		40.0	54.0		50.0	50.0	
Base Capacity (vph)	358	407	172	456	465	219	700	721	390	824
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	1.60	1.06	0.31	0.32	0.36	0.64	0.58	0.87	0.79

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	524	128	182	140	151	78	449	415	339	534	121
Future Volume (veh/h)	274	524	128	182	140	151	78	449	415	339	534	121
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1690	1602	1650	1723	1776	1620	1543	1727	1667	1740	1527	1650
Adj Flow Rate, veh/h	274	524	128	182	140	0	78	449	0	339	534	121
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	2	2	3	7	8	15	10	5	2	9	9
Cap, veh/h	364	323	79	170	462	358	205	708	581	411	674	153
Arrive On Green	0.06	0.26	0.24	0.06	0.26	0.00	0.41	0.41	0.00	0.11	0.56	0.54
Sat Flow, veh/h	1610	1244	304	1641	1776	1377	641	1727	1417	1657	1203	273
Grp Volume(v), veh/h	274	0	652	182	140	0	78	449	0	339	0	655
Grp Sat Flow(s),veh/h/ln	1610	0	1548	1641	1776	1377	641	1727	1417	1657	0	1476
Q Serve(g_s), s	6.0	0.0	26.0	6.0	6.3	0.0	11.0	20.7	0.0	11.0	0.0	35.2
Cycle Q Clear(g_c), s	6.0	0.0	26.0	6.0	6.3	0.0	31.2	20.7	0.0	11.0	0.0	35.2
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	364	0	402	170	462	358	205	708	581	411	0	827
V/C Ratio(X)	0.75	0.00	1.62	1.07	0.30	0.00	0.38	0.63	0.00	0.83	0.00	0.79
Avail Cap(c_a), veh/h	364	0	402	170	462	358	205	708	581	411	0	827
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.5	0.0	37.2	34.6	29.7	0.0	35.7	23.5	0.0	21.1	0.0	17.6
Incr Delay (d2), s/veh	13.4	0.0	290.3	88.0	1.7	0.0	5.3	4.3	0.0	17.0	0.0	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	43.5	6.1	3.3	0.0	2.3	10.7	0.0	6.2	0.0	16.0
LnGrp Delay(d),s/veh	47.8	0.0	327.5	122.6	31.4	0.0	41.0	27.8	0.0	38.1	0.0	25.3
LnGrp LOS	D		F	F	C		D	C		D		C
Approach Vol, veh/h	926			322			527			994		
Approach Delay, s/veh	244.8			83.0			29.8			29.7		
Approach LOS	F			F			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		60.0	10.0	30.0	15.0	45.0	10.0	30.0				
Change Period (Y+Rc), s		6.4	4.0	* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s		53.6	6.0	* 24	11.0	38.6	6.0	* 24				
Max Q Clear Time (g_c+I1), s		37.2	8.0	8.3	13.0	33.2	8.0	28.0				
Green Ext Time (p_c), s		9.1	0.0	1.4	0.0	2.9	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	107.8											
HCM 2010 LOS	F											
Notes												

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Queues

3: Erbsville Rd & Columbia St W

08/17/2018



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	144	488	586	548	339	125	616	241	228	791
v/c Ratio	0.61	1.00	2.03	0.62	0.41	0.58	1.10	0.43	1.08	1.61
Control Delay	39.3	72.7	497.3	21.4	4.3	27.8	98.4	10.5	107.1	308.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	72.7	497.3	21.4	4.3	27.8	98.4	10.5	107.1	308.5
Queue Length 50th (m)	21.0	81.3	~147.0	67.6	3.8	12.9	~121.7	8.6	~28.2	~198.2
Queue Length 95th (m)	#43.4	#145.0	#209.5	100.8	18.1	#24.2	#183.8	27.5	#72.5	#266.9
Internal Link Dist (m)		183.2		225.1			181.1			157.5
Turn Bay Length (m)	94.0		90.0		40.0	54.0		50.0	50.0	
Base Capacity (vph)	236	488	288	880	835	214	562	558	212	492
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	1.00	2.03	0.62	0.41	0.58	1.10	0.43	1.08	1.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	371	117	586	548	339	125	616	241	228	610	181
Future Volume (veh/h)	144	371	117	586	548	339	125	616	241	228	610	181
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1775	1613	1650	1775	1863	1733	1775	1827	1683	1757	1630	1650
Adj Flow Rate, veh/h	144	371	117	586	548	0	125	616	0	228	610	181
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	3	3	0	2	1	0	4	4	1	1	1
Cap, veh/h	292	366	115	287	890	704	211	568	445	210	375	111
Arrive On Green	0.31	0.31	0.29	0.12	0.48	0.00	0.08	0.31	0.00	0.08	0.31	0.28
Sat Flow, veh/h	814	1176	371	1690	1863	1473	1690	1827	1430	1674	1204	357
Grp Volume(v), veh/h	144	0	488	586	548	0	125	616	0	228	0	791
Grp Sat Flow(s),veh/h/ln	814	0	1546	1690	1863	1473	1690	1827	1430	1674	0	1562
Q Serve(g_s), s	14.3	0.0	28.0	11.0	19.6	0.0	4.6	28.0	0.0	7.0	0.0	28.0
Cycle Q Clear(g_c), s	18.9	0.0	28.0	11.0	19.6	0.0	4.6	28.0	0.0	7.0	0.0	28.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	292	0	481	287	890	704	211	568	445	210	0	486
V/C Ratio(X)	0.49	0.00	1.01	2.04	0.62	0.00	0.59	1.08	0.00	1.08	0.00	1.63
Avail Cap(c_a), veh/h	292	0	481	287	890	704	211	568	445	210	0	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	31.3	23.6	17.4	0.0	23.4	31.0	0.0	27.0	0.0	31.3
Incr Delay (d2), s/veh	5.9	0.0	44.7	482.0	3.2	0.0	11.6	62.4	0.0	86.5	0.0	291.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	17.9	43.2	10.8	0.0	2.8	23.9	0.0	7.0	0.0	51.4
LnGrp Delay(d),s/veh	35.8	0.0	76.0	505.7	20.6	0.0	35.0	93.4	0.0	113.5	0.0	323.2
LnGrp LOS	D		F	F	C		C	F		F		F
Approach Vol, veh/h		632			1134			741			1019	
Approach Delay, s/veh		66.8			271.3			83.6			276.3	
Approach LOS		E			F			F			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	32.0		47.0	11.0	32.0	15.0	32.0				
Change Period (Y+Rc), s	4.0	6.4		* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s	7.0	25.6		* 41	7.0	25.6	11.0	* 26				
Max Q Clear Time (g_c+I1), s	6.6	30.0		21.6	9.0	30.0	13.0	30.0				
Green Ext Time (p_c), s	0.0	0.0		8.2	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			196.6									
HCM 2010 LOS			F									
Notes												

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Future Background 2031 - Improved

Queues

3: Erbsville Rd & Columbia St W

08/17/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	274	524	128	182	140	151	78	449	415	339	534	121
v/c Ratio	0.77	1.26	0.32	1.06	0.31	0.32	0.27	0.64	0.58	0.87	0.64	0.16
Control Delay	43.9	168.4	8.7	114.7	32.0	7.0	22.8	28.8	12.1	38.1	19.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	168.4	8.7	114.7	32.0	7.0	22.8	28.8	12.1	38.1	19.4	2.7
Queue Length 50th (m)	40.6	~128.2	0.6	~27.3	21.9	0.0	9.8	68.2	22.0	34.3	66.6	0.0
Queue Length 95th (m)	#72.9	#189.4	14.7	#64.0	38.2	14.5	21.2	101.3	51.3	#72.9	101.7	7.9
Internal Link Dist (m)		183.2			225.1			181.1			157.5	
Turn Bay Length (m)	94.0		70.0	90.0		40.0	54.0		50.0	50.0		90.0
Base Capacity (vph)	358	416	395	172	456	465	289	700	721	390	838	746
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	1.26	0.32	1.06	0.31	0.32	0.27	0.64	0.58	0.87	0.64	0.16

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	524	128	182	140	151	78	449	415	339	534	121
Future Volume (veh/h)	274	524	128	182	140	151	78	449	415	339	534	121
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1690	1618	1542	1723	1776	1620	1543	1727	1667	1740	1514	1587
Adj Flow Rate, veh/h	274	524	128	182	140	0	78	449	0	339	534	121
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	2	7	3	7	8	15	10	5	2	9	4
Cap, veh/h	364	421	310	170	462	358	277	708	581	411	848	717
Arrive On Green	0.06	0.26	0.24	0.06	0.26	0.00	0.41	0.41	0.00	0.11	0.56	0.54
Sat Flow, veh/h	1610	1618	1308	1641	1776	1377	640	1727	1417	1657	1514	1338
Grp Volume(v), veh/h	274	524	128	182	140	0	78	449	0	339	534	121
Grp Sat Flow(s),veh/h/ln	1610	1618	1308	1641	1776	1377	640	1727	1417	1657	1514	1338
Q Serve(g_s), s	6.0	26.0	8.3	6.0	6.3	0.0	9.4	20.7	0.0	11.0	24.0	4.6
Cycle Q Clear(g_c), s	6.0	26.0	8.3	6.0	6.3	0.0	18.4	20.7	0.0	11.0	24.0	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	364	421	310	170	462	358	277	708	581	411	848	717
V/C Ratio(X)	0.75	1.25	0.41	1.07	0.30	0.00	0.28	0.63	0.00	0.83	0.63	0.17
Avail Cap(c_a), veh/h	364	421	310	170	462	358	277	708	581	411	848	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	37.0	32.3	34.6	29.7	0.0	26.3	23.5	0.0	21.1	15.0	11.8
Incr Delay (d2), s/veh	13.4	129.2	4.0	88.0	1.7	0.0	2.5	4.3	0.0	17.0	3.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	26.7	3.3	6.1	3.3	0.0	1.9	10.7	0.0	6.2	10.8	1.8
LnGrp Delay(d),s/veh	47.8	166.2	36.3	122.6	31.4	0.0	28.8	27.8	0.0	38.1	18.5	12.3
LnGrp LOS	D	F	D	F	C		C	C		D	B	B
Approach Vol, veh/h	926				322				527			
Approach Delay, s/veh	113.2				83.0				28.0			
Approach LOS	F				F				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		60.0	10.0	30.0	15.0	45.0	10.0	30.0				
Change Period (Y+Rc), s		6.4	4.0	* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s		53.6	6.0	* 24	11.0	38.6	6.0	* 24				
Max Q Clear Time (g_c+I1), s		26.0	8.0	8.3	13.0	22.7	8.0	28.0				
Green Ext Time (p_c), s		18.8	0.0	8.9	0.0	12.2	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	61.6											
HCM 2010 LOS	E											
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Queues

3: Erbsville Rd & Columbia St W

08/17/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	144	371	117	586	548	339	125	616	241	228	610	181
v/c Ratio	0.61	0.75	0.24	1.64	0.62	0.41	0.58	1.10	0.43	1.08	1.22	0.36
Control Delay	39.3	39.3	4.6	319.5	21.4	4.3	27.8	98.4	10.5	107.1	144.2	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	39.3	4.6	319.5	21.4	4.3	27.8	98.4	10.5	107.1	144.2	6.3
Queue Length 50th (m)	21.0	57.3	0.0	~137.6	67.6	3.8	12.9	~121.7	8.6	~28.2	~130.3	0.0
Queue Length 95th (m)	#43.4	#97.2	9.0	#208.8	100.8	18.1	#24.2	#183.8	27.5	#72.5	#192.1	14.5
Internal Link Dist (m)		183.2			225.1			181.1			157.5	
Turn Bay Length (m)	94.0		70.0	90.0		40.0	54.0		50.0	50.0		90.0
Base Capacity (vph)	236	492	485	358	880	835	214	562	558	212	502	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.75	0.24	1.64	0.62	0.41	0.58	1.10	0.43	1.08	1.22	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	371	117	586	548	339	125	616	241	228	610	181
Future Volume (veh/h)	144	371	117	586	548	339	125	616	241	228	610	181
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1775	1602	1650	1775	1863	1733	1775	1827	1683	1757	1634	1618
Adj Flow Rate, veh/h	144	371	117	586	548	0	125	616	0	228	610	181
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	3	0	0	2	1	0	4	4	1	1	2
Cap, veh/h	292	498	399	354	890	704	211	568	445	210	508	386
Arrive On Green	0.31	0.31	0.29	0.12	0.48	0.00	0.08	0.31	0.00	0.08	0.31	0.28
Sat Flow, veh/h	814	1602	1398	1690	1863	1473	1690	1827	1430	1674	1634	1358
Grp Volume(v), veh/h	144	371	117	586	548	0	125	616	0	228	610	181
Grp Sat Flow(s),veh/h/ln	814	1602	1398	1690	1863	1473	1690	1827	1430	1674	1634	1358
Q Serve(g_s), s	14.3	18.7	5.9	11.0	19.6	0.0	4.6	28.0	0.0	7.0	28.0	9.9
Cycle Q Clear(g_c), s	18.9	18.7	5.9	11.0	19.6	0.0	4.6	28.0	0.0	7.0	28.0	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	498	399	354	890	704	211	568	445	210	508	386
V/C Ratio(X)	0.49	0.74	0.29	1.66	0.62	0.00	0.59	1.08	0.00	1.08	1.20	0.47
Avail Cap(c_a), veh/h	292	498	399	354	890	704	211	568	445	210	508	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	27.8	25.1	24.9	17.4	0.0	23.4	31.0	0.0	27.0	31.0	26.6
Incr Delay (d2), s/veh	5.9	9.7	1.9	307.8	3.2	0.0	11.6	62.4	0.0	86.5	107.8	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	9.6	2.5	33.9	10.8	0.0	2.8	23.9	0.0	7.0	27.8	4.2
LnGrp Delay(d),s/veh	35.8	37.5	26.9	332.8	20.6	0.0	35.0	93.4	0.0	113.5	138.8	30.6
LnGrp LOS	D	D	C	F	C		C	F		F	F	C
Approach Vol, veh/h	632				1134				741			
Approach Delay, s/veh	35.1				181.9				83.6			
Approach LOS	D				F				F			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	32.0		47.0	11.0	32.0	15.0	32.0				
Change Period (Y+Rc), s	4.0	6.4		* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s	7.0	25.6		* 41	7.0	25.6	11.0	* 26				
Max Q Clear Time (g_c+I1), s	6.6	30.0		21.6	9.0	30.0	13.0	20.9				
Green Ext Time (p_c), s	0.0	0.0		13.9	0.0	0.0	0.0	4.1				

Intersection Summary

HCM 2010 Ctrl Delay 115.3

HCM 2010 LOS F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Future Total 2031 – Baseline

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Copper & Platinum 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3. Future Total (2031) - Base Scenario

Report generation date: 8/17/2018 3:40:04 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
[Lane Simulation] - 2031 Future Total								
1 - Copper (W)	0.0	4.28		A	8.2	45.09		E
2 - Platinum (S)	158.7	496.38		F	0.7	5.71		A
3 - Copper (E)	0.0	5.29		A	2.5	12.03		B
4 - Platinum (N)	1.0	9.74		A	0.6	6.85		A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

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Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1090206796	346	18.09

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.
Last Run	Lane Simulation	2 - Platinum (S) - Lane Simulation	Arm 2: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	4.28	0.0	A	22	33
2 - Platinum (S)	496.38	158.7	F	1182	1773
3 - Copper (E)	5.29	0.0	A	15	22
4 - Platinum (N)	9.74	1.0	A	325	488

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	20	5	281	19	516	0.0	0.0	3.615	A
2 - Platinum (S)	961	240	0	964	300	0.0	5.5	18.254	C
3 - Copper (E)	12	3	621	12	343	0.0	0.0	4.437	A
4 - Platinum (N)	270	67	528	269	105	0.0	0.5	5.871	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	22	5	333	22	602	0.0	0.0	3.832	A
2 - Platinum (S)	1154	289	0	1115	355	5.5	20.3	49.270	E
3 - Copper (E)	15	4	723	15	392	0.0	0.0	5.116	A
4 - Platinum (N)	320	80	617	318	121	0.5	0.7	7.567	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	24	6	407	24	606	0.0	0.0	4.147	A
2 - Platinum (S)	1426	357	0	1146	431	20.3	87.5	170.937	F
3 - Copper (E)	18	4	731	18	415	0.0	0.0	5.209	A
4 - Platinum (N)	389	97	624	389	124	0.7	1.0	9.047	A

08:45 - 09:00

	Total	Junction		Throughput	Start	End		
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Arm	Demand (PCU/hr)	Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	(exit side) (PCU/hr)	queue (PCU)	queue (PCU)	Delay (s)	LOS
1 - Copper (W)	26	6	412	26	621	0.0	0.0	4.275	A
2 - Platinum (S)	1429	357	0	1152	438	87.5	156.6	384.579	F
3 - Copper (E)	17	4	741	17	411	0.0	0.0	5.289	A
4 - Platinum (N)	393	98	638	395	120	1.0	1.0	9.736	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	21	5	327	21	619	0.0	0.0	3.953	A
2 - Platinum (S)	1156	289	0	1146	348	156.6	158.7	496.377	F
3 - Copper (E)	14	4	740	14	407	0.0	0.0	5.195	A
4 - Platinum (N)	312	78	633	312	121	1.0	0.7	8.042	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	18	4	279	18	617	0.0	0.0	3.811	A
2 - Platinum (S)	966	242	0	1163	297	158.7	113.3	415.479	F
3 - Copper (E)	12	3	748	12	415	0.0	0.0	4.978	A
4 - Platinum (N)	268	67	629	268	130	0.7	0.6	7.121	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	20	991	0.020	19	0.0	0.0	3.615	A
	Exit	1	1		516			516	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	961	1154	0.833	964	0.0	5.5	18.254	C
	Exit	1	1		300			300	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	12	794	0.015	12	0.0	0.0	4.437	A
	Exit	1	1		343			343	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	270	848	0.318	269	0.0	0.5	5.871	A
	Exit	1	1		105			105	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	22	961	0.022	22	0.0	0.0	3.832	A
	Exit	1	1		602			602	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	1154	1154	1.000	1115	5.5	20.3	49.270	E
	Exit	1	1		355			355	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	15	736	0.020	15	0.0	0.0	5.116	A
	Exit	1	1		392			392	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	320	797	0.401	318	0.5	0.7	7.567	A
	Exit	1	1		121			121	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue	End queue	Delay (s)	LOS
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					(PCU/hr)				(PCU)	(PCU)		
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	24	918	0.027	24	0.0	0.0	4.147	A
	Exit	1	1		606			606	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	1426	1154	1.236	1146	20.3	87.5	170.937	F
	Exit	1	1		431			431	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	18	731	0.024	18	0.0	0.0	5.209	A
	Exit	1	1		415			415	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	389	793	0.491	389	0.7	1.0	9.047	A
	Exit	1	1		124			124	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	26	915	0.028	26	0.0	0.0	4.275	A
	Exit	1	1		621			621	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	1429	1154	1.239	1152	87.5	156.6	384.579	F
	Exit	1	1		438			438	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	17	725	0.024	17	0.0	0.0	5.289	A
	Exit	1	1		411			411	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	393	784	0.501	395	1.0	1.0	9.736	A
	Exit	1	1		120			120	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	21	965	0.022	21	0.0	0.0	3.953	A
	Exit	1	1		619			619	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	1156	1154	1.002	1146	156.6	158.7	496.377	F
	Exit	1	1		348			348	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	14	726	0.020	14	0.0	0.0	5.195	A
	Exit	1	1		407			407	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	312	788	0.396	312	1.0	0.7	8.042	A
	Exit	1	1		121			121	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	18	992	0.018	18	0.0	0.0	3.811	A
	Exit	1	1		617			617	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	966	1154	0.837	1163	158.7	113.3	415.479	F
	Exit	1	1		297			297	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	12	721	0.016	12	0.0	0.0	4.978	A
	Exit	1	1		415			415	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	268	790	0.340	268	0.7	0.6	7.121	A
	Exit	1	1		130			130	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	45.09	8.2	E	521	781
2 - Platinum (S)	5.71	0.7	A	375	563
3 - Copper (E)	12.03	2.5	B	519	778
4 - Platinum (N)	6.85	0.6	A	286	429

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	424	106	514	423	37	0.0	1.0	7.967	A
2 - Platinum (S)	311	78	72	309	865	0.0	0.4	4.553	A
3 - Copper (E)	427	107	249	427	133	0.0	0.7	6.088	A
4 - Platinum (N)	229	57	322	229	354	0.0	0.4	4.785	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	507	127	615	508	46	1.0	1.9	12.562	B
2 - Platinum (S)	365	91	93	365	1030	0.4	0.5	4.967	A
3 - Copper (E)	500	125	292	498	165	0.7	1.2	7.550	A
4 - Platinum (N)	282	70	380	281	410	0.4	0.5	5.601	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	624	156	760	624	54	1.9	6.7	33.124	D
2 - Platinum (S)	446	111	115	445	1269	0.5	0.7	5.700	A
3 - Copper (E)	628	157	361	622	200	1.2	2.5	11.701	B
4 - Platinum (N)	343	86	471	343	512	0.5	0.6	6.694	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Copper (W)	623	156	764	617	57	6.7	8.2	45.085	E
2 - Platinum (S)	453	113	116	454	1266	0.7	0.7	5.706	A
3 - Copper (E)	619	155	368	619	202	2.5	2.1	12.030	B
4 - Platinum (N)	346	86	475	347	512	0.6	0.6	6.846	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	518	129	623	521	46	8.2	1.8	20.502	C
2 - Platinum (S)	364	91	92	364	1052	0.7	0.6	5.090	A
3 - Copper (E)	510	127	293	511	162	2.1	1.1	8.368	A
4 - Platinum (N)	279	70	391	279	413	0.6	0.4	5.907	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	430	107	524	431	40	1.8	1.0	9.092	A
2 - Platinum (S)	312	78	78	311	877	0.6	0.4	4.586	A
3 - Copper (E)	427	107	252	427	137	1.1	0.8	6.488	A
4 - Platinum (N)	238	59	326	238	354	0.4	0.3	5.028	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	424	856	0.495	423	0.0	1.0	7.967	A
	Exit	1	1		37			37	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	311	1112	0.279	309	0.0	0.4	4.553	A
	Exit	1	1		865			865	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	427	1010	0.423	427	0.0	0.7	6.088	A
	Exit	1	1		133			133	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	229	968	0.237	229	0.0	0.4	4.785	A
	Exit	1	1		354			354	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	507	798	0.636	508	1.0	1.9	12.562	B
	Exit	1	1		46			46	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	365	1100	0.332	365	0.4	0.5	4.967	A
	Exit	1	1		1030			1030	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	500	985	0.508	498	0.7	1.2	7.550	A
	Exit	1	1		165			165	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	282	934	0.302	281	0.4	0.5	5.601	A
	Exit	1	1		410			410	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	624	714	0.874	624	1.9	6.7	33.124	D

1 - Copper (W)	Exit	1	1		54			54	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	446	1087	0.410	445	0.5	0.7	5.700	A
	Exit	1	1		1269			1269	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	628	945	0.665	622	1.2	2.5	11.701	B
	Exit	1	1		200			200	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	343	881	0.390	343	0.5	0.6	6.694	A
	Exit	1	1		512			512	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	623	711	0.876	617	6.7	8.2	45.085	E
	Exit	1	1		57			57	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	453	1087	0.417	454	0.7	0.7	5.706	A
	Exit	1	1		1266			1266	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	619	941	0.658	619	2.5	2.1	12.030	B
	Exit	1	1		202			202	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	346	879	0.393	347	0.6	0.6	6.846	A
	Exit	1	1		512			512	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	518	793	0.653	521	8.2	1.8	20.502	C
	Exit	1	1		46			46	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	364	1101	0.331	364	0.7	0.6	5.090	A
	Exit	1	1		1052			1052	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	510	984	0.518	511	2.1	1.1	8.368	A
	Exit	1	1		162			162	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	279	928	0.300	279	0.6	0.4	5.907	A
	Exit	1	1		413			413	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	430	851	0.505	431	1.8	1.0	9.092	A
	Exit	1	1		40			40	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	312	1109	0.281	311	0.6	0.4	4.586	A
	Exit	1	1		877			877	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	427	1008	0.424	427	1.1	0.8	6.488	A
	Exit	1	1		137			137	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	238	965	0.247	238	0.4	0.3	5.028	A
	Exit	1	1		354			354	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Erb & Platinum.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3. Future Total (2031) - Base Scenario

Report generation date: 8/9/2018 2:54:06 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
[Lane Simulation] - 2031 Future Total								
1 - Erb (W)	2.2	6.83		A	1.4	7.75		A
2 - Platinum (S)	0.1	10.19		B	0.3	15.69		C
3 - Erb (E)	58.0	140.26		F	1.4	5.32		A
4 - Platinum (N)	0.5	4.75		A	6.1	16.52		C

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

--	--	--	--	--	--	--	--

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	753816914	361	42.88

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	6.83	2.2	A	1026	1538
2 - Platinum (S)	10.19	0.1	B	26	38
3 - Erb (E)	140.26	58.0	F	1114	1670
4 - Platinum (N)	4.75	0.5	A	363	544

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	847	212	149	847	343	0.0	1.1	4.777	A
2 - Platinum (S)	20	5	973	20	23	0.0	0.0	5.230	A
3 - Erb (E)	919	230	254	921	740	0.0	3.2	11.337	B
4 - Platinum (N)	302	76	191	301	984	0.0	0.4	4.122	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1004	251	172	1003	409	1.1	1.6	5.471	A
2 - Platinum (S)	27	7	1149	27	26	0.0	0.1	6.989	A
3 - Erb (E)	1091	273	299	1090	877	3.2	7.2	21.209	C
4 - Platinum (N)	350	88	231	351	1158	0.4	0.4	4.372	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1226	306	213	1225	507	1.6	2.2	6.733	A
2 - Platinum (S)	31	8	1405	31	33	0.1	0.1	9.603	A
3 - Erb (E)	1332	333	357	1236	1080	7.2	34.4	67.790	F
4 - Platinum (N)	437	109	284	436	1309	0.4	0.5	4.753	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	1238	310	210	1240	507	2.2	2.1	6.829	A
2 - Platinum (S)	31	8	1419	31	32	0.1	0.1	10.189	B
3 - Erb (E)	1338	335	366	1249	1084	34.4	58.0	140.255	F
4 - Platinum (N)	435	109	281	436	1334	0.5	0.5	4.715	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1006	252	173	1005	409	2.1	1.6	5.541	A
2 - Platinum (S)	23	6	1152	24	26	0.1	0.0	7.476	A
3 - Erb (E)	1085	271	292	1176	883	58.0	34.6	136.879	F
4 - Platinum (N)	354	88	228	353	1240	0.5	0.5	4.345	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	832	208	145	834	347	1.6	1.1	4.844	A
2 - Platinum (S)	21	5	957	21	22	0.0	0.0	5.929	A
3 - Erb (E)	915	229	241	968	738	34.6	7.0	50.333	F
4 - Platinum (N)	299	75	194	299	1015	0.5	0.3	4.171	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	351	1043	0.336	350	0.0	0.4	4.323	A
			2	1, 3, 4	496	1043	0.476	497	0.0	0.7	5.096	A
	Exit	1	1		343			343	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	20	658	0.030	20	0.0	0.0	5.230	A
	Exit	1	1		23			23	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	756	1005	0.753	758	0.0	3.0	12.885	B
			2	1, 2, 3	163	1005	0.162	163	0.0	0.2	4.256	A
	Exit	1	1		740			740	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	227	1027	0.221	226	0.0	0.3	4.214	A
			2	3, 4	75	1027	0.073	75	0.0	0.1	3.723	A
		2	1	(1, 2, 3, 4)	302			302	0.0	0.0	0.027	A
	Exit	1	1		984			984	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	425	1034	0.411	424	0.4	0.6	4.878	A
			2	1, 3, 4	579	1034	0.560	578	0.7	1.0	5.911	A
	Exit	1	1		409			409	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	27	557	0.048	27	0.0	0.1	6.989	A
	Exit	1	1		26			26	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	878	988	0.889	876	3.0	6.9	25.111	D
			2	1, 2, 3	213	988	0.216	214	0.2	0.3	4.790	A
	Exit	1	1		877			877	0.0	0.0	0.000	A
	Entry	1	1	1, 2, 3	264	1013	0.260	263	0.3	0.3	4.513	A
			2	3, 4	87	1013	0.086	87	0.1	0.1	3.733	A

4 - Platinum (N)		2	1	(1, 2, 3, 4)	350			351	0.0	0.0	0.050	A
	Exit	1	1		1158			1158	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	540	1019	0.530	540	0.6	0.9	5.939	A
			2	1, 3, 4	685	1019	0.672	685	1.0	1.3	7.362	A
	Exit	1	1		507			507	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	31	408	0.076	31	0.1	0.1	9.603	A
	Exit	1	1		33			33	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	1051	967	1.086	955	6.9	34.0	83.998	F
			2	1, 2, 3	281	967	0.291	281	0.3	0.4	5.475	A
	Exit	1	1		1080			1080	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	324	994	0.326	324	0.3	0.4	4.931	A
			2	3, 4	112	994	0.113	112	0.1	0.1	3.813	A
		2	1	(1, 2, 3, 4)	437			437	0.0	0.0	0.112	A
	Exit	1	1		1309			1309	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	547	1020	0.536	548	0.9	0.8	5.997	A
			2	1, 3, 4	692	1020	0.678	693	1.3	1.3	7.488	A
	Exit	1	1		507			507	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	31	400	0.077	31	0.1	0.1	10.189	B
	Exit	1	1		32			32	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	1059	964	1.098	969	34.0	57.6	176.106	F
			2	1, 2, 3	280	964	0.290	280	0.4	0.4	5.677	A
	Exit	1	1		1084			1084	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	324	995	0.326	325	0.4	0.4	4.872	A
			2	3, 4	111	995	0.112	111	0.1	0.1	3.827	A
		2	1	(1, 2, 3, 4)	435			435	0.0	0.0	0.109	A
	Exit	1	1		1334			1334	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	431	1034	0.417	431	0.8	0.6	4.892	A
			2	1, 3, 4	575	1034	0.556	574	1.3	1.0	6.030	A
	Exit	1	1		409			409	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	23	555	0.042	24	0.1	0.0	7.476	A
	Exit	1	1		26			26	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	863	991	0.871	953	57.6	34.3	170.943	F
			2	1, 2, 3	222	991	0.224	223	0.4	0.3	5.043	A
	Exit	1	1		883			883	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	264	1014	0.260	263	0.4	0.4	4.470	A
			2	3, 4	90	1014	0.089	90	0.1	0.1	3.798	A
		2	1	(1, 2, 3, 4)	354			354	0.0	0.0	0.042	A
	Exit	1	1		1240			1240	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	346	1044	0.332	346	0.6	0.4	4.396	A
			2	1, 3, 4	486	1044	0.466	488	1.0	0.7	5.161	A

	Exit	1	1		347			347	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	21	668	0.032	21	0.0	0.0	5.929	A
	Exit	1	1		22			22	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	746	1009	0.739	799	34.3	6.8	61.316	F
			2	1, 2, 3	169	1009	0.167	169	0.3	0.2	4.544	A
	Exit	1	1		738			738	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	227	1026	0.221	226	0.4	0.3	4.304	A
			2	3, 4	73	1026	0.071	73	0.1	0.1	3.611	A
		2	1	(1, 2, 3, 4)	299			299	0.0	0.0	0.034	A
	Exit	1	1		1015			1015	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	7.75	1.4	A	536	805
2 - Platinum (S)	15.69	0.3	C	46	69
3 - Erb (E)	5.32	1.4	A	782	1173
4 - Platinum (N)	16.52	6.1	C	1064	1596

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	451	113	676	450	669	0.0	0.8	5.029	A
2 - Platinum (S)	36	9	1078	36	48	0.0	0.1	5.826	A
3 - Erb (E)	643	161	181	643	932	0.0	0.8	4.333	A
4 - Platinum (N)	870	218	476	870	348	0.0	1.6	5.910	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	525	131	805	527	811	0.8	0.8	5.996	A
2 - Platinum (S)	44	11	1276	44	55	0.1	0.1	8.676	A
3 - Erb (E)	767	192	213	765	1107	0.8	1.0	4.632	A
4 - Platinum (N)	1046	262	571	1044	407	1.6	2.2	7.724	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	645	161	982	644	990	0.8	1.4	7.507	A
2 - Platinum (S)	57	14	1564	55	62	0.1	0.3	14.760	B
3 - Erb (E)	932	233	260	934	1359	1.0	1.4	5.309	A
4 - Platinum (N)	1278	319	699	1274	496	2.2	5.8	14.734	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	639	160	985	641	1001	1.4	1.4	7.748	A
2 - Platinum (S)	58	14	1561	57	65	0.3	0.3	15.687	C
3 - Erb (E)	950	238	258	950	1361	1.4	1.4	5.319	A
4 - Platinum (N)	1282	320	709	1277	498	5.8	6.1	16.523	C

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	520	130	793	520	809	1.4	0.9	6.335	A
2 - Platinum (S)	45	11	1257	45	55	0.3	0.1	9.836	A
3 - Erb (E)	762	191	209	762	1093	1.4	0.9	4.663	A
4 - Platinum (N)	1031	258	571	1031	400	6.1	2.2	8.971	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	439	110	675	438	679	0.9	0.7	5.396	A
2 - Platinum (S)	37	9	1070	37	43	0.1	0.1	7.025	A
3 - Erb (E)	639	160	177	639	929	0.9	0.8	4.391	A
4 - Platinum (N)	877	219	477	878	339	2.2	1.5	6.280	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	163	852	0.191	162	0.0	0.3	4.522	A
			2	1, 3, 4	288	852	0.339	288	0.0	0.5	5.311	A
	Exit	1	1		669			669	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	36	598	0.060	36	0.0	0.1	5.826	A
	Exit	1	1		48			48	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	368	1031	0.357	367	0.0	0.5	4.552	A
			2	1, 2, 3	276	1031	0.267	276	0.0	0.3	4.048	A
	Exit	1	1		932			932	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	500	924	0.541	501	0.0	0.8	5.841	A
			2	3, 4	369	924	0.400	369	0.0	0.6	5.138	A
		2	1	(1, 2, 3, 4)	870			870	0.0	0.1	0.365	A
	Exit	1	1		348			348	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	194	805	0.240	194	0.3	0.3	5.234	A
			2	1, 3, 4	331	805	0.411	333	0.5	0.5	6.439	A
	Exit	1	1		811			811	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	44	483	0.091	44	0.1	0.1	8.676	A
	Exit	1	1		55			55	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	434	1019	0.425	433	0.5	0.6	4.829	A
			2	1, 2, 3	333	1019	0.327	332	0.3	0.4	4.377	A
	Exit	1	1		1107			1107	0.0	0.0	0.000	A
	Entry	1	1	1, 2, 3	584	890	0.657	584	0.8	1.1	7.062	A
			2	3, 4	460	890	0.517	460	0.6	0.7	5.978	A

4 - Platinum (N)		2	1	(1, 2, 3, 4)	1046			1045	0.1	0.4	1.134	A
	Exit	1	1		407			407	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	251	741	0.339	251	0.3	0.5	6.225	A
			2	1, 3, 4	394	741	0.531	394	0.5	1.0	8.319	A
	Exit	1	1		990			990	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	57	316	0.179	55	0.1	0.3	14.760	B
	Exit	1	1		62			62	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	518	1002	0.516	519	0.6	0.8	5.611	A
			2	1, 2, 3	414	1002	0.414	415	0.4	0.6	4.935	A
	Exit	1	1		1359			1359	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	701	844	0.831	702	1.1	1.9	9.116	A
			2	3, 4	571	844	0.677	572	0.7	1.2	7.746	A
		2	1	(1, 2, 3, 4)	1278			1272	0.4	2.7	6.215	A
	Exit	1	1		496			496	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	247	740	0.333	247	0.5	0.4	6.537	A
			2	1, 3, 4	392	740	0.530	393	1.0	0.9	8.513	A
	Exit	1	1		1001			1001	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	58	318	0.181	57	0.3	0.3	15.687	C
	Exit	1	1		65			65	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	521	1003	0.519	521	0.8	0.8	5.620	A
			2	1, 2, 3	429	1003	0.428	429	0.6	0.6	4.947	A
	Exit	1	1		1361			1361	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	699	840	0.832	699	1.9	2.0	9.463	A
			2	3, 4	576	840	0.685	578	1.2	1.2	7.953	A
		2	1	(1, 2, 3, 4)	1282			1275	2.7	2.9	7.740	A
	Exit	1	1		498			498	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	194	810	0.239	194	0.4	0.3	5.370	A
			2	1, 3, 4	326	810	0.402	326	0.9	0.6	6.913	A
	Exit	1	1		809			809	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	45	494	0.090	45	0.3	0.1	9.836	A
	Exit	1	1		55			55	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	429	1021	0.420	429	0.8	0.5	4.865	A
			2	1, 2, 3	333	1021	0.326	333	0.6	0.4	4.404	A
	Exit	1	1		1093			1093	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	580	890	0.652	580	2.0	1.1	7.523	A
			2	3, 4	451	890	0.507	451	1.2	0.7	6.385	A
		2	1	(1, 2, 3, 4)	1031			1031	2.9	0.4	1.983	A
	Exit	1	1		400			400	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	158	852	0.186	158	0.3	0.3	4.849	A
			2	1, 3, 4	281	852	0.329	280	0.6	0.5	5.704	A

	Exit	1	1		679			679	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	37	603	0.061	37	0.1	0.1	7.025	A
	Exit	1	1		43			43	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	1, 4	364	1032	0.353	364	0.5	0.5	4.584	A
			2	1, 2, 3	275	1032	0.266	275	0.4	0.3	4.136	A
	Exit	1	1		929			929	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	501	924	0.542	500	1.1	0.9	6.195	A
			2	3, 4	377	924	0.408	378	0.7	0.5	5.272	A
		2	1	(1, 2, 3, 4)	877			877	0.4	0.1	0.487	A
	Exit	1	1		339			339	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Ladyslipper & Columbia 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3. Future Total (2031) - Base Scenario

Report generation date: 8/17/2018 3:41:03 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM						PM					
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Total												
1 - Columbia (W)	19.2	68.04		F	38.16	E	1.7	10.13		B	125.43	F
2 - Ladyslipper (S)	0.4	6.57		A			63.8	209.95		F		
3 - Columbia (E)	0.6	5.66		A			35.4	127.68		F		
4 - Ladyslipper (N)	0.5	5.86		A			0.5	9.91		A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	924032163	184	9.63

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	68.04	19.2	F	751	1127
2 - Ladyslipper (S)	6.57	0.4	A	177	265
3 - Columbia (E)	5.66	0.6	A	304	455
4 - Ladyslipper (N)	5.86	0.5	A	217	325

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	621	155	248	620	230	0.0	1.7	8.611	A
2 - Ladyslipper (S)	150	37	477	149	392	0.0	0.2	4.701	A
3 - Columbia (E)	247	62	115	245	511	0.0	0.4	4.652	A
4 - Ladyslipper (N)	181	45	297	181	62	0.0	0.2	4.510	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	738	184	290	737	273	1.7	3.4	14.140	B
2 - Ladyslipper (S)	169	42	551	169	476	0.2	0.2	5.541	A
3 - Columbia (E)	297	74	131	297	589	0.4	0.4	5.024	A
4 - Ladyslipper (N)	208	52	356	207	73	0.2	0.4	4.983	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	890	223	369	870	332	3.4	13.2	42.116	E
2 - Ladyslipper (S)	212	53	673	213	566	0.2	0.4	6.571	A
3 - Columbia (E)	366	91	161	364	725	0.4	0.6	5.658	A
4 - Ladyslipper (N)	265	66	435	266	91	0.4	0.4	5.711	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	905	226	360	883	335	13.2	19.2	68.042	F
2 - Ladyslipper (S)	212	53	666	211	577	0.4	0.3	6.541	A
3 - Columbia (E)	364	91	163	363	715	0.6	0.6	5.623	A
4 - Ladyslipper (N)	261	65	434	262	92	0.4	0.5	5.859	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	739	185	290	758	272	19.2	4.4	36.945	E
2 - Ladyslipper (S)	173	43	566	172	482	0.3	0.3	6.050	A
3 - Columbia (E)	296	74	134	297	605	0.6	0.4	4.911	A
4 - Ladyslipper (N)	209	52	354	208	77	0.5	0.3	5.087	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	614	153	246	612	231	4.4	1.7	10.723	B
2 - Ladyslipper (S)	145	36	459	146	398	0.3	0.1	4.991	A
3 - Columbia (E)	251	63	112	251	493	0.4	0.4	4.692	A
4 - Ladyslipper (N)	176	44	301	175	62	0.3	0.3	4.474	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	621	1010	0.615	620	0.0	1.7	8.611	A
	Exit	1	1		230			230	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	150	878	0.170	149	0.0	0.2	4.701	A
	Exit	1	1		392			392	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	247	1088	0.227	245	0.0	0.4	4.652	A
	Exit	1	1		511			511	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	181	982	0.184	181	0.0	0.2	4.510	A
	Exit	1	1		62			62	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	738	986	0.748	737	1.7	3.4	14.140	B
	Exit	1	1		273			273	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	169	835	0.202	169	0.2	0.2	5.541	A
	Exit	1	1		476			476	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	297	1078	0.275	297	0.4	0.4	5.024	A
	Exit	1	1		589			589	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	208	948	0.219	207	0.2	0.4	4.983	A
	Exit	1	1		73			73	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	890	940	0.947	870	3.4	13.2	42.116	E

1 - Columbia (W)	Exit	1	1		332			332	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	212	764	0.278	213	0.2	0.4	6.571	A
	Exit	1	1		566			566	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	366	1060	0.345	364	0.4	0.6	5.658	A
	Exit	1	1		725			725	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	265	902	0.293	266	0.4	0.4	5.711	A
	Exit	1	1		91			91	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	905	945	0.958	883	13.2	19.2	68.042	F
	Exit	1	1		335			335	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	212	768	0.276	211	0.4	0.3	6.541	A
	Exit	1	1		577			577	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	364	1060	0.344	363	0.6	0.6	5.623	A
	Exit	1	1		715			715	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	261	903	0.290	262	0.4	0.5	5.859	A
	Exit	1	1		92			92	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	739	986	0.750	758	19.2	4.4	36.945	E
	Exit	1	1		272			272	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	173	826	0.210	172	0.3	0.3	6.050	A
	Exit	1	1		482			482	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	296	1076	0.275	297	0.6	0.4	4.911	A
	Exit	1	1		605			605	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	209	949	0.220	208	0.5	0.3	5.087	A
	Exit	1	1		77			77	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	614	1012	0.607	612	4.4	1.7	10.723	B
	Exit	1	1		231			231	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	145	888	0.163	146	0.3	0.1	4.991	A
	Exit	1	1		398			398	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	251	1089	0.231	251	0.4	0.4	4.692	A
	Exit	1	1		493			493	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	176	979	0.180	175	0.3	0.3	4.474	A
	Exit	1	1		62			62	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	10.13	1.7	B	489	733
2 - Ladyslipper (S)	209.95	63.8	F	830	1245
3 - Columbia (E)	127.68	35.4	F	759	1139
4 - Ladyslipper (N)	9.91	0.5	A	134	201

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	404	101	247	403	658	0.0	0.6	5.690	A
2 - Ladyslipper (S)	673	168	314	673	335	0.0	2.2	10.978	B
3 - Columbia (E)	624	156	371	623	616	0.0	2.1	10.931	B
4 - Ladyslipper (N)	110	28	793	111	200	0.0	0.2	5.867	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	476	119	288	478	787	0.6	0.8	6.889	A
2 - Ladyslipper (S)	815	204	379	808	386	2.2	6.3	23.085	C
3 - Columbia (E)	741	185	442	739	745	2.1	5.0	20.956	C
4 - Ladyslipper (N)	133	33	943	132	238	0.2	0.3	7.451	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	591	148	338	590	890	0.8	1.7	9.894	A
2 - Ladyslipper (S)	999	250	464	884	464	6.3	37.2	95.013	F
3 - Columbia (E)	912	228	482	845	866	5.0	23.5	67.416	F
4 - Ladyslipper (N)	163	41	1065	162	261	0.3	0.4	9.417	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	582	145	344	580	895	1.7	1.6	10.127	B
2 - Ladyslipper (S)	990	248	451	891	473	37.2	63.8	209.953	F
3 - Columbia (E)	898	225	486	861	855	23.5	35.4	127.682	F
4 - Ladyslipper (N)	161	40	1078	160	268	0.4	0.5	9.905	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	475	119	302	477	880	1.6	0.9	7.660	A
2 - Ladyslipper (S)	819	205	371	916	408	63.8	39.1	201.273	F
3 - Columbia (E)	749	187	501	808	786	35.4	17.0	105.451	F
4 - Ladyslipper (N)	127	32	1053	129	255	0.5	0.3	9.520	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	405	101	247	404	719	0.9	0.7	5.892	A
2 - Ladyslipper (S)	682	171	315	745	336	39.1	7.0	73.903	F
3 - Columbia (E)	632	158	413	655	646	17.0	3.3	36.611	E
4 - Ladyslipper (N)	109	27	856	109	212	0.3	0.2	7.487	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	404	1011	0.399	403	0.0	0.6	5.690	A
	Exit	1	1		658			658	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	673	972	0.692	673	0.0	2.2	10.978	B
	Exit	1	1		335			335	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	624	939	0.664	623	0.0	2.1	10.931	B
	Exit	1	1		616			616	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	110	695	0.159	111	0.0	0.2	5.867	A
	Exit	1	1		200			200	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	476	987	0.482	478	0.6	0.8	6.889	A
	Exit	1	1		787			787	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	815	934	0.872	808	2.2	6.3	23.085	C
	Exit	1	1		386			386	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	741	898	0.825	739	2.1	5.0	20.956	C
	Exit	1	1		745			745	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	133	608	0.218	132	0.2	0.3	7.451	A
	Exit	1	1		238			238	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	591	958	0.617	590	0.8	1.7	9.894	A

1 - Columbia (W)	Exit	1	1		890			890	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	999	885	1.129	884	6.3	37.2	95.013	F
	Exit	1	1		464			464	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	912	875	1.043	845	5.0	23.5	67.416	F
	Exit	1	1		866			866	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	163	537	0.303	162	0.3	0.4	9.417	A
	Exit	1	1		261			261	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	582	955	0.609	580	1.7	1.6	10.127	B
	Exit	1	1		895			895	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	990	893	1.109	891	37.2	63.8	209.953	F
	Exit	1	1		473			473	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	898	872	1.029	861	23.5	35.4	127.682	F
	Exit	1	1		855			855	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	161	530	0.305	160	0.4	0.5	9.905	A
	Exit	1	1		268			268	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	475	979	0.486	477	1.6	0.9	7.660	A
	Exit	1	1		880			880	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	819	939	0.872	916	63.8	39.1	201.273	F
	Exit	1	1		408			408	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	749	864	0.867	808	35.4	17.0	105.451	F
	Exit	1	1		786			786	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	127	544	0.234	129	0.5	0.3	9.520	A
	Exit	1	1		255			255	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	1	1, 2, 3, 4	405	1011	0.401	404	0.9	0.7	5.892	A
	Exit	1	1		719			719	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	2	1, 2, 3, 4	682	972	0.702	745	39.1	7.0	73.903	F
	Exit	1	1		336			336	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	1, 2, 3, 4	632	915	0.690	655	17.0	3.3	36.611	E
	Exit	1	1		646			646	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	109	658	0.166	109	0.3	0.2	7.487	A
	Exit	1	1		212			212	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Street BC & Platinum 1-Lane.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3. Future Total (2031) - Base Scenario

Report generation date: 8/17/2018 3:42:05 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
[Lane Simulation] - 2031 Future Total								
1 - Street B/C (W)	0.0	4.26		A	0.5	6.00		A
2 - Platinum (S)	0.2	4.05		A	1.4	8.68		A
3 - Street B/C (E)	0.0	3.78		A	0.4	7.35		A
4 - Platinum (N)	1.0	6.60		A	0.6	5.53		A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

--	--	--	--	--	--	--	--

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1212404326	101	2.11

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Street B/C (W)	4.26	0.0	A	29	43
2 - Platinum (S)	4.05	0.2	A	129	193
3 - Street B/C (E)	3.78	0.0	A	20	30
4 - Platinum (N)	6.60	1.0	A	487	730

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	24	6	312	25	82	0.0	0.0	3.540	A
2 - Platinum (S)	107	27	73	106	264	0.0	0.1	3.744	A
3 - Street B/C (E)	14	4	131	14	48	0.0	0.0	3.369	A
4 - Platinum (N)	395	99	0	394	145	0.0	0.6	5.066	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	30	7	385	30	96	0.0	0.0	4.142	A
2 - Platinum (S)	126	31	94	126	321	0.1	0.1	3.932	A
3 - Street B/C (E)	18	4	155	18	64	0.0	0.0	3.550	A
4 - Platinum (N)	480	120	0	481	173	0.6	0.6	5.590	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	33	8	464	34	116	0.0	0.0	3.907	A
2 - Platinum (S)	157	39	112	157	387	0.1	0.2	4.055	A
3 - Street B/C (E)	22	6	192	22	77	0.0	0.0	3.779	A
4 - Platinum (N)	579	145	0	580	214	0.6	0.9	6.417	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Street B/C (W)	33	8	473	34	124	0.0	0.0	4.256	A
2 - Platinum (S)	153	38	112	153	395	0.2	0.1	3.854	A
3 - Street B/C (E)	26	6	186	26	78	0.0	0.0	3.503	A
4 - Platinum (N)	596	149	0	597	212	0.9	1.0	6.605	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	24	6	378	24	93	0.0	0.0	4.197	A
2 - Platinum (S)	124	31	85	124	317	0.1	0.2	3.827	A
3 - Street B/C (E)	22	5	149	22	61	0.0	0.0	3.385	A
4 - Platinum (N)	474	118	0	471	171	1.0	0.8	5.754	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	27	7	316	27	78	0.0	0.0	3.823	A
2 - Platinum (S)	107	27	79	106	263	0.2	0.1	3.663	A
3 - Street B/C (E)	16	4	133	16	53	0.0	0.0	3.359	A
4 - Platinum (N)	394	99	0	394	149	0.8	0.5	4.875	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	24	973	0.025	25	0.0	0.0	3.540	A
	Exit	1	1		82			82	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	107	1112	0.096	106	0.0	0.1	3.744	A
	Exit	1	1		264			264	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	14	1078	0.013	14	0.0	0.0	3.369	A
	Exit	1	1		48			48	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	395	1154	0.343	394	0.0	0.6	5.066	A
	Exit	1	1		145			145	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	30	931	0.032	30	0.0	0.0	4.142	A
	Exit	1	1		96			96	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	126	1100	0.114	126	0.1	0.1	3.932	A
	Exit	1	1		321			321	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	18	1064	0.017	18	0.0	0.0	3.550	A
	Exit	1	1		64			64	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	480	1154	0.416	481	0.6	0.6	5.590	A
	Exit	1	1		173			173	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	33	885	0.038	34	0.0	0.0	3.907	A

1 - Street B/C (W)	Exit	1	1		116			116	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	157	1089	0.144	157	0.1	0.2	4.055	A
	Exit	1	1		387			387	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	22	1043	0.022	22	0.0	0.0	3.779	A
	Exit	1	1		77			77	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	579	1154	0.502	580	0.6	0.9	6.417	A
	Exit	1	1		214			214	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	33	880	0.038	34	0.0	0.0	4.256	A
	Exit	1	1		124			124	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	153	1089	0.140	153	0.2	0.1	3.854	A
	Exit	1	1		395			395	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	26	1046	0.025	26	0.0	0.0	3.503	A
	Exit	1	1		78			78	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	596	1154	0.517	597	0.9	1.0	6.605	A
	Exit	1	1		212			212	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	24	935	0.026	24	0.0	0.0	4.197	A
	Exit	1	1		93			93	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	124	1105	0.112	124	0.1	0.2	3.827	A
	Exit	1	1		317			317	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	22	1068	0.020	22	0.0	0.0	3.385	A
	Exit	1	1		61			61	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	474	1154	0.411	471	1.0	0.8	5.754	A
	Exit	1	1		171			171	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	27	971	0.028	27	0.0	0.0	3.823	A
	Exit	1	1		78			78	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	107	1108	0.096	106	0.2	0.1	3.663	A
	Exit	1	1		263			263	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	16	1077	0.015	16	0.0	0.0	3.359	A
	Exit	1	1		53			53	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	394	1154	0.342	394	0.8	0.5	4.875	A
	Exit	1	1		149			149	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Street B/C (W)	6.00	0.5	A	241	362
2 - Platinum (S)	8.68	1.4	A	428	642
3 - Street B/C (E)	7.35	0.4	A	161	242
4 - Platinum (N)	5.53	0.6	A	395	592

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	195	49	264	193	53	0.0	0.3	4.448	A
2 - Platinum (S)	350	88	229	350	228	0.0	0.6	5.495	A
3 - Street B/C (E)	133	33	543	134	36	0.0	0.2	4.955	A
4 - Platinum (N)	319	80	0	317	678	0.0	0.4	4.502	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	230	58	323	232	68	0.3	0.3	5.138	A
2 - Platinum (S)	419	105	274	423	281	0.6	0.7	6.469	A
3 - Street B/C (E)	164	41	655	164	42	0.2	0.3	6.024	A
4 - Platinum (N)	391	98	0	391	820	0.4	0.6	4.875	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	296	74	395	296	77	0.3	0.4	5.749	A
2 - Platinum (S)	516	129	350	511	341	0.7	1.4	8.245	A
3 - Street B/C (E)	194	48	807	193	55	0.3	0.4	7.159	A
4 - Platinum (N)	472	118	0	473	1000	0.6	0.6	5.533	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Street B/C (W)	288	72	392	288	76	0.4	0.5	5.996	A
2 - Platinum (S)	518	129	340	524	339	1.4	1.0	8.679	A
3 - Street B/C (E)	195	49	812	196	53	0.4	0.3	7.348	A
4 - Platinum (N)	467	117	0	468	1008	0.6	0.6	5.201	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	242	61	329	242	66	0.5	0.2	5.163	A
2 - Platinum (S)	423	106	287	424	284	1.0	0.7	6.832	A
3 - Street B/C (E)	150	38	666	150	45	0.3	0.3	6.120	A
4 - Platinum (N)	393	98	0	395	816	0.6	0.3	4.880	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	195	49	274	195	52	0.2	0.2	4.603	A
2 - Platinum (S)	343	86	234	342	235	0.7	0.7	5.526	A
3 - Street B/C (E)	131	33	536	132	39	0.3	0.1	5.399	A
4 - Platinum (N)	325	81	0	326	668	0.3	0.4	4.476	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	195	1001	0.195	193	0.0	0.3	4.448	A
	Exit	1	1		53			53	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	350	1021	0.343	350	0.0	0.6	5.495	A
	Exit	1	1		228			228	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	133	840	0.158	134	0.0	0.2	4.955	A
	Exit	1	1		36			36	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	319	1154	0.277	317	0.0	0.4	4.502	A
	Exit	1	1		678			678	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	230	967	0.238	232	0.3	0.3	5.138	A
	Exit	1	1		68			68	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	419	995	0.421	423	0.6	0.7	6.469	A
	Exit	1	1		281			281	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	164	775	0.212	164	0.2	0.3	6.024	A
	Exit	1	1		42			42	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	391	1154	0.339	391	0.4	0.6	4.875	A
	Exit	1	1		820			820	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
	Entry	1	1	1, 2, 3, 4	296	925	0.320	296	0.3	0.4	5.749	A

1 - Street B/C (W)	Exit	1	1		77			77	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	516	951	0.543	511	0.7	1.4	8.245	A
	Exit	1	1		341			341	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	194	687	0.282	193	0.3	0.4	7.159	A
	Exit	1	1		55			55	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	472	1154	0.409	473	0.6	0.6	5.533	A
	Exit	1	1		1000			1000	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	288	927	0.311	288	0.4	0.5	5.996	A
	Exit	1	1		76			76	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	518	957	0.541	524	1.4	1.0	8.679	A
	Exit	1	1		339			339	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	195	684	0.285	196	0.4	0.3	7.348	A
	Exit	1	1		53			53	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	467	1154	0.405	468	0.6	0.6	5.201	A
	Exit	1	1		1008			1008	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	242	963	0.252	242	0.5	0.2	5.163	A
	Exit	1	1		66			66	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	423	988	0.428	424	1.0	0.7	6.832	A
	Exit	1	1		284			284	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	150	768	0.195	150	0.3	0.3	6.120	A
	Exit	1	1		45			45	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	393	1154	0.341	395	0.6	0.3	4.880	A
	Exit	1	1		816			816	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Street B/C (W)	Entry	1	1	1, 2, 3, 4	195	995	0.196	195	0.2	0.2	4.603	A
	Exit	1	1		52			52	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	1, 2, 3, 4	343	1018	0.337	342	0.7	0.7	5.526	A
	Exit	1	1		235			235	0.0	0.0	0.000	A
3 - Street B/C (E)	Entry	1	1	1, 2, 3, 4	131	843	0.156	132	0.3	0.1	5.399	A
	Exit	1	1		39			39	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	325	1154	0.282	326	0.3	0.4	4.476	A
	Exit	1	1		668			668	0.0	0.0	0.000	A

Queues

3: Erbsville Rd & Columbia St W

08/17/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	279	560	128	182	167	151	78	449	415	339	534	148
v/c Ratio	0.83	1.35	0.32	1.06	0.37	0.32	0.27	0.64	0.58	0.87	0.64	0.19
Control Delay	51.4	203.1	8.7	114.7	33.1	7.0	22.8	28.8	12.6	38.1	19.4	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	203.1	8.7	114.7	33.1	7.0	22.8	28.8	12.6	38.1	19.4	2.6
Queue Length 50th (m)	41.5	~142.8	0.6	~27.3	26.5	0.0	9.8	68.2	23.2	34.3	66.6	0.0
Queue Length 95th (m)	#82.0	#205.6	14.7	#64.0	45.0	14.5	21.2	101.3	52.7	#72.9	101.7	8.6
Internal Link Dist (m)	183.2		225.1				181.1			157.5		
Turn Bay Length (m)	94.0		70.0	90.0		40.0	54.0		50.0	50.0		90.0
Base Capacity (vph)	335	416	395	172	456	465	289	700	717	390	838	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.35	0.32	1.06	0.37	0.32	0.27	0.64	0.58	0.87	0.64	0.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	560	128	182	167	151	78	449	415	339	534	148
Future Volume (veh/h)	279	560	128	182	167	151	78	449	415	339	534	148
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.9
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1690	1618	1542	1723	1776	1620	1543	1727	1667	1740	1514	1587
Adj Flow Rate, veh/h	279	560	128	182	167	0	78	449	0	339	534	148
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	2	7	3	7	8	15	10	5	2	9	4
Cap, veh/h	345	421	310	170	462	358	272	708	581	411	848	717
Arrive On Green	0.06	0.26	0.24	0.06	0.26	0.00	0.41	0.41	0.00	0.11	0.56	0.54
Sat Flow, veh/h	1610	1618	1308	1641	1776	1377	624	1727	1417	1657	1514	1338
Grp Volume(v), veh/h	279	560	128	182	167	0	78	449	0	339	534	148
Grp Sat Flow(s),veh/h/ln	1610	1618	1308	1641	1776	1377	624	1727	1417	1657	1514	1338
Q Serve(g_s), s	6.0	26.0	8.3	6.0	7.7	0.0	9.7	20.7	0.0	11.0	24.0	5.8
Cycle Q Clear(g_c), s	6.0	26.0	8.3	6.0	7.7	0.0	18.7	20.7	0.0	11.0	24.0	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	421	310	170	462	358	272	708	581	411	848	717
V/C Ratio(X)	0.81	1.33	0.41	1.07	0.36	0.00	0.29	0.63	0.00	0.83	0.63	0.21
Avail Cap(c_a), veh/h	345	421	310	170	462	358	272	708	581	411	848	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	37.0	32.3	34.6	30.2	0.0	26.4	23.5	0.0	21.1	15.0	12.1
Incr Delay (d2), s/veh	18.3	164.7	4.0	88.0	2.2	0.0	2.6	4.3	0.0	17.0	3.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	30.8	3.3	6.1	4.0	0.0	1.9	10.7	0.0	6.2	10.8	2.3
LnGrp Delay(d),s/veh	54.0	201.7	36.3	122.6	32.4	0.0	29.0	27.8	0.0	38.1	18.5	12.8
LnGrp LOS	D	F	D	F	C		C	C		D	B	B
Approach Vol, veh/h	967				349				527			
Approach Delay, s/veh	137.2				79.5				28.0			
Approach LOS	F				E				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	60.0		10.0	30.0	15.0	45.0	10.0	30.0				
Change Period (Y+Rc), s	6.4		4.0	* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s	53.6		6.0	* 24	11.0	38.6	6.0	* 24				
Max Q Clear Time (g_c+I1), s	26.0		8.0	9.7	13.0	22.7	8.0	28.0				
Green Ext Time (p_c), s	19.0		0.0	8.9	0.0	12.3	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	69.8											
HCM 2010 LOS	E											
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Queues

3: Erbsville Rd & Columbia St W

08/17/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	281	456	117	586	618	339	125	616	280	228	610	204
v/c Ratio	1.49	0.93	0.24	1.99	0.70	0.41	0.58	1.10	0.49	1.08	1.22	0.39
Control Delay	276.1	57.8	4.6	478.5	23.8	5.4	27.8	98.4	10.9	107.1	144.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	276.1	57.8	4.6	478.5	23.8	5.4	27.8	98.4	10.9	107.1	144.2	6.2
Queue Length 50th (m)	~67.9	75.7	0.0	~144.5	80.6	7.0	12.9	~121.7	10.0	~28.2	~130.3	0.0
Queue Length 95th (m)	#114.8	#132.1	9.0	#206.9	119.5	23.0	#24.2	#183.8	31.2	#72.5	#192.1	15.4
Internal Link Dist (m)	183.2			225.1			181.1			157.5		
Turn Bay Length (m)	94.0		70.0	90.0		40.0	54.0		50.0	50.0		90.0
Base Capacity (vph)	188	492	485	294	880	818	214	562	577	212	502	520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.49	0.93	0.24	1.99	0.70	0.41	0.58	1.10	0.49	1.08	1.22	0.39

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary

3: Erbsville Rd & Columbia St W

08/17/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	281	456	117	586	618	339	125	616	280	228	610	204
Future Volume (veh/h)	281	456	117	586	618	339	125	616	280	228	610	204
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1775	1602	1650	1775	1863	1733	1775	1827	1683	1757	1634	1618
Adj Flow Rate, veh/h	281	456	117	586	618	0	125	616	0	228	610	204
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	3	0	0	2	1	0	4	4	1	1	2
Cap, veh/h	247	498	399	296	890	704	211	568	445	210	508	386
Arrive On Green	0.31	0.31	0.29	0.12	0.48	0.00	0.08	0.31	0.00	0.08	0.31	0.28
Sat Flow, veh/h	763	1602	1398	1690	1863	1473	1690	1827	1430	1674	1634	1358
Grp Volume(v), veh/h	281	456	117	586	618	0	125	616	0	228	610	204
Grp Sat Flow(s),veh/h/ln	763	1602	1398	1690	1863	1473	1690	1827	1430	1674	1634	1358
Q Serve(g_s), s	19.7	24.7	5.9	11.0	23.3	0.0	4.6	28.0	0.0	7.0	28.0	11.4
Cycle Q Clear(g_c), s	28.0	24.7	5.9	11.0	23.3	0.0	4.6	28.0	0.0	7.0	28.0	11.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	247	498	399	296	890	704	211	568	445	210	508	386
V/C Ratio(X)	1.14	0.91	0.29	1.98	0.69	0.00	0.59	1.08	0.00	1.08	1.20	0.53
Avail Cap(c_a), veh/h	247	498	399	296	890	704	211	568	445	210	508	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	29.9	25.1	22.4	18.4	0.0	23.4	31.0	0.0	27.0	31.0	27.1
Incr Delay (d2), s/veh	99.8	23.9	1.9	453.7	4.5	0.0	11.6	62.4	0.0	86.5	107.8	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	14.2	2.5	42.3	12.9	0.0	2.8	23.9	0.0	7.0	27.8	4.8
LnGrp Delay(d),s/veh	138.2	53.8	26.9	476.1	22.8	0.0	35.0	93.4	0.0	113.5	138.8	32.2
LnGrp LOS	F	D	C	F	C		C	F		F	F	C
Approach Vol, veh/h	854				1204				741			
Approach Delay, s/veh	77.9				243.4				83.6			
Approach LOS	E				F				F			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	32.0		47.0	11.0	32.0	15.0	32.0				
Change Period (Y+Rc), s	4.0	6.4		* 6.3	4.0	6.4	4.0	* 6.3				
Max Green Setting (Gmax), s	7.0	25.6		* 41	7.0	25.6	11.0	* 26				
Max Q Clear Time (g_c+I1), s	6.6	30.0		25.3	9.0	30.0	13.0	30.0				
Green Ext Time (p_c), s	0.0	0.0		13.2	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 2010 Ctrl Delay	140.2
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Future Total 2031 - Improved

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Copper & Platinum Mod.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3.1 Future Total (2031) - Modified

Report generation date: 8/17/2018 3:43:14 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Total										
1 - Copper (W)	0.0	4.37	A	38.34	E	6.8	38.69	E	17.88	C
2 - Platinum (S)	20.8	46.73	E			0.8	5.56	A		
3 - Copper (E)	0.0	5.99	A			1.9	11.95	B		
4 - Platinum (N)	1.4	11.55	B			0.7	6.73	A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1750928277	233	18.65

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	4.37	0.0	A	23	35
2 - Platinum (S)	46.73	20.8	E	1182	1773
3 - Copper (E)	5.99	0.0	A	15	22
4 - Platinum (N)	11.55	1.4	B	323	485

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	20	5	278	20	523	0.0	0.0	3.735	A
2 - Platinum (S)	975	244	0	973	297	0.0	2.6	8.749	A
3 - Copper (E)	13	3	628	13	345	0.0	0.0	4.164	A
4 - Platinum (N)	265	66	535	265	105	0.0	0.5	6.027	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	21	5	341	21	620	0.0	0.0	4.020	A
2 - Platinum (S)	1153	288	0	1161	362	2.6	3.5	12.764	B
3 - Copper (E)	13	3	747	13	414	0.0	0.0	4.964	A
4 - Platinum (N)	328	82	633	328	127	0.5	0.7	7.627	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	28	7	402	28	739	0.0	0.0	3.996	A
2 - Platinum (S)	1413	353	0	1393	430	3.5	15.6	32.253	D
3 - Copper (E)	17	4	891	17	502	0.0	0.0	5.749	A
4 - Platinum (N)	385	96	756	385	151	0.7	1.2	10.738	B

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Copper (W)	28	7	403	28	740	0.0	0.0	4.369	A
2 - Platinum (S)	1434	358	0	1394	431	15.6	20.8	46.725	E
3 - Copper (E)	18	5	893	18	501	0.0	0.0	5.993	A
4 - Platinum (N)	386	97	759	385	153	1.2	1.4	11.546	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	24	6	324	23	621	0.0	0.0	3.794	A
2 - Platinum (S)	1150	288	0	1170	348	20.8	4.6	24.470	C
3 - Copper (E)	15	4	748	15	422	0.0	0.0	5.217	A
4 - Platinum (N)	310	77	635	309	127	1.4	0.7	8.992	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	18	4	277	18	517	0.0	0.0	3.987	A
2 - Platinum (S)	966	242	0	965	295	4.6	2.3	9.272	A
3 - Copper (E)	11	3	624	11	341	0.0	0.0	4.802	A
4 - Platinum (N)	266	66	528	266	107	0.7	0.4	6.465	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	20	993	0.020	20	0.0	0.0	3.735	A
	Exit	1	1		523			523	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	344	1035	0.332	345	0.0	0.5	5.241	A
			2	1, 2, 4	629	1035	0.608	628	0.0	1.3	6.895	A
		2	1	(1, 2, 3, 4)	975			973	0.0	0.8	2.441	A
	Exit	1	1		297			297	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	13	790	0.016	13	0.0	0.0	4.164	A
	Exit	1	1		345			345	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	265	844	0.314	265	0.0	0.5	6.027	A
	Exit	1	1		105			105	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	21	956	0.022	21	0.0	0.0	4.020	A
	Exit	1	1		620			620	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	416	1035	0.402	414	0.5	0.8	5.639	A
			2	1, 2, 4	744	1035	0.718	747	1.3	1.3	7.614	A
		2	1	(1, 2, 3, 4)	1153			1160	0.8	1.4	5.843	A
	Exit	1	1		362			362	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	13	721	0.018	13	0.0	0.0	4.964	A
	Exit	1	1		414			414	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	328	787	0.416	328	0.5	0.7	7.627	A
	Exit	1	1		127			127	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	28	921	0.030	28	0.0	0.0	3.996	A
	Exit	1	1		739			739	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	501	1035	0.484	502	0.8	0.9	6.260	A
			2	1, 2, 4	891	1035	0.861	891	1.3	2.3	8.712	A
	Exit	2	1	(1, 2, 3, 4)	1413			1393	1.4	12.5	24.397	C
		1	1		430			430	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	17	638	0.026	17	0.0	0.0	5.749	A
	Exit	1	1		502			502	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	385	716	0.537	385	0.7	1.2	10.738	B
	Exit	1	1		151			151	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	28	921	0.031	28	0.0	0.0	4.369	A
	Exit	1	1		740			740	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	497	1035	0.480	501	0.9	0.8	6.434	A
			2	1, 2, 4	896	1035	0.865	893	2.3	2.3	8.862	A
	Exit	2	1	(1, 2, 3, 4)	1434			1393	12.5	17.7	38.729	E
		1	1		431			431	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	18	637	0.029	18	0.0	0.0	5.993	A
	Exit	1	1		501			501	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	386	715	0.540	385	1.2	1.4	11.546	B
	Exit	1	1		153			153	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	24	966	0.024	23	0.0	0.0	3.794	A
	Exit	1	1		621			621	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	423	1035	0.408	422	0.8	0.7	5.891	A
			2	1, 2, 4	745	1035	0.719	748	2.3	1.6	8.109	A
	Exit	2	1	(1, 2, 3, 4)	1150			1168	17.7	2.3	17.226	C
		1	1		348			348	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	15	721	0.021	15	0.0	0.0	5.217	A
	Exit	1	1		422			422	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	310	786	0.394	309	1.4	0.7	8.992	A
	Exit	1	1		127			127	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	18	993	0.018	18	0.0	0.0	3.987	A
	Exit	1	1		517			517	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	341	1035	0.330	341	0.7	0.5	5.150	A
			2	1, 2, 4	624	1035	0.603	624	1.6	1.2	6.944	A
	Exit	2	1	(1, 2, 3, 4)	966			965	2.3	0.7	2.985	A
		1	1		295			295	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	11	793	0.014	11	0.0	0.0	4.802	A
	Exit	1	1		341			341	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	266	848	0.313	266	0.7	0.4	6.465	A
	Exit	1	1		107			107	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Copper (W)	38.69	6.8	E	519	779
2 - Platinum (S)	5.56	0.8	A	371	557
3 - Copper (E)	11.95	1.9	B	516	775
4 - Platinum (N)	6.73	0.7	A	284	426

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	432	108	510	430	39	0.0	1.2	8.167	A
2 - Platinum (S)	301	75	80	300	860	0.0	0.5	4.686	A
3 - Copper (E)	414	104	245	415	134	0.0	0.9	6.215	A
4 - Platinum (N)	232	58	316	233	343	0.0	0.3	4.783	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	514	128	607	515	48	1.2	1.8	12.093	B
2 - Platinum (S)	365	91	89	364	1033	0.5	0.6	5.014	A
3 - Copper (E)	497	124	295	495	158	0.9	1.2	7.805	A
4 - Platinum (N)	279	70	377	279	414	0.3	0.4	5.454	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	614	153	755	612	55	1.8	6.3	30.765	D
2 - Platinum (S)	443	111	114	447	1253	0.6	0.7	5.562	A
3 - Copper (E)	617	154	361	617	199	1.2	1.9	10.887	B
4 - Platinum (N)	342	86	470	341	509	0.4	0.7	6.593	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Copper (W)	622	155	760	619	53	6.3	6.8	38.692	E
2 - Platinum (S)	444	111	115	445	1264	0.7	0.8	5.408	A
3 - Copper (E)	630	158	359	630	201	1.9	1.9	11.952	B
4 - Platinum (N)	338	85	473	341	516	0.7	0.6	6.727	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	502	125	624	502	47	6.8	1.7	18.225	C
2 - Platinum (S)	375	94	94	375	1032	0.8	0.5	4.981	A
3 - Copper (E)	508	127	300	506	168	1.9	1.3	7.938	A
4 - Platinum (N)	282	70	389	282	417	0.6	0.4	5.854	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	432	108	520	433	36	1.7	1.2	9.551	A
2 - Platinum (S)	298	74	74	297	879	0.5	0.5	4.735	A
3 - Copper (E)	431	108	240	432	132	1.3	0.7	6.408	A
4 - Platinum (N)	231	58	325	230	347	0.4	0.4	4.938	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	432	859	0.503	430	0.0	1.2	8.167	A
	Exit	1	1		39			39	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	55	1007	0.055	55	0.0	0.1	3.799	A
			2	1, 2, 4	245	1007	0.244	245	0.0	0.4	4.773	A
		2	1	(1, 2, 3, 4)	301			301	0.0	0.0	0.100	A
	Exit	1	1		860			860	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	414	1012	0.409	415	0.0	0.9	6.215	A
	Exit	1	1		134			134	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	232	971	0.239	233	0.0	0.3	4.783	A
	Exit	1	1		343			343	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	514	802	0.640	515	1.2	1.8	12.093	B
	Exit	1	1		48			48	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	69	1003	0.069	69	0.1	0.1	3.938	A
			2	1, 2, 4	296	1003	0.295	295	0.4	0.5	5.044	A
		2	1	(1, 2, 3, 4)	365			365	0.0	0.0	0.184	A
	Exit	1	1		1033			1033	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	497	983	0.506	495	0.9	1.2	7.805	A
	Exit	1	1		158			158	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	279	936	0.298	279	0.3	0.4	5.454	A
	Exit	1	1		414			414	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	614	717	0.856	612	1.8	6.3	30.765	D
	Exit	1	1		55			55	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	85	994	0.086	85	0.1	0.1	3.917	A
			2	1, 2, 4	358	994	0.360	361	0.5	0.5	5.551	A
	Exit	1	1	(1, 2, 3, 4)	443			444	0.0	0.0	0.328	A
			1		1253			1253	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	617	945	0.653	617	1.2	1.9	10.887	B
	Exit	1	1		199			199	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	342	882	0.388	341	0.4	0.7	6.593	A
	Exit	1	1		509			509	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	622	714	0.871	619	6.3	6.8	38.692	E
	Exit	1	1		53			53	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	86	994	0.086	86	0.1	0.1	4.007	A
			2	1, 2, 4	359	994	0.361	359	0.5	0.6	5.362	A
	Exit	1	1	(1, 2, 3, 4)	444			444	0.0	0.1	0.307	A
			1		1264			1264	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	630	946	0.666	630	1.9	1.9	11.952	B
	Exit	1	1		201			201	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	338	880	0.384	341	0.7	0.6	6.727	A
	Exit	1	1		516			516	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	502	793	0.633	502	6.8	1.7	18.225	C
	Exit	1	1		47			47	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	75	1002	0.074	75	0.1	0.1	3.965	A
			2	1, 2, 4	300	1002	0.300	300	0.6	0.4	5.048	A
	Exit	1	1	(1, 2, 3, 4)	375			375	0.1	0.0	0.146	A
			1		1032			1032	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	508	980	0.519	506	1.9	1.3	7.938	A
	Exit	1	1		168			168	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	282	929	0.303	282	0.6	0.4	5.854	A
	Exit	1	1		417			417	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Copper (W)	Entry	1	1	1, 2, 3, 4	432	853	0.506	433	1.7	1.2	9.551	A
	Exit	1	1		36			36	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	1	3	58	1009	0.058	58	0.1	0.1	3.824	A
			2	1, 2, 4	240	1009	0.238	240	0.4	0.4	4.796	A
	Exit	1	1	(1, 2, 3, 4)	298			298	0.0	0.0	0.124	A
			1		879			879	0.0	0.0	0.000	A
3 - Copper (E)	Entry	1	1	1, 2, 3, 4	431	1015	0.425	432	1.3	0.7	6.408	A
	Exit	1	1		132			132	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3, 4	231	966	0.239	230	0.4	0.4	4.938	A
	Exit	1	1		347			347	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2031 Future Total - Erb & Platinum Mod.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3.1 Future Total (2031) - Modified

Report generation date: 8/9/2018 2:58:17 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Total										
1 - Erb (W)	2.3	6.85	A	6.44	A	1.4	7.64	A	10.62	B
2 - Platinum (S)	0.1	10.64	B			0.3	15.25	C		
3 - Erb (E)	2.5	6.51	A			1.3	4.68	A		
4 - Platinum (N)	0.6	4.78	A			5.6	16.34	C		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1136332748	308	49.73

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	6.85	2.3	A	1028	1542
2 - Platinum (S)	10.64	0.1	B	26	39
3 - Erb (E)	6.51	2.5	A	1115	1673
4 - Platinum (N)	4.78	0.6	A	364	546

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	843	211	146	844	339	0.0	1.1	4.760	A
2 - Platinum (S)	22	5	969	21	21	0.0	0.0	5.191	A
3 - Erb (E)	912	228	254	913	736	0.0	1.3	4.803	A
4 - Platinum (N)	297	74	188	298	980	0.0	0.4	4.205	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1004	251	171	1000	413	1.1	1.7	5.427	A
2 - Platinum (S)	25	6	1146	25	25	0.0	0.0	7.161	A
3 - Erb (E)	1086	271	297	1085	874	1.3	1.7	5.359	A
4 - Platinum (N)	358	90	227	358	1156	0.4	0.4	4.393	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1224	306	211	1224	503	1.7	2.3	6.719	A
2 - Platinum (S)	32	8	1405	32	31	0.0	0.1	9.283	A
3 - Erb (E)	1345	336	367	1347	1070	1.7	2.5	6.434	A
4 - Platinum (N)	435	109	279	435	1434	0.4	0.5	4.723	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	1237	309	207	1241	513	2.3	2.2	6.849	A
2 - Platinum (S)	30	7	1417	29	30	0.1	0.1	10.635	B
3 - Erb (E)	1341	335	360	1343	1087	2.5	2.4	6.505	A
4 - Platinum (N)	436	109	284	436	1418	0.5	0.6	4.778	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	1014	254	173	1014	413	2.2	1.5	5.532	A
2 - Platinum (S)	25	6	1160	25	27	0.1	0.1	7.455	A
3 - Erb (E)	1100	275	299	1098	887	2.4	1.7	5.405	A
4 - Platinum (N)	354	88	233	354	1164	0.6	0.4	4.422	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	844	211	144	844	348	1.5	1.1	4.914	A
2 - Platinum (S)	22	5	967	22	22	0.1	0.0	6.238	A
3 - Erb (E)	909	227	248	909	741	1.7	1.1	4.828	A
4 - Platinum (N)	302	76	192	301	965	0.4	0.4	4.113	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	351	1044	0.336	351	0.0	0.4	4.321	A
			2	1, 3, 4	492	1044	0.472	493	0.0	0.7	5.071	A
	Exit	1	1		339			339	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	22	661	0.033	21	0.0	0.0	5.191	A
	Exit	1	1		21			21	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	378	949	0.398	378	0.0	0.5	4.856	A
			2	1, 4	405	949	0.427	406	0.0	0.6	4.886	A
			3	1, 2, 3	129	949	0.136	129	0.0	0.2	4.240	A
		2	1	(1, 4)	812			812	0.0	0.0	0.024	A
			2	(1, 2, 3)	101			101	0.0	0.0	0.000	A
	Exit	1	1		736			736	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	224	1028	0.217	224	0.0	0.3	4.359	A
			2	3, 4	74	1028	0.072	74	0.0	0.1	3.602	A
		2	1	(1, 2, 3, 4)	297			297	0.0	0.0	0.029	A
	Exit	1	1		980			980	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	425	1034	0.410	424	0.4	0.6	4.813	A
			2	1, 3, 4	579	1034	0.560	576	0.7	1.1	5.886	A
	Exit	1	1		413			413	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	25	558	0.044	25	0.0	0.0	7.161	A
	Exit	1	1		25			25	0.0	0.0	0.000	A
		1	1	4	447	938	0.476	447	0.5	0.7	5.461	A

3 - Erb (E)	Entry		2	1, 4	479	938	0.511	478	0.6	0.7	5.391	A
			3	1, 2, 3	159	938	0.170	160	0.2	0.2	4.439	A
		2	1	(1, 4)	964			964	0.0	0.0	0.091	A
			2	(1, 2, 3)	121			121	0.0	0.0	0.005	A
	Exit	1	1		874			874	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	270	1014	0.266	270	0.3	0.3	4.543	A
			2	3, 4	89	1014	0.087	88	0.1	0.1	3.730	A
		2	1	(1, 2, 3, 4)	358			358	0.0	0.0	0.052	A
	Exit	1	1		1156			1156	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	538	1020	0.527	538	0.6	0.9	5.980	A
			2	1, 3, 4	687	1020	0.673	686	1.1	1.4	7.295	A
	Exit	1	1		503			503	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	32	409	0.078	32	0.0	0.1	9.283	A
	Exit	1	1		31			31	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	554	920	0.602	555	0.7	1.0	6.369	A
			2	1, 4	578	920	0.628	579	0.7	1.1	6.367	A
			3	1, 2, 3	213	920	0.232	213	0.2	0.3	4.696	A
		2	1	(1, 4)	1190			1190	0.0	0.1	0.372	A
			2	(1, 2, 3)	155			155	0.0	0.0	0.019	A
	Exit	1	1		1070			1070	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	321	995	0.322	321	0.3	0.4	4.888	A
			2	3, 4	114	995	0.114	114	0.1	0.1	3.851	A
		2	1	(1, 2, 3, 4)	435			435	0.0	0.0	0.106	A
	Exit	1	1		1434			1434	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	547	1022	0.535	549	0.9	0.9	6.089	A
			2	1, 3, 4	690	1022	0.675	692	1.4	1.3	7.451	A
	Exit	1	1		513			513	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	30	401	0.074	29	0.1	0.1	10.635	B
	Exit	1	1		30			30	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	551	922	0.597	553	1.0	0.9	6.435	A
			2	1, 4	578	922	0.626	578	1.1	1.1	6.411	A
			3	1, 2, 3	213	922	0.231	212	0.3	0.3	4.759	A
		2	1	(1, 4)	1178			1179	0.1	0.1	0.387	A
			2	(1, 2, 3)	163			162	0.0	0.0	0.023	A
	Exit	1	1		1087			1087	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	327	994	0.329	327	0.4	0.4	4.950	A
			2	3, 4	109	994	0.110	109	0.1	0.1	3.850	A
		2	1	(1, 2, 3, 4)	436			436	0.0	0.0	0.108	A
	Exit	1	1		1418			1418	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	430	1034	0.416	431	0.9	0.5	4.958	A
			2	1, 3, 4	585	1034	0.566	583	1.3	1.0	5.957	A
	Exit	1	1		413			413	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	25	550	0.045	25	0.1	0.1	7.455	A
	Exit	1	1		27			27	0.0	0.0	0.000	A
			1	4	448	938	0.478	448	0.9	0.7	5.514	A

3 - Erb (E)	Entry	1	2	1, 4	487	938	0.520	486	1.1	0.8	5.445	A
			3	1, 2, 3	165	938	0.176	164	0.3	0.2	4.416	A
		2	1	(1, 4)	972			972	0.1	0.0	0.094	A
			2	(1, 2, 3)	128			128	0.0	0.0	0.008	A
	Exit	1	1		887			887	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	267	1012	0.263	266	0.4	0.3	4.584	A
			2	3, 4	87	1012	0.086	88	0.1	0.1	3.695	A
		2	1	(1, 2, 3, 4)	354			354	0.0	0.0	0.059	A
	Exit	1	1		1164			1164	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	347	1044	0.332	347	0.5	0.5	4.473	A
			2	1, 3, 4	497	1044	0.476	497	1.0	0.6	5.228	A
	Exit	1	1		348			348	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	22	662	0.033	22	0.1	0.0	6.238	A
	Exit	1	1		22			22	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	371	951	0.391	371	0.7	0.5	4.945	A
			2	1, 4	408	951	0.429	408	0.8	0.5	4.876	A
			3	1, 2, 3	130	951	0.136	130	0.2	0.1	4.131	A
		2	1	(1, 4)	806			806	0.0	0.0	0.034	A
			2	(1, 2, 3)	102			102	0.0	0.0	0.004	A
	Exit	1	1		741			741	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	230	1027	0.224	229	0.3	0.3	4.270	A
			2	3, 4	72	1027	0.070	72	0.1	0.1	3.520	A
		2	1	(1, 2, 3, 4)	302			302	0.0	0.0	0.025	A
	Exit	1	1		965			965	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Erb (W)	7.64	1.4	A	537	806
2 - Platinum (S)	15.25	0.3	C	45	68
3 - Erb (E)	4.68	1.3	A	780	1170
4 - Platinum (N)	16.34	5.6	C	1054	1582

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	439	110	675	439	669	0.0	0.7	5.047	A
2 - Platinum (S)	39	10	1068	39	45	0.0	0.1	5.890	A
3 - Erb (E)	642	161	177	641	930	0.0	0.8	4.097	A
4 - Platinum (N)	867	217	476	868	342	0.0	1.6	5.845	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	528	132	801	530	812	0.7	0.7	5.855	A
2 - Platinum (S)	46	11	1277	46	54	0.1	0.1	8.113	A
3 - Erb (E)	773	193	211	774	1112	0.8	0.9	4.362	A
4 - Platinum (N)	1041	260	577	1036	407	1.6	2.5	7.734	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	641	160	965	643	987	0.7	1.3	7.205	A
2 - Platinum (S)	55	14	1544	55	64	0.1	0.3	13.412	B
3 - Erb (E)	937	234	259	935	1340	0.9	1.3	4.662	A
4 - Platinum (N)	1245	311	699	1253	495	2.5	5.1	14.503	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Erb (W)	632	158	981	633	979	1.3	1.4	7.641	A
2 - Platinum (S)	53	13	1548	54	65	0.3	0.2	15.254	C
3 - Erb (E)	930	232	259	929	1343	1.3	1.3	4.683	A
4 - Platinum (N)	1262	316	688	1271	500	5.1	5.6	16.336	C

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	530	133	799	529	813	1.4	0.9	6.222	A
2 - Platinum (S)	43	11	1274	43	53	0.2	0.1	9.393	A
3 - Erb (E)	758	189	216	760	1102	1.3	0.8	4.343	A
4 - Platinum (N)	1040	260	570	1042	405	5.6	2.4	8.560	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	451	113	675	453	674	0.9	0.5	5.330	A
2 - Platinum (S)	36	9	1083	36	46	0.1	0.1	6.980	A
3 - Erb (E)	641	160	185	642	933	0.8	0.7	4.164	A
4 - Platinum (N)	872	218	478	871	349	2.4	1.4	6.202	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	159	852	0.187	158	0.0	0.3	4.563	A
			2	1, 3, 4	280	852	0.329	281	0.0	0.4	5.315	A
	Exit	1	1		669			669	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	39	603	0.065	39	0.0	0.1	5.890	A
	Exit	1	1		45			45	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	99	969	0.102	98	0.0	0.1	3.749	A
			2	1, 4	285	969	0.294	285	0.0	0.3	4.110	A
			3	1, 2, 3	258	969	0.266	257	0.0	0.4	4.212	A
		2	1	(1, 4)	387			387	0.0	0.0	0.001	A
			2	(1, 2, 3)	255			255	0.0	0.0	0.001	A
	Exit	1	1		930			930	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	490	924	0.531	491	0.0	0.9	5.870	A
			2	3, 4	376	924	0.407	377	0.0	0.6	4.933	A
		2	1	(1, 2, 3, 4)	867			867	0.0	0.1	0.374	A
	Exit	1	1		342			342	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	198	807	0.245	198	0.3	0.3	5.199	A
			2	1, 3, 4	330	807	0.409	332	0.4	0.5	6.236	A
	Exit	1	1		812			812	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	46	483	0.095	46	0.1	0.1	8.113	A
	Exit	1	1		54			54	0.0	0.0	0.000	A
		1	1	4	122	961	0.127	122	0.1	0.1	4.007	A

3 - Erb (E)	Entry		2	1, 4	339	961	0.353	340	0.3	0.4	4.328	A
			3	1, 2, 3	312	961	0.325	311	0.4	0.4	4.519	A
		2	1	(1, 4)	468			468	0.0	0.0	0.005	A
			2	(1, 2, 3)	305			305	0.0	0.0	0.010	A
	Exit	1	1		1112			1112	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	586	888	0.660	584	0.9	1.3	7.052	A
			2	3, 4	453	888	0.510	453	0.6	0.9	6.001	A
		2	1	(1, 2, 3, 4)	1041			1039	0.1	0.4	1.141	A
	Exit	1	1		407			407	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	247	747	0.330	247	0.3	0.4	6.089	A
			2	1, 3, 4	395	747	0.528	396	0.5	0.9	7.900	A
	Exit	1	1		987			987	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	55	328	0.168	55	0.1	0.3	13.412	B
	Exit	1	1		64			64	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	152	948	0.160	152	0.1	0.2	4.070	A
			2	1, 4	403	948	0.425	402	0.4	0.5	4.685	A
			3	1, 2, 3	381	948	0.402	381	0.4	0.5	4.841	A
		2	1	(1, 4)	560			560	0.0	0.0	0.011	A
			2	(1, 2, 3)	376			377	0.0	0.0	0.019	A
	Exit	1	1		1340			1340	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	690	844	0.818	693	1.3	1.7	9.146	A
			2	3, 4	561	844	0.665	561	0.9	1.2	7.556	A
		2	1	(1, 2, 3, 4)	1245			1251	0.4	2.2	6.058	A
	Exit	1	1		495			495	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	243	742	0.328	243	0.4	0.4	6.454	A
			2	1, 3, 4	389	742	0.524	389	0.9	1.0	8.382	A
	Exit	1	1		979			979	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	53	326	0.163	54	0.3	0.2	15.254	C
	Exit	1	1		65			65	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	154	948	0.163	154	0.2	0.2	4.147	A
			2	1, 4	401	948	0.423	401	0.5	0.6	4.703	A
			3	1, 2, 3	374	948	0.395	375	0.5	0.6	4.837	A
		2	1	(1, 4)	562			562	0.0	0.0	0.013	A
			2	(1, 2, 3)	368			368	0.0	0.0	0.023	A
	Exit	1	1		1343			1343	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	707	848	0.834	709	1.7	1.9	9.405	A
			2	3, 4	563	848	0.664	563	1.2	1.3	7.844	A
		2	1	(1, 2, 3, 4)	1262			1270	2.2	2.4	7.635	A
	Exit	1	1		500			500	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	195	808	0.242	195	0.4	0.3	5.426	A
			2	1, 3, 4	335	808	0.415	334	1.0	0.6	6.685	A
	Exit	1	1		813			813	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	43	484	0.089	43	0.2	0.1	9.393	A
	Exit	1	1		53			53	0.0	0.0	0.000	A
			1	4	114	959	0.119	114	0.2	0.1	4.002	A

3 - Erb (E)	Entry	1	2	1, 4	332	959	0.346	332	0.6	0.4	4.343	A
			3	1, 2, 3	312	959	0.325	314	0.6	0.3	4.460	A
		2	1	(1, 4)	457			457	0.0	0.0	0.002	A
			2	(1, 2, 3)	301			301	0.0	0.0	0.007	A
	Exit	1	1		1102			1102	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	591	890	0.664	592	1.9	1.2	7.344	A
			2	3, 4	450	890	0.505	450	1.3	0.8	6.284	A
		2	1	(1, 2, 3, 4)	1040			1041	2.4	0.4	1.701	A
	Exit	1	1		405			405	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Erb (W)	Entry	1	1	2, 3	160	852	0.188	161	0.3	0.1	4.820	A
			2	1, 3, 4	291	852	0.342	293	0.6	0.3	5.612	A
	Exit	1	1		674			674	0.0	0.0	0.000	A
2 - Platinum (S)	Entry	1	2	1, 2, 3, 4	36	595	0.060	36	0.1	0.1	6.980	A
	Exit	1	1		46			46	0.0	0.0	0.000	A
3 - Erb (E)	Entry	1	1	4	99	967	0.102	99	0.1	0.1	3.874	A
			2	1, 4	284	967	0.293	284	0.4	0.3	4.146	A
			3	1, 2, 3	258	967	0.267	259	0.3	0.3	4.289	A
		2	1	(1, 4)	383			383	0.0	0.0	0.002	A
			2	(1, 2, 3)	258			258	0.0	0.0	0.004	A
	Exit	1	1		933			933	0.0	0.0	0.000	A
4 - Platinum (N)	Entry	1	1	1, 2, 3	501	924	0.542	500	1.2	0.8	6.141	A
			2	3, 4	370	924	0.401	371	0.8	0.5	5.303	A
		2	1	(1, 2, 3, 4)	872			871	0.4	0.1	0.425	A
	Exit	1	1		349			349	0.0	0.0	0.000	A

Junctions 9
ARCADY 9 - Roundabout Module
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Filename: 2031 Future Total - Ladyslipper & Columbia Mod.j9

Path: \\CD1175-F01\work_group\01605\Active\161413446\5 Technical Work\ARCADY\3.1 Future Total (2031) - Modified

Report generation date: 8/17/2018 3:44:09 PM

»2031 Future Total, AM

»2031 Future Total, PM

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS	Queue (PCU)	Delay (s)	LOS	Junction Delay (s)	Junction LOS
[Lane Simulation] - 2031 Future Total										
1 - Columbia (W)	1.0	4.15	A	4.95	A	0.5	2.97	A	22.85	C
2 - Ladyslipper (S)	0.3	5.75	A			4.0	13.41	B		
3 - Columbia (E)	0.7	5.85	A			12.1	47.85	E		
4 - Ladyslipper (N)	0.5	5.82	A			0.6	11.91	B		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	8/2/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\mkaczmarek
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1301820042	101	6.83

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2031 Future Total	AM	ONE HOUR	08:00	09:30	15	✓
D2	2031 Future Total	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

2031 Future Total, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	4.15	1.0	A	749	1123
2 - Ladyslipper (S)	5.75	0.3	A	175	263
3 - Columbia (E)	5.85	0.7	A	308	462
4 - Ladyslipper (N)	5.82	0.5	A	220	330

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	603	151	253	601	234	0.0	0.6	2.848	A
2 - Ladyslipper (S)	146	36	463	145	392	0.0	0.3	4.775	A
3 - Columbia (E)	253	63	110	254	497	0.0	0.3	4.817	A
4 - Ladyslipper (N)	186	46	302	185	62	0.0	0.3	4.381	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	733	183	306	732	291	0.6	0.7	3.301	A
2 - Ladyslipper (S)	177	44	559	179	479	0.3	0.1	5.101	A
3 - Columbia (E)	314	78	142	314	595	0.3	0.4	5.353	A
4 - Ladyslipper (N)	218	55	377	220	80	0.3	0.2	5.053	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	898	225	353	896	323	0.7	1.0	4.127	A
2 - Ladyslipper (S)	208	52	663	208	586	0.1	0.3	5.502	A
3 - Columbia (E)	364	91	161	361	711	0.4	0.7	5.620	A
4 - Ladyslipper (N)	251	63	425	251	97	0.2	0.4	5.367	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	915	229	369	918	324	1.0	1.0	4.146	A
2 - Ladyslipper (S)	203	51	699	204	588	0.3	0.3	5.752	A
3 - Columbia (E)	367	92	153	366	750	0.7	0.7	5.851	A
4 - Ladyslipper (N)	258	65	437	257	83	0.4	0.5	5.815	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	738	185	314	741	272	1.0	0.5	3.346	A
2 - Ladyslipper (S)	169	42	581	169	474	0.3	0.3	4.988	A
3 - Columbia (E)	300	75	128	304	623	0.7	0.5	5.255	A
4 - Ladyslipper (N)	226	56	359	227	73	0.5	0.3	5.290	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	606	151	248	604	235	0.5	0.6	2.934	A
2 - Ladyslipper (S)	149	37	457	149	395	0.3	0.2	4.578	A
3 - Columbia (E)	252	63	116	251	489	0.5	0.4	4.743	A
4 - Ladyslipper (N)	180	45	302	181	65	0.3	0.2	4.616	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	603	1888	0.319	601	0.0	0.6	2.848	A
	Exit	1	1		234			234	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	38	868	0.044	38	0.0	0.1	4.677	A
			2	1, 2, 4	108	868	0.124	107	0.0	0.2	4.803	A
	Exit	1	1	(1, 2, 3, 4)	146			146	0.0	0.0	0.006	A
			1		392			392	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	36	996	0.037	37	0.0	0.0	3.755	A
			2	1, 2, 3	217	996	0.218	217	0.0	0.2	4.834	A
	Exit	1	1	(1, 2, 3, 4)	253			253	0.0	0.0	0.134	A
			1		497			497	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	186	979	0.190	185	0.0	0.3	4.381	A
	Exit	1	1		62			62	0.0	0.0	0.000	A

08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	733	1850	0.396	732	0.6	0.7	3.301	A
	Exit	1	1		291			291	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	41	834	0.049	42	0.1	0.0	4.571	A
			2	1, 2, 4	136	834	0.163	137	0.2	0.1	5.211	A
	Exit	1	1	(1, 2, 3, 4)	177			177	0.0	0.0	0.053	A
			1		479			479	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	45	984	0.046	46	0.0	0.0	4.345	A
			2	1, 2, 3	268	984	0.273	269	0.2	0.4	5.265	A
	Exit	1	1	(1, 2, 3, 4)	314			314	0.0	0.0	0.216	A
			1		595			595	0.0	0.0	0.000	A

4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	218	936	0.233	220	0.3	0.2	5.053	A
	Exit	1	1		80			80	0.0	0.0	0.000	A

08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	898	1816	0.495	896	0.7	1.0	4.127	A
	Exit	1	1		323			323	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	54	796	0.068	54	0.0	0.1	5.144	A
			2	1, 2, 4	154	796	0.194	154	0.1	0.2	5.558	A
		2	1	(1, 2, 3, 4)	208			208	0.0	0.0	0.051	A
	Exit	1	1		586			586	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	52	977	0.053	51	0.0	0.0	4.189	A
			2	1, 2, 3	312	977	0.320	310	0.4	0.6	5.489	A
		2	1	(1, 2, 3, 4)	364			364	0.0	0.0	0.300	A
	Exit	1	1		711			711	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	251	908	0.276	251	0.2	0.4	5.367	A
	Exit	1	1		97			97	0.0	0.0	0.000	A

08:45 - 09:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	915	1804	0.507	918	1.0	1.0	4.146	A
	Exit	1	1		324			324	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	57	783	0.073	57	0.1	0.2	5.077	A
			2	1, 2, 4	146	783	0.186	147	0.2	0.2	5.904	A
		2	1	(1, 2, 3, 4)	203			203	0.0	0.0	0.073	A
	Exit	1	1		588			588	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	46	980	0.047	47	0.0	0.1	4.205	A
			2	1, 2, 3	320	980	0.327	319	0.6	0.6	5.720	A
		2	1	(1, 2, 3, 4)	367			367	0.0	0.0	0.344	A
	Exit	1	1		750			750	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	258	901	0.287	257	0.4	0.5	5.815	A
	Exit	1	1		83			83	0.0	0.0	0.000	A

09:00 - 09:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	738	1844	0.400	741	1.0	0.5	3.346	A
	Exit	1	1		272			272	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	45	825	0.055	46	0.2	0.0	4.711	A
			2	1, 2, 4	124	825	0.151	123	0.2	0.3	5.058	A
		2	1	(1, 2, 3, 4)	169			169	0.0	0.0	0.024	A
	Exit	1	1		474			474	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	40	989	0.040	41	0.1	0.0	4.000	A
			2	1, 2, 3	261	989	0.264	263	0.6	0.4	5.139	A
		2	1	(1, 2, 3, 4)	300			301	0.0	0.1	0.268	A
	Exit	1	1		623			623	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	226	946	0.239	227	0.5	0.3	5.290	A
	Exit	1	1		73			73	0.0	0.0	0.000	A

09:15 - 09:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	606	1892	0.320	604	0.5	0.6	2.934	A
	Exit	1	1		235			235	0.0	0.0	0.000	A

2 - Ladyslipper (S)	Entry	1	1	3	36	870	0.041	36	0.0	0.1	4.266	A
			2	1, 2, 4	113	870	0.130	113	0.3	0.1	4.681	A
		2	1	(1, 2, 3, 4)	149			149	0.0	0.0	0.005	A
	Exit	1	1		395			395	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	39	993	0.040	39	0.0	0.0	4.138	A
			2	1, 2, 3	212	993	0.214	212	0.4	0.3	4.773	A
		2	1	(1, 2, 3, 4)	252			252	0.1	0.0	0.068	A
	Exit	1	1		489			489	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	180	979	0.184	181	0.3	0.2	4.616	A
	Exit	1	1		65			65	0.0	0.0	0.000	A

2031 Future Total, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.

Results

Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Columbia (W)	2.97	0.5	A	489	734
2 - Ladyslipper (S)	13.41	4.0	B	830	1245
3 - Columbia (E)	47.85	12.1	E	760	1140
4 - Ladyslipper (N)	11.91	0.6	B	131	197

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	408	102	241	407	663	0.0	0.3	2.414	A
2 - Ladyslipper (S)	684	171	318	679	329	0.0	1.5	6.424	A
3 - Columbia (E)	625	156	370	621	628	0.0	1.8	8.550	A
4 - Ladyslipper (N)	108	27	795	108	195	0.0	0.2	5.774	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	476	119	288	476	794	0.3	0.3	2.609	A
2 - Ladyslipper (S)	819	205	377	820	387	1.5	2.1	8.455	A
3 - Columbia (E)	739	185	451	735	747	1.8	3.5	14.299	B
4 - Ladyslipper (N)	129	32	952	130	234	0.2	0.3	7.646	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	585	146	347	586	962	0.3	0.4	2.917	A
2 - Ladyslipper (S)	1009	252	459	1004	475	2.1	4.0	12.954	B
3 - Columbia (E)	911	228	550	886	912	3.5	11.2	34.374	D
4 - Ladyslipper (N)	161	40	1149	161	287	0.3	0.6	10.676	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS

1 - Columbia (W)	581	145	352	580	973	0.4	0.5	2.968	A
2 - Ladyslipper (S)	991	248	457	990	476	4.0	3.8	13.408	B
3 - Columbia (E)	913	228	540	910	907	11.2	12.1	47.845	E
4 - Ladyslipper (N)	156	39	1170	156	281	0.6	0.6	11.914	B

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	483	121	288	484	793	0.5	0.3	2.664	A
2 - Ladyslipper (S)	809	202	378	810	393	3.8	1.8	8.798	A
3 - Columbia (E)	746	187	444	751	744	12.1	3.3	24.409	C
4 - Ladyslipper (N)	127	32	954	126	241	0.6	0.4	8.970	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	402	100	238	402	657	0.3	0.3	2.435	A
2 - Ladyslipper (S)	667	167	318	666	323	1.8	1.3	6.722	A
3 - Columbia (E)	624	156	365	622	619	3.3	1.7	9.865	A
4 - Ladyslipper (N)	107	27	788	107	200	0.4	0.2	6.567	A

Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

Lanes: Main Results for each time segment

17:00 - 17:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	408	1897	0.215	407	0.0	0.3	2.414	A
	Exit	1	1		663			663	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	313	920	0.340	312	0.0	0.5	5.553	A
			2	1, 2, 4	369	920	0.401	367	0.0	0.8	6.080	A
	Exit	1	1	(1, 2, 3, 4)	684			682	0.0	0.2	0.582	A
			1		329			329	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	96	902	0.107	97	0.0	0.1	4.539	A
			2	1, 2, 3	526	902	0.584	524	0.0	1.2	7.321	A
	Exit	1	1	(1, 2, 3, 4)	625			623	0.0	0.4	1.644	A
			1		628			628	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	108	693	0.156	108	0.0	0.2	5.774	A
	Exit	1	1		195			195	0.0	0.0	0.000	A

17:15 - 17:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	476	1862	0.255	476	0.3	0.3	2.609	A
	Exit	1	1		794			794	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	374	899	0.416	374	0.5	0.7	6.483	A
			2	1, 2, 4	445	899	0.495	446	0.8	0.9	6.988	A
	Exit	1	1	(1, 2, 3, 4)	819			820	0.2	0.4	1.694	A
			1		387			387	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	113	873	0.129	112	0.1	0.2	4.965	A
			2	1, 2, 3	624	873	0.716	623	1.2	1.8	9.113	A
	Exit	1	1	(1, 2, 3, 4)	739			737	0.4	1.5	5.808	A
			1		747			747	0.0	0.0	0.000	A

4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	129	603	0.214	130	0.2	0.3	7.646	A
	Exit	1	1		234			234	0.0	0.0	0.000	A

17:30 - 17:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	585	1820	0.322	586	0.3	0.4	2.917	A
	Exit	1	1		962			962	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	460	870	0.529	459	0.7	1.0	7.517	A
			2	1, 2, 4	546	870	0.627	545	0.9	1.3	8.325	A
		2	1	(1, 2, 3, 4)	1009			1005	0.4	1.8	4.993	A
	Exit	1	1		475			475	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	139	837	0.166	139	0.2	0.2	5.288	A
			2	1, 2, 3	749	837	0.895	747	1.8	2.5	11.301	B
		2	1	(1, 2, 3, 4)	911			888	1.5	8.5	23.977	C
	Exit	1	1		912			912	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	161	489	0.330	161	0.3	0.6	10.676	B
	Exit	1	1		287			287	0.0	0.0	0.000	A

17:45 - 18:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	581	1816	0.320	580	0.4	0.5	2.968	A
	Exit	1	1		973			973	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	455	870	0.523	457	1.0	0.9	7.752	A
			2	1, 2, 4	535	870	0.614	534	1.3	1.4	8.333	A
		2	1	(1, 2, 3, 4)	991			989	1.8	1.5	5.345	A
	Exit	1	1		476			476	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	139	840	0.165	139	0.2	0.2	5.579	A
			2	1, 2, 3	771	840	0.918	772	2.5	2.5	11.675	B
		2	1	(1, 2, 3, 4)	913			910	8.5	9.4	37.110	E
	Exit	1	1		907			907	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	156	477	0.327	156	0.6	0.6	11.914	B
	Exit	1	1		281			281	0.0	0.0	0.000	A

18:00 - 18:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	483	1863	0.259	484	0.5	0.3	2.664	A
	Exit	1	1		793			793	0.0	0.0	0.000	A
2 - Ladyslipper (S)	Entry	1	1	3	371	899	0.413	371	0.9	0.7	6.464	A
			2	1, 2, 4	439	899	0.488	439	1.4	0.9	7.230	A
		2	1	(1, 2, 3, 4)	809			810	1.5	0.3	1.932	A
	Exit	1	1		393			393	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	115	875	0.132	115	0.2	0.2	5.058	A
			2	1, 2, 3	635	875	0.726	635	2.5	1.7	10.125	B
		2	1	(1, 2, 3, 4)	746			751	9.4	1.4	15.194	C
	Exit	1	1		744			744	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	127	602	0.212	126	0.6	0.4	8.970	A
	Exit	1	1		241			241	0.0	0.0	0.000	A

18:15 - 18:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Columbia (W)	Entry	1	2	1, 2, 3, 4	402	1898	0.212	402	0.3	0.3	2.435	A
	Exit	1	1		657			657	0.0	0.0	0.000	A

2 - Ladyslipper (S)	Entry	1	1	3	305	921	0.331	305	0.7	0.5	5.765	A
			2	1, 2, 4	362	921	0.393	361	0.9	0.6	6.141	A
		2	1	(1, 2, 3, 4)	667			667	0.3	0.2	0.760	A
	Exit	1	1		323			323	0.0	0.0	0.000	A
3 - Columbia (E)	Entry	1	1	4	100	903	0.110	100	0.2	0.1	4.606	A
			2	1, 2, 3	524	903	0.579	522	1.7	1.2	8.020	A
		2	1	(1, 2, 3, 4)	624			623	1.4	0.3	2.409	A
	Exit	1	1		619			619	0.0	0.0	0.000	A
4 - Ladyslipper (N)	Entry	1	1	1, 2, 3, 4	107	698	0.154	107	0.4	0.2	6.567	A
	Exit	1	1		200			200	0.0	0.0	0.000	A