

1357 Baseline Road Transportation Impact Assessment Strategy Report

January 17, 2020

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1.0 SCREENING

1.1 SUMMARY OF DEVELOPMENT

Municipal Address	1357 Baseline Road
Description of Location	North-east corner of the Baseline Road at Clyde Avenue intersection. The site is bound by Baseline Road to the south, Clyde Avenue to the west, and existing commercial to the north and east.
Land Use Classification	Residential, Commercial
Development Size (units)	Retirement units: 228 Apartment units: 174
Development Size (ft ²)	Commercial: 5,900ft ² GFA
Number of Accesses and Locations	1 full movements access to the proposed parking garage off existing Private Access 2, approximately 25m north of Baseline Road
Phase of Development	1 Phase
Buildout Year	Assumed build-out and occupancy by 2022

If available, please attach a sketch of the development or site plan to this form.

1.2 TRIP GENERATION TRIGGER

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size	Triggered
Single-family homes	40 units	×
Townhomes or apartments	90 units	\checkmark
Office	3,500 m ²	×
Industrial	5,000 m ²	×
Fast-food restaurant or coffee shop	100 m ²	×
Destination retail	1,000 m ²	×
Gas station or convenience market	75 m ²	×

* If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

If the proposed development size is greater than the sizes identified above, <u>the Trip Generation Trigger is</u> satisfied.



1.3 LOCATION TRIGGERS

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	~	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone? *	~	

*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

1.4 SAFETY TRIGGERS

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		×
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	~	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		×
Is the proposed driveway within auxiliary lanes of an intersection?		×
Does the proposed driveway make use of an existing median break that serves an existing site?		×
Is there a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		×
Does the development include a drive-thru facility?		×

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

1.5 SUMMARY

	Yes	No
Does the development satisfy the Trip Generation Trigger?	\checkmark	
Does the development satisfy the Location Trigger?	✓	
Does the development satisfy the Safety Trigger?	\checkmark	

If none of the triggers are satisfied, <u>the TIA Study is complete</u>. If one or more of the triggers is satisfied, <u>the TIA Study must continue into the next stage</u> (Screening and Scoping).



2.0 SCOPING

2.1 EXISTING AND PLANNED CONDITIONS

2.1.1 Proposed Development

Selection Groupe International Inc. is preparing a development application for Site Plan Control of a proposed development in the Civic Hospital / Central Park neighbourhood of Ottawa, Ontario. The proposed development is located at the north-east corner of the Baseline Road at Clyde Avenue intersection. The site is bound by Baseline Road to the south, Clyde Avenue to the west, and existing commercial to the north and east.

Figure 1 illustrates the location of the subject development. The subject site is currently zoned as Arterial Mainstreet (AM) Zone; the purpose of the AM Zone, according to the City of Ottawa Official Plan, is to:

- "accommodate a broad range of uses including retail, service commercial, offices, residential and institutional uses in mixed-use buildings or side by side in separate buildings in areas designated Arterial Mainstreet in the Official Plan; and
- Impose development standards that will promote intensification while ensuring that they are compatible with the surrounding uses."

The existing property is currently an empty lot that is the last portion to be developed of the overall 1357 Baseline Road property parcel. There are currently three existing shared private accesses to the 1357 Baseline Road property. Private Access 1 is a full movements signalized intersection and is located on Baseline Road approximately 270m east of Clyde Avenue. Private Access 2 is a right-in only intersection and is located on Baseline Road approximately 100m east of Clyde Avenue. Private Access 3 is a right-in / right-out only intersection and is located on Clyde Avenue approximately 100m north of Baseline Road. Access to the parking garage for the subject site will be located approximately 40m north of Baseline Road along Private Access 2 and will not have any turning restrictions. A total of 333 vehicle parking spaces and 156 bicycle parking spaces will be provided as part of the proposed development.

The proposed site will be constructed in one phase. Build-out and occupancy of the proposed site is anticipated to occur in 2022.

Table 1 outlines the proposed land uses assumed for the analysis which were obtained from the *Institute of Transportation (ITE) Trip Generation Manual 10th Edition*.

Figure 2 illustrates the proposed site plan.



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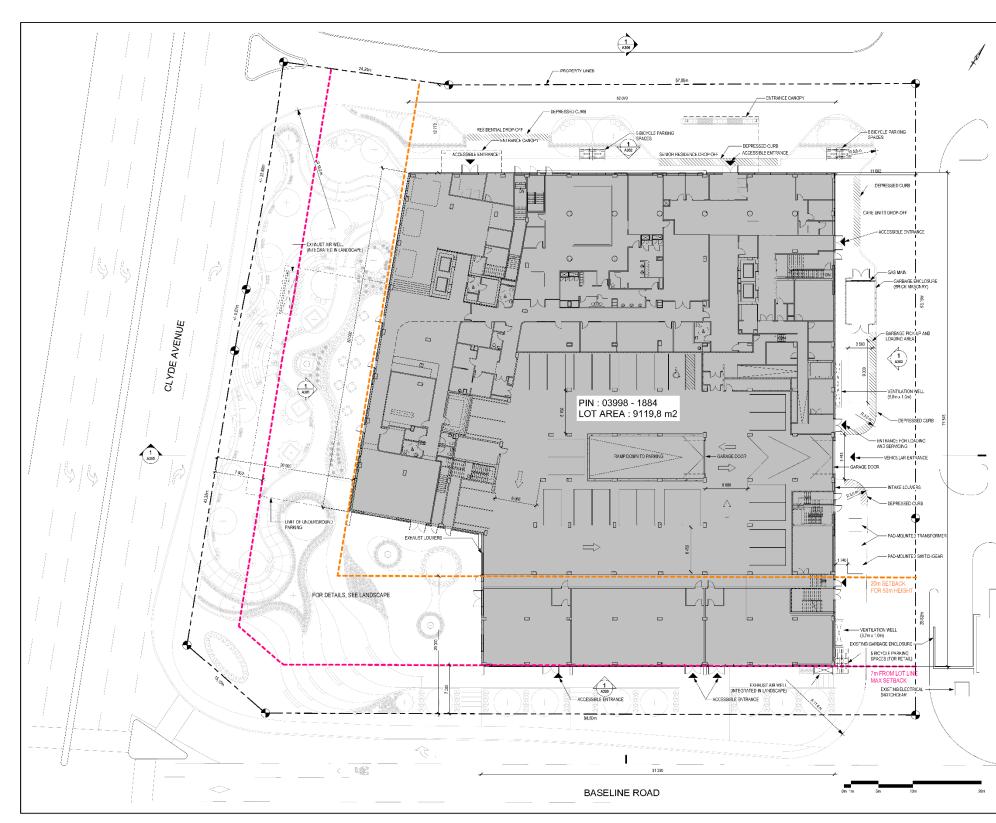
Figure 1 - Site Location

Table 1 - Proposed Land Uses / Land Use Codes

Land Use	Size	Land Use Code (LUC)
LUC 252	228 units	Senior Adult Housing – Attached
LUC 222	174 units	High-Rise Apartments
LUC 820	5,500 ft² GFA	Shopping Centre









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2.1.2 Existing Conditions

2.1.2.1 Roads and Traffic Control

The roadways under consideration in the study area are described as follows:

Baseline Road	Within the vicinity of the subject site, Baseline Road is a municipal five-lane divided arterial roadway. The posted speed limit along Baseline Road across the frontage of the subject site is 60 km/h. Sidewalks are provided along both sides of the road and an on-street bicycle lane is provided in the westbound direction. As outlined in the City's Official Plan, Baseline Road is designated as an Arterial Mainstreet across the frontage of the subject site.
Clyde Avenue	Within the vicinity of the subject site, Clyde Avenue is a municipal four-lane divided arterial roadway. The posted speed limit along Clyde Avenue across the frontage of the subject site is 60 km/h. Sidewalks are provided along both sides of Clyde

There are numerous commercial driveways along both Baseline Road and Clyde Avenue within 200m of the existing Private Accesses.

lanes are provided in all directions.

Avenue. The intersection with Baseline Road is signalized and auxiliary left turn

Figure 3 illustrates the existing lane configuration and traffic control.



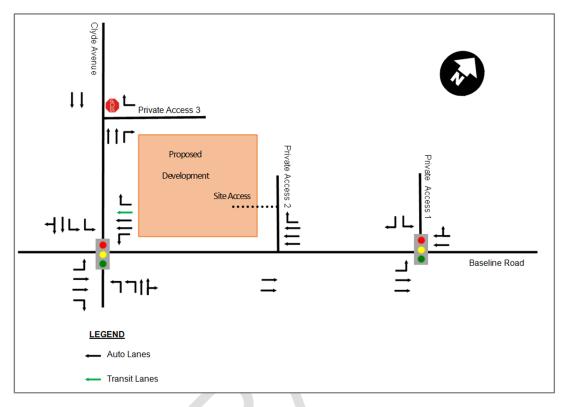


Figure 3 - Existing Lane Configuration and Traffic Control

2.1.2.2 Walking and Cycling

Within the vicinity of the subject site, sidewalks are provided on both sides of Baseline Road and Clyde Avenue. Across the frontage of the subject site, there is currently an on-street bicycle lane along Baseline Road in the westbound direction. Both Baseline Road and Clyde Avenue are designated as 'spine' cycling routes in the City of Ottawa's Ultimate Cycling Network.

2.1.2.3 Transit

Transit service is currently provided in the immediate vicinity of the proposed development via the following routes:

Route 50 Route 50 is a Local Route that runs between Tunney's Pasture Station and Lincoln Fields Station

Route 81 Route 81 is a Local Route that runs between Tunney's Pasture Station and Clyde Avenue

Route 88 Route 88 is a Frequent Route that runs between Hurdman Station and Terry Fox Station

There are transit stops located at the intersection of Baseline Road and Clyde Avenue that are serviced by all three transit routes.

Figure 4 illustrates nearby transit routes and bus stop locations.



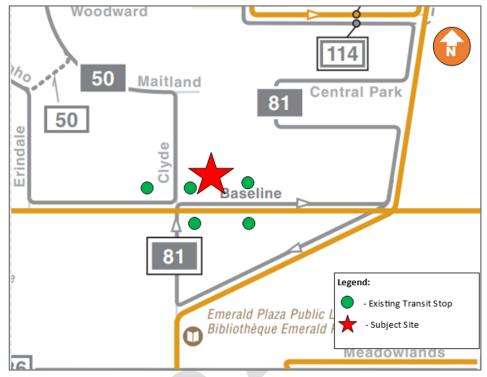


Figure 4 - Study Area Transit Routes and Stops

(Source: OC Transpo System Map, accessed November 7th, 2019)

2.1.2.4 Traffic Management Measures

No traffic management measures are currently provided near the subject site.

2.1.2.5 Traffic Volumes

Traffic volumes at the study area intersections were collected in the summer of 2019. **Figure 5** illustrates the 2019 traffic volumes at the four study area intersections.

Appendix A contains the traffic data and is provided for reference.



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Scoping

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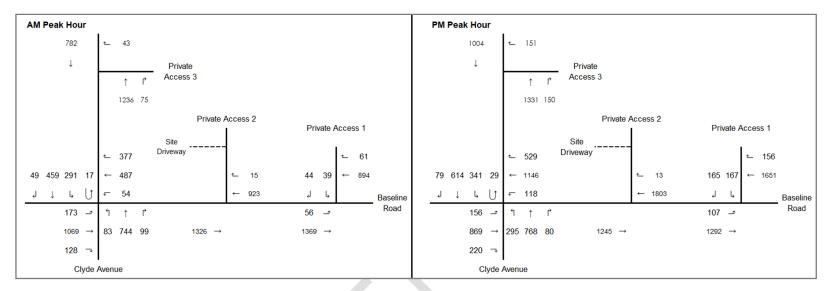


Figure 5 - 2019 Existing Traffic Volumes

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2.1.2.6 Collision History

Collision data was provided by the City of Ottawa for the period January 2014 to December 2018 in the vicinity of the subject site. The data was reviewed to determine if any intersections or road segments exhibited an identifiable collision pattern during the five (5) year period.

Table 2 includes the collision summary for each road segment and intersection in the study area.

		Baseline Road at Clyde Avenue	Baseline Road at Private Access 1	Baseline Road between Clyde and Private Access 1	Clyde Avenue between Baseline Road and Maitland Avenue
	Property Damage Only	104	19	16	10
Classification	Non-Fatal Injury	19	10	6	1
	Fatal	0	0	0	1
	Rear End	76	12	15	3
0 a 111 a 1 a 1 a 1 a 1 a 1 a 1 a 1 a 1	Angle / Turning	24	13	0	4
Collision Type	Sideswipe	20	0	5	3
	Single Motor Vehicle	3	4	2	2
	Other Motor Vehicle	112	24	19	9
	Ran off Road	0	0	1	0
Front	Cyclist	1	1	0	1
Event	Pedestrian	0	4	1	1
	Skidding	7	0	1	1
	Physical (curb, pole, barrier)	3	0	0	0

Table 2 - Collision Summary

Based on the collision data summarized in **Table 2** above, it was found that the Baseline Road at Clyde Avenue intersection experienced the highest number of collisions. A collision diagram was created (**Figure 6** below) for this intersection to visually depict the directions the vehicles were traveling at the time of the collisions to determine there are any discernable patterns.



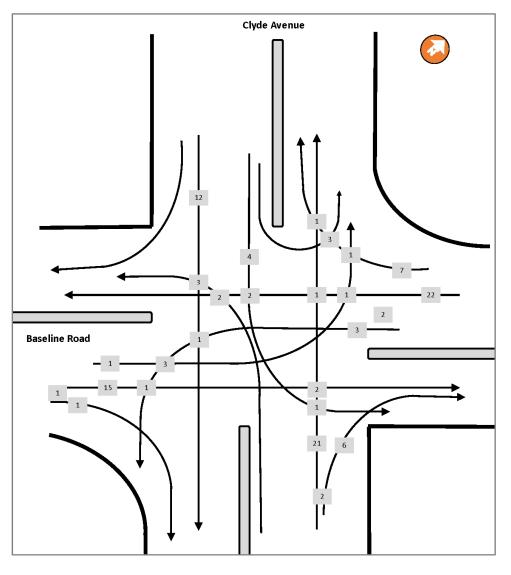


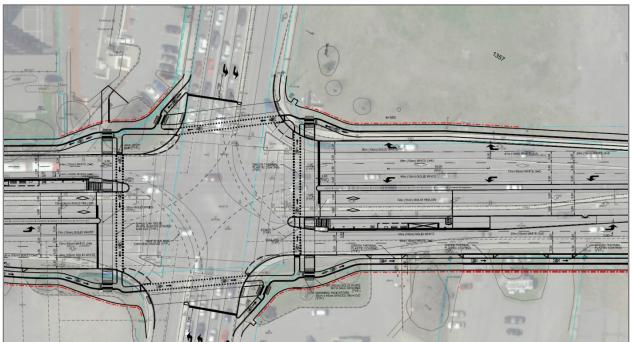
Figure 6 - Collisions at the Baseline Road at Clyde Avenue Intersection (2014 – 2018)

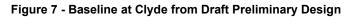
Based on the data depicted in **Figure 6** above, it was found the majority of the collisions at this intersection involved vehicles traveling in the westbound direction. There is a vertical crest along Baseline Road just east of Clyde Avenue which may contribute to the high frequency of collisions. Vehicles traveling in the westbound direction may not see other vehicles that are stopped at the Clyde Avenue intersection as they traverse over the crest of the hill. Their speeds may increase as they descend the hill at which point there may not be sufficient space to safely stop, thus leading to rear end collisions. The westbound right turn lane is currently configured as a regular channelized lane (i.e. instead of a smart channel), which reduces the angle of view for motorists as they attempt to check for oncoming vehicles. To add to the problem, the southbound left turn currently has two lanes with a permitted 'u-turn' sign, which is atypical for dual left turn lanes. This combination of design elements of the westbound right turn lane and permitted u-turn movements in the southbound left direction at this intersection likely contributes to the abnormal number of collisions involving the westbound right turn lane.



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Once the Baseline Road Bus Rapid Transit (BRT) in place, the cross-section of Baseline Road across the frontage of the subject site will change. Based on the draft preliminary design for the Baseline Road BRT, the Baseline Road at Clyde Avenue intersection will include a westbound left turn lane, a westbound through lane, a two westbound through lanes, and a westbound right turn lane (**Figure 7** below).





Source: Draft Preliminary Design. Obtained from the City of Ottawa on October 30, 2019.

2.1.3 Planned Conditions

2.1.3.1 Road Network Modifications

One transit improvement is scheduled to occur within the vicinity of the subject development, as outlined in the City of Ottawa's Transportation Master Plan and are summarized in **Table 3** below.

Table 3 - City of Ottawa Transportation Master Plan F	Projects
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Project	Description	TMP Phase	
Baseline / Heron /	At-grade Bus Rapid Transit connecting Baseline Station to Heron Station	Affordable Network (2031)	
Baseline / Heron / Walkley / St. Laurent	At-grade Bus Rapid Transit connecting Bayshore Station to St. Laurent Station	Network Concept (i.e. beyond 2031)	



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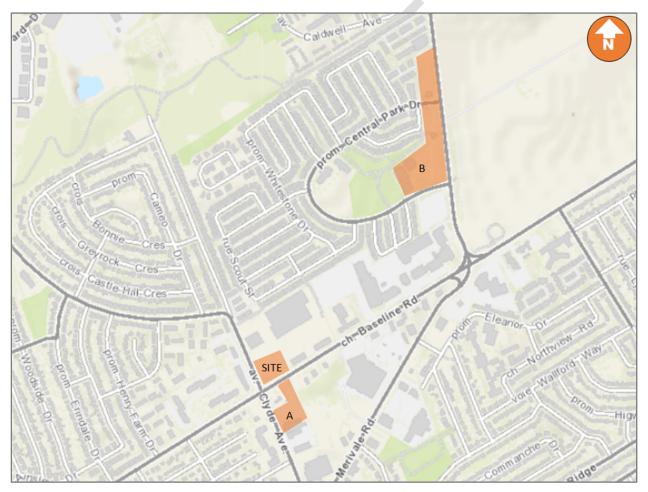
2.1.3.2 Future Background Developments

There are two developments scheduled to occur within the vicinity of the subject site, as illustrated in **Figure 8** and described in **Table 4**.

Key Plan Reference	Development	Location	Description	Build-Out Horizon
A	1375 Clyde Avenue	Southeast quadrant of the Baseline Road at Clyde Avenue intersection.	Self-storage facility, restaurant and expansion of existing retail building.	2020
В	300 Central Park	West of Merivale Road, between Central Park Drive and Caldwell Avenue	740 high-rise apartment units, 180,000 ft ² of retail, and 48,000 ft ² of office.	No definitive timeline outlined in the TIA. Assumed to be by 2022 for the subject TIA.

Table 4 - Background Developments





2.2 STUDY AREA AND TIME PERIODS

2.2.1 Study Area

The proposed study area is limited to the following intersections:

- 1. Baseline Road at Clyde Avenue;
- 2. Baseline Road at Private Access 1;
- 3. Baseline Road at Private Access 2; and
- 4. Clyde Avenue at Private Access 3.

2.2.2 Time Periods

The proposed scope of the transportation assessment includes the following analysis time periods:

- Weekday AM peak hour of roadway; and
- Weekday PM peak hour of roadway.

2.2.3 Horizon Years

The scope of the transportation assessment proposes the following horizon years:

- 2019 existing conditions;
- 2022 future background conditions;
- 2022 total future conditions (site build-out); and
- 2027 total future conditions (5 years beyond build-out).



2.3 EXEMPTIONS REVIEW

Table 5 summarizes the Exemptions Review table from the City of Ottawa's 2017 Transportation Impact Assessment

 Guidelines.

Module	Element	Exemption Considerations	Exempted?				
Design Review Component							
	4.1.2 Circulation and Access	Only required for site plans	No				
4.1 Development Design	4.1.3 New Street Networks	Only required for plans of subdivision	Yes				
	4.2.1 Parking Supply	Only required for site plans	No				
4.2 Parking	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Yes				
Network Impact Component							
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	No				
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Yes				
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Yes				
4.9 Intersection Design	All Elements	Not required if site generation trigger is not met.	No				

Table 5 - Exemptions Review



3.0 FORECASTING

The Step 3.0 – Forecasting section has been reviewed by the City of Ottawa and was subject to revision as per the comments prepared by the City, dated November 27th, 2019. The comment responses reflected are herein. Further detail can be found in **Appendix B**.

3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1 Trip Generation and Mode Shares

The *Institute of Transportation (ITE) Trip Generation Manual* (10th edition) was used to forecast auto trip generation for the proposed senior's residence and commercial land use. The *TRANS Trip Generation Residential Trip Rates Study Report* was used to forecast auto trip generation for the apartment land use. Land use codes 252 – Senior Adult Housing Attached (ITE), 820 – Shopping Centre (ITE), and 222 – High-Rise Apartments (TRANS) were thought to be the most representative of the proposed land uses. **Table 6** outlines the assumed land uses and the trip generation rates for each land use.

As per the City of Ottawa's 2017 TIA Guidelines, the auto trip generation rates of the apartment land use were converted to person trips using the auto mode shares outlined in Table 3.13 in the TRANS Trip Generation Residential Trip Rates Study Report. The auto trip generation rates of the senior's residence and commercial land use were converted to person trips using a conversion factor of 1.28. **Table 7** outlines development-generated person trips for each land use.

1110	Land Use	Size	Week	Weekday AM Peak Hour			Weekday PM Peak Hour		
LUC	Land Use	Size	In	Out	Rate	In	Out	Total	
252	Senior Adult Housing Attached	228 units	35%	65%	0.20	55%	45%	0.26	
820	Shopping Centre	5,500 ft ² GFA	62%	38%	0.94	48%	52%	3.81	
222	High-Rise Apartments	174 units	24%	76%	0.31	61%	39%	0.36	

Table 6 - Land Uses and Trip Generation Rates

Table 7 - Person Trips Generated by Land Use

LUC	Land Use	Trip Conversion	We	ekday AM F	Peak Hour	Weekday PM Peak Hour		
LUC			In	Out	Total	In	Out	Total
		Auto Trips	16	29	45	32	27	59
252	Senior Adult Housing Attached	Conversion Factor	1.28	1.28	1.28	1.28	1.28	1.28
	Allached	Person Trips	20	37	58	41	35	76
		Auto Trips	4	2	6	11	11	22
820	Shopping Centre	Conversion Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	5	3	8	14	14	28
		Auto Trips	13	41	54	38	25	63
222	High-Rise Apartments	Auto Mode Share		37%		40%		
		Person Trips	27	86	114	73	45	118
	Total	Auto Trips	30	63	93	72	56	128
	Total	Person Trips	52	126	180	128	94	222



To reflect local travel characteristics, the person trips were assigned to the four primary modal shares (i.e. auto, passenger, transit, and active moves) according to the TRANS Committee's 2011 Origin-Destination (O-D) Survey for the Merivale District. The subject site is located within the Baseline Road Bus Rapid Transit Corridor, however, based on direction from the City of Ottawa, the BRT is planned to be constructed by 2023, which is one year after the build-out of the subject site. As such, the characteristics from the Merivale District were used to develop the mode shares for the subject development for the 2022 build-out horizon.

Table 8 outlines the anticipated trip generation potential of the proposed development by travel mode based on assumed mode share targets for the 2022 horizon year.

LUC	Land Use	Trip Conversion		Weekd	Weekday AM Peak Hour			Weekday PM Peak Hour		
LUC	Lanu USe			In	Out	Total	In	Out	Total	
		Auto	50%	10	19	29	21	18	38	
		Passenger	15%	3	6	9	6	5	11	
252	Senior Adult Housing Attached	Walk	10%	2	4	6	4	4	8	
	Alldonou	Bike	5%	1	2	3	2	2	4	
		Transit	20%	4	7	12	8	7	15	
		Auto	50%	3	2	4	7	7	14	
		Passenger	15%	1	0	1	2	2	4	
820	Shopping Centre	Walk	10%	1	0	1	1	1	3	
		Bike	5%	0	0	0	1	1	1	
		Transit	20%	1	1	2	3	3	6	
		Auto	50%	14	43	57	37	23	59	
		Passenger	15%	4	13	17	11	7	18	
222	High-Rise Apartments	Walk	10%	3	9	11	7	5	12	
	Apartments	Bike	5%	1	4	6	4	2	6	
		Transit	20%	5	17	23	15	9	24	
		Aut	o Trips	27	64	90	65	48	111	
		Pas	senger	8	19	27	19	14	33	
	Total		Walk	6	13	18	12	10	23	
			Bike	2	6	9	7	5	11	
			Transit	10	25	37	26	19	45	

Table 8 - Trips Generated by Travel Mode – Without Baseline BRT

Once the Baseline Road BRT Is operational, the transit modal share for the subject development will increase and thus the auto modal share will decrease. Therefore, the number of auto trips that the proposed development will generate will decrease once the Baseline Road BRT is constructed. A second trip generation was developed to reflect the revised modal shares once the Baseline BRT is open, as shown in **Table 9** below. These modal shares were agreed upon by the City prior to the submission of the Step 3 TIA.



LUC	Land Use	Trip Conversion		Weeko	Weekday AM Peak Hour			Weekday PM Peak Hour		
LUC	Lanu USe	The Conver	The conversion		Out	Total	In	Out	Total	
		Auto	30%	6	11	17	12	11	23	
	о ·	Passenger	15%	3	6	9	6	5	11	
252	Senior Adult Housing Attached	Walk	10%	2	4	6	4	4	8	
	Alldoned	Bike	5%	1	2	3	2	2	4	
		Transit	40%	8	15	23	16	14	30	
		Auto	30%	2	1	2	4	4	8	
		Passenger	15%	1	0	1	2	2	4	
820	Shopping Centre	Walk	10%	1	0	1	1	1	3	
		Bike	5%	0	0	0	1	1	1	
		Transit	40%	2	1	3	6	6	11	
		Auto	30%	8	26	34	22	14	35	
		Passenger	15%	4	13	17	11	7	18	
222	High-Rise Apartments	Walk	10%	3	9	11	7	5	12	
	Apartments	Bike	5%	1	4	6	4	2	6	
		Transit	40%	11	34	46	29	18	47	
		Aut	to Trips	16	38	53	38	29	66	
		Pas	senger	8	19	27	19	14	33	
	Total		Walk	6	13	18	12	10	23	
			Bike	2	6	9	7	5	11	
			Transit	21	50	72	51	38	88	

Table 9 - Trips Generated by Travel Mode – With Baseline BRT

3.1.2 Trip Distribution

The distribution of traffic to / from the proposed development was determined through examination of the Trans Committee's 2011 Origin-Destination (O-D) Survey for the Merivale District. **Table 10** provides a summary of the estimated distribution for the traffic generated by the proposed development.

Table 10 - Traffic Distribution Assumptions

				Via (to / from)	
Cardinal Direc	ction	Clyde Avenue	Clyde Avenue	Baseline Road	Baseline Road
		(North)	(South)	(West)	(East)
North	15%	15%			
East	40%	32%			8%
South	5%		5%		
West	10%	5%		5%	
Internal (Merivale)	30%		24%		6%
Total	100%	52%	29%	5%	14%

3.1.3 Trip Assignment

Site generated trips were assigned to the study area road network based on the trip distribution assumptions outlined in **Table 10** above. **Figure 9** outlines the site assignment assumptions. It should be noted that the red value represent the outbound trips and the black values represent the inbound trips.



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Forecasting January 17, 2020

Figure 10 illustrates the site generated trips for the proposed site during the AM and PM peak hours without the Baseline Road BRT in place.

Figure 11 illustrates the site generated trips for the proposed site during the AM and PM peak hours with the Baseline Road BRT in place.

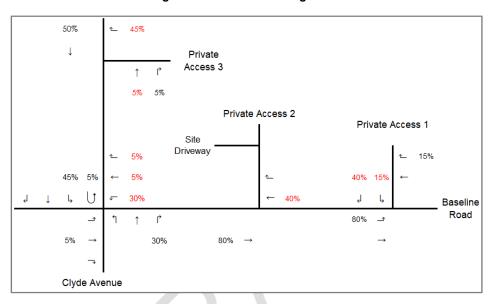


Figure 9 - Site Traffic Assignment



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Forecasting

January 17, 2020

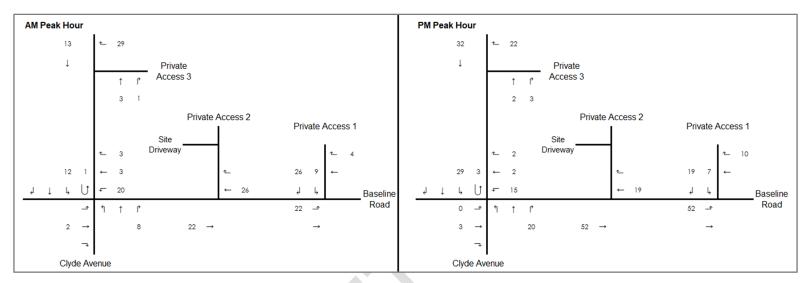
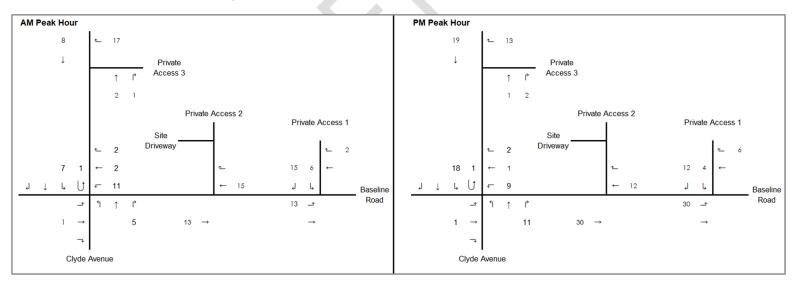


Figure 10 - Site Generated Traffic Volumes – Without Baseline BRT

Figure 11 - Site Generated Traffic Volumes - With Baseline BRT



3.2 BACKGROUND NETWORK TRAVEL DEMAND

3.2.1 Transportation Network Plans

As outlined in **Table 3** in **section 2.1.3.1**, the only road infrastructure project that is included in the TMP within the vicinity of the subject site is the Baseline Road Bus Rapid Transit. As per direction from the City of Ottawa, it is assumed that this BRT will be constructed by 2023.

3.2.2 Background Growth

The City of Ottawa provided **Figure 12** below, which outlines the average annual growth rates based on trend lines. As illustrated in **Figure 12**, the average annual growth in the vicinity of the subject site is in the range of 0.2% - 2.0%. To be conservative, a 2% annual background growth rate was used in the subject analysis until the BRT is constructed, which is assumed to be by 2023.

As outlined in the *Baseline Road Bus Rapid Transit Planning and Environmental Assessment Study* (July 2017), the BRT is anticipated to reduce the traffic volumes on Baseline Road by approximately 10% when comparing 2010 volumes to 2031 projected volumes. Considering that the BRT will be constructed by 2023, this 10% reduction in traffic equates to roughly 1.25% reduction per annum between 2023 and the 2031.

Based on the above, a 2% growth rate was used in the subject analysis between 2019 and 2023 (i.e. until the Baseline BRT is constructed). Between 2023 and 2027 (i.e. the 5-year horizon for the subject development), a -1.25% growth rate was used to account for the shift in modal share from automobile to transit.

As part of the Step 1 and 2 Report, the City of Ottawa agreed that the future volumes on Baseline Road should be capped at approximately 1,600 - 1,800 vehicles per hour (vph) per direction, which is consistent with the existing capacity of the two-lane section of Baseline Road. Using the above growth projections, the 2027 ultimate volumes along Baseline Road at anticipated to be in accordance with the 1,600 - 1,800 vph capacity.

3.2.3 Other Developments

In addition to the background growth rate outlined in **Section 3.2.2** above, there are two background developments that are assumed to be built by the 2027 ultimate horizon, per **Table 4**. The site trips were obtained from their respective traffic studies and explicitly added to the transportation network as background traffic.



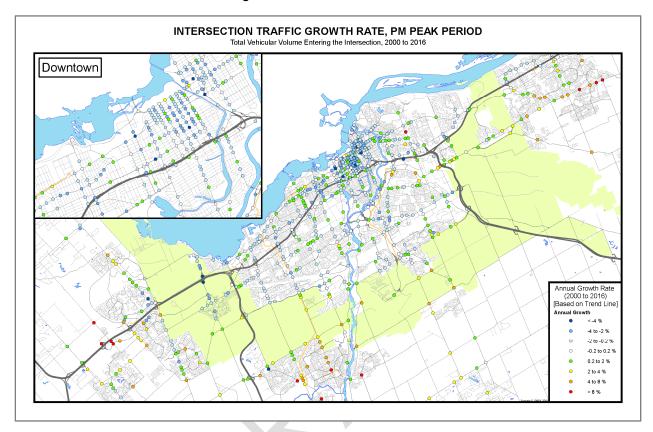


Figure 12 – Annual Growth Rates

3.3 DEMAND RATIONALIZATION

Based on direction from the City of Ottawa, the realistic demands along Baseline Road once the BRT is operational will be in the range of 1,600 - 1,800 vehicles per hour per direction. Based on the aforementioned sections, the volumes along Baseline Road were forecasted to remain within this range. The City has provided direction that these volumes should not be further reduced to account for demand rationalization. This methodology was applied moving forward, even if the operations at the intersections are found to be poor.



4.0 STRATEGY

4.1 DEVELOPMENT DESIGN

4.1.1 Design for Sustainable Modes

Bicycle facilities: A total of 156 bicycle parking spaces are provided for the proposed development. Eighteen (18) spaces are provided at the northern and eastern sides of the building while the rest is provided underground on parking level P1.

Pedestrian facilities: Pedestrian connections are included on the site plan which will connect the proposed building to the existing sidewalks along Baseline Road and Clyde Avenue.

Parking areas: A total of 333 vehicle parking spaces are provided in addition to one (1) loading space. The 333 parking spaces consist of 287 regular vehicle parking spaces, 37 visitor parking spaces, and 9 accessible parking spaces.

The accessible parking spaces are dispersed across all parking levels. The loading space is located at the eastern side of the building, along Private Access 2.

Transit facilities: Transit stops for OC Transpo routes 50, 81, and 88 are currently serviced by stops located at the vicinity of the intersection of Baseline Road and Clyde Avenue Drive. There are sidewalks along both sides of Baseline Road and Clyde Avenue as well as pedestrian crosswalks at the intersection for pedestrians to access these transit stops.

4.1.2 Circulation and Access

One site access (Site Driveway) is proposed approximately 40m north of Baseline Road along the Private Access 2. The Site Driveway connects the developments ground level and underground parking to Private Access 2. The site access will be full movements access with no turning restrictions and will be stop controlled along the access's approach. It should be noted that Private Access 2 intersection at Baseline Road is a Right-In (RI) only access, which means that vehicles existing the Site Driveway will have to use Private Access 1 and Private Access 3 to access the public roadway network. Vehicles heading towards the development's parking structure can utilize Private Accesses 1, 2, and 3 depending on their direction of travel. **Figure 3** shows a schematic of the study area's access as well as private and public roadways.

Within the vicinity of the subject site, pedestrian access is facilitated through the existing sidewalks along Baseline Road and Clyde Avenue. Sidewalk connections are proposed between at all sides of the development. Boulevards are proposed at the southern and western sides of the building and will connect to sidewalks along Baseline Road and Clyde Avenue, respectively.

4.1.3 New Street Networks

Not applicable; exempted during screening and scoping.



4.2 PARKING

4.2.1 Parking Supply

Auto Parking - As per Schedule 1A of the city's zoning by-law No. 2008-250, the development is located in Area B (Outer Urban / Inner Suburban). However, Area X (Inner Urban) rates apply due to the proximity of the development to the future Bus Rapid Transit (BRT) stations as identified in Schedule 2A. Based Sections 101 and 102, the minimum vehicle parking space requirement is 0.25 per rooming unit for the residential component and 1.25 vehicle parking spaces per 100m² for the retail component. No off-street parking spaces are required for the first 12 residential units. The minimum requirement for visitor parking spaces is 0.1 vehicle parking space per unit.

Based on the proposed land uses, a minimum of 101 vehicle parking spaces are required for the residential component, 7 vehicle parking spaces are required for the retail component, and 37 vehicle parking spaces are required for visitors.

Within area B, the maximum total provided spaces shall not exceed 703 spaces, of which the maximum allowed visitor's parking spaces is 60.

The proposed site plan indicates there will be a total of 333 parking spaces provided, of which 20 vehicle parking spaces are allocated for retail uses, 267 vehicle parking spaces for the residential component, and 37 vehicle parking spaces are dedicated for visitors. In addition, one space at the eastern side of the building is allocated for loading and offloading activities. The proposed parking spaces fall within the City of Ottawa minimum and maximum allowed ranges as summarized in **Table 11**.

#	Land Use	Min. Requirement (# Spaces)	Max. Requirement (# Spaces)	Provided (# Spaces)
1	Retail	7	20	20
2	Residential	101	703	267
3	Visitors	37	60	37
4	Loading	NA	NA	1*
5	Accessible	9	NA	9
5	Total	154	783	333

Table 11 - Summary of Development Parking Spaces

* Excluded from the total parking spaces calculations

Bicycle Parking – As per City of Ottawa Zoning By-law 2008-250 (Section 111), the minimum bicycle parking rate of 0.25 bicycle parking space per residential unit and 1 bicycle parking space per 250m² of retail (gross floor area) are required.

Based on the proposed land uses, a minimum of 101 bicycle spaces are required for the residential component and 2 bicycle spaces are required for the retail component. The proposed site plan indicates there will be a total of 156 bicycle spaces provided, where 150 is allocated for the residential component and 6 for the retail component. The provided bicycle parking spaces meets the minimum requirements.



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4.2.2 Spillover Parking

Not applicable; exempted during screening and scoping.

4.3 BOUNDARY STREET DESIGN

4.3.1 Design Concept

The subject development is located in an area that will experience a substantial amount of change over the next few years in terms of the transportation environment. The Baseline Road BRT is scheduled to be implemented by 2023, which will have a large impact on the transportation network in the surrounding area. Two separate MMLOS analyses were completed; one for the existing conditions (i.e. before the Baseline Road BRT) and one for the ultimate conditions (i.e. after the Baseline Road BRT).

Appendix C contains the detailed MMLOS analysis and is provided for reference.

4.3.1.1 Existing Conditions (i.e. before the Baseline Road BRT)

As outlined in the City of Ottawa's *Official Plan* Schedule B, both Baseline Road and Clyde Avenue fall within the 'General Urban Area' designation. In addition, the following information was found:

- Baseline Road and Clyde Avenue are both classified as Arterial Roadways;
- Baseline Road and Clyde Avenue are both classified as Cycling Spine Routes;
- Baseline Road is classified as a Cross-Town Bikeway;
- Baseline Road is classified as a Transit Corridor; and
- Baseline Road is classified as a Full Loads truck route.

Based on the aforementioned information, the Pedestrian Level of Service (PLOS) target for both Baseline Road and Clyde Avenue is C. The Bicycle Level of Service (BLOS) target is B for Baseline Road and C for Clyde Avenue. The Transit Level of Service (TLOS) target is B for Baseline Road and D for Clyde Avenue. The Truck Level of Service (TkLOS) target is D for Baseline Road and E for Clyde Avenue.

Figure 13 illustrates the MMLOS targets and results for both roadway segments under existing conditions.



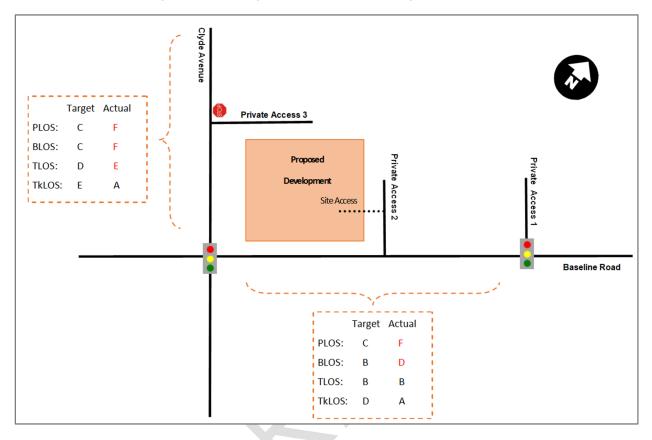


Figure 13 – Existing Conditions – MMLOS Targets and Results

Baseline Road

The PLOS target of C along Baseline Road, across the frontage of the subject development, is not currently being met due to the width of the existing sidewalk, lack of boulevards, volume of traffic, and posted speed limit. To improve the PLOS and meet the target of C, the sidewalk width would need to be increased to 2.0m, a 2.0m boulevard would need to be implemented, and the posted speed limit would need to be reduced to 50 km/h. As Baseline Road is an arterial roadway, reducing the posted speed limit is likely not a viable option. The ultimate design for the Baseline Road BRT includes modifications to the pedestrian facilities, which will be further explored in the MMLOS analysis for the ultimate conditions.

The BLOS target of B along Baseline Road, across the frontage of the subject development, is not currently being met due to the number of vehicle lanes, as well as the posted speed limit. Due to the number of lanes along Baseline Road, the only feasible option to achieve the BLOS target would be to implement a physically separated cycling facility (i.e. cycle track). The ultimate design for the Baseline Road BRT includes cycle tracks along Baseline Road, which will be further explored in the MMLOS analysis for the ultimate conditions.

The TLOS target of B along Baseline Road, across the frontage of the subject development, is currently being met due to the limited parking / driveway friction along the corridor.



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The TkLOS target of D along Baseline Road, across the frontage of the subject development, is currently being met due to the number and width of the travel lanes.

Clyde Avenue

The PLOS target of C along Clyde Avenue, across the frontage of the subject development, is not currently being met due to the width of the existing sidewalk, lack of boulevards, volume of traffic, and posted speed limit. To improve the PLOS and meet the target of C, the sidewalk width would need to be increased to 2.0m, a 2.0m boulevard would need to be implemented, and the posted speed limit would need to be reduced to 50 km/h. As Clyde Avenue is an arterial roadway, reducing the posted speed limit is likely not a viable option.

The BLOS target of C along Clyde Avenue, across the frontage of the subject development, is not currently being met due to the lack of cycling facilities, the number of lanes, as well as the posted speed limit. Due to the number of lanes along Clyde Avenue, the only feasible option to achieve the BLOS target would be to implement a physically separated cycling facility (i.e. cycle track), however, this would have financial and property constraints.

The TLOS target of D along Clyde Avenue, across the frontage of the subject development, is currently being met due to the limited parking / driveway friction along the corridor.

The TkLOS target of E along Clyde Avenue, across the frontage of the subject development, is currently being met due to the number and width of the travel lanes.

4.3.1.2 Ultimate Conditions (i.e. after the Baseline Road BRT)

By the year 2023, the city is expecting to implement the BRT corridor upgrades with dedicated transitway ROW and transit priority measures along Baseline Road. In terms of the MMLOS targets, both roadway segments will fall under the 'within 600m of a rapid transit station' Policy Area once the Baseline BRT is implemented and the proposed transit station at the Baseline Road at Clyde Avenue intersection is built. The geometric elements of the ultimate Baseline Road cross-section were taken from **Figure 7**, included in **Section 2.1.2.6**.

The Pedestrian Level of Service (PLOS) target for both Baseline Road and Clyde Avenue will be A. The Bicycle Level of Service (BLOS) target will be A for Baseline Road and C for Clyde Avenue. The Transit Level of Service (TLOS) target will be A for Baseline Road and D for Clyde Avenue. The Truck Level of Service (TkLOS) targets will remain unchanged at D for Baseline Road and E for Clyde Avenue.

Figure 14 illustrates the MMLOS targets and results for both roadway segments under ultimate conditions.

Baseline Road

The Baseline Road BRT design includes a boulevard and cycle track separating the sidewalk and the vehicle travel lanes. This improves the PLOS in the ultimate conditions, however, with the implementation of the BRT corridor, the PLOS target will increase to an A. Despite the increased width between the pedestrians and vehicles, the PLOS target of A is not anticipated to be met in the ultimate conditions. Reducing the speed limit to 30 km/h or reducing the traffic volumes to less than 3000 AADT would allow the PLOS target of A to be met, however, as Baseline Road is an arterial road, these are not feasible solutions.



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With the implementation of the BRT corridor, the BLOS target will increase to an A along Baseline Road. The Baseline Road BRT design includes separated cycling facilities along both sides of Baseline Road, which will allow the BLOS target of A to be met in the ultimate conditions.

With the rapid transit corridor in place, the TLOS target along Baseline Road will increase to an A, which is anticipated to be met in the ultimate conditions.

The TkLOS target of D along Baseline Road, across the frontage of the subject development, is anticipated to continue to be met due to the number and width of the travel lanes.

Clyde Avenue

The PLOS target of A along Clyde Avenue, across the frontage of the subject development, is anticipated to continue to not be met due to the width of the existing sidewalk, lack of boulevards, volume of traffic, and posted speed limit. To improve the PLOS and meet the target of A, the sidewalk width would need to be increased to 2.0m, a 2.0m boulevard would need to be implemented, the posted speed limit would need to be reduced to 50 km/h, and the volume of traffic would need to be reduced to less than 3000 AADT. As Clyde Avenue is an arterial roadway, reducing the posted speed limit and traffic volumes are likely not viable options.

The BLOS target of C along Clyde Avenue, across the frontage of the subject development, is anticipated to continue to not be met due to the lack of cycling facilities, the number of lanes, as well as the posted speed limit. Due to the number of lanes along Clyde Avenue, the only feasible option to achieve the BLOS target would be to implement a physically separated cycling facility (i.e. cycle track), however, this would have financial and property constraints.

The TLOS target of D along Clyde Avenue, across the frontage of the subject development, is anticipated to continue to not be met due to the limited parking / driveway friction along the corridor.

The TkLOS target of E along Clyde Avenue, across the frontage of the subject development, is anticipated to continue to be met due to the number and width of the travel lanes.



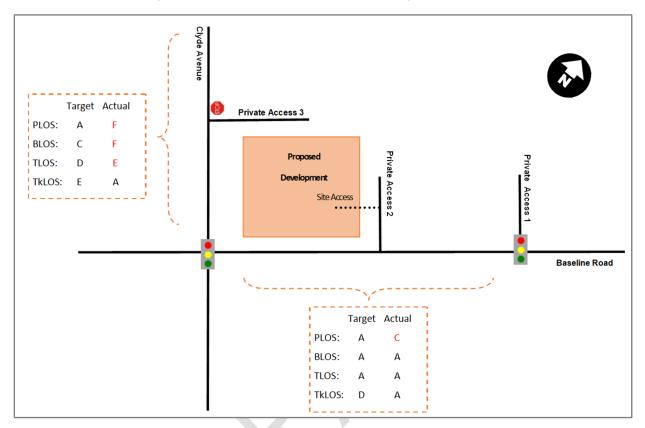


Figure 14 – Ultimate Conditions – MMLOS Targets and Results

4.4 ACCESS INTERSECTIONS DESIGN

4.4.1 Location and Design of Access

The parking garage access for the subject site will be located approximately 45m north of Baseline Road along Private Access 2 and will not have any turning restrictions. The garage entrance will facilitate both ingress and egress and will be approximately 6.5m wide with a variable grade of approximately 6% - 16%.

4.4.2 Intersection Control

The site access is a low-volume driveway located on a Private Shared Access (Private Access 2) and is anticipated to be a One Way Stop Control (OWSC) access.

4.4.3 Intersection Design

Section 4.9.2 contains the detailed intersection and MMLOS analyses under all horizons.



4.5 TRANSPORTATION DEMAND MANAGEMENT

4.5.1 Context for TDM

The proposed development is currently owned by Selection Groupe International Inc. The site consists of senior residential units, apartment units, and three retail units and is expected to be open by the year 2022. The tenants for the retail component are not known yet. As outlined in **Section 3.1.1**, the Traffic Assessment Zone (TAZ) in which the subject development resides calls for an auto mode share of 50% and a transit share of 20%. However, after the implementation of the BRT corridor improvements along Baseline Road, the auto modal share is expected to decrease to 30% while the transit modal share is expected to increase to 40%. These transit modal shares were agreed upon by the City during the preparation of the Step 3 – Forecasting Report. It is expected that BRT service will have a 5-6 minute headway during the AM peak and a 7-8 minute headway during the PM peak, which will support these transit modal share assumptions.

To support the future bicycle modal share of 5%, the development is planned to provide a total of 156 bicycle parking spaces. To support the future walking modal share of 10%, the development is planned to include ample sidewalk connections from the proposed building to the existing pedestrian network along both Clyde Avenue and Baseline Road.

As the proposed development is not anticipated to generate a substantial amount of vehicle traffic as compared to the traffic that is already on the boundary road network, the auto modal shares are not anticipated to be an issue.

4.5.2 Need and Opportunity

In order to support the transit and active modal share targets outlined in **Table 8**, cycling and transit modes will need to be supported. This includes the provision of bicycle parking as well as ensuring convenient pedestrian connections are provided to sidewalk facilities leading to bus stop locations. These aforementioned facilities have been included on the site plan to support active modes.

4.5.3 TDM Program

The City of Ottawa TDM Checklists were used to determine what TDM measures could be implemented based on the available information. Based on the checklists, the following TDM measures have been incorporated into the site plan:

- Locate building close to the street, and do not locate parking areas between the street and building entrances;
- Locate building entrances in order to minimize walking distances to sidewalks and transit stops;
- Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort;
- Provide convenient, direct access to stations or major stops along rapid transit routes;
- Provide safe, direct, and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major entrances, providing walkways from public streets to major building entrances;



- Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas;
- Make sidewalks and open space as easily accessible through features such as gradual grade transition and depressed curbs at street corners;
- Include adequately spaced inter-block cycling and pedestrian connections to facilitate travel by active transportation;
- Provide safe, direct, and attractive walking routes from building entrances to nearby transit stops;
- Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible
- Provide the number of bicycle parking spaces as per the City of Ottawa By-Law;
- Ensure that bicycle parking spaces and access aisles meet minimum dimensions;
- Where more than 50 bicycle parking spaces are provided, locate at least 25% of spaces within the building;
- Provide a designated area for carpool drivers without using fire lanes or other no-stopping zones;
- Do not provide more parking than permitted by zoning, nor less than required by zoning; and
- Cyclists have the option of using the elevators to access the underground bicycle parking instead of relying on the vehicle ramp.

The TDM checklists are contained in **Appendix D**.

4.6 NEIGHBOURHOOD TRAFFIC MANAGEMENT

Not applicable; exempted during screening and scoping.

4.7 TRANSIT

4.7.1 Route Capacity

An assumed transit modal share of 20% was adopted for all land uses contained within the proposed development prior to the implementation of the 2023 BRT corridor upgrades along Baseline Road. The 2022 interim forecasted transit trips for the proposed development is 37 and 45 total transit trips during the AM and PM peak hours, respectively.

There are three OC Transpo transit routes within approximately 230m walking distance of the proposed site; routes 50, 81, and 88. Route 50 is a local route that runs Monday to Saturday during peak periods between Lincoln Fields and Tunney's Pasture Station with 30-minute headways. Route 81 is a local route that runs daily with 20- to 30-minute headways between Clyde and Tunney's Pasture Station. Route 88 is a frequent route that runs daily with headways reaching 6-10 minutes during the peak hours between Hurdman and Terry Fox stations.



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Standard and articulated buses have seated capacities of 40 and 70 people; respectively. Based on the current transit routes in the vicinity of the subject site, the hourly transit capacity is estimated between 400 and 700 people during the weekday AM and PM peak hours. The proposed development is therefore anticipated to occupy a maximum of 5% to 11% of transit capacity prior to the implementation of Baseline Road's BRT corridor upgrades.

Once the BRT upgrades along Baseline Road are implemented, the subject development's transit trips are expected to increase to 72 and 88 trips during the AM and PM peak hours, respectively. Based on the *Baseline Road Bus Rapid Transit Corridor Transit and Traffic Operations Assessment (2016)* (which is Appendix B of the *Baseline Road Bus Rapid Transit Planning and Environmental Assessment Study)*, the anticipated headways of the BRT corridor are approximately 5 minutes during the AM peak hour and approximately 7 minutes during PM peak hours. It has been assumed that once the BRT is operational, transit route 50 will continue to run with the same schedule as existing, whereas, transit routes 81 and 88 will operate under the BRT headways, as previously described.

The anticipated capacity of the BRT corridor is 480 to 840 people during the weekday AM peak hour and 340 to 600 people during the weekday PM peak. The anticipated capacity of transit route 50 is expected to remain at 80 to 140 people during both the weekday AM and PM peak hours. The total transit capacity in the study area is therefore anticipated to be 560 to 920 people during the weekday AM peak hour and 480 to 745 people during the weekday PM peak hour. The proposed development is therefore anticipated to occupy between 8% to 13% of the transit capacity during the weekday AM peak hour and 12% to 18% during the weekday PM peak hour once the Baseline Road BRT is operational.

4.7.2 Transit Priority

Prior to the implementation of the BRT corridor upgrades along Baseline Road, the proposed development will utilize the existing transit stops abutting the subject site and is therefore not expected to significantly impact the transit travel times of the existing routes or trigger the need for transit priority measures. Currently, localized transit priority measures are implemented at the intersection of Baseline Road at Clyde Avenue and consist of bus queue jumps along the eastbound and westbound approaches of the intersection. It is planned that the east-west transit service will run at a dedicated BRT Transitway with TSP measures implemented at intersections during the 2023 horizon year. Based on direction from the City of Ottawa, it is anticipated that TSP operations will be implemented along Baseline Road at signalized intersections. Therefore, a Bus TSP phasing with the ability to truncate conflicting phases and extend parallel phases that can run with the BRT was assumed at the intersections of Baseline Road with Clyde Avenue and Private Access 1. The method of TSP detection and anticipated operations are not known at this time and could affect the Measures of Effectiveness (MOEs) at the intersection (i.e. delays and queues for transit and general traffic). For the purpose of the ultimate conditions' assessment, it has been assumed that the TSP can truncate conflicting phases left turn phases by 4 to 6 seconds and extend parallel non-conflicting phases (eastbound and westbound through movements) by the same time during the AM peak hour. During the PM peak hour, it was assumed that the TSP is capable of truncating conflicting left turns by up to two seconds and is able to extend parallel phases by two seconds at the intersection of Baseline Road / Clyde Avenue. At the intersection of Baseline Road / Private Access 1, the TSP was assumed to be capable of truncating the westbound left turn phase by up to 8 seconds while the same duration was assumed to be used as parallel phases' extension when transit is detected prior to the end of the east-west phases green time.



It should be noted that for TSP phase extension operations, typically transit vehicles are detected in advance of the approach's stop bar. Upon bus detection, the controller decides whether to extend the parallel phase, if already operating, based on the travel time needed to reach and clear the intersection <u>or</u> decides to terminate the parallel phase early then operates all upcoming conflicting phases at specified minimum splits in order to serve buses as early as possible. Factors influencing the controller's decision to extend or truncate include the travel time and travel time reliability from the point of detection (i.e. slack time) as well as the method of TSP activation (loop detection versus wireless).

4.8 REVIEW OF NETWORK CONCEPT

Not applicable; exempted during screening and scoping.

4.9 INTERSECTION DESIGN

4.9.1 Intersection Control

The existing intersection control will be maintained as the default control for all study area intersections for existing and 2022 assessments. The 2027 horizon year assessment utilizes the BRT corridor upgrades as illustrated in **Figure 7**. It should be noted that the ultimate intersection design for the intersection of Baseline Road at Private Access 1 was not available, however, the intersection operations assumed no improvements were planned except for the implementation of a dedicate BRT ROW as well as TSP operations and the addition of a continuous segregated cycling facility was running east-west through the intersection. Any intersection improvements triggered through the intersection level of service analysis will be highlighted and adopted accordingly. The existing signal timing plan for the intersections of Baseline Road with Clyde Avenue and Private Access 1 were obtained from the City of Ottawa.

4.9.2 Intersection Design

An assessment of the study area intersections was undertaken to determine the operational characteristics of the study area intersections under the horizons identified in the Screening and Scoping report. Intersection operational analysis was facilitated by Synchro 10.0[™] software package and the MMLOS analysis was completed for the signalized intersection for all modes and compared against the City of Ottawa's MMLOS targets. The Highway Capacity Manual (HCM) 6th edition analysis method in Synchro was used to assess the study intersections. It should be noted that this method has some limitations which were addressed as follows:

- Unsignalized Movement Delays (Channelized Right turns with yield control): The HCM method does not report on
 unsignalized movements delays. Rather these movements were analyzed and reported on using Synchro's
 percentile method as a mean to approximate delays and queues experienced by right turning traffic. This limitation
 impacts the 2019 and 2022 horizon year vehicular LOS assessments.
- RTOR: HCM's implementation of right turns on red is conservative and assumes no vehicles performing RTOR.
 RTOR influence on signal operations was incorporated using the equations provided by Trafficware's white paper on HCM 6th edition implementation in Synchro².



[.]trafficware.com/uploads/2/2/2/5/22256874/hcm6th_working_white_paper_synchro_-_march2018.pdf

• Synchro does not report on the intersection volume-to-capacity ratio using HCM 6th edition method. Therefore, intersection volume-to-capacity is not reported for the overall intersection operations. For the MMLOS purpose, the maximum movement's volume-to-capacity at the intersection was used to assess the intersections performance.

4.9.2.1 2019 Existing Conditions

Figure 5 illustrates 2019 existing AM and PM peak hour traffic volumes at the study area intersections.

Intersection Capacity Analysis

Table 12 summarizes the results of the Synchro analysis under 2019 existing conditions. The intersection of Baseline Road at Clyde Avenue is currently operating at or above capacity with several individual movements operating at LOS F during the AM and PM peak hours. No improvements are recommended as this intersection is expected to be upgraded to favor east-west BRT transit once the BRT upgrades are implemented along Baseline Road by 2023. Furthermore, implementing intersection treatments to address vehicular operations is expected to negatively impact the multi-modal traffic operations for other modes (transit, cycling, and pedestrian).

The southbound movement at the intersection of Baseline Road at Private Access 1 is currently operating with more than 50s of delay during both the AM and PM peak hours, while the volume to capacity ratios remain acceptable (i.e. less than 0.90). This suggests that any additional traffic (background or site generated) will likely cause the delays to increase.

The Clyde Avenue at Private Access 3 intersection is currently operating acceptably.

Appendix E contains detailed intersection performance worksheets.

Intersection	Intersection Control	App	roach / Movement	LOS	V/C	Delay (s)	Queue 95 th (m)
		EB	Left	F (F)	1.17 (1.16)	177.1 (182.0)	120.4 (114.1)
			Through	F (D)	1.02 (0.84)	72.0 (46.6)	221.9 (159.6)
			Right	A* (A*)	0.24* (0.41*)	5.1* (15.4*)	11.2* (37.8*)
			Left	C (D)	0.78 (0.87)	72.6 (97.1)	28.0 (70.7)
	T (6	WB	Through	A (F)	0.56 (<mark>1.10</mark>)	38.1 (<mark>101.8</mark>)	83.3 (282.1)
Baseline Road at Clyde Avenue	Traffic Signals		Right	B* (E)	0.70* (0.94*)	22.6* (50.6*)	69.1* (#164.7)
Ciyde Avenue	Signais		Left	B (D)	0.64 (0.90)	61.1 (80.9)	19.6 (77.0)
		NB	Through / Right	E (F)	0.99 (1.08)	81.8 (113.9)	186.9 (224.0)
		SB	Left	D (F)	0.86 (1.04)	68.4 (114.8)	69.3 (100.8)
			Through / Right	A (D)	0.47 (0.88)	31.3 (<mark>64.5</mark>)	79.8 (147.7)
		Overall Intersection		-	-	62.1 (82.7)	-
	Traffic Signals	FD	Left	A (B)	0.14 (0.70)	3.8 (38.5)	4.2 (59.5)
		EB	Through	A (A)	0.54 (0.55)	3.9 (6.6)	70.0 (93.1)
Baseline Road at		WB	Through / Right	A (D)	0.42 (0.84)	6.7 (24.0)	67.9 (228.9)
Private Access 1		0.5	Left	A (D)	0.37 (0.83)	55.4 (62.7)	17.5 (77.7)
		SB	Right	A (A)	0.09 (0.42)	52.7 (53.2)	7.7 (67.9)
		Ov	erall Intersection	-	-	5.9 (19.9)	-
Clyde Avenue at	Minor Stop	WB	Right	A (A)	0.13 (0.50)	15.8 (26.3)	2.8 (18.9)
Private Access 3 (right-in / right-out)		Ove	erall Intersection	-	-	-	-

Table 12 - 2019 Existing Intersection Operations



Notes:	
1.	Table format: AM (PM)
2.	v/c – represents the anticipated volume divided by the predicted capacity
3.	* Estimated using Synchro's Percentile Method
4.	# for v/c <1, queue requires multiple cycles to be cleared
5.	Red highlight: Movement operating at or above capacity; Orange Highlight: Movement operating near capacity.

Multi-Modal Level of Service Analysis – Signalized Intersections

The MMLOS targets at intersections are determined by taking the most stringent of the MMLOS targets for each individual road segment. As such, based on **Section 4.3.1**, the PLOS target is currently C, the BLOS target is currently B, the TLOS target is currently D, and the TkLOS target is currently D. The Vehicle Level of Service (VLOS) target is currently D for both intersections. The aforementioned targets apply to both study area signalized intersections.

Baseline Road at Clyde Avenue

The Pedestrian Level of Service (PLOS) at the intersection of Baseline Road at Clyde Avenue is currently operating at a PLOS F, which does not meet the desired target of C. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross at the intersection. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating pedestrian refuge areas by means of wide medians (i.e. > 2.4m) along with operational measures such as prohibition of RTOR are not expected to highly improve the PLOS.

The Bicycle Level of Service (BLOS) is currently operating at a BLOS of D at the intersection of Baseline Road at Clyde Avenue which does not meet the desired target of B. Based on the MMLOS guidelines, intersection BLOS is influenced by the availability of dedicated cycling amenities, number of lanes cyclists must cross to negotiate a turn at intersections, and roadway operating speeds. Introducing dedicated bike lanes as well as reducing the speed limit to 50 km/h is expected to result in meeting the desired BLOS target of B. As the Baseline Road BRT plans include cycling infrastructure (i.e. cycle tracks), it is not recommended to implement any improvements as an interim mitigation measure.

The Transit Level of Service (TLOS) at the intersection of Baseline Road at Clyde Avenue is currently operating with a TLOS of F which does not meet the desired target of D. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. The signal timing plans that were obtained from the City of Ottawa indicates that this intersection operates with a conventional NEMA phasing. The Synchro analysis indicate that the eastbound and westbound queues at the intersection of Baseline Road / Clyde Avenue reach beyond the bus queue jumps in both directions. Therefore, buses are highly impacted by traffic operations. It is not recommended to implement any improvements as an interim mitigation measure as Baseline Road's corridor within the vicinity of the study area is expected to be upgraded to include a dedicated east-west BRT corridor.

The Truck Level of Service (TkLOS) at the intersection of Baseline Road at Clyde Avenue is currently operating with a TkLOS of B, which meets the target of D.

The Vehicular Level of Service (VLOS) is currently operating at VLOS F at the intersection of Baseline Road at Clyde Avenue, which does not meet the target of D. Improving the intersection can be performed by adding additional roadway capacity through increasing the number of lanes; however, this treatment may not be feasible due to cost, ROW restrictions, and adverse impacts on MMLOS performance for other modes.



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Appendix C contains the detailed MMLOS analysis and is provided for reference.

Baseline Road at Private Access 1

The Pedestrian Level of Service (PLOS) at the intersection of Baseline Road and Private Access 1 currently operates with a PLOS F, which does not meet the desired target of C. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating pedestrian refuge areas by means of wide medians (i.e. > 2.4m) along with operational measures such as prohibition of RTOR are not expected to highly improve the PLOS to the desired targets.

The Bicycle Level of Service (BLOS) at the intersection of Baseline Road at Private Access 1 is currently operating a BLOS of F, which does not meet the desired target of B. Based on the MMLOS guidelines, intersection BLOS is influenced by the availability of dedicated cycling amenities, number of lanes cyclists must cross to negotiate a turn at intersections, and roadway operating speeds. Introducing dedicated bike lanes as well as reducing the speed limits to 50 km/h is expected to result in meeting the desired BLOS target of B. As the Baseline Road BRT plans include cycling infrastructure (i.e. cycle tracks), it is not recommended to implement any improvements as an interim mitigation measure.

The Transit Level of Service (TLOS) at the intersection of Baseline Road at Private Access 1 is currently operating with a TLOS of E, which does not meet the targeted value of D. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. Currently, buses operate under mixed traffic conditions with high exposure to signal delays. No improvements are recommended to address existing conditions as Baseline Road's corridor within the vicinity of the study area is expected to be upgraded to include a dedicated east-west running BRT corridor.

The Truck Level of Service (TkLOS) at the intersection of Baseline Road at Private Access 1 is currently operating with a TkLOS of B, which meets the target of D.

The Vehicular Level of Service (VLOS) at the intersection of Baseline Road at Private Access 1 is currently operating at VLOS of D, which meets the desired target.

Appendix C contains the detailed MMLOS analysis and is provided for reference.

4.9.2.2 2022 Future Background Conditions

Figure 15 illustrates the 2022 future background AM and PM peak hour traffic volumes at the study area intersections.

Intersection Capacity Analysis

Table 13 summarizes the results of the Synchro analysis for the 2022 future background horizon. Consistent with the existing conditions, the intersection of Baseline Road at Clyde Avenue is expected to operate at or above capacity with multiple movements operating at LOS F during both the AM and PM peak hours. However, geometric improvements are not recommended as this intersection is expected to be upgraded to favor east-west BRT transit through BRT corridor upgrades by the year 2023. Furthermore, implementing intersection treatments to address vehicular operations is expected to negatively impact the multi-modal traffic operations for other modes (transit, cycling, and pedestrian).



Although no geometric improvements are recommended, there is an opportunity to improve the overall intersection operations during the AM peak hour by increasing the eastbound left turn split by 6 seconds, which is time taken from the conflicting westbound through traffic phase. The overall intersection cycle length was maintained at 120 seconds during the AM peak hour similar to the existing Signal Timing Plan (STP). This signal timing adjustment improves the operations for the eastbound left turn movement, particularly during the AM peak hour. The operations for both the existing signal timing plan as well as this optimized signal timing plan was reported in **Table 13** below.

Consistent with the results from the existing conditions analysis, the southbound movement at the intersection of Baseline Road at Private Access 1 is anticipated to experience more than 50s of delay during both the AM and PM peak hours. Despite this, the volume to capacity ratios remains acceptable.

The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably.

Appendix E contains detailed intersection performance worksheets.

Traffic Signals	App EB WB NB SB	roach / Movement	LOS F (F) E (D) A* (A) C (D) A (F) B* (E) B (D)	V/C 1.12 (1.11) 1.00 (0.83) 0.23* (0.39*) 0.78 (0.86) 0.56 (1.09) 0.70* (0.92*) 0.64 (0.89)	Delay (s) 160.3 (163.9) 65.7 (46.1) 4.6* (14.5*) 72.6 (94.3) 38.0 (97.5) 22.0* (46.7*)	Queue 95 th (m) 111.3 (105.7) 210.7 (156.8) 10.0* (35.0*) 28.0 (68.6) 84.0 (274.4) 68.2* (#157.9*
	WB	Through Right Left Through Right Left Through / Right	E (D) A* (A) C (D) A (F) B* (E) B (D)	1.00 (0.83) 0.23* (0.39*) 0.78 (0.86) 0.56 (1.09) 0.70* (0.92*)	65.7 (46.1) 4.6* (14.5*) 72.6 (94.3) 38.0 (97.5) 22.0* (46.7*)	210.7 (156.8) 10.0* (35.0*) 28.0 (68.6) 84.0 (274.4)
	WB	Right Left Through Right Left Through / Right	A* (A) C (D) A (F) B* (E) B (D)	0.23* (0.39*) 0.78 (0.86) 0.56 (1.09) 0.70* (0.92*)	4.6* (14.5*) 72.6 (94.3) 38.0 (97.5) 22.0* (46.7*)	10.0* (35.0*) 28.0 (68.6) 84.0 (274.4)
	NB	Left Through Right Left Through / Right	C (D) A (F) B* (E) B (D)	0.78 (0.86) 0.56 (1.09) 0.70* (0.92*)	72.6 (94.3) 38.0 (97.5) 22.0* (46.7*)	28.0 (68.6) 84.0 (274.4)
	NB	Through Right Left Through / Right	A (F) B* (E) B (D)	0.56 (1.09) 0.70* (0.92*)	38.0 (97.5) 22.0* (46.7*)	84.0 (274.4)
	NB	Right Left Through / Right	B* (E) B (D)	0.70* (0.92*)	22.0* (46.7*)	. ,
		Left Through / Right	B (D)	· · ·	· · · /	68 2* (#157 0*)
Signals		Through / Right	. ,	0.64 (0.89)		00.2 (#137.9
				0.04 (0.09)	61.2 (<mark>80.0</mark>)	18.9 (76.3)
	SB	L off	E (F)	0.95 (1.06)	72.9 (109.2)	172.2 (217.0)
	5B	Leit	D (F)	0.85 (1.03)	67.8 (111.7)	67.9 (99.4)
		Through / Right	A (D)	0.45 (0.84)	31.1 (5 9.5)	76.3 (137.2)
	Ove	erall Intersection	-	-	57.5 (79.0)	-
	Optimized Signal Timing Plan (AM Peak) – EBL split increased by 6 seconds					
		Left			75 2 (163 9)	79.8 (105.7)
	EB		. ,	· /	. ,	210.7 (156.8)
		<u> </u>	()		· /	10.0* (35.0*)
	WB	<u> </u>		. ,		28.0 (68.6)
			. ,	· /	. ,	87.5 (274.4)
					. ,	67.0* (#157.9*
	NB	Left			· /	18.9 (76.3)
		Through / Right	. ,	· /	. ,	172.2 (217.0)
		Left	. ,	· · ·	. ,	67.9 (99.4)
	SB	Through / Right	A (D)	0.45 (0.84)	. ,	76.3 (137.2)
	Ove	erall Intersection	-	-	54.5 (79.0)	-
		Left	A (A)	0.12 (0.59)	3.7 (29.9)	4.2 (35.0)
	EB	Through	. ,	0.54 (0.55)	3.7 (6.0)	67.2 (89.6)
Traffic	WB	Through / Right		0.41 (0.83)	6.5 (20.7)	65.1 (229.6)
Signals	0.5	Left	A (D)	0.35 (0.82)	· · · ·	16.1 (71.4)
0	SB	Right	A (A)	· /	53.0 (54.4)	6.3 (63.0)
	Ove	-	-	-	5.7 (17.5)	-
	WB	Right	A (A)	0.11 (0.45)	15.4 (24.1)	2.8 (15.4)
Minor Stop	Overall Intersection		-	-	-	-
Γ	Signals	Traffic Signals WB WB Vinor Stop	LeftEBLeftRightRightRightRightWBThroughRightRightNBLeftThrough / RightRightSBLeftThrough / RightLeftBBLeftThrough / RightRightSignalsLeftWBThrough / RightWBThrough / RightWBRightWBRight	Image: constraint of the sector of the se	Image: Traffic Signals Image: Traffic Signals From WBT split Vertex Left D (F) 0.87 (1.11) EB Through E (D) 1.00 (0.83) Right A* (A) 0.23* (0.39*) Right A* (A) 0.23* (0.39*) WB Left C (D) 0.78 (0.86) WB Through A (F) 0.62 (1.09) Right B* (E) 0.73* (0.92*) NB Left B (D) 0.64 (0.89) Through / Right B (D) 0.64 (0.89) Through / Right E (F) 0.95 (1.06) SB Left D (F) 0.85 (1.03) Through / Right A (D) 0.45 (0.84) Overall Intersection - - Signals Through / Right A (D) 0.94 (0.55) WB Through / Right A (D) 0.41 (0.83) Signals WB Right A (A) 0.08 (0.42)	Image: Traffic Signals Left D (F) $0.87 (1.11)$ $75.2 (163.9)$ From WBT split EB Through E (D) $1.00 (0.83)$ $65.7 (46.1)$ Right A* (A) $0.23* (0.39*)$ $4.6* (14.5*)$ WB Left C (D) $0.78 (0.86)$ $72.6 (94.3)$ WB Through A (F) $0.62 (1.09)$ $41.8 (97.5)$ Right B* (E) $0.73* (0.92*)$ $23.0* (46.7*)$ NB Left B (D) $0.64 (0.89)$ $61.2 (80.0)$ Through / Right E (F) $0.95 (1.06)$ $72.9 (109.2)$ SB Left D (F) $0.85 (1.03)$ $67.8 (111.7)$ Through / Right A (D) $0.45 (0.84)$ $31.1 (59.5)$ Overall Intersection - - 54.5 (79.0) Traffic BB Left A (A) $0.12 (0.59)$ $3.7 (29.9)$ Through / Right A (D) $0.44 (0.55)$ $3.7 (6.0)$ $3.7 (29.9)$ Through / Right A (D) $0.35 (0.82)$

Table 13 - 2022 Future Background Conditions Intersection Operations



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	n Control	Approach / Movement	LOS	V/C	Delay (s)	Queue 95 th (m)			
	 v/c – represents the anticipated volume divided by the predicted capacity * Estimated using Synchro's Percentile Method 								
	S. Estimated using Synchro's Percentue weinod 4. # for v/c <1, queue requires multiple cycles to be cleared								
5. Red highlig	5. Red highlight: Movement operating at or above capacity; Orange Highlight: Movement operating near capacity.								

Multi-Modal Level of Service Analysis – Signalized Intersections

The intersection operating conditions remain similar to existing conditions; therefore, the intersection MMLOS discussion in **Section 4.9.2.1** applies to the 2022 future background analysis.

Appendix C contains the detailed MMLOS analysis and is provided for reference.



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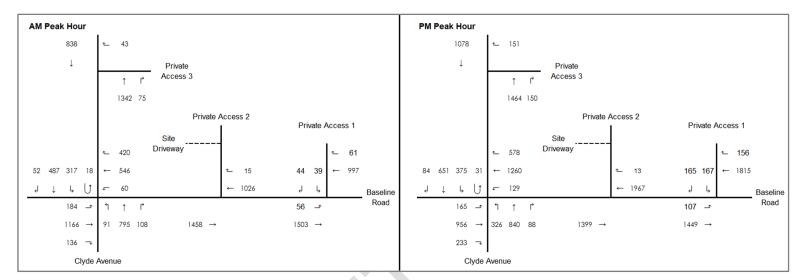


Figure 15 – 2022 Future Background Traffic Volumes

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4.9.2.3 2022 Total Future Conditions

Figure 16 illustrates 2022 total future AM and PM peak hour traffic volumes at the study area intersections.

Intersection Capacity Analysis

Table 14 summarizes the results of the Synchro analysis for the 2022 total future horizon. Consistent with the previous two horizons, the intersection of Baseline Road at Clyde Avenue is expected to continue to operate at or above capacity with multiple movements operating at LOS F during the AM and PM peak hours. However, no improvements are recommended as this intersection is expected to be upgraded to favor east-west BRT transit as the BRT corridor upgrades take place by the year 2023. Furthermore, implementing intersection treatments to address vehicular operations is expected to negatively impact the multi-modal traffic operations for other modes (transit, cycling, and pedestrian).

Consistent with the previous horizons, the southbound movement at the intersection of Baseline Road at Private Access 1 is anticipated to experience more than 50s of delay during both the AM and PM peak hours. Despite this, the volume to capacity ratios remains acceptable.

The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably.

Appendix E contains detailed intersection performance worksheets.

Intersection	Intersection Control	Арр	roach / Movement	LOS	V/C	Delay (s)	Queue 95 th (m)
			Left	D (F)	0.87 (<mark>1.11</mark>)	75.2 (163.9)	79.8 (105.7)
		EB	Through	F (D)	1.06 (0.83)	83.1 (46.2)	230.3 (157.5)
			Right	A* (A*)	0.24* (0.39*)	4.6* (14.5*)	10.0* (35.0*)
			Left	C (E)	0.79 (<mark>0.96</mark>)	68.8 (119.3)	36.4 (83.3)
	- <i>m</i>	WB	Through	B (F)	0.63 (<mark>1.09</mark>)	42.4 (<mark>98.2</mark>)	88.2 (275.8)
Baseline Road at Clyde Avenue	Traffic Signals		Right	B* (E)	0.74* (<mark>0.93</mark> *)	23.7* (48.7*)	68.2* (#160.9)
Olyde Avenue		NB	Left	B (D)	0.64 (0.89)	61.2 (80.0)	18.9 (76.3)
		IND	Through / Right	E (F)	0.96 (1.09)	75.3 (118.3)	175.7 (228.2)
		SB	Left	D (F)	0.86 (<mark>1.11</mark>)	69.1 (136.4)	70.7 (114.1)
			Through / Right	A (D)	0.45 (0.84)	30.8 (<mark>59.5</mark>)	76.3 (137.2)
		Overall Intersection		-	-	59.8 (83.6)	-
	Traffic Signals	EB	Left	A (B)	0.17 (0.86)	4.3 (<mark>58.0</mark>)	5.6 (62.3)
			Through	A (A)	0.54 (0.55)	4.2 (6.3)	72.1 (91.7)
Baseline Road at		WB	Through / Right	A (D)	0.42 (0.85)	7.2 (23.0)	70.7 (242.9)
Private Access 1		Signals SB	Left	A (D)	0.37 (0.82)	54.2 (63.0)	18.9 (73.5)
			Right	A (A)	0.29 (0.50)	53.6 (55.1)	28.0 (74.9)
		Overall Intersection		-	-	6.9 (20.3)	-
Clyde Avenue at		WB	Right	A (A)	0.19 (0.52)	16.3 (26.5)	4.9 (19.6)
Private Access 3 (right-in / right-out)	Minor Stop	Ove	Overall Intersection		-	-	-

Table 14 – 2022 Total Future Intersection Operations

Table format: AM (PM) v/c – represents the anticipated volume divided by the predicted capacity 2.

3. * Estimated using Synchro's Percentile Method

4

for v/c <1, queue requires multiple cycles to be cleared Red highlight: Movement operating at or above capacity; Orange Highlight: Movement operating near capacity.



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Multi-Modal Level of Service Analysis – Signalized Intersections

The intersection operating conditions remain similar to existing conditions; therefore, the intersection MMLOS discussion in **Section 4.9.2.1** applies to the 2022 total future analysis.

Appendix C contains the detailed MMLOS analysis and is provided for reference.



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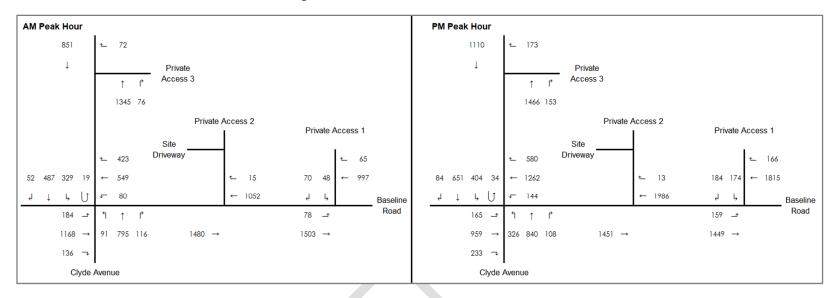


Figure 16 – 2022 Total Future Traffic Volumes

4.9.2.4 2027 Ultimate Conditions

Figure 17 illustrates 2027 ultimate AM and PM peak hour traffic volumes at the study area intersections.

Intersection Capacity Analysis

Table 15 summarizes the results of the Synchro analysis for the 2027 ultimate horizon. The intersection of Baseline Road at Clyde Avenue was assessed using the preliminary design geometry that includes the BRT Transitway upgrades shown in **Figure 7**. The intersection of Baseline Road at Private Access 1 was assessed with a dedicated BRT Transitway as well as a segregated cycling facility. It was assumed that right turn on red (RTOR) operations will be prohibited at both Baseline Road Intersections within the vicinity of the development due to the segregated cycling facilities.

Based on discussions with the City of Ottawa, both signalized intersections are expected to operate under intersection TSP measures. It was assumed that the bus phase operates with non-conflicting traffic phases, i.e. eastbound and westbound through traffic phases. TSP operations were assumed to run through advanced detection and TSP activation was assumed to be able to truncate conflicting phases or extend non-conflicting phases that can run with the bus phase. The TSP operations were assumed not to be able to omit or rotate traffic phases.

Generally, once a bus is detected in advance, prior reaching the signal's stop line, if there is sufficient time for the bus to reach and clear the intersection, within the allowable maximum phase extension limits, the eastbound and westbound through phases will be extended to allow the unimpeded movement of the bus. On the other hand, if the bus's travel time to the intersection is greater than the allowable parallel phases' green extension, the parallel phases will be terminated early and the signal will run all conflicting phases at pre-defined minimum times so that the stopped bus gets service early. For a signal to be able to extend parallel phases, bus travel time reliability is usually considered in the decision to extend versus truncate phases. For instance, if the detection method is wireless with a travel time uncertainty of 2 seconds, the traffic controller adds 2 seconds to the detection travel time and compares the total to remaining green time in the parallel phase added to the maximum extension limit.

Typically, for median running at-grade BRT corridors, parallel left turn lanes operate as fully protected left phases as a safety requirement. This is due to the fact that it is challenging for left turners to look for conflicts for buses coming from behind. In the case of the study intersections, all eastbound and westbound left turn movements must be fully protected at the intersections of Baseline Road with Clyde Avenue and Private Access 1. Further to the above, it was assumed that all RTOR operations will be prohibited both intersections as a full implementation of a complete streets design with cycling facilities is expected. The signalized intersections within the study area were assessed and summarized in **Table 15** both with and without TSP operations in place. It should be noted that the TSP assessment using Synchro is only an approximation and is not intended to be an accurate assessment. To approximate TSP operations, left turn phase splits were reduced manually to a minimum split that results in less than 3 minutes of average delay for conflicting vehicular movements.

As indicated in **Table 15**, without TSP phase implementation, the intersection of Baseline Road at Clyde Avenue is expected to continue to operate at or above capacity with several individual movements operating at LOS F during both the weekday AM and PM peak hours. With the TSP implementation, the non-conflicting through movements (eastbound and westbound through movements) are expected to improve slightly but remain close to capacity operating conditions. Conflicting left turn phases are expected to experience deteriorated operations as compared to the without TSP



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scenario. Although there are multiple movements operating at or above capacity, no improvements are recommended to address vehicular operational delays.

At the intersection of Baseline Road / Private Access 1, the scenario without TSP operations results in high delays for the eastbound left and southbound movements. Once TSP operations are in place, it was found that the delays for the eastbound left turn movement deteriorate substantially and the volume to capacity ratio exceeds 1.0.

Adding vehicular capacity is expected to result in deteriorated Pedestrian and Bicycle Levels of Service. Furthermore, higher vehicular delays are generally acceptable along highly active multi-modal corridors especially those served by frequent rapid transit.

The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably under 2027 ultimate conditions.

Appendix E contains detailed intersection performance worksheets.

Intersection	Intersection Control	Аррі	roach / Movement	LOS	V/C	Delay (s)	Queue 95 th (m)
			Left	D (F)	0.86 (1.07)	74.1 (153.4)	77.7 (100.1)
		EB	Through	E (C)	0.99 (0.80)	62.7 (44.6)	200.2 (150.5)
			Right	A (A)	0.26 (0.45)	30.0 (36.2)	39.9 (74.2)
			Left	C (D)	0.79 (0.88)	70.5 (100.1)	31.5 (72.8)
	Traffic	WB	Through	A (F)	0.59 (<mark>1.06</mark>)	40.8 (<mark>85.7</mark>)	84.7 (252.7)
	Signals		Right	F (F)	1.02 (1.13)	93.7 (123.4)	179.2 (280)
	Without TSP	NB	Left	B (D)	0.64 (0.87)	61.3 (76.6)	18.2 (72.8)
		IND	Through / Right	E (F)	0.95 (1.07)	72.6 (111.8)	170.8 (219.8)
		SB	Left	D (F)	0.85 (<mark>1.04</mark>)	67.5 (116.3)	67.2 (102.2)
		30	Through / Right	A (D)	0.44 (0.82)	31.0 (57 .1)	74.9 (131.6)
Baseline Road at		Ove	erall Intersection	-	-	61.0 (85.2)	-
Clyde Avenue	Traffic Signals <u>With TSP</u>	ЕВ	Left	F (F)	1.08 (1.07)	148.5 (153.4)	105.0 (100.1)
			Through	E (C)	0.92 (0.77)	48.6 (41.6)	181.3 (146.3)
			Right	A (A)	0.25 (0.43)	27.6 (34.3)	38.5 (72.8)
		WB	Left	C (D)	0.79 (0.88)	70.5 (100.1)	31.5 (72.8)
			Through	A (F)	0.50 (<mark>1.01</mark>)	34.6 (70.5)	78.4 (235.9)
			Right	D (F)	0.86 (<mark>1.08</mark>)	56.3 (104.1)	144.9 (260.4)
		NB	Left	B (E)	0.65 (<mark>1.00</mark>)	61.7 (109.7)	18.2 (85.4)
			Through / Right	E (F)	0.95 (1.07)	72.6 (111.8)	170.8 (219.8)
		SB	Left	F (F)	1.10 (1.21)	136.8 (179.4)	90.3 (121.1)
			Through / Right	A (D)	0.48 (0.82)	33.4 (<mark>57.6</mark>)	77.7 (132.3)
		Ove	erall Intersection	-	-	61.4 (85.6)	-
		EB	Left	C (D)	0.79 (0.84)	73.6 (73.4)	30.8 (62.3)
	_	LD	Through	A (A)	0.53 (0.54)	4.2 (6.7)	70.0 (91.7)
	Traffic	WB	Through / Right	A (D)	0.42 (0.90)	7.8 (32.9)	71.4 (277.9)
	Signals <u>Without TSP</u>	SB	Left	A (D)	0.32 (0.70)	53.4 (<mark>57.4</mark>)	16.8 (67.2)
Baseline Road at		00	Right	A (A)	0.47 (0.82)	55.6 (62.3)	46.9 (121.8)
Private Access 1		Ove	Overall Intersection		-	8.3 (22.9)	-
	Troffic	EB	Left	C (D)	0.79 (<mark>1.02</mark>)	86.8 (143.5)	35.0 (84.0)
	Traffic Signals	LD	Through	A (A)	0.53 (0.54)	4.2 (6.7)	70.0 (91.7)
	With TSP	WB	Through / Right	A (D)	0.42 (0.88)	7.8 (29.0)	71.4 (261.8)
		SB	Left	A (D)	0.32 (0.70)	53.4 (<mark>57.4</mark>)	16.8 (67.2)

Table 15 – 2027 Ultimate Intersection Operations



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			Right	A (A)	0.47 (0.82)	55.6 (<mark>62.3</mark>)	46.9 (121.8)
		Ove	erall Intersection	-	-	8.6 (23.9)	-
Clyde Avenue at		WB	Right	A (A)	0.15 (0.45)	15.6 (23.9)	3.5 (16.1)
Private Access 3 (right-in / right-out)	Minor Stop	Ove	erall Intersection	-	-	-	-
Notes: 6. Table format: AM (PM) 7. v/c - represents the anticipated volume divided by the predicted capacity 8. * Estimated using Synchro's Percentile Method 9. # for v/c <1, queue requires multiple cycles to be cleared							

Multi-Modal Level of Service Analysis – Signalized Intersections

By 2027, the Baseline Road BRT upgrades will be implemented, and as such, both study area signalized intersections will be considered 'within 600m of a rapid transit station' Policy Area due to the proposed transit stop at the Baseline Road at Clyde Avenue intersection. The multi-modal level of service (MMLOS) targets at intersections are determined by taking the most stringent of the MMLOS targets for each individual roadway segment. As such, for both signalized intersections, the Pedestrian Level of Service (PLOS) target is A, Bicycle Level of Service (BLOS) target is A, Transit Level of Service (TLOS) target is A, Truck Level of Service (TkLOS) target is D, and Vehicular Level of Service (VLOS) target is E.

Baseline Road at Clyde Avenue

The Pedestrian Level of Service (PLOS) is projected to operate with a PLOS of F, which does not meet the desired target of A. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating other improvements such as pedestrian leading intervals or reducing the corner radii are not expected to highly improve the PLOS to the desired targets and will have minimal impacts to the PLOS.

The ultimate geometry for the Baseline Road at Clyde Avenue intersection includes cycle tracks and cross-rides. Based on this configuration, the Bicycle Level of Service (BLOS) is expected to operate with a BLOS of A, which meets the desired target.

The Transit Level of Service (TLOS) is projected to operate with a TLOS of F, which does not meet the desired target of A. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. The signal timing plans that were obtained from the City of Ottawa indicates that this intersection operates with a conventional NEMA phasing. The ultimate conditions Synchro analysis indicate that the eastbound and westbound delays are likely 30 seconds of less. However, the north and south approaches are expected to serve transit with delays greater than 40 seconds and therefore resulting in a TLOS F. Introducing bus queue jumps may have limited benefits as queues are expected to be beyond 200 metres long. Furthermore, queue jumps may be subject to ROW limitations. Implementing intersection modifications or operating aggressive forms of TSP operations (i.e. skipping and rotating traffic phases) could improve transit service but can severely impact other modes LOS. Therefore, no improvements are recommended to address future ultimate conditions.

The Truck Level of Service (TkLOS) is projected to operate with a TkLOS of B, which meets the desired target of D.

The Vehicular Level of Service (VLOS) is projected to operate with a VLOS of F, which does not meet the desired target of E. Increasing the number of lanes at this intersection would increase capacity and thus improve the VLOS, however, it would be to the detriment of the other modes of transportation and is therefore not recommended.



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Baseline Road at Private Access 1

The Pedestrian Level of Service (PLOS) is projected to operate with a PLOS of F, which does not meet the desired target of A. Based on the MMLOS guidelines, intersection PLOS is largely influenced by the number of lanes pedestrians cross. Due to the nature of arterial roads, reducing the number of lanes at the intersection is not a feasible option. Incorporating other improvements such as pedestrian leading intervals or reducing the corner radii are not expected to highly improve the PLOS to the desired targets and have minimal impacts to PLOS.

The ultimate geometry for the Baseline Road BRT includes cycle tracks and cross-rides at intersecting street with Baseline Road. Based on this configuration, the Bicycle Level of Service (BLOS) is expected to operate with a BLOS of A, which meets the desired target.

The Transit Level of Service (TLOS) is projected to operate with a TLOS of C, which does not meet the targeted value of A. Based on the MMLOS guidelines, intersection TLOS is governed by the delay at the intersection. Buses are expected to operate with approximately 20 seconds of delay, which is significantly less compared to general traffic. Implementing intersection modifications or operating aggressive forms of TSP operations (i.e. skipping and rotating traffic phases) could improve transit service but can severely impact other modes of transportation. Therefore, no improvements are recommended to address the TLOS at this intersection.

The Truck Level of Service (TkLOS) is projected to operate with a TkLOS of B, which meets the desired target of D.

The Vehicular Level of Service (VLOS) is projected to operate with a VLOS of D, which meets the desired target of E.



Strategy

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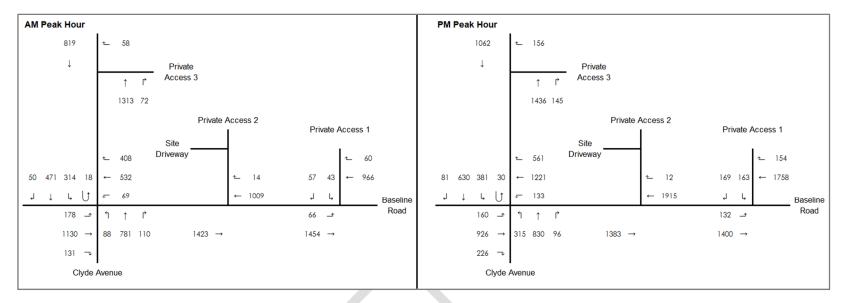


Figure 17 - 2027 Ultimate Traffic Volumes

January 17, 2020

5.0 CONCLUSION

The subject Transportation Impact Assessment (TIA) was prepared in support of a Site Plan application for a proposed development located in the Civic Hospital / Central Park neighborhood of Ottawa, Ontario. The proposed development is located at 1357 Baseline Road at the north-east quadrant of the Baseline Road at Clyde Avenue intersection.

The proposed development includes 228 senior adult housing units, 174 apartment units, and approximately 5,500 ft² GFA of retail space. The development includes 333 vehicle parking spaces and 156 bicycle parking spaces. The development will be accessed via one full movements site access along Private Access 2.

2019 Existing

- The intersection of Baseline Road at Clyde Avenue is currently operating at or above capacity with several
 individual movements operating at a LOD F during both the AM and PM peak hours. No improvements are
 recommended as this intersection is expected to be upgraded to favor east-east BRT transit once the BRT
 upgrades are implemented along Baseline Road by 2023.
- The southbound movement at the intersection of Baseline Road at Private Access 1 is currently operating with more than 50s of delay during both the AM and PM peak hours, while the volume to capacity ratios remain acceptable (i.e. less than 0.90). This suggests that any additional traffic (background or site generated) will likely cause the delays to increase.
- The Clyde Avenue at Private Access 3 intersection is currently operating acceptably.

2022 Future Background

- Consistent with the existing conditions, the intersection of Baseline Road at Clyde Avenue is expected to
 operate at or above capacity with multiple movements operating at LOS F during both the AM and PM peak
 hours. However, geometric improvements are not recommended as this intersection is expected to be
 upgraded to favor east-west BRT transit through BRT corridor upgrades by the year 2023. The signal timing
 plan can be improved by increasing the eastbound left turn split by 6 seconds, which is time taken from the
 conflicting westbound through traffic phase. This signal timing adjustment improves the operations for the
 eastbound left turn movement, particularly during the AM peak hour.
- Consistent with the results from the existing conditions analysis, the southbound movement at the intersection of Baseline Road at Private Access 1 is anticipated to experience more than 50s of delay during both the AM and PM peak hours. Despite this, the volume to capacity ratios remains acceptable.
- The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably.

2022 Total Future

• Consistent with the previous two horizons, the intersection of Baseline Road at Clyde Avenue is expected to continue to operate at or above capacity with multiple movements operating at LOS F during the AM and PM



peak hours. However, no improvements are recommended as this intersection is expected to be upgraded to favor east-west BRT transit as the BRT corridor upgrades take place by the year 2023.

- Consistent with the previous horizons, the southbound movement at the intersection of Baseline Road at Private Access 1 is anticipated to experience more than 50s of delay during both the AM and PM peak hours. Despite this, the volume to capacity ratios remains acceptable.
- The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably.

2027 Ultimate

- The Baseline Road BRT improvements are scheduled to be in place by 2023. The geometry from the draft preliminary design for the Baseline Road BRT project was used in the analysis of the 2027 ultimate horizon.
- Without Transit Signal Priority (TSP) in place along the BRT corridor, the intersection of Baseline Road at Clyde Avenue is expected to continue to operate at or above capacity with several individual movements operating at LOS F during both the weekday AM and PM peak hours. With TSP implementation, the nonconflicting through movements (eastbound and westbound through movements) are expected to improve slightly but remain close to capacity operating conditions. Conflicting left turn phases are expected to experience deteriorated operations as compared to the without TSP scenario.
- At the intersection of Baseline Road / Private Access 1, the scenario without TSP operations results in high delays for the eastbound left and southbound movements. Once TSP operations are in place, it was found that the delays for the eastbound left turn movement deteriorate substantially and the volume to capacity ratio exceeds 1.0.
- The intersection of Clyde Avenue at Private Access 3 is anticipated to continue to operate acceptably under 2027 ultimate conditions.

The Multi-Modal Level of Service (MMLOS) assessment for existing roadway segments (i.e. prior to the Baseline Road BRT) found that:

Baseline Road and Clyde Avenue, across the frontage of the subject development, do not currently meet the
Pedestrian and Bicycle Level of Service targets, while they do meet the Transit and Truck Level of Service
targets. To improve the PLOS, the sidewalk widths would need to be increased to 2.0m, a 2.0m boulevard
would need to be implemented, and the posted speed limit would need to be reduced to 50 km/h. To improve
the BLOS, a physically separated bicycle facility (i.e. cycle track) would need to be implemented. As the
Baseline Road BRT will be implemented by 2023, it is not recommended to mitigate these deficiencies as an
interim condition.

The Multi-Modal Level of Service (MMLOS) assessment for ultimate roadway segments (i.e. with the Baseline Road BRT) found that:

Implementing the Baseline Road BRT increases the PLOS target to an A along Baseline Road, which is not
anticipated to be met in the ultimate conditions. Reducing the speed limit to 30 km/h or reducing the traffic



volumes to less than 3000 AADT would allow the PLOS target of A to be met, however, as Baseline Road is an arterial road, these are not feasible solutions.

- The proposed cycle tracks along Baseline Road will allow the BLOS target on Baseline Road to be met in the ultimate conditions.
- The TLOS and TkLOS targets are anticipated to continue to be met along Baseline Road under the ultimate conditions.
- Clyde Avenue is not anticipated to meet the PLOS nor BLOS targets under the ultimate conditions. To improve
 these levels of service, a 2.0m sidewalks with 2.0m boulevard would need to be implemented, the volume of
 traffic would need to be reduced to less than 3000 AADT, the posted speed limit would need to be reduced to
 50 km/h, and a physically separated bicycle facility (i.e. cycle track) would need to be implemented.
- The TLOS and TkLOS targets are anticipated to continue to be met along Clyde Avenue under the ultimate conditions.

The MMLOS assessment for existing signalized intersections (i.e. prior to the Baseline Road BRT) found that:

- The intersection of Baseline Road at Clyde Avenue currently does not meet the PLOS, BLOS, TLOS, and VLOS targets, while it does meet the TkLOS target. Measures that would improve the MMLOS include reducing the number of vehicle lanes, reducing the posted speed limit, reducing the volume of cars, and implementing higher order cycling facilities. As this intersection is scheduled to undergo geometric changes as a result of the Baseline Road BRT, no interim mitigation measures are recommended.
- The intersection of Baseline Road at Private Access 1 currently does not meet the PLOS, BLOS, and TLOS targets while it does meet the TkLOS and VLOS targets. Measures that would improve the MMLOS include reducing the number of vehicle lanes, reducing the posted speed limit, reducing the volume of cars, and implementing higher order cycling facilities. As this intersection is scheduled to undergo geometric changes as a result of the Baseline Road BRT, no interim measures are recommended.

The MMLOS assessment for ultimate signalized intersections (i.e. with the Baseline Road BRT) found that:

- The intersection of Baseline Road at Clyde Avenue is not projected to meet the PLOS, TLOS, and VLOS targets while it is projected to meet the BLOS and TkLOS targets. Despite the future geometry at this intersection, based on the crossing distance for pedestrians, it is anticipated at the PLOS target will not be met. Reducing the number of vehicle lanes would improve the PLOS, however, as Baseline Road and Clyde Avenue are both arterial roadways, this is not a feasible option. While the future geometry at this intersection includes median BRT, the transit delays in the northbound and southbound directions result in a TLOS that is below target. Introducing features such as queue jump lanes would improve the TLOS, however, there may be ROW limitations. Adding additional vehicle lanes at this intersection would improve the VLOS, however, it would be to the detriment of the other modes of transportation and is therefore not recommended.
- The intersection of Baseline Road at Private Access 1 is not projected to meet the PLOS and TLOS targets while it is anticipated to meet the BLOS, TkLOS, and VLOS targets. Reducing the number of lanes along Baseline Road would improve the PLOS, however, with the future median BRT and the classification of



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Baseline Road as an arterial roadway, this is not a feasible option. To improve the TLOS, measures such as aggressive forms of TSP operations could be implemented, however, this can severely impact other modes of transportation and is therefore not recommended.

Based on the transportation evaluation presented in this transportation study, the proposed development at 1357 Baseline Road can be supported and should be permitted to proceed from a transportation perspective.



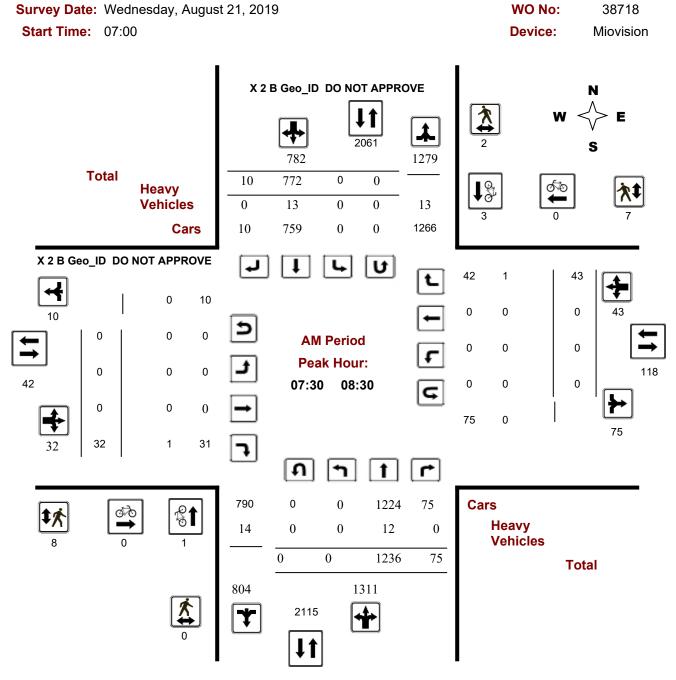
APPENDICES

Appendix A Traffic DAta January 17, 2020

Appendix A **TRAFFIC DATA**



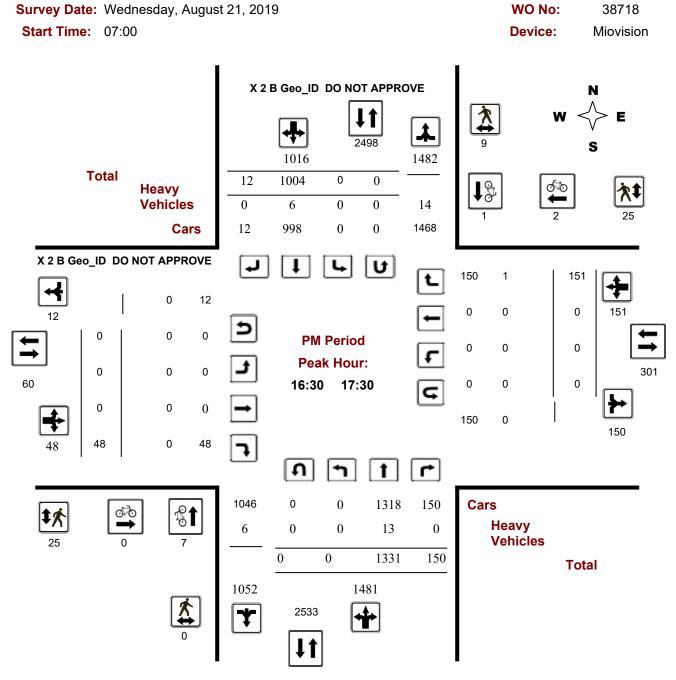
Turning Movement Count - Full Study Peak Hour DiagramX 2 B Geo ID DO NOT APPROVE @ X 2 B Geo ID DO NOT APPROVE



Comments ACTUAL LOC : CLYDE AVE 90M NORTH OF BASELINE RD PRIV ACCESS



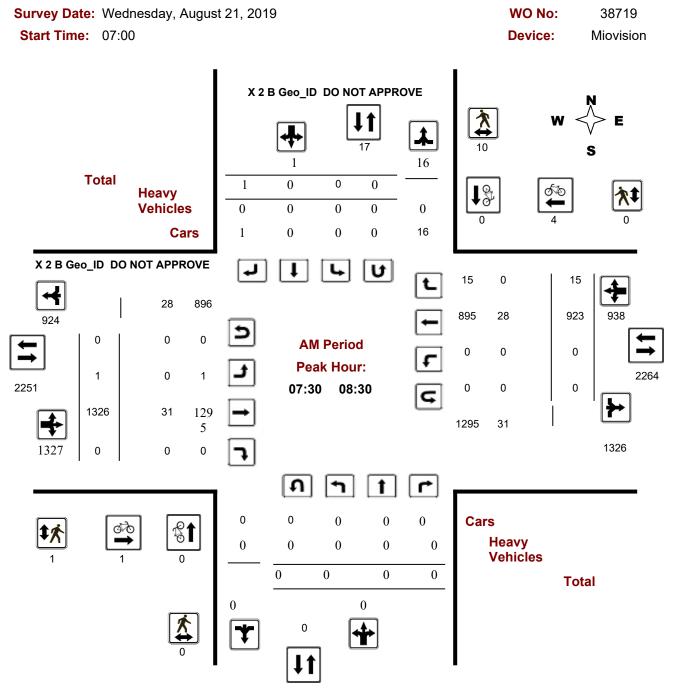
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Comments ACTUAL LOC : CLYDE AVE 90M NORTH OF BASELINE RD PRIV ACCESS



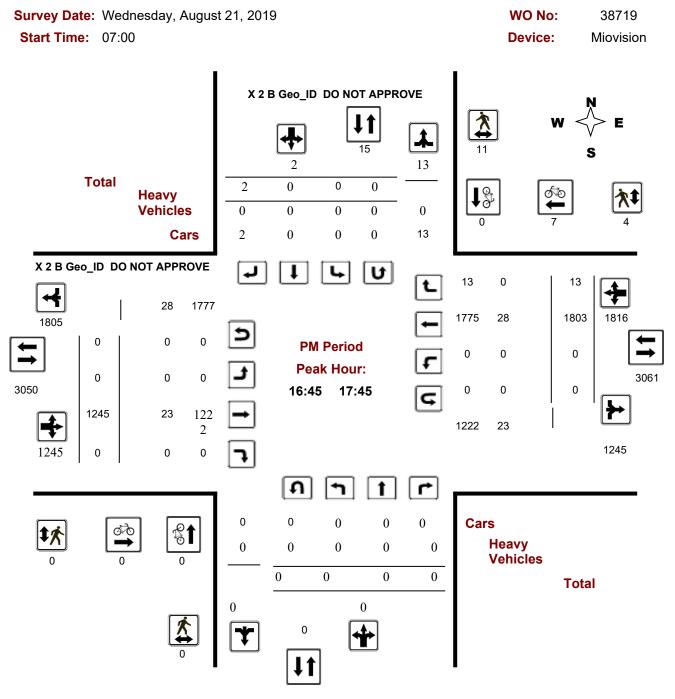
Turning Movement Count - Full Study Peak Hour DiagramX 2 B Geo ID DO NOT APPROVE @ X 2 B Geo ID DO NOT APPROVE



Comments ACTUAL LOC : BASELINE RD 115M EAST OF CLYDE AVE



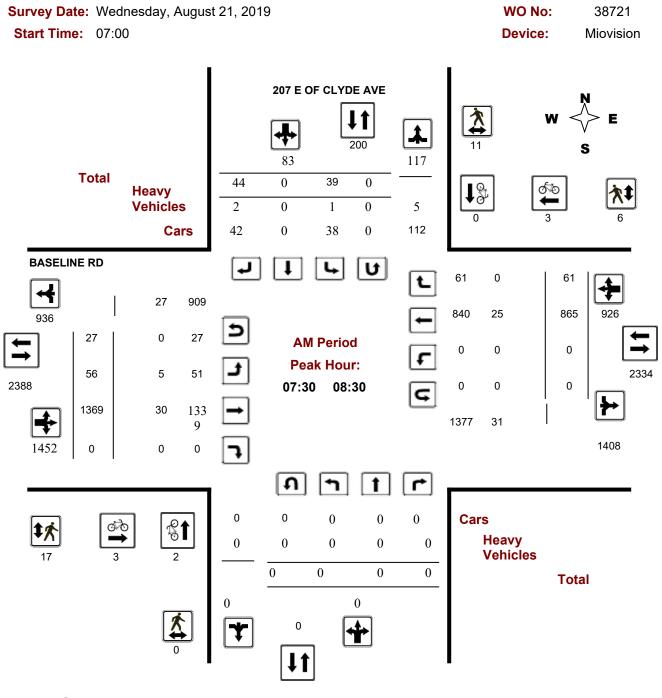
Turning Movement Count - Full Study Peak Hour DiagramX 2 B Geo ID DO NOT APPROVE @ X 2 B Geo ID DO NOT APPROVE



Comments ACTUAL LOC : BASELINE RD 115M EAST OF CLYDE AVE



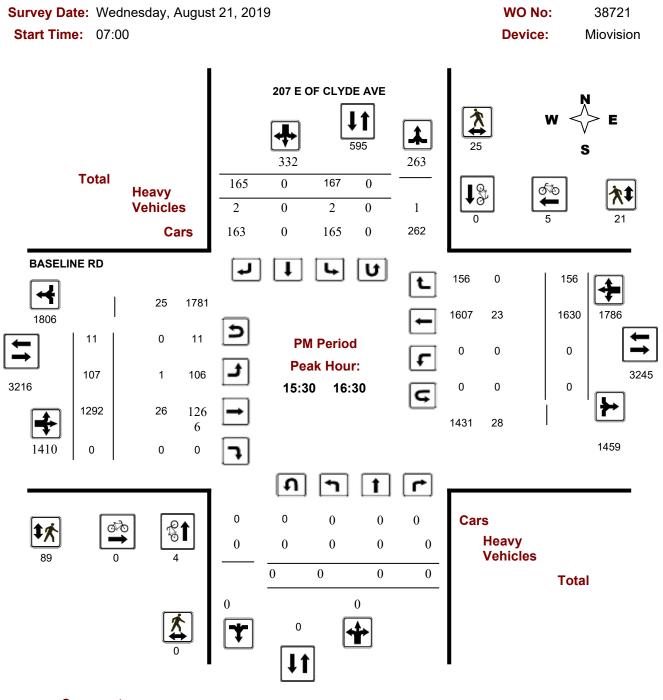
Turning Movement Count - Full Study Peak Hour Diagram BASELINE RD @ 207 E OF CLYDE AVE



Comments



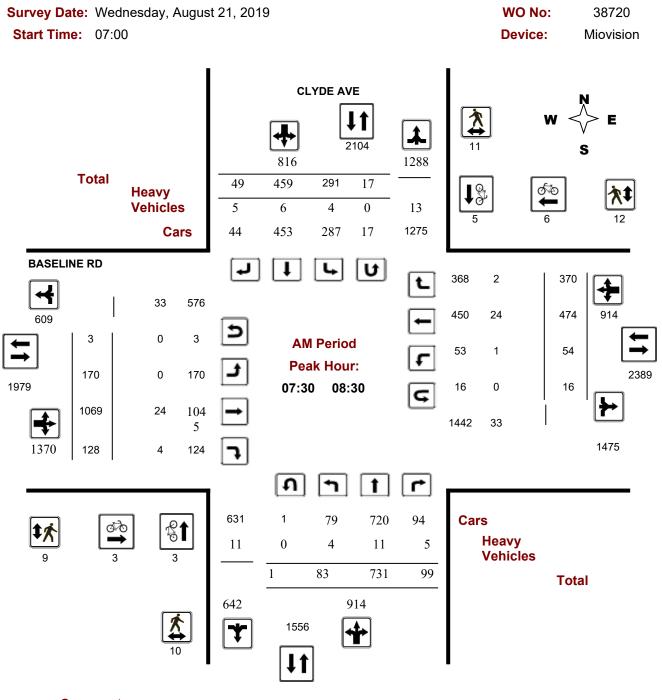
Turning Movement Count - Full Study Peak Hour Diagram BASELINE RD @ 207 E OF CLYDE AVE



Comments



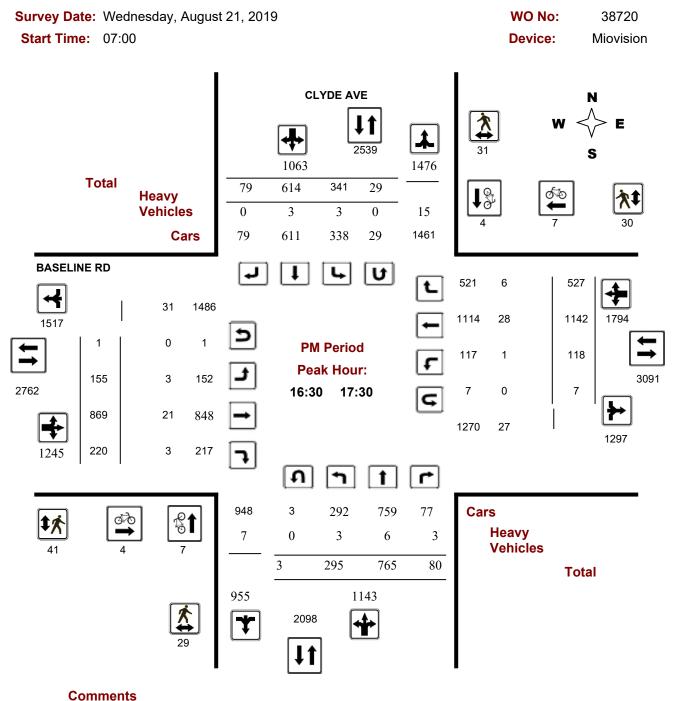
Turning Movement Count - Full Study Peak Hour Diagram BASELINE RD @ CLYDE AVE



Comments



Turning Movement Count - Full Study Peak Hour Diagram BASELINE RD @ CLYDE AVE



Connorm

Appendix B Correspondance January 17, 2020

Appendix B CORRESPONDANCE



Lauren,

The City staff have reviewed your response and have no further comments. Please proceed with the TIA Step 4 – Strategy report and submit the report with the Site Plan Application.

Thank you,

Wally Dubyk Project Manager - Transportation Approvals Development Review, Central & South Branches 613-580-2424 x13783

From: O'Grady, Lauren <Lauren.OGrady@stantec.com>
Sent: November 28, 2019 9:04 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Moore, Sean <Sean.Moore@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>
Subject: RE: 1357 Baseline Rd - Forecasting Comments

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Hi Wally,

Thank you for providing your comments on the Step 3 TIA. Please see my responses in green below. Can you please circulate my responses to the appropriate City staff to receive concurrence so I can proceed with the Step 4 TIA?

Thank you,

Lauren O'Grady P.Eng. Transportation Engineer

Direct: 613-784-2264 lauren.o'grady@stantec.com

Stantec 400 - 1331 Clyde Avenue Ottawa ON K2C 3G4

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From: Dubyk, Wally <<u>Wally.Dubyk@ottawa.ca</u>>
Sent: Wednesday, November 27, 2019 7:13 AM
To: O'Grady, Lauren <<u>Lauren.OGrady@stantec.com</u>>
Cc: Moore, Sean <<u>Sean.Moore@ottawa.ca</u>>
Subject: 1357 Baseline Rd - Forecasting Comments

Lauren,

1357 Baseline Road TIA Forecasting Report

Please review the following Forecasting comments;

Transportation Engineering

Use TRANS to forecast trips for Land Use Code 222. Using ITE underestimates trips generated by the development. Noted. The LUC 222 will use the TRANS rates in the Step 4 TIA.

Separate the walking and cycling mode shares. Noted. The walking and cycling mode shares will be separated in the Step 4 TIA.

Consider increasing the future transit mode share target. The Baseline BRT will front this development directly, and Stage 2 of LRT will be in place at Baseline Station a few kilometers away. Review the TDM strategies to support the transition to higher transit mode share. Reducing the available parking should be considered. As outlined in Section 3.1.1, the transit modal shares that were used in the subject TIA were agreed upon by the City prior to the submission of the Step 3 TIA. The TDM strategies will be reviewed as part of the Step 4 TIA.

Monitoring of mode share may be required if site design does not support the projected mode shares. Please refer to comment #1 from Traffic Signal Operations below.

Consider internalization or pass-by reductions for the shopping centre. Due to the negligible traffic the commercial land use is anticipated to generate (i.e. maximum of 14 two-way trips during the PM peak hour), internal capture and pass-by were not applied. Applying these two reductions would have a negligible impact on the number of trips the proposed development is anticipated to generate.

Justify the volume distribution at accesses. Since this development is adjacent to the intersection of Baseline and Clyde, the westbound traffic is directly connected to Private Access 2. Adjust Figures 8-10 if changes are made. Section 3.1.2 contained an error. The distribution of traffic at the site accesses was not based on the 2019 existing volumes as stated in Step 3, but rather, it was based on the Trans OD Survey for the Merivale district. Section 3.1.2 will be revised as part of the Step 4 TIA and will

provide clarification.

Include traffic projections from developments at 1375 Clyde, 1454 Merivale and 300 Central Park in Section 3.2.3. The proposed developments at 1375 Clyde and 300 Central Park will be included in the Step 4 TIA. It is our understanding that the development at 1454 Merivale is currently constructed and fully operational, therefore, the trips associated with this development has already been captured in the turning movement counts that were collected in the summer of 2019.

Traffic Signal Operations

The 332 vehicle parking spaces being proposed as part of development do not align with the transit modal share targets (40%). Baseline Road is already at capacity and further lane reductions as part of the bus rapid transit will add more pressure to an already congested corridor. The 40% modal share once the BRT is operational was agreed upon by the City of Ottawa during the preparation of the Step 3 TIA. The ITE and TRANS trip generation rates are based on the number of residential units and not on the number of parking spaces. The tenants that will be occupying the seniors portion of the proposed development are not likely to drive during the AM and PM peak hours (AM trip gen rate is 0.20 and PM trip gen rate is 0.26). However, based on market research, the developer wishes to provide options for parking spaces so that the seniors can keep their cars and use them as they wish (likely off peak, according to the trip generation rates). We don't anticipate the transit modal share being anything less than 40%, even with the proposed number of parking spaces. Referring to the third comment from TES above, the transit modal share might in fact be higher than 40%. Based on the zoning, providing 322 parking spaces is closer to the minimum rather than the maximum allowable parking spaces (min is appx 180 and max is appx 800). Furthermore, out of the proposed 322 parking spaces, appx 60 of them are reserved for visitors. We recommend keeping the transit modal share at 40% once the BRT is operational.

Demand Rationalization will be required if the VLOS indicates that the boundary intersections are at capacity. Noted.

Wally Dubyk Project Manager - Transportation Approvals Development Review, Central & South Branches 613-580-2424 x13783

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Appendix C Multi-Modal Level of Service Assessments January 17, 2020

Appendix C MULTI-MODAL LEVEL OF SERVICE ASSESSMENTS



Multi-Modal Level of Service - Segments Form

Consultant Scenario	Stantec Existing Conditions		1357 Baseline Rd 10-Jan-20	
SEGMENTS		LOS	Baseline Road Across Frontage	Clyde Avenue Across Frontage
Pedestrian	Sidewalk Width Boulevard Width Avg Daily Curb Lane Traffic Volume Operating Speed On-Street Parking Level of Service	F	1.8 m < 0.5 m > 3000 > 60 km/h no	1.8 m < 0.5 m > 3000 > 60 km/h no
	Level of Service			Г
	Type of Cycling Facility		Curbside Bike Lane	Mixed Traffic
	Number of Travel Lanes		≥ 3 each direction	≥ 6 lanes total
	Operating Speed		>50 to 70 km/h	≥ 50 to 60 km/h
	# of Lanes & Operating Speed LoS		D	F
Bicycle	Bike Lane (+ Parking Lane) Width	_	≥1.5 to <1.8 m	
<u>c</u>	Bike Lane Width LoS	F	В	-
Ö	Bike Lane Blockages		Rare	
	Blockage LoS		Α	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h
	Unsignalized Crossing - Lowest LoS		A D	A
	Level of Service		U	F
Transit	Facility Type	_	Bus lane	Mixed Traffic
rar	Friction or Ratio Transit:Posted Speed	F	Cf ≤ 60	Vt/Vp ≤ 0.6
F	Level of Service		В	E
×	Truck Lane Width		≤ 3.5 m	≤ 3.5 m
Truck	Travel Lanes per Direction	Α	> 1	> 1
F	Level of Service		Α	Α

Multi-Modal Level of Service - Segments Form

Consultant Scenario	Stantec Ultimate Conditions		1357 Baseline Rd 10-Jan-20	
SEGMENTS			Baseline Road Across Frontage	Clyde Avenue Across Frontage
an	Sidewalk Width Boulevard Width		≥ 2 m > 2 m	1.8 m < 0.5 m
Pedestrian	Avg Daily Curb Lane Traffic Volume Operating Speed On-Street Parking	F	> 3000 > 50 to 60 km/h no	> 3000 > 60 km/h no
Ре	Exposure to Traffic PLoS		С	F
	Level of Service		С	-
	Type of Cycling Facility		Physically Separated	Mixed Traffic
	Number of Travel Lanes			≥ 6 lanes total
	Operating Speed			≥ 50 to 60 km/h
Bicycle	# of Lanes & Operating Speed LoS Bike Lane (+ Parking Lane) Width	_	-	F
cy	Bike Lane Width LoS	F	-	
Ξ	Bike Lane Blockages			
	Blockage LoS		-	-
	Median Refuge Width (no median = < 1.8 m) No. of Lanes at Unsignalized Crossing			< 1.8 m refuge ≤ 3 lanes
	Sidestreet Operating Speed			≤ 3 lanes ≤ 40 km/h
	Unsignalized Crossing - Lowest LoS		Α	A
	Level of Service		A	F
Transit	Facility Type	_	Segregated ROW	Mixed Traffic
rar	Friction or Ratio Transit:Posted Speed	F	<u>Cf ≤ 60</u>	Vt/Vp ≤ 0.6
F	Level of Service		Α	E
×	Truck Lane Width		≤ 3.5 m	≤ 3.5 m
Truck	Travel Lanes per Direction	Α	> 1	> 1
F	Level of Service		Α	Α

Multi-Modal Level of Service - Intersections Form

Consultant Scenario			d					
	INTERSECTIONS	Baseline & Clyde				Baseline & Private Access 1		
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	EAST	WEST
	Lanes	7	7	8	8	4	4	6
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Protected	Protected	Protected	Protected	Protected/ Permissive	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	No
lian	Right Turn Channel	Conv'tl without Receiving Lane	No Channel	Conv'tl without Receiving Lane	Smart Channel	No Channel	No Channel	No Channel
stl	Corner Radius	10-15m	10-15m	15-25m	15-25m	10-15m	10-15m	10-15m
Pedestrian	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
_	PETSI Score	16	12	-2	0	53	58	28
	Ped. Exposure to Traffic LoS	F	F	F	F	D	D	F
	Cycle Length	130	130	130	130	130	130	130
	Effective Walk Time Average Pedestrian Delay	7 58	7 58	7 58	7 58	7 58	7 58	7 58
	Pedestrian Delay LoS	E	E	E	E	E	E	E
		F	F	F	F	E	E	F
	Level of Service	•	<u> </u>	F	•	E	F	<u> </u>
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	EAST	WEST
	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Pocket Bike Lane	Pocket Bike Lane	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank></blank>			> 50 m Introduced right turn lane	≤ 50 m Introduced right turn lane	> 50 m	Not Applicable	
	Dedicated Right Turning Speed			≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable	
<u>e</u>	Cyclist Through Movement			D	В	F	Not Applicable	
ycl	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Separated	Mixed Traffic	Separated	Mixed Traffic
Bicycle	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed		One lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	≤ 40 km/h		≥ 60 km/h
	Left Turning Cyclist	C	С	С	В	В	-	F
	Level of Service	С	С	D	В	F	-	F
				D			F	
ų	Average Signal Delay	> 40 sec	> 40 sec	> 40 sec	> 40 sec	0 sec	≤ 30 sec	≤ 40 sec
nsi		F	F	F	F	А	D	E
Transit	Level of Service			F			Е	
	Effective Corner Radius	10 - 15 m	10 - 15 m	> 15 m	> 15 m	10 - 15 m	10 - 15 m	
ck	Number of Receiving Lanes on Departure from Intersection	≥2	≥2	≥2	≥2	≥2	≥2	
Truck		В	В	Α	Α	В	В	-
	Level of Service			В			В	
Auto	Volume to Capacity Ratio		>	1.00			0.81 - 0.90	
÷		F			0.81 - 0.90 D			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario				1357 Baseline R 10-Jan-20	d			
	INTERSECTIONS	Baseline & Clyde				Basel	ine & Private Ac	cess 1
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	EAST	WEST
	Lanes	6	6	8	8	4	6	7
	Median	No Median - 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m
	Conflicting Left Turns	Protected	Protected	Protected	Protected	Protected	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn
	Right Turns on Red (RToR) ?	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited
	Ped Signal Leading Interval?	No	No	No	No	No	No	No
ian	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
str	Corner Radius	10-15m	10-15m	15-25m	15-25m	10-15m	10-15m	10-15m
Pedestrian	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
₽.	PETSI Score	31	31	4	4	64	28	26
	Ped. Exposure to Traffic LoS	E	E	F	F	С	F	F
	Cycle Length	130	130	130	130	130	130	130
	Effective Walk Time	7	7	7	7	7	7	7
	Average Pedestrian Delay	58	58	58	58	58	58	58
	Pedestrian Delay LoS	E	E	E	E	E	E	E
		E	E	F	F	E	F	F
	Level of Service			F			F	
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	EAST	WEST
	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP			
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank></blank>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	> 50 m		
	Dedicated Right Turning Speed	Not Applicable	Not Applicable	Not Applicable	Not Applicable	≤ 25 km/h		
٩	Cyclist Through Movement	Not Applicable	Not Applicable	Not Applicable	Not Applicable	F	Not Applicable	Not Applicable
ycl	Separated or Mixed Traffic	Separated	Separated	Separated	Separated	Mixed Traffic	Separated	Separated
Bicycle	Left Turn Approach							
	Operating Speed							
	Left Turning Cyclist	-	-	-	-	-	-	-
	Level of Service	-	-	-	-	-	-	-
	Average Signal Delay	> 40 sec	> 40 sec	≤ 30 sec	≤ 30 sec	0 sec	≤ 20 sec	≤ 20 sec
Isit		F	F	D	D	A	C	C
Transit	Level of Service			F			С	
	Effective Corner Radius	10 - 15 m	10 - 15 m	> 15 m	> 15 m	10 - 15 m	10 - 15 m	
×	Number of Receiving Lanes on Departure	≥2	≥2	≥2	≥2	≥2	≥2	
Truck	from Intersection	В	В	Α	Α	В	В	
F	Level of Service				<u> </u>		B	
	Volume to Conceitu Datia			B				
Auto	Volume to Capacity Ratio			1.00			0.81 - 0.90	
A	Level of Service	F				D		

Appendix D Transportation Demand Management January 17, 2020

Appendix D TRANSPORTATION DEMAND MANAGEMENT



TDM-Supportive Development Design and Infrastructure Checklist:

Non-Residential Developments (office, institutional, retail or industrial)

Legend			
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed		
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users		
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance		

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	1.	WALKING & CYCLING: ROUTES	
	1.1	Building location & access points	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	\checkmark
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	\checkmark
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	\checkmark
	1.2	Facilities for walking & cycling	~
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official <i>Plan policy 4.3.12</i>)	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see Official Plan policy 4.3.10)	
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see Official Plan policy 4.3.10)	
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on- road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see Official Plan policy 4.3.11)	
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	V
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	
	1.3	Amenities for walking & cycling	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	2.	WALKING & CYCLING: END-OF-TRIP FACILI	TIES
	2.1	Bicycle parking	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see Official Plan policy 4.3.6)	
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well- used areas (<i>see Zoning By-law Section 111</i>)	
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored <i>(see Zoning By-law Section 111)</i>	
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	
	2.2	Secure bicycle parking	-
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see Zoning By-law Section 111)	
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	
	2.3	Shower & change facilities	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	
	2.4	Bicycle repair station	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	3.	TRANSIT	
	3.1	Customer amenities	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	
	4.	RIDESHARING	
	4.1	Pick-up & drop-off facilities	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	\checkmark
	4.2	Carpool parking	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	
	5.	CARSHARING & BIKESHARING	
	5.1	Carshare parking spaces	
BETTER	5.1.1	Provide carshare parking spaces in permitted non- residential zones, occupying either required or provided parking spaces (see Zoning By-law Section 94)	
	5.2	Bikeshare station location	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	6.	PARKING	
	6.1	Number of parking spaces	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly <i>(see Zoning By-law</i> <i>Section 104)</i>	
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking <i>(see Zoning By-law Section 111)</i>	
	6.2	Separate long-term & short-term parking areas	•
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	
	7.	OTHER	
	7.1	On-site amenities to minimize off-site trips	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	

TDM Measures Checklist:

Non-Residential Developments (office, institutional, retail or industrial)

Legend

BASIC The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER The measure could maximize support for users of sustainable modes, and optimize development performance

The measure is one of the most dependably effective tools to encourage the use of sustainable modes

	TDM	measures: Non-residential developments	Check if proposed & add descriptions
	1.	TDM PROGRAM MANAGEMENT	
	1.1	Program coordinator	
BASIC	★ 1.1.1	Designate an internal coordinator, or contract with an external coordinator	
	1.2	Travel surveys	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	
	2.	WALKING AND CYCLING	
	2.1	Information on walking/cycling routes & destin	ations
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances	
	2.2	Bicycle skills training	
		Commuter travel	
BETTER	2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	
	2.3	Valet bike parking	
		Visitor travel	
BETTER	2.3.1	Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	

	TDM	measures: Non-residential developments	Check if proposed & add descriptions
	3.	TRANSIT	
	3.1	Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances	
BASIC	3.1.2	Provide online links to OC Transpo and STO information	
BETTER	3.1.3	Provide real-time arrival information display at entrances	
	3.2	Transit fare incentives	
		Commuter travel	
BETTER	3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	
BETTER	★ 3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	
		Visitor travel	
BETTER	3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	
	3.3	Enhanced public transit service	
		Commuter travel	
BETTER	3.3.1	Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	
		Visitor travel	
BETTER	3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	
	3.4	Private transit service	
		Commuter travel	
BETTER	3.4.1	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	
		Visitor travel	
BETTER	3.4.2	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	

	TDM	measures: Non-residential developments	Check if proposed & add descriptions
	4.	RIDESHARING	
	4.1	Ridematching service	
		Commuter travel	
BASIC ★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	
	4.2	Carpool parking price incentives	
		Commuter travel	
BETTER	4.2.1	Provide discounts on parking costs for registered carpools	
	4.3	Vanpool service	
		Commuter travel	
BETTER	4.3.1	Provide a vanpooling service for long-distance commuters	
	5.	CARSHARING & BIKESHARING	
	5.1	Bikeshare stations & memberships	
BETTER	5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	
		Commuter travel	1
BETTER	5.1.2	Provide employees with bikeshare memberships for local business travel	
	5.2	Carshare vehicles & memberships	
		Commuter travel	
BETTER	5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	
BETTER	5.2.2	Provide employees with carshare memberships for local business travel	
	6.	PARKING	
	6.1	Priced parking	
		Commuter travel	
BASIC ★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	
BASIC	6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	
		Visitor travel	1
BETTER	6.1.3	Charge for short-term parking (hourly)	

TDM Measures Checklist

Version 1.0 (30 June 2017)

	TDM	measures: Non-residential developments	Check if proposed & add descriptions
	7.	TDM MARKETING & COMMUNICATIONS	
	7.1	Multimodal travel information	
		Commuter travel	
BASIC ★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	
		Visitor travel	
BETTER ★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	
	7.2	Personalized trip planning	
		Commuter travel	
BETTER ★	7.2.1	Offer personalized trip planning to new/relocating employees	
	7.3	Promotions	
		Commuter travel	
BETTER	7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	
	8.	OTHER INCENTIVES & AMENITIES	
	8.1	Emergency ride home	
		Commuter travel	
BETTER ★	8.1.1	Provide emergency ride home service to non-driving commuters	
	8.2	Alternative work arrangements	
		Commuter travel	
BASIC ★	8.2.1	Encourage flexible work hours	
BETTER	8.2.2	Encourage compressed workweeks	
BETTER ★	8.2.3	Encourage telework	
	8.3	Local business travel options	
		Commuter travel	
BASIC ★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	
	8.4	Commuter incentives	
		Commuter travel	
BETTER	8.4.1	Offer employees a taxable, mode-neutral commuting allowance	
	8.5	On-site amenities	
		Commuter travel	
BETTER	8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	

TDM-Supportive Development Design and Infrastructure Checklist: *Residential Developments (multi-family or condominium)*

	Legend
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

	TDM-s	supportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	1.	WALKING & CYCLING: ROUTES	
	1.1	Building location & access points	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	\checkmark
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	\checkmark
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	\checkmark
	1.2	Facilities for walking & cycling	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official <i>Plan policy 4.3.12</i>)	

	TDM-s	supportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see Official Plan policy 4.3.10)	
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see Official Plan policy 4.3.10)	
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on- road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see Official Plan policy 4.3.11)	
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	\checkmark
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	
	1.3	Amenities for walking & cycling	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	

	TDM-s	supportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	2.	WALKING & CYCLING: END-OF-TRIP FACILI	TIES
	2.1	Bicycle parking	_
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see Official Plan policy 4.3.6)	
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well- used areas (see Zoning By-law Section 111)	complies with ZBL; bicycle storage lockers at grade
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored <i>(see Zoning By-law Section 111)</i>	
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	
	2.2	Secure bicycle parking	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see Zoning By-law Section 111)	bicycle parking provided at grade in locker room
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi- family residential developments	
	2.3	Bicycle repair station	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	
	3.	TRANSIT	
	3.1	Customer amenities	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	

	TDM-s	upportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	4.	RIDESHARING	
	4.1	Pick-up & drop-off facilities	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	
	5.	CARSHARING & BIKESHARING	
	5.1	Carshare parking spaces	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses <i>(see Zoning By-law Section 94)</i>	
	5.2	Bikeshare station location	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	
	6.	PARKING	
	6.1	Number of parking spaces	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly <i>(see Zoning By-law</i> <i>Section 104)</i>	
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking <i>(see Zoning By-law Section 111)</i>	
	6.2	Separate long-term & short-term parking areas	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	

TDM Measures Checklist:

Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER The measure could maximize support for users of sustainable modes, and optimize development performance

The measure is one of the most dependably effective tools to encourage the use of sustainable modes

	TDM	measures: Residential developments	Check if proposed & add descriptions
	1.	TDM PROGRAM MANAGEMENT	
	1.1	Program coordinator	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	
	1.2	Travel surveys	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	
	2.	WALKING AND CYCLING	
	2.1	Information on walking/cycling routes & des	tinations
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances (multi-family, condominium)	
	2.2	Bicycle skills training	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	

	TDM	measures: Residential developments	Check if proposed & add descriptions
	3.	TRANSIT	
	3.1	Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances (multi-family, condominium)	
BETTER	3.1.2	Provide real-time arrival information display at entrances (multi-family, condominium)	
	3.2	Transit fare incentives	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	
	3.3	Enhanced public transit service	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels <i>(subdivision)</i>	
	3.4	Private transit service	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	
	4.	CARSHARING & BIKESHARING	
	4.1	Bikeshare stations & memberships	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station (<i>multi-family</i>)	
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized <i>(multi-family)</i>	
	4.2	Carshare vehicles & memberships	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	
	5.	PARKING	
	5.1	Priced parking	
BASIC ★	5.1.1	Unbundle parking cost from purchase price (condominium)	
BASIC ★	5.1.2	Unbundle parking cost from monthly rent (multi-family)	

	TDM	measures: Residential developments	Check if proposed & add descriptions
	6.	TDM MARKETING & COMMUNICATIONS	
	6.1	Multimodal travel information	
BASIC ★	6.1.1	Provide a multimodal travel option information package to new residents	
	6.2	Personalized trip planning	
BETTER ★	6.2.1	Offer personalized trip planning to new residents	

Appendix E Intersection Performance Worksheets January 17, 2020

Appendix E INTERSECTION PERFORMANCE WORKSHEETS



Appendix E Intersection Performance Worksheets January 17, 2020

2019 Existing Conditions



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SB
ane Configurations	٦	^	1	٦	<u>†</u> †	1	ኘካ	≜ î≽			<u>ል</u> ካ	†
raffic Volume (veh/h)	173	1069	128	54	487	377	83	744	99	17	291	45
uture Volume (veh/h)	173	1069	128	54	487	377	83	744	99	17	291	45
nitial Q (Qb), veh	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		0.97		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				N
Adj Sat Flow, veh/h/ln	1800	1772	1758	1772	1730	1786	1730	1786	1786		1786	178
Adi Flow Rate, veh/h	192	1188	0	60	541	0	92	827	101		323	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.9
Percent Heavy Veh, %	0	2	3	2	5	1	5	1	1		1	
Cap, veh/h	164	1160		77	967		143	837	102		377	108
Arrive On Green	0.10	0.34	0.00	0.05	0.29	0.00	0.04	0.28	0.28		0.11	0.3
Sat Flow, veh/h	1714	3367	1490	1688	3287	1514	3196	3033	370		3300	314
Grp Volume(v), veh/h	192	1188	0	60	541	0	92	463	465		323	27
Grp Sat Flow(s), veh/h/ln	1714	1683	1490	1688	1643	1514	1598	1697	1706		1650	169
Q Serve(g s), s	11.5	41.4	0.0	4.2	16.7	0.0	3.4	32.6	32.6		11.5	15
Cycle Q Clear(g_c), s	11.5	41.4	0.0	4.2	16.7	0.0	3.4	32.6	32.6		11.5	15
Prop In Lane	1.00		1.00	1.00	10.1	1.00	1.00	02.0	0.22		1.00	10.
Lane Grp Cap(c), veh/h	164	1160	1.00	77	967	1.00	143	468	471		377	58
V/C Ratio(X)	1.17	1.02		0.78	0.56		0.64	0.99	0.99		0.86	0.4
Avail Cap(c a), veh/h	164	1160		162	967		384	468	471		396	58
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00		1.00	1.0
Uniform Delay (d), s/veh	54.2	39.3	0.0	56.7	35.8	0.0	56.4	43.3	43.3		52.2	30.
Incr Delay (d2), s/veh	122.8	32.7	0.0	15.9	2.3	0.0	4.8	38.5	38.4		16.3	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
%ile BackOfQ(95%),veh/In	17.2	31.7	0.0	4.0	11.9	0.0	2.8	26.6	26.7		9.9	11
Unsig. Movement Delay, s/veh			5.10			22.60						
LnGrp Delay(d),s/veh	177.1	72.0	5.1	72.6	38.1	22.6	61.1	81.8	81.7		68.4	31.
LnGrp LOS	F	F	A	E	D	C	E	F	F		E	
Approach Vol, veh/h		1522	А		1020	A		1020				87
Approach Delay, s/veh		79.0			33.8			79.9				44.
Approach LOS		E			C			E				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	47.8	20.3	40.0	18.0	41.7	12.0	48.3				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	34.6	14.4	* 33	11.5	34.6	14.4	* 33				
Max Q Clear Time (g_c+l1), s	6.2	43.4	13.5	34.6	13.5	18.7	5.4	17.3				
Green Ext Time (p_c), s	0.1	0.0	0.2	0.0	0.0	6.8	0.2	7.0				
ntersection Summary												
HCM 6th Ctrl Delay			62.1									
HCM 6th LOS			E									
			-									
Notes												
Jser approved ignoring U-Tur												
* HCM 6th computational engi												
Unsignalized Delay for [EBR,)	NBR] is i	ncluded ir	n caiculat	ions of th	e approad	ch delay a	ind inters	ection del	ay.			

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

	*
Movement	SBR
Lanconfigurations	
Traffic Volume (veh/h)	49
Future Volume (veh/h)	49
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	46
Peak Hour Factor	0.90
Percent Heavy Veh, %	1
Cap, veh/h	98
Arrive On Green	0.35
Sat Flow, veh/h	282
Grp Volume(v), veh/h	281
Grp Sat Flow(s),veh/h/ln	1728
Q Serve(g_s), s	15.3
Cycle Q Clear(g_c), s	15.3
Prop In Lane	0.16
Lane Grp Cap(c), veh/h	597
V/C Ratio(X)	0.47
Avail Cap(c_a), veh/h	597
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	30.7
Incr Delay (d2), s/veh	0.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	11.4
Unsig. Movement Delay, s/v	
LnGrp Delay(d),s/veh	31.3
LnGrp LOS	С
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

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HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Synchro 10 Report Page 2

12/20/2019

HCM 6th Signalized Intersection Summary

	⊁	-	+		1	1
Movement	EBL	EBT	WBT	WBR	SBL	SBR
	5	44		TUDIX	N N	1
Lane Configurations			†]			
Traffic Volume (veh/h)	56	1369	894	61	39	44
Future Volume (veh/h)	56	1369	894	61	39	44
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact		No	No		No	
	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	62	1521	993	64	43	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	458	2799	2391	154	116	103
Arrive On Green	0.04	0.83	0.74	0.74	0.07	0.07
Sat Flow, veh/h	1688	3455	3298	207	1688	1502
Grp Volume(v), veh/h	62	1521	521	536	43	9
Grp Sat Flow(s), veh/h/ln		1683	1683	1733	1688	1502
Q Serve(q_s), s	0.9	16.7	13.7	13.7	2.9	0.7
Cycle Q Clear(g_c), s	0.9	16.7	13.7	13.7	2.9	0.7
Prop In Lane	1.00	10.7	10.7	0.12	1.00	1.00
		2799	1254	1291	116	103
Lane Grp Cap(c), veh/h						
V/C Ratio(X)	0.14	0.54	0.42	0.42	0.37	0.09
Avail Cap(c_a), veh/h	523	2799	1254	1291	450	400
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh		3.1	5.6	5.6	53.4	52.4
Incr Delay (d2), s/veh	0.1	0.8	1.0	1.0	2.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh	/lr0.6	10.0	9.5	9.7	2.5	1.1
Unsig. Movement Delay						
LnGrp Delay(d),s/veh	3.8	3.9	6.7	6.6	55.4	52.7
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h		1583	1057		52	
Approach Delay, s/veh		3.9	6.6		54.9	
Approach LOS		A	A		D	
		2	A	4	5	6
Timer - Assigned Phs						
Phs Duration (G+Y+Rc),		105.6		14.4	10.4	95.2
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gma		* 76		* 32	9.0	* 61
Max Q Clear Time (g_c+		18.7		4.9	2.9	15.7
Green Ext Time (p_c), s	1	44.6		0.2	0.1	25.0
Intersection Summary						
	_		5.9			
HCM 6th Ctrl Delay						
HCM 6th Ctrl Delay HCM 6th LOS			5.9 A			

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

Intersection Int Delay, s/veh 0.3 Movement WBL Movement WBL Lane Configurations Traffic Vol, veh/h 0 Future Vol, veh/h 0 Conflicting Peds, #hr 0 Sign Control Stop RT Channelized -Storage Length -Veh in Median Storage, # 0 Grade, % 0 Peak Hour Factor 90
 WBL
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Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	1	2	1
Mvmt Flow	0	48	1373	83	0	869
Major/Minor	Minor1	1	Major1	Μ	lajor2	
Conflicting Flow All	-	696	0	-	-	-
Stage 1		-	-	-	-	-
Stage 2	-	-		-	-	
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	384	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	381	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	15.8		0		0	
HCM LOS	С					
Minor Lane/Major Mvr	nt	NBTV	VBLn1	SBT		
Capacity (veh/h)			381	-		
HCM Lane V/C Ratio			0.125			
HCM Control Delay (s)	-	15.8	-		
HCM Lane LOS	,	-	С	-		
HCM 95th %tile Q(veh	n)	-	0.4	-		

0

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EBR 220 220 0 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.00 1.00	WBL 118 118 118 118 118 118 118 118 118 118 118 118 118 118 118 118 111	WBT ↑↑ 1146 1146 1146 0 0 0 100 No 1772 1273 1155 1.00 1155 1.00 1.00 1.00 2 1155 1.00 1.00 42.7	WBR # 529 529 0 1.00 1.00 1786 0 0.90 1 0.00 1514 0.0 1514 0.0 1.00 1.00 0.00 0.00 0.00	NBL 295 295 0 1.00 1.00 1786 328 0.90 1 366 0.11 3300 12.8 1650 12.8 1.00 366 0.90 366 0.90 366 0.90 366 0.90 366 0.90 366 0.90 366 0.90 366 0.90 366	NBT ↑↑> 768 768 768 768 768 768 768 768 768 768 768 768 768 768 768 853 0.90 1786 853 0.90 1 792 0.21 3111 465 1697 33.1 432 1.08 432 1.00	NBR 80 80 0 0.95 1.00 1786 82 0.90 176 0.25 1 76 0.299 470 1714 33.1 0.17 436 1.00 1.00	<u>SBU</u> 29 23	SBL 341 341 0 1.00 1.00 1.00 1786 379 0.90 1 366 0.11 3309 1650 14.4 1.04 366 1.04 366 1.00	SE 61 61 61 1.0 80 68 0.9 77 0.2 305 38 171 27 27 43 0.8 43 43
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1786 0.90 1 0.00 1514 0 1514 0.0 1514 0.0 1.00 1.00 1.00 0.00 0.0	1786 131 0.00 1 150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	No 1772 1273 0.90 2 1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1786 0.90 1 0.00 1514 0 1514 0.0 1.00 1.00	1786 328 0.90 1 366 0.11 3300 328 1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	No 1786 853 0.90 1 792 0.25 3111 465 1697 33.1 33.1 33.1 432 1.08 432 1.00	1786 82 0.90 1 76 0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		1786 379 0.90 1 366 0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	18 6 0.: 7 0. 30 30 30 31 7 27 27 4 0. 4
0 0.90 1 0.00 1514 0 1514 0.0 1.514 0.0 1.00 1.00 1.00 0.00 0.0	131 0.90 1 150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 0.87 1.00 1.00 1.00	No 1772 1273 0.90 2 1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0 0.90 1 0.00 1514 0 1514 0.0 1.00 1.00	328 0.90 1 366 0.11 3300 328 1650 12.8 12.8 1.28 1.00 366 0.90 366 1.00 1.00	No 1786 853 0.90 1 792 0.25 3111 465 1697 33.1 33.1 33.1 432 1.08 432 1.00	82 0.90 1 76 0.25 299 470 1714 33.1 33.1 33.1 33.1 436 1.08 436 1.00		379 0.90 1 366 0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	18 6 0.: 7 0. 30 30 30 31 7 27 27 4 0. 4
0 0.90 1 0.00 1514 0 1514 0.0 1.514 0.0 1.00 1.00 1.00 0.00 0.0	131 0.90 1 150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 0.87 1.00 1.00 1.00	1273 0.90 2 1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0 0.90 1 0.00 1514 0 1514 0.0 1.00 1.00	328 0.90 1 366 0.11 3300 328 1650 12.8 12.8 1.28 1.00 366 0.90 366 1.00 1.00	853 0.90 1 792 0.25 3111 465 1697 33.1 33.1 33.1 432 1.08 432 1.00	82 0.90 1 76 0.25 299 470 1714 33.1 33.1 33.1 33.1 436 1.08 436 1.00		379 0.90 1 366 0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	6 0. 30 30 317 27 27 4 0. 4
0.90 1 0.00 1514 0 1514 0.0 0.0 1.00 1.00 0.00 0.0 0.0	0.90 1 150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	0.90 2 1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0.90 1 0.00 1514 0 1514 0.0 0.0 1.00 1.00 0.00	328 0.90 1 366 0.11 3300 328 1650 12.8 12.8 1.28 1.00 366 0.90 366 1.00 1.00	0.90 1 792 0.25 3111 465 1697 33.1 33.1 432 1.08 432 1.00	0.90 1 76 0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		0.90 1 366 0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	66 0.1 30 30 31 17 27 27 41 0.1 41 41
1 0.00 1514 0 1514 0.0 0.0 1.00 1.00 1.00 0.00 0.0	1 150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	0.90 2 1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1 0.00 1514 0 1514 0.0 0.0 1.00 1.00	0.90 1 366 0.11 3300 328 1650 12.8 1.00 366 0.90 366 1.00 1.00	1 792 0.25 3111 465 1697 33.1 33.1 432 1.08 432 1.00	1 76 0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		1 366 0.11 3300 379 1650 14.4 14.4 14.4 1.00 366 1.04 366	7 0.3 30 31 17 27 27 27 4 3 0.4 4
0.00 1514 0 1514 0.0 0.0 1.00 1.00 1.00 0.00 0.0	150 0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	1155 0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0.00 1514 0 1514 0.0 0.0 1.00 1.00	366 0.11 3300 328 1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	792 0.25 3111 465 1697 33.1 33.1 33.1 432 1.08 432 1.00	76 0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		366 0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	0.3 30 17 27 27 43 0.4 43
1514 0 1514 0.0 0.0 1.00 1.00 1.00 0.00 0.0	0.09 1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1514 0 1514 0.0 1.00 1.00	0.11 3300 328 1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	0.25 3111 465 1697 33.1 33.1 432 1.08 432 1.00	0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		0.11 3300 379 1650 14.4 14.4 1.00 366 1.04 366	0.3 30 17 27 27 43 0.4 43
1514 0 1514 0.0 0.0 1.00 1.00 1.00 0.00 0.0	1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	0.34 3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1514 0 1514 0.0 1.00 1.00	0.11 3300 328 1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	0.25 3111 465 1697 33.1 33.1 432 1.08 432 1.00	0.25 299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		3300 379 1650 14.4 14.4 1.00 366 1.04 366	0.3 30 17 27 27 43 0.4 43
1514 0 1514 0.0 0.0 1.00 1.00 1.00 0.00 0.0	1701 131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	3367 1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1514 0 1514 0.0 1.00 1.00	3300 328 1650 12.8 1.00 366 0.90 366 1.00 1.00	3111 465 1697 33.1 33.1 432 1.08 432 1.00	299 470 1714 33.1 33.1 0.17 436 1.08 436 1.00		3300 379 1650 14.4 14.4 1.00 366 1.04 366	305 38 171 27 27 43 0.8 43
0 1514 0.0 1.00 1.00 1.00 0.00 0.0	131 1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	1273 1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0 1514 0.0 0.0 1.00 1.00	328 1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	465 1697 33.1 33.1 432 1.08 432 1.00	470 1714 33.1 33.1 0.17 436 1.08 436 1.00		379 1650 14.4 14.4 1.00 366 1.04 366	38 171 27 27 43 0.8 43
1514 0.0 0.0 1.00 1.00 0.00 0.0	1701 9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	1683 44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	1514 0.0 0.0 1.00 1.00 1.00 0.00	1650 12.8 12.8 1.00 366 0.90 366 1.00 1.00	1697 33.1 33.1 432 1.08 432 1.00	1714 33.1 33.1 0.17 436 1.08 436 1.00		1650 14.4 14.4 1.00 366 1.04 366	17 27 27 4: 0.4 4:
0.0 0.0 1.00 1.00 0.00 0.0	9.9 9.9 1.00 150 0.87 150 1.00 1.00 58.5	44.6 44.6 1155 1.10 1155 1.00 1.00 42.7	0.0 0.0 1.00 1.00	12.8 12.8 1.00 366 0.90 366 1.00 1.00	33.1 33.1 432 1.08 432 1.00	33.1 33.1 0.17 436 1.08 436 1.00		14.4 14.4 1.00 366 1.04 366	27 27 43 0.4
0.0 1.00 1.00 0.00 0.0	9.9 1.00 150 0.87 150 1.00 1.00 58.5	44.6 1155 1.10 1155 1.00 1.00 42.7	0.0 1.00 1.00 0.00	12.8 1.00 366 0.90 366 1.00 1.00	33.1 432 1.08 432 1.00	33.1 0.17 436 1.08 436 1.00		14.4 1.00 366 1.04 366	27 4: 0.1 4:
1.00 1.00 0.00 0.0	1.00 150 0.87 150 1.00 1.00 58.5	1155 1.10 1155 1.00 1.00 42.7	1.00 1.00 0.00	1.00 366 0.90 366 1.00 1.00	432 1.08 432 1.00	0.17 436 1.08 436 1.00		1.00 366 1.04 366	43 0.8 43
1.00 0.00 0.0	150 0.87 150 1.00 1.00 58.5	1.10 1155 1.00 1.00 42.7	1.00	366 0.90 366 1.00 1.00	1.08 432 1.00	436 1.08 436 1.00		366 1.04 366	0.8 43
0.00 0.0	0.87 150 1.00 1.00 58.5	1.10 1155 1.00 1.00 42.7	0.00	0.90 366 1.00 1.00	1.08 432 1.00	1.08 436 1.00		1.04 366	0.8 43
0.00 0.0	150 1.00 1.00 58.5	1155 1.00 1.00 42.7	0.00	366 1.00 1.00	432 1.00	436 1.00		366	43
0.00 0.0	1.00 1.00 58.5	1.00 1.00 42.7	0.00	1.00 1.00	1.00	1.00			
0.00 0.0	1.00 58.5	1.00 42.7	0.00	1.00					
0.0	58.5	42.7			1.00			1.00	1.0
					40.0				
	38.0			57.1	48.5	48.5		57.8 57.0	46
	0.0	59.1	0.0	23.8	65.4	65.2			17
0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0
0.0	10.1	40.3	0.0	11.0	31.7	32.0		14.4	21
15.40	07.4	101.0	50.60			440.7			~ ~ ~
15.4	97.1	101.8	50.6	80.9	113.9	113.7		114.8	64
В	F	F	D	F	F	F		F	
A		1992	А		1263				114
		86.3			105.2				81
		F			F				
3	4	5	6	7	8				
21.0	40.0	18.0	51.0	21.0	40.0				
6.6	* 6.9	6.5	6.4	6.6	* 6.9				
14.4	* 33	11.5	44.6	14.4	* 33				
0.0	0.0	0.0	0.0	0.0	2.4				
82.7									
						av			
	16.4 0.0 82.7 F	16.4 35.1 0.0 0.0 82.7 F	16.4 35.1 13.5 0.0 0.0 0.0 82.7 F	16.4 35.1 13.5 46.6 0.0 0.0 0.0 0.0 82.7 F - clearance times for the phases crossic calculations of the approach delay as the app	16.4 35.1 13.5 46.6 14.8 0.0 0.0 0.0 0.0 0.0 82.7 F F Image: Second Se	16.4 35.1 13.5 46.6 14.8 29.9 0.0 0.0 0.0 0.0 0.0 2.4 82.7 F - - - - clearance times for the phases crossing the barrier. -	16.4 35.1 13.5 46.6 14.8 29.9 0.0 0.0 0.0 0.0 2.4 82.7 F clearance times for the phases crossing the barrier. calculations of the approach delay and intersection delay.	16.4 35.1 13.5 46.6 14.8 29.9 0.0 0.0 0.0 0.0 2.4 82.7 F clearance times for the phases crossing the barrier. calculations of the approach delay and intersection delay.	16.4 35.1 13.5 46.6 14.8 29.9 0.0 0.0 0.0 0.0 2.4 82.7 F clearance times for the phases crossing the barrier. calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road J

12/20/2019

Movement	SBR
	SBK
LanesConfigurations	70
Traffic Volume (veh/h)	79
Future Volume (veh/h)	79
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.94
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1800
Adj Flow Rate, veh/h	80
Peak Hour Factor	0.90
Percent Heavy Veh, %	0
Cap, veh/h	91
Arrive On Green	0.25
Sat Flow, veh/h	358
Grp Volume(v), veh/h	381
Grp Sat Flow(s),veh/h/ln	1706
Q Serve(g_s), s	27.9
Cycle Q Clear(g_c), s	27.9
Prop In Lane	0.21
Lane Grp Cap(c), veh/h	434
V/C Ratio(X)	0.88
Avail Cap(c_a), veh/h	434
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	46.5
Incr Delay (d2), s/veh	18.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	
Unsig. Movement Delay, s/	veh
LnGrp Delay(d),s/veh	64.5
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

1357 Baseline Road 09/16/2019 2019 Existing PM

Synchro 10 Report Page 2

12/20/2019

HCM 6th Signalized Intersection Summary

			-		1	,
	/	+	-	~	*	*
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	3	44	≜ 1₀		1	1
Traffic Volume (veh/h)	107	1292	1651	156	167	165
Future Volume (veh/h)	107	1292	1651	156	167	165
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact	h	No	No		No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	119	1436	1834	167	186	84
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	169	2609	2155	193	224	199
Arrive On Green	0.04	0.78	0.69	0.69	0.13	0.13
Sat Flow, veh/h	1688	3455	3208	279	1688	1502
Grp Volume(v), veh/h	119	1436	975	1026	186	84
Grp Sat Flow(s),veh/h/ln	1688	1683	1683	1715	1688	1502
Q Serve(q s), s	2.5	21.8	55.3	59.8	14.0	6.7
Cycle Q Clear(g c), s	2.5	21.8	55.3	59.8	14.0	6.7
Prop In Lane	1.00			0.16	1.00	1.00
Lane Grp Cap(c), veh/h	169	2609	1163	1185	224	199
V/C Ratio(X)	0.70	0.55	0.84	0.87	0.83	0.42
Avail Cap(c a), veh/h	209	2609	1163	1185	415	370
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	n 30.7	5.7	14.7	15.5	55.0	51.8
Incr Delay (d2), s/veh	7.8	0.8	7.3	8.6	7.8	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh		13.3	32.7	35.9	11.1	9.7
Unsig. Movement Delay						
LnGrp Delay(d),s/veh	38.5	6.6	22.0	24.0	62.7	53.2
LnGrp LOS	D	A	С	С	E	D
Approach Vol, veh/h		1555	2001		270	
Approach Delay, s/veh		9.0	23.1		59.8	
Approach LOS		A	С		E	
Timer Assigned Dis		2		4	5	6
Timer - Assigned Phs Phs Duration (G+Y+Rc).		2 106.6		23.4	10.9	95.6
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gma		* 86		* 32	6.0 8.0	* 72
Max Q Clear Time (g c+				16.0	4.5	61.8
Green Ext Time (p_c), s		44.9		1.3	4.5	10.2
Green Ext Time (p_c), s		44.9		1.0	0.1	10.2
Intersection Summary						
HCM 6th Ctrl Delay			19.9			
			В			
HCM 6th LOS						

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	- 11	1		***
Traffic Vol, veh/h	0	151	1331	150		1004
Future Vol, veh/h	0	151	1331	150	0	1004
Conflicting Peds, #/hr	0	31	0	31	0	0
Sign Control	Stop	Stop	Free	Free		Free
RT Channelized		Stop	-	Free		None
Storage Length	-	0	-	450		-
Veh in Median Storage			0			0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	0	168	1479	167	0	1116
Major/Minor I	Minor1	,	Majort		laia n	
			Major1		Major2	
Conflicting Flow All		771	0	-		
Stage 1	-	-	-			-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-		-
Critical Hdwy Stg 1	-	-	-	-		-
Critical Hdwy Stg 2			-			-
Follow-up Hdwy	-	3.32	-			-
Pot Cap-1 Maneuver	0	343	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	333	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-		-
Stage 1	-	-	-	-	-	-
Stage 2	-		-	-		-
					0.0	
Approach	WB		NB		SB	
HCM Control Delay, s	26.3		0		0	
HCM LOS	D					
Minor Lane/Major Mvm	ıt	NRTV	VBLn1	SBT		
Capacity (veh/h)		-	333	-		
HCM Lane V/C Ratio			0.504			
HCM Control Delay (s)			26.3			
HCM Lane LOS			20.3 D	-		
			2.7			
HCM 95th %tile Q(veh)		-	2.1			

Appendix E Intersection Performance Worksheets January 17, 2020

2022 Future Background Conditions – Original Signal Timing Plans



	۶		\mathbf{r}	1	-	*	1	Ť	r	LA	1	ŧ
Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SE
ane Configurations	٦	^	1	3	† †	1	ኘኘ	≜ †⊅			31	Ť
raffic Volume (veh/h)	184	1166	136	60	546	420	91	795	108	18	317	4
uture Volume (veh/h)	184	1166	136	60	546	420	91	795	108	18	317	4
nitial Q (Qb), veh	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		0.97		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.
Nork Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1800	1772	1758	1772	1730	1786	1730	1786	1786		1786	17
Adj Flow Rate, veh/h	184	1166	0	60	546	0	91	795	100		317	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.1
Percent Heavy Veh, %	0	2	3	2	5	1	5	1	1		1	
Cap, veh/h	164	1166		77	972		142	833	105		372	10
Arrive On Green	0.10	0.35	0.00	0.05	0.30	0.00	0.04	0.28	0.28		0.11	0.3
Sat Flow, veh/h	1714	3367	1490	1688	3287	1514	3196	3021	380		3300	31
Grp Volume(v), veh/h	184	1166	0	60	546	0	91	446	449		317	2
Grp Sat Flow(s),veh/h/ln	1714	1683	1490	1688	1643	1514	1598	1697	1704		1650	16
Q Serve(g s), s	11.5	41.5	0.0	4.2	16.8	0.0	3.4	31.0	31.0		11.3	14
Cycle Q Clear(q c), s	11.5	41.5	0.0	4.2	16.8	0.0	3.4	31.0	31.0		11.3	14
Prop In Lane	1.00	41.0	1.00	1.00	10.0	1.00	1.00	31.0	0.22		1.00	14
ane Grp Cap(c), veh/h	164	1166	1.00	77	972	1.00	142	468	470		372	5
//C Ratio(X)	1.12	1.00		0.78	0.56		0.64	0.95	0.95		0.85	0.4
Avail Cap(c a), veh/h	1.12	1166		162	972		384	468	470		396	5
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Jostream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00		1.00	1.0
Jniform Delay (d), s/veh	54.2	39.2	0.00	56.7	35.7	0.00	56.4	42.7	42.7		52.3	30
	106.1	26.4	0.0	15.9	2.3	0.0	4.8	30.2	30.2		15.6	
ncr Delay (d2), s/veh												0
nitial Q Delay(d3),s/veh	0.0 15.9	0.0	0.0	0.0	0.0 12.0	0.0	0.0	0.0 24.5	0.0 24.6		0.0 9.7	
%ile BackOfQ(95%),veh/In Jnsig. Movement Delay, s/veh		30.1	4.60	4.0	12.0	22.00	2.1	24.0	24.0		9.7	10
	160.3	65.7	4.60	72.6	38.0	22.00	61.2	72.9	72.9		67.8	31
_nGrp Delay(d),s/veh	100.5 F	65.7 F		72.0 E	30.0 D	22.0 C	61.2 E	72.9 E	72.9 E		67.6 E	31
InGrp LOS	г		A	E			E		E		E	
Approach Vol, veh/h		1486	A		1026	A		986				8
Approach Delay, s/veh		71.8			33.5			71.8				44
Approach LOS		E			С			E				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	47.9	20.1	40.0	18.0	41.9	11.9	48.2				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	34.6	14.4	* 33	11.5	34.6	14.4	* 33				
Max Q Clear Time (g c+l1), s	6.2	43.5	13.3	33.0	13.5	18.8	5.4	16.5				
Green Ext Time (p_c), s	0.1	0.0	0.2	0.0	0.0	6.9	0.2	6.9				
ntersection Summary												
HCM 6th Ctrl Delay			57.5									
HCM 6th LOS			E									
			-									
Votes												
Jser approved ignoring U-Turr HCM 6th computational engin	ne requir	es equal (
Unsignalized Delay for [EBR, W												

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

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	-
Movement	SBR
Lanconfigurations	
Traffic Volume (veh/h)	52
Future Volume (veh/h)	52
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	45
Peak Hour Factor	1.00
Percent Heavy Veh, %	1
Cap, veh/h	99
Arrive On Green	0.34
Sat Flow, veh/h	289
Grp Volume(v), veh/h	269
Grp Sat Flow(s),veh/h/ln	1726
Q Serve(g_s), s	14.5
Cycle Q Clear(g_c), s	14.5
Prop In Lane	0.17
Lane Grp Cap(c), veh/h	594
V/C Ratio(X)	0.45
Avail Cap(c_a), veh/h	594
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	30.6
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	10.9
Unsig. Movement Delay, s/v	
LnGrp Delay(d),s/veh	31.1
LnGrp LOS	С
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Timer - Assigned PIIS	

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HCM 6th Signalized Intersection Summary

			100000			
	1	→	+	~	1	-
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	44	≜ 1₀		1	1
Traffic Volume (veh/h)	56	1503	997	61	39	44
Future Volume (veh/h)	56	1503	997	61	39	44
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A pbT)	1.00	0	0	0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact		No	No	1.00	No	1.00
	1772	1772	1772	1772		1772
Adj Sat Flow, ven/h/m Adi Flow Rate, veh/h	56	1503	997	57	39	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	460	2808	2423	139	111	99
Arrive On Green	0.04	0.83	0.75	0.75	0.07	0.07
Sat Flow, veh/h	1688	3455	3324	185	1688	1502
Grp Volume(v), veh/h	56	1503	519	535	39	8
Grp Sat Flow(s),veh/h/ln	1688	1683	1683	1737	1688	1502
Q Serve(g_s), s	0.8	16.1	13.4	13.4	2.7	0.6
Cycle Q Clear(q c), s	0.8	16.1	13.4	13.4	2.7	0.6
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h		2808	1261	1301	111	99
V/C Ratio(X)	0.12	0.54	0.41	0.41	0.35	0.08
Avail Cap(c a), veh/h	527	2808	1261	1301	450	400
HCM Platoon Ratio	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	1.00
				5.5	53.6	52.6
Uniform Delay (d), s/veh		3.0	5.5			
Incr Delay (d2), s/veh	0.1	0.7	1.0	1.0	1.9	0.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh		9.6	9.3	9.5	2.3	0.9
Unsig. Movement Delay						
LnGrp Delay(d),s/veh	3.7	3.7	6.5	6.4	55.5	53.0
LnGrp LOS	Α	A	A	A	E	D
Approach Vol, veh/h		1559	1054		47	
Approach Delay, s/veh		3.7	6.4		55.0	
Approach LOS		Α	Α		E	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc)		105.9		14.1	10.2	95.7
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gm		* 76		* 32	9.0	* 61
Max Q Clear Time (g_c+		18.1		4.7	2.8	15.4
Green Ext Time (p_c), s		44.5		0.2	0.1	25.0
Internetion Cummon						
Intersection Summary		_	67			
HCM 6th Ctrl Delay HCM 6th LOS			5.7 A			

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TYDE	1 I		TIDIN	ODL	
Traffic Vol. veh/h	0	43	1342	75	0	838
Future Vol. veh/h	0	43	1342	75	0	838
Conflicting Peds, #/hr	0	43	1342	/5	0	030
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	
Storage Length	-	0	-	450		-
Veh in Median Storage			0	-		0
Grade, %	0		0			0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	2	1
Mvmt Flow	0	43	1342	75	0	838
Major/Minor	Minor1	,	Major1		Major2	
Conflicting Flow All	-	680	0	-		-
Stage 1		-	-			
Stage 2	-	-	-	-		-
Critical Hdwy		6.94	-			-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2		-	-		-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	393	-	0	0	-
Stage 1	0		-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %	-			-	-	
Mov Cap-1 Maneuver	-	390	-	-		-
Mov Cap-2 Maneuver				-		
Stage 1						
Stage 2		-		-		
Approach	WB		NB		SB	
HCM Control Delay, s	15.4		0		0	
HCM LOS	C					
1011200	Ŭ					
Minor Lane/Major Mvm	nt	NBIN	VBLn1	SBT		
Capacity (veh/h)		-	390			
HCM Lane V/C Ratio		-	0.11	-		
HCM Control Delay (s)	1	-	15.4	-		
HCM Lane LOS		-	С	-		
HCM 95th %tile Q(veh)	-	0.4	-		

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lovement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SE
ane Configurations	5	††	1	5	† †	1	ሻሻ	≜î ≽			31	Ť
raffic Volume (veh/h)	165	956	233	129	1260	578	326	840	88	31	375	6
uture Volume (veh/h)	165	956	233	129	1260	578	326	840	88	31	375	65
nitial Q (Qb), veh	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		0.95		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				1
Adj Sat Flow, veh/h/ln	1772	1772	1786	1786	1772	1786	1786	1786	1786		1786	18
Adj Flow Rate, veh/h	165	956	0	129	1260	0	326	840	82		375	65
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	2	2	1	1	2	1	1	1	1		1	
Cap, veh/h	149	1155		150	1155		366	791	77		366	77
Arrive On Green	0.09	0.34	0.00	0.09	0.34	0.00	0.11	0.25	0.25		0.11	0.2
Sat Flow, veh/h	1688	3367	1514	1701	3367	1514	3300	3106	303		3300	305
Grp Volume(v), veh/h	165	956	0	129	1260	0	326	459	463		375	36
Grp Sat Flow(s), veh/h/ln	1688	1683	1514	1701	1683	1514	1650	1697	1713		1650	171
Q Serve(q_s), s	11.5	33.9	0.0	9.7	44.6	0.0	12.7	33.1	33.1		14.4	26
Cycle Q Clear(q c), s	11.5	33.9	0.0	9.7	44.6	0.0	12.7	33.1	33.1		14.4	26
Prop In Lane	1.00	00.0	1.00	1.00	44.0	1.00	1.00	00.1	0.18		1.00	20
ane Grp Cap(c), veh/h	149	1155	1.00	150	1155	1.00	366	432	436		366	43
//C Ratio(X)	1.11	0.83		0.86	1.09		0.89	1.06	1.06		1.03	0.8
Avail Cap(c a), veh/h	149	1155		150	1155		366	432	436		366	43
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.52	430		1.00	4.
Jpstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00		1.00	1.0
Jniform Delay (d), s/veh	59.2	39.2	0.00	58.4	42.7	0.00	57.0	48.5	48.5		57.8	45
ncr Delay (d2), s/veh	104.7	6.9	0.0	35.8	54.8	0.0	22.9	60.7	60.6		53.9	13
nitial 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
%ile BackOfQ(95%),veh/ln	15.1	22.4	0.0	9.8	39.2	0.0	10.9	30.8	31.0		14.2	19
Jnsig. Movement Delay, s/veh		22.4	14.50	9.0	39.Z	46.70	10.9	30.0	31.0		14.2	19
	163.9	46.1	14.50	94.3	97.5	46.7	80.0	109.2	109.0		111.7	59
_nGrp Delay(d),s/veh _nGrp LOS	103.9 F	40.1 D	14.5 B	94.5 F	97.5 F	40.7 D	60.0 E	109.2 F	109.0 F		F	
	г			г			E		г		г	
Approach Vol, veh/h		1354	A		1967	A		1248				110
Approach Delay, s/veh		55.0			82.4			101.5				77
Approach LOS		D			F			F				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	51.0	21.0	40.0	18.0	51.0	21.0	40.0				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	44.6	14.4	* 33	11.5	44.6	14.4	* 33				
Max Q Clear Time (g c+11), s	11.7	35.9	16.4	35.1	13.5	46.6	14.7	28.3				
Green Ext Time (p_c), s	0.0	6.7	0.0	0.0	0.0	0.0	0.0	3.3				
ntersection Summary												
HCM 6th Ctrl Delay			79.0									
HCM 6th LOS			E									
Votes												
User approved ignoring U-Turn HCM 6th computational engine			clearance	times for	r the phas	ses crossi	ng the ba	irrier.				
Unsignalized Delay for [EBR, \	NBR] is i	included i	n calculat	ions of th	e approa	ch delay a	ind inters	ection de	lay.			

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

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Avement aft Disordigurations raftic Volume (vehh) viture Volume (vehh) viture Volume (vehh) viture Volume (vehh) viture Volume (vehh) viture Volume (vehh) viture Volk Zanc On Approach vitig Sat How, vehh vehh Vehk, vehh vehh Vehk, vehh zerent Heavy Veh, % Zap, vehh vehh vehh Sat Flow, v	*
art (Garacians) iraffic Volume (vehh) iraffic Volume (vehh) hinla (2 (b), veh Vet 2 Note (Vehh) hinla (2 (b), veh Vet 2 Note On Approach (y) Sat Flow, vehh) Vet 2 Anoe On Approach (y) Flow Rate, vehh Pack Hoar, vehh Nation Paler, vehh Pack Hoar, vehh Nation Paler, vehh Artop Delay(d), sheh nich Delay (d), sheh nich Delay (d), sheh nich Delay (d), sheh hich Delay, vehh	SBR
'uture Yolume' (vehh) 'nitial Q (0b), veh Yed-Bike Adj(A, pbT) Yed-Bike Adj(A, pbT) Yerk Zone On Approach (dj Sat Flow, vehh)n Yenk Hon Factor Yerendt Heavy Veh, % Zap, vehh Yerendt Heavy Veh, % Zap, vehh Sar Volg, vehh Sar Volg, vehh Sar Volg, s), s Yolde O Clear(g, c), s North Clear(g), s Add Clear(g, c), s North Clear(g), s Movement Delay, s/veh Aforp Delay(d), sheh	
nitial O (D), veh 44-Bike Adj(A, pbT) Parking Bus, Adj 164-Bike Adj(A, pbT) Parking Bus, Adj 163-Bit Dow, Vehhlm 163-Bit Dow, Vehhlm 164-Bit Dow, Pach 164-Bit Dow, Pach 164-Bi	84
Ped-Bike Adj(A, pbT) Parking Bus, Adj Vork Zone On Approach dig Sat Flow, vehhlvin dig Sat Flow, vehhlvin Peak Hour Factor Perent Heavy Veh, % Zap, vehh vehv Gon Green Sat Flow, vehvlin Sar Volume(v), vehvlin Sig Sat Flow(s), vehvlin Sar Sat Flow(s), vehvlin Sar Sat	84
Parking Bus, Adj Verk Zone On Approach Verk Zone On Approach Verk Zone On Approach Verk Zone On Approach Parcent Heavy Verh, % Say, vehnh Say, vehnh Say, Vehnh Say, Vehnh Say, Vehnh Say Say, Vehnh Say Say, Vehnh Sayrel G, Sayrel M, Sayrel Vehn Sayrel G, Sayrel Vehn Sayrel G, Sayrel Vehn Sayrel G, Sayrel Markon M, Sayrel G, Sayrel M, Sayrel Markon M, Sayrel G, Sayrel M, Sayrel Markon M, Sayrel G, Sayrel M, Sayr	0
Verk Zone On Approach vig Sat Flow, vehnh vig Sat Flow, vehnh vig Flow Rate, vehnh vig Flow Rate, vehnh view Charger Veh, % Sap, vehnh virwe On Green Sat Flow, vehnh Sirp Volume(v), vehnh Sirp Volume(v), vehnh Sat Flow, sol, sol, sol, vig Cap(Ca, s), so vig Cap(Ca, s), so vig Cap(Ca, s), sol vig Cap(Ca, s), vehnh rdC Rato(X) vig Cap(Ca, s), vehnh rdC Rato(X) vig Cap(Ca, s), vehnh rdC Rato(X) vig Cap(Ca, s), vehnh rdC Rato(X), siveh nicital O Delay(d), s	0.94
vig Sat Elow, veh/h/in vig Sat Elow, veh/h/in vack Hour Factor Varcent Heavy Veh, % Say, veh/h vrive On Green sat Flow, veh/h sip Volume(v), veh/h sip Volume(v), veh/h sip Volume(v), veh/h S Sarve(o, s), s Sycle Q Clast(g, c), s try ol Lane and Grp Cag(c), veh/h (C Ratio(X) Vavial Cag(c, a), veh/h (C Ratio(X) Vavial Cag(c, a), veh/h nor Delay (d), siveh nor Delay (d), siveh nor Delay (d), siveh norg Delay(d), siveh	1.00
tig Flow Rale, wehh *ak Hour Factor *ercent Heary Veh, % 2ap, wehh strive On Green 3at Flow, wehh 3rp Sat Flow(s), vehh 3rp Sat Flow(s), vehh 3rp Sat Flow(s), vehh 3rp Sat Flow(s), vehh 3rs (ap), s, s, yole O Clear(g, c), s thore (ap), vehh 4CM Plabon Ralio 10, strein Fliert(1) 10, sheh 11, and Clear, sheh 11, and the sheh 11, a	
Peak Hour Factor Peach Heavy Veh, % Jap, veh/h strike On Green star How, veh/h Jap Volume(r), veh/h Jap Volume(r), veh/h Ja Serve(g, s), s yop In Lane ane Grp Cap(c), veh/h (C Ratio(X) yold O Clear(g, c), s thore of the strike (C Ratio(X) Val Cap(c, s), veh/h (C Ratio(X) Val Cap(c, s), veh/h (C Ratio(X) (J Server), veh/h (C Ratio(X) (J Server), veh/h (J Server), veh/h Grp Delay(J Siveh nGrp Delay(J Siveh nGrp Delay(J Siveh)	1800
Percent Heavy Veh, % 2ap, weh/h virke On Green 3at Flow, weh/h 3m Sat Flow(s), weh/h 3m Sat Flow(s), weh/h 3m Sat Flow(s), weh/h 3m Sat Flow(s), weh/h 4m Grap(ca), weh/h	77
Jag, vehn trive On Green Jat Flow, vehn Jar Volume(v), vehn Jar Volume(v), vehn Jar Volume(v), vehn Jar Volug, s), s vrop in Lane ane Grp Cap(c), vehn //C Ratio(X) ane Grp Cap(c), vehn //C Ratio(X) ane Grp Cap(c), vehn //C Ratio(X) Jar Volume (G), vehn Ratio (D slav) All Capitol Jar Volume All Capitol Jar Volume All Capitol Jar Volume All Capitol Jar Volume All Capitol Jar Volume All Capitol Jar Volume All Capitol Jar Volume Jar Volume Ja	1.00
whire On Green air Flow, vehih airp Volume(v), vehih airp Sat Flow(s), vehih airp Satervica, s), s Sarve(a, s), s Sarve(a, s), s valie Cap(c, s), vehih (C Ratio(X) wali Cap(c, s), vehih (CA Ratio (X) Josteraam Filler(I) Inform Delay (c), siveh nicit O Delay(c), siveh nicit O Delay(c), siveh nicit D D Delay(c), siveh nicit D D Delay(c), siveh nicit D D D Delay(c), siveh nicit D D D D D D D D D D D D D D D D D D D	0
sat Flow, veh/h sip Volume(v), veh/h sip Volume(v), veh/h sip Sat Flow(s), veh/h S serv(e), s), s voje O (Caer(c), s), s voje O (Caer(c), veh/h //C Ratio(X) wal Cap(c, a), veh/h //C Ratio(X) sip Sate nor Delay (c), siveh nor Delay (c), siveh nor Delay (c), siveh nor Delay (c), siveh nor Delay (c), siveh norg Delay(d), siveh norg Dela	92
Sin Volume(v), veh/h Sin Starl(su,s), veh/h Sarl(su,s), s Sarl(su,s), s Sarl(0.25
sing Sat (Daw(s), vehihlin Stervic(), s), s Sycle O (Daeri(), c), s Yoro In Lane ane Grp Cap(c), vehih //C Ratio(X) wali Cap(c, a), vehih /CM Plabon Ratio Jupatream Filter(I) Inform Delay (d), siveh Indig D Delay(d), siveh	361
3 Serve(p, s), s yop (a) Clear(p, c), s Yrop In Lane are Gro Ecp(c), veh/h (C) Ratio(X) Vial Cap(c, a), veh/h (C) Ratio(X) (C) Ratio(X) (C) Ratio(X) (C) Ratio (C) Ratio(X) (C) Ratio (C) Rat	364
Syde C Clear(g_c), s frop In Lane and Gro Cap(c), veh/h //C Ratio(X) valiCap(c_a), veh/h CKI Platoon Ratio Japtraam Filler(I) Jinform Delay (d), slveh nor Delay (d), slveh nor Delay (d), slveh niGro Delay (d), slveh niGro Delay (d), slveh niGro Delay (d), slveh niGro Delay Norma Markan Status Norma Norma Status Norma	1706
Top In Lane ane Grp Cap(c), veh/h //C Rato(X) wall Cap(c a), veh/h (CKI Hatson Ratio Distream Filler(I) ninform Delay (c), siveh nor Delay (c), siveh ning D near(c), siveh ning p nearb val, weh/h	26.3
ane Grp Cap(c), veh/h //C Ratio(X) //C Ratio(X) //C Ratio(X) //C Ratio(X) //C Ration Ratio //C Ration Ratio //C Ration Ratio //C Ration Ratio //C	26.3
//C Raio(X) waii Cap(c_a), veh/h tCM Platoon Ratio Jpstraam Filter(I) Jniform Delay (d2), siveh ncr Delay (d2), siveh ncr Delay (d2), siveh itial Q Delay(d3), siveh nGrp Delay(d), siveh nGrp Delay(d), siveh nGrp LOS upproach V0, veh/h	0.21
vail Cap(c_a), veh/h iCM Platon Ratio jpstream Filler(s), lveh nitial Delay (d), s/veh nitial Q Delay(d3), s/veh idle Back0fQ(95%), veh/in n.Grg Delay(d), s/veh n.Grg Delay(d), s/veh n.Grg DOS pproach Vol, veh/h	434
ICM Platoon Ratio Jpstream Filter(1) Jniorm Delay (d), s/veh nor Delay (d2), s/veh initial Q Delay(d3), s/veh initial Q Delay(d3), s/veh Jnsig, Movement Delay, s/veh .nGrp Delay(d), s/veh .nGrp LOS	0.84
Jpstream Filter(I) Jniform Delay (d), s/veh ncr Delay (d2), s/veh nitial Q Delay(d3),s/veh (ále BackOfQ(95%), veh/ln Jnsig, Movement Delay, s/veh .nGrp Delay(d),s/veh .nGrp Delay(d),s/veh morp LOS vpproach Vol, veh/h	434
Jniform Delay (d), s/veh ncr Delay (d2), s/veh nitial Q Delay(d3), s/veh nitial B ackO(Q(95%), veh/in Jnsig, Movement Delay, s/veh nGrp Delay(d), s/veh nGrp LOS vpproach Vol, veh/h	1.00
ncr Delay (d2), s/veh nitial Q Delay(d3), s/veh kile BackOfQ(95%), veh/ln Jnsig. Movement Delay, s/veh .nGrp Delay(d), s/veh .nGrp LOS vpproach Vol, veh/h	1.00
nitial Q Delay(d3),s/veh (sile BackOfQ(95%),veh/ln Jnsig. Movement Delay, s/veh .nGrp Delay(d),s/veh .nGrp LOS Approach Vol, veh/h	45.9
kile BackOfQ(95%),veh/ln Jnsig. Movement Delay, s/veh .nGrp Delay(d),s/veh .nGrp LOS Approach Vol, veh/h	13.5
Jnsig. Movement Delay, s/veh InGrp Delay(d),s/veh InGrp LOS Approach Vol, veh/h	0.0
InGrp Delay(d),s/veh InGrp LOS Approach Vol, veh/h	19.6
nGrp LOS Approach Vol, veh/h	
Approach Vol, veh/h	59.5
	E
Approach Delay, s/veh	
Approach LOS	
imer - Assigned Phs	

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HCM 6th Signalized Intersection Summary

			+	4	1	1
	-	+	0.0010448	-	*	-
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	3	- 11	† 1		1	1
Traffic Volume (veh/h)	107	1449	1815	156	167	165
Future Volume (veh/h)	107	1449	1815	156	167	165
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact	h	No	No		No	
	1772	1772	1772	1772	1772	1772
Adi Flow Rate, veh/h	107	1449	1815	151	167	76
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	182	2649	2211	181	204	182
Arrive On Green	0.04	0.79	0.70	0.70	0.12	0.12
	1688	3455	3234	258	1688	1502
	107	1449	958	1008	167	76
Grp Volume(v), veh/h						
Grp Sat Flow(s),veh/h/ln		1683	1683	1720	1688	1502 6.1
Q Serve(g_s), s	2.1	20.9	51.0	54.7		
Cycle Q Clear(g_c), s	2.1	20.9	51.0	54.7	12.6	6.1
Prop In Lane	1.00			0.15	1.00	1.00
Lane Grp Cap(c), veh/h		2649	1183	1209	204	182
V/C Ratio(X)	0.59	0.55	0.81	0.83	0.82	0.42
Avail Cap(c_a), veh/h	222	2649	1183	1209	415	370
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh		5.2	13.3	13.9	55.8	52.9
Incr Delay (d2), s/veh	3.0	0.8	6.0	6.8	7.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%).veh	/ln5.0	12.8	30.2	32.8	10.2	9.0
Unsig. Movement Delay						
LnGrp Delay(d),s/veh	29.9	6.0	19.3	20.7	63.6	54.4
LnGrp LOS	C	A	B	C	E	D
Approach Vol. veh/h		1556	1966		243	
Approach Delay, s/veh		7.6	20.0		60.7	
		7.0 A	20.0 C		60.7 E	
Approach LOS			U			
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc),		108.1		21.9	10.9	97.2
Change Period (Y+Rc),	s	* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gma	ax), s	* 86		* 32	8.0	* 72
Max Q Clear Time (g_c+		22.9		14.6	4.1	56.7
Green Ext Time (p_c), s		45.7		1.2	0.1	15.2
Intersection Summary						
· · · · · · · · · · · · · · · · · · ·	_		47.5			
HCM 6th Ctrl Delay			17.5			
HCM 6th LOS			В			
es.						

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection	_	_	_	_		_
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TTDL	1	A	1 I	UDL	444
Traffic Vol, veh/h	0				0	
Future Vol. veh/h	0	151 151	1464 1464	150 150	0	1078 1078
	0	31	1464	31	0	1078
Conflicting Peds, #/hr						
Sign Control	Stop	Stop	Free	Free		Free
RT Channelized		Stop	-	Free		None
Storage Length	-	0		450		
Veh in Median Storage			0	-		0
Grade, %	0		0		-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	0	151	1464	150	0	1078
Major/Minor	Minor1	,	Major1	,	Major2	
Conflicting Flow All	-	763	0		najorz	
Stage 1		105	0			
				-		-
Stage 2						
Critical Hdwy	-					-
Critical Hdwy Stg 1	-	-	-	-		-
Critical Hdwy Stg 2			-			-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	347	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	-	337	-	-	-	-
Mov Cap-2 Maneuver						
Stage 1	-			-	-	
Stage 2					-	
Staye 2						
Approach	WB		NB		SB	
HCM Control Delay, s	24.1		0		0	
HCM LOS	С					
Minor Lane/Major Mvn	nt	NBTV	VBLn1	SBT		
Capacity (veh/h)						
HCM Lane V/C Ratio			0.448			
			24.1	-		
HCM Control Delay (s))					
HCM Lane LOS			C	-		
HCM 95th %tile Q(veh)	-	2.2	-		

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Appendix E Intersection Performance Worksheets January 17, 2020

2022 Future Background Conditions – Optimized Signal Timing Plans



	۶		Y	1	-		1	Ť	1	L#	1	ŧ
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SB
ane Configurations	ň	^	1	٦	<u>†</u> †	1	ኘካ	≜ î≽			<u>ስ</u> ካ	*
Fraffic Volume (veh/h)	184	1166	136	60	546	420	91	795	108	18	317	48
uture Volume (veh/h)	184	1166	136	60	546	420	91	795	108	18	317	48
nitial Q (Qb), veh	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		0.97		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				N
Adj Sat Flow, veh/h/ln	1800	1772	1758	1772	1730	1786	1730	1786	1786		1786	178
di Flow Rate, veh/h	184	1166	0	60	546	0	91	795	100		317	48
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	0	2	3	2	5	1	5	1	1		1	
Cap, veh/h	212	1166		77	881		142	833	105		372	107
Arrive On Green	0.12	0.35	0.00	0.05	0.27	0.00	0.04	0.28	0.28		0.11	0.3
Sat Flow, veh/h	1714	3367	1490	1688	3287	1514	3196	3021	380		3300	313
Grp Volume(v), veh/h	184	1166	0	60	546	0	91	446	449		317	26
Grp Sat Flow(s),veh/h/ln	1714	1683	1490	1688	1643	1514	1598	1697	1704		1650	169
Q Serve(g s), s	12.6	41.5	0.0	4.2	17.5	0.0	3.4	31.0	31.0		11.3	14
Cycle Q Clear(g_c), s	12.6	41.5	0.0	4.2	17.5	0.0	3.4	31.0	31.0		11.3	14
Prop In Lane	1.00	11.0	1.00	1.00		1.00	1.00	01.0	0.22		1.00	
ane Grp Cap(c), veh/h	212	1166	1.00	77	881	1.00	142	468	470		372	58
//C Ratio(X)	0.87	1.00		0.78	0.62		0.64	0.95	0.95		0.85	0.4
Avail Cap(c a), veh/h	250	1166		162	881		384	468	470		396	58
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Jpstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00		1.00	1.0
Jniform Delay (d), s/veh	51.6	39.2	0.0	56.7	38.6	0.0	56.4	42.7	42.7		52.3	30.
ncr Delay (d2), s/veh	23.5	26.4	0.0	15.9	3.3	0.0	4.8	30.2	30.2		15.6	0.
nitial 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.
%ile BackOfQ(95%),veh/In	11.4	30.1	0.0	4.0	12.5	0.0	2.7	24.5	24.6		9.7	10.
Jnsig. Movement Delay, s/veh			4.60			23.00						
_nGrp Delay(d),s/veh	75.2	65.7	4.6	72.6	41.8	23.0	61.2	72.9	72.9		67.8	31.
InGrp LOS	E	F	A	E	D	С	E	E	E		E	
Approach Vol, veh/h		1486	А		1026	A		986				84
Approach Delay, s/veh		61.3			35.9			71.8				44
Approach LOS		E			D			E				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.9	47.9	20.1	40.0	21.3	38.6	11.9	48.2				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	34.6	14.4	* 33	17.5	28.6	14.4	* 33				
Max Q Clear Time (g_c+I1), s	6.2	43.5	13.3	33.0	14.6	19.5	5.4	16.5				
Green Ext Time (p_c), s	0.1	0.0	0.2	0.0	0.2	4.6	0.2	6.9				
ntersection Summary												
HCM 6th Ctrl Delay			54.5									
HCM 6th LOS			D									
	_		5			_	_			_		
Votes												
Jser approved ignoring U-Turr HCM 6th computational engin			aloaranor	timor for	the phor	oc orocci	na tha ha	rrior				
Jnsignalized Delay for [EBR, V									av.			
morginalized Delay for [EDIX, V	1914191	noruuod II	· saisulat	0.10 01 01	o appioa	uoiay c	and mildla		<i>wj.</i>			

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

	*
Movement	SBR
Lanconfigurations	
Traffic Volume (veh/h)	52
Future Volume (veh/h)	52
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	45
Peak Hour Factor	1.00
Percent Heavy Veh, %	1
Cap, veh/h	99
Arrive On Green	0.34
Sat Flow, veh/h	289
Grp Volume(v), veh/h	269
Grp Sat Flow(s),veh/h/ln	1726
Q Serve(q s), s	14.5
Cycle Q Clear(g c), s	14.5
Prop In Lane	0.17
Lane Grp Cap(c), veh/h	594
V/C Ratio(X)	0.45
Avail Cap(c a), veh/h	594
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	30.6
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	10.9
Unsig. Movement Delay, s/ve	eh
LnGrp Delay(d),s/veh	31.1
LnGrp LOS	С
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Timer - Assigned Phs	

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HCM 6th TWSC <u>4: Clyde Avenue & Private Access 3</u>

Synchro 10 Report Page 2

12/20/2019

HCM 6th Signalized Intersection Summary

		200000	+		Υ.	1
	-	+		~	*	*
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1	**	≜ î≽		5	1
Traffic Volume (veh/h)	56	1503	997	61	39	44
Future Volume (veh/h)	56	1503	997	61	39	44
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact		No	No	1.00	No	1.00
	1772	1772	1772	1772	1772	1772
Adj Sat How, venninn Adi Flow Rate, veh/h	56	1503	997	57	39	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
		1.00	1.00			
Percent Heavy Veh, %	2			2	2	2
Cap, veh/h	460	2808	2423	139	111	99
Arrive On Green	0.04	0.83	0.75	0.75	0.07	0.07
Sat Flow, veh/h	1688	3455	3324	185	1688	1502
Grp Volume(v), veh/h	56	1503	519	535	39	8
Grp Sat Flow(s),veh/h/ln	11688	1683	1683	1737	1688	1502
Q Serve(q s), s	0.8	16.1	13.4	13.4	2.7	0.6
Cycle Q Clear(q c), s	0.8	16.1	13.4	13.4	2.7	0.6
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	460	2808	1261	1301	111	99
V/C Ratio(X)	0.12	0.54	0.41	0.41	0.35	0.08
Avail Cap(c a), veh/h	527	2808	1261	1301	450	400
HCM Platoon Ratio	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	1.00
		3.0	5.5	5.5	53.6	52.6
Uniform Delay (d), s/veh						
Incr Delay (d2), s/veh	0.1	0.7	1.0	1.0	1.9	0.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh		9.6	9.3	9.5	2.3	0.9
Unsig. Movement Delay						
LnGrp Delay(d),s/veh	3.7	3.7	6.5	6.4	55.5	53.0
LnGrp LOS	Α	A	A	А	E	D
Approach Vol, veh/h		1559	1054		47	
Approach Delay, s/veh		3.7	6.4		55.0	
Approach LOS		A	A		E	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc)		105.9		14.1	10.2	95.7
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gm	ax), s	* 76		* 32	9.0	* 61
Max Q Clear Time (g_c+	+I1), s	18.1		4.7	2.8	15.4
Green Ext Time (p_c), s	5	44.5		0.2	0.1	25.0
Internetion Cummons						
Intersection Summary			_		_	_
HCM 6th Ctrl Delay			5.7			
HCM 6th LOS			A			

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

Intersection Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	1	1		^
Traffic Vol, veh/h	0	43	1342	75	0	838
Future Vol, veh/h	0	43	1342	75	0	838
Conflicting Peds, #/hr	0	9	0	9	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0		450	-	
Veh in Median Storage	e, # 0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	2	1
Mvmt Flow	0	43	1342	75	0	838
Major/Minor	Minor1		Inior1	-	laior?	
			/lajor1		lajor2	
Conflicting Flow All	-	680	0			
Stage 1	-		-			-
Stage 2		-				
Critical Hdwy	-	6.94	-		-	-
Critical Hdwy Stg 1	-					
Critical Hdwy Stg 2		-	-			-
Follow-up Hdwy	-	3.32	-	-	-	
Pot Cap-1 Maneuver	0	393	-	0	0	-
Stage 1	0			0	0	
Stage 2	0	-		0	0	
Platoon blocked, %		200				
Mov Cap-1 Maneuver		390	-		-	-
Mov Cap-2 Maneuver	-					
Stage 1		-	-		-	-
Stage 2	-	-	-			-
Approach	WB		NB		SB	
HCM Control Delay, s	15.4		0		0	
HCM LOS	C		J			
	U					
Minor Lane/Major Mvm	nt	NBTV		SBT		
Capacity (veh/h)		-	390	-		
HCM Lane V/C Ratio		-	0.11			
HCM Control Delay (s)		-	15.4			
HCM Lane LOS		-	С			
HCM 95th %tile Q(veh))	-	0.4			

Appendix E Intersection Performance Worksheets January 17, 2020

2022 Total Future Conditions



nihal (Qb), veh 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		۶		\mathbf{r}	1	-		1	Ť	r	L#	1	ŧ
Traffic Volume (vehn) 184 1168 136 80 549 4/3 51 755 116 19 329 mital Q (Ob) veh 0 </th <th>Novement</th> <th>EBL</th> <th>EBT</th> <th>EBR</th> <th></th> <th>WBT</th> <th>WBR</th> <th></th> <th>NBT</th> <th>NBR</th> <th>SBU</th> <th></th> <th>SE</th>	Novement	EBL	EBT	EBR		WBT	WBR		NBT	NBR	SBU		SE
iuture Vehnh) 184 116 136 80 549 423 91 795 116 19 329 hind (Qb), +0 110 100 1	ane Configurations	٦.	††	1	5	† †	1	ሻሻ	↑ 1>			31	t t
nihal (Qb), wh ele Bikk Adj(A, pbT) 1.00 1.00 1.00 1.00 1.00 1.00 0.97 1.00 harking Bis, Adj 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	raffic Volume (veh/h)	184	1168		80	549		91	795	116	19		48
Det-Bik Adj(A, pbT) 1.00 </td <td>uture Volume (veh/h)</td> <td>184</td> <td>1168</td> <td>136</td> <td>80</td> <td>549</td> <td>423</td> <td>91</td> <td>795</td> <td>116</td> <td>19</td> <td>329</td> <td>48</td>	uture Volume (veh/h)	184	1168	136	80	549	423	91	795	116	19	329	48
Parking Dax, Adj 1.00	nitial Q (Qb), veh		0			0			0				
Note Zore On Ágoraach No No No No Work Zore On Ágoraach No 1772 1786 1726 1786 1786 1786 1786 1786 1786 1786 1786 1786 1786 1785 100 1.00 1	Ped-Bike Adj(A_pbT)			1.00			1.00					1.00	
kgl Saf Elow, veh/h 1200 1726 1727 1726 1727 1726 1727 1726 1727 1728 1727 1728 1727 1728 1727 1728 1727 1728 1727 1728 1727 1728 1727 1728 1727 1728	Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
high Flow Rate, wehh 184 1168 0 80 549 0 91 795 108 329 Pack Hour Factor 1.00 1.02 1.01 1.01 1.02 1.02 1.02 3.03 3.01	Nork Zone On Approach		No			No			No				N
Peak Hour Fador 1.00	Adj Sat Flow, veh/h/ln	1800	1772	1758	1772	1730	1786	1730	1786	1786		1786	178
Percent Heavy Veh, % 0 2 3 2 5 1 5 1 1 1 1 1 Cap, wehh 212 1107 101 871 142 825 112 382 Arrive On Green 0.12 0.337 1490 1688 2827 15114 3186 2989 405 3300 507 Volume(r), wehh 1714 3367 1490 1688 2827 15114 3186 2989 405 Source (a, b), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle O Clear(g, c), s 10.0 1.00 1.00 1.00 1.00 1.00 1.00 1.	Adj Flow Rate, veh/h	184	1168	0	80	549	0	91	795	108		329	48
Cap, vehh 212 1107 101 871 142 825 112 382 Arwe On Green 0.12 0.33 0.00 0.06 0.26 0.00 0.28 0.28 0.12 0.33 0.00 0.26 0.00 0.28 0.12 0.33 0.00 0.26 0.00 0.00 0.28 0.12 0.33 0.00 0.28 0.12 0.31 451 452 329 0.30 0.56 17.7 0.0 3.4 31.5 31.5 11.8 0.93 0.95 0.77 0.0 3.4 31.5 31.5 11.8 Opclec OClear(c), s 1.26 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 0.24 10.0 1.00	Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Armie On Green 0.12 0.33 0.00 0.06 0.26 0.00 0.04 0.28 0.28 0.12 Sat Flow, wehn 1714 3367 1490 1688 3287 1514 3196 2989 406 3300 Sat Flow, wehn 1714 1881 1490 1688 3287 1514 3196 2989 406 3300 Sig Sat Flow(s), wehn 1714 1683 1490 1688 1643 1514 1538 1697 1699 1650 355 0.0 5.6 17.7 0.0 3.4 31.5 11.8 Ope In Lane 100 1.00 1.00 1.00 1.00 0.24 1.00 Lane Gro, Cap(c), wehn 212 1107 162 871 384 468 469 382 V/C Ratio(X) 0.87 1.06 0.79 0.63 0.64 4.99 0.24 1.00 Urc Ratio(X) 0.87 1.06 0.03 0.00	Percent Heavy Veh, %	0	2	3	2	5	1	5	1	1		1	
Sat Flow, wehn 1714 3367 1430 1688 227 1514 3166 2989 406 3300 Gry Volume(v), wehn 184 1168 0 0549 0 91 451 452 329 Gry Volume(v), wehn 1714 1683 1490 1688 1643 1514 1588 1697 1699 1650 Q Serve(q, g), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Orgo Calcar(q, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Orgo Calcar(q, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Orgo Calcar(q, c), s 10.0 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Cap, veh/h	212	1107		101	871		142	825	112		382	108
Gry Volume(v), whih 184 1168 0 80 549 0 91 451 452 329 Gry Sat Flow(s), wehnlin 1714 1683 1490 1688 1643 1514 1588 1697 1699 1650 325 31.5 11.6 1500 34 31.5 31.5 11.8 1000 1.00 <td>Arrive On Green</td> <td>0.12</td> <td>0.33</td> <td>0.00</td> <td>0.06</td> <td>0.26</td> <td>0.00</td> <td>0.04</td> <td>0.28</td> <td>0.28</td> <td></td> <td>0.12</td> <td>0.3</td>	Arrive On Green	0.12	0.33	0.00	0.06	0.26	0.00	0.04	0.28	0.28		0.12	0.3
Carr Sat Flow(g) wehnlin 1714 1683 1490 1688 1643 1514 1588 1697 1699 1650 O Serve(g, s) 12 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 1.26 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 1.00 <td>Sat Flow, veh/h</td> <td>1714</td> <td>3367</td> <td>1490</td> <td>1688</td> <td>3287</td> <td>1514</td> <td>3196</td> <td>2989</td> <td>406</td> <td></td> <td>3300</td> <td>313</td>	Sat Flow, veh/h	1714	3367	1490	1688	3287	1514	3196	2989	406		3300	313
Carr Sat Flow(g) wehnlin 1714 1683 1490 1688 1643 1514 1588 1697 1699 1650 O Serve(g, s) 12 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 1.26 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 1.00 <td>Grp Volume(v), veh/h</td> <td>184</td> <td>1168</td> <td>0</td> <td>80</td> <td>549</td> <td>0</td> <td>91</td> <td>451</td> <td>452</td> <td></td> <td>329</td> <td>26</td>	Grp Volume(v), veh/h	184	1168	0	80	549	0	91	451	452		329	26
Ω Serve(q, s), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 Cycle Q Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Cycle Q Clear(g, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 11.8 Cycle Q Clear(g, c), sehth 212 1107 101 871 142 468 469 382 VC Ratic (X) 0.87 1.06 1.00													169
Cycle Q Clear(q, c), s 12.6 39.5 0.0 5.6 17.7 0.0 3.4 31.5 31.5 11.8 Prop In Lane 100 1.0													14
Prop In Lane 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.02 0.24 1.00 Lane Gro Cap(c), whith 212 1107 101 817 1.04 468 469 382 VIC Ratic (X) 0.87 1.06 0.79 0.63 0.64 0.96 0.96 0.86 Avail Cap(c, a), whith 250 1107 162 871 344 468 489 396 Hours Mate 1.00													14
Laine Gro Cap(c), velvih 212 1107 101 871 142 468 469 382 ViC Rata(X) 0.87 1.06 0.79 0.63 0.64 0.96 0.86 Avail Cap(c, a), velvih 250 1107 162 871 384 468 469 396 HCM Platom Ratio 1.00 <td></td> <td></td> <td>00.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>01.0</td> <td></td> <td></td> <td></td> <td></td>			00.0						01.0				
VIC Rafio(X) 0.87 1.06 0.79 0.63 0.64 0.96 0.96 0.86 Avail Cap(c, a), vehin 250 1107 162 871 384 468 469 396 Avail Cap(c, a), vehin 100 1.00			1107	1.00		871	1.00		468				58
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$													0.4
HCM Plakon Ratio 100 1.00 1.00 1.00 1.00 1.00 1.00 1.00													58
Upstream Filter(I) 1.00 <td></td> <td></td> <td></td> <td>1.00</td> <td></td> <td></td> <td>1.00</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.0</td>				1.00			1.00						1.0
Uniform Delay (d), siveh 51.6 40.3 0.0 65.7 38.9 0.0 65.4 42.9 42.9 52.1 Incide Delay (d), siveh 0.3 4.3 0.0 13.1 3.5 0.0 4.8 32.4 17.0 Initial O Delay (d), siveh 0.0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.0</td></td<>													1.0
Incr Delay (d2), siveh 23.5 42.9 0.0 13.1 3.5 0.0 4.8 32.4 32.7 53.0 0.0													30
Initial Q Delay(d3), siven 0.0 10.1 Units 0.0 0.0 23.7 61.2 75.3 75.3 69.1 10.9 Approach Delay, slveh 75.0 56.9 8 94 Approach Delay, slveh 75.0 56.9 6.5 6.4 6.6 *6.9													0.
Nale BackOlQ095%), vehin 11.4 32.9 0.0 5.2 12.6 0.0 2.7 2.5.1 2.5.1 10.1 Unsig, Movement Delay, siveh 4.60 23.70 23.70 23.70 10.1 10.1 10.1 10.1 10.1 23.70 10.1 10.1 23.70 10.1 10.1 10.1 10.1 23.70 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 23.70 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 10.1 12.3 10.1 <													0
Unsig Movement Delay, siveh 4.60 23.70 LinGrp Delay(d), siveh 75.2 83.1 4.6 68.8 42.4 23.7 61.2 75.3 75.3 69.1 LnGrp LOS E F A E D C E													10
LnGrb Delay(d), kveh 75.2 83.1 4.6 68.8 42.4 23.7 61.2 75.3 75.3 69.1 LnGrp LOS E F A D C E		11.4	02.0		0.2	12.0		2.1	20.1	20.1		10.1	10
LnGrp LOS E F A E D C E D C E E E D Agroach Vol, vehn 1488 A 1052 A 994 Approach Dely, siveh 75.0 36.9 77.0 D D E E D C E E D D E D <thd< th=""> D <thd< th=""> <thd< th=""></thd<></thd<></thd<>		75.2	83.1		68.8	12.4		61.2	75.3	75.3		60.1	30
Approach Vol, veh/h 1488 A 1052 A 994 Approach Delay, sveh 75.0 36.9 74.0 Approach Delay, sveh 12 3 4 5 6 7 8 Timer - Assigned Phis 1.3.7 45.9 20.5 40.0 21.3 38.2 11.9 48.6 Change Period (Y-Rc), s 5 6.4 6.6 6.9 6 7 8 Max Orean Setting (Cmax), s 11.5 34.6 14.4 *33 17.5 28.6 14.4 *33 Max O Clear Time (p.c.), s 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary - - 4.5 0.2 6.9 - HOM 6th CID Delay 59.8 - 59.8 - - -													00.
Approach Delay, siveh 75.0 36.9 74.0 Approach LOS E D E Immer - Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+Y+Rc), s 13.7 45.9 20.5 40.0 21.3 38.2 11.9 48.6 Change Period (Y+Rc), s 6.5 6.4 6.6 *6.9 45.5 64.4 *33 Max G Creen Setting (Gmax), s 1.5 34.6 14.4 *33 17.5 28.6 14.4 *33 Green EXT Time (p.c), s 0.1 0.0 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary E E E E E Notes E E E E E								-		-			86
Approach LOS E D E Timer - Assigned Phs 1 2 3 4 5 7 8 There - Assigned Phs 1 2 3 4 5 7 8 Phe Duration (G*Y+Rc), s 13.7 45.9 20.5 40.0 21.3 38.2 11.9 48.6 Change Period (Y+Rc), s 6.5 6.4 6.6 * 6.9 6.5 6.4 6.6 * 6.9 Max Green Setting (cmax), s 15 34.6 14.4 * 33 14.4 * 33 Max Q Clear Time (g, c-1), s 0.6 10.0 0.0 0.2 4.5 0.2 6.9 Intersection Summary - - - - - - HCM 6th LOS E - - - - - -				A			A						45.
Imer - Assigned Phs 1 2 3 4 5 6 7 8 Phs Duration (G+V+Rc), s 13.7 45.9 20.5 40.0 21.3 38.2 11.9 48.6 Drange Period (V+Rc), s 5 6.4 6.6 *6.9 6.5 4.6 6 *6.9 Max Green Setting (Gmax), s 11.5 34.6 14.4 *33 17.5 28.6 14.4 *33 Max Q Cherr Time (g_c+1), s 7.6 41.5 13.8 33.5 14.6 19.7 5.4 16.5 Green Ext Time (c_c,c), s 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary - - - - - - - - - 6.9 Hold Status 59.8 -													40
Phe Duration (G+Y+Rc), s 13.7 45.9 20.5 40.0 21.3 38.2 11.9 48.6 Change Period (Y+Rc), s 6.5 6.4 6.6 6.9 6.5 6.4 6.6 6.9 Max Green Setting (Gmax), s 11.5 34.6 14.4 33 17.5 28.6 14.4 *33 Max Q Chear Time (g_c-H), s 7.6 41.5 13.8 33.5 14.6 19.7 5.4 16.5 Green EXT Time (g_c, c), s 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary FMCM 6th CMD Pelay 59.8 FMCM 6th LOS E Notes	Approach LOS		E			U			E				
Change Period (Y-Rc), s 6.5 6.4 6.6 * 6.9 6.5 6.4 6.6 * 6.9 War Green Setting (Gmax), s 11.5 34.6 14.4 * 33 17.5 28.6 14.4 * 33 War Q Clear Time (p, c), s 0.1 0.0 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary	Timer - Assigned Phs	1	2		4	5		7	8				
Max Green Setting (Gmax), s 11.5 34.6 14.4 *33 17.5 28.6 14.4 *33 Max Q Clear Time (g_c+l1), s 7.6 41.5 13.8 33.5 14.6 19.7 5.4 16.5 Green EX Time (g_c,c), s 0.1 0.0 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary HCM 6th Crit Delay 59.8 HCM 6th LOS E Notes	Phs Duration (G+Y+Rc), s	13.7	45.9	20.5	40.0	21.3	38.2	11.9	48.6				
Max Q Clear Time (g_c+l1), s 7.6 41.5 13.8 33.5 14.6 19.7 5.4 16.5 Green Ext Time (g_c,c), s 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary	Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Green Ext Time (p. c), s 0.1 0.0 0.2 4.5 0.2 6.9 Intersection Summary HCM 6th Cirl Delay 59.8 -	Max Green Setting (Gmax), s	11.5	34.6	14.4	* 33	17.5	28.6	14.4	* 33				
Intersection Summary HCM 6th CMI Delay 59.8 HCM 6th LOS E Notes	Max Q Clear Time (g_c+I1), s	7.6	41.5	13.8	33.5	14.6	19.7	5.4	16.5				
HCM 6th Ctrl Delay 59.8 HCM 6th LOS E Notes		0.1	0.0	0.1	0.0	0.2	4.5	0.2	6.9				
HCM 6th Ctrl Delay 59.8 HCM 6th LOS E Notes	ntersection Summary												
HCM 6th LOS E				59.8									
				E									
	Votes	_		_	_	_	_	_	_		_	_	
		ina mov	omont										
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. Unsignalized Delay for [EBR, WBR] is included in calculations of the approach delay and intersection delay.	* HCM 6th computational engir	ie requir	es equal							lav			

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

12/20/2019

Movement	SBR
Lanesconfigurations	
Traffic Volume (veh/h)	52
Future Volume (veh/h)	52
nitial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Nork Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	45
Peak Hour Factor	1.00
Percent Heavy Veh, %	1
Cap, veh/h	100
Arrive On Green	0.35
Sat Flow, veh/h	289
Grp Volume(v), veh/h	269
Grp Sat Flow(s),veh/h/ln	1727
Q Serve(g_s), s	14.5
Cycle Q Clear(g_c), s	14.5
Prop In Lane	0.17
Lane Grp Cap(c), veh/h	599
V/C Ratio(X)	0.45
Avail Cap(c_a), veh/h	599
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	30.3
ncr Delay (d2), s/veh	0.5
nitial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	10.9
Unsig. Movement Delay, s/ve	
LnGrp Delay(d),s/veh	30.8
LnGrp LOS	С
Approach Vol, veh/h	
Approach Delay, s/veh Approach LOS	

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HCM 6th Signalized Intersection Summary

				cess	1	,
	1	-	-	~	*	*
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	3	44	≜ 1₀		1	1
Traffic Volume (veh/h)	78	1503	997	65	48	70
Future Volume (veh/h)	78	1503	997	65	48	70
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A pbT)	1.00	-	-	0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact	h	No	No		No	
	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	78	1503	997	61	48	34
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	452	2768	2363	145	131	117
Arrive On Green	0.04	0.82	0.73	0.73	0.08	0.08
Sat Flow, veh/h	1688	3455	3310	197	1688	1502
Grp Volume(v), veh/h	78	1503	521	537	48	34
Grp Sat Flow(s), veh/h/lr		1683	1683	1735	1688	1502
Q Serve(q s), s	1.2	17.2	14.3	14.3	3.2	2.6
Cycle Q Clear(g c), s	1.2	17.2	14.3	14.3	3.2	2.6
	1.00	17.2	14.5	0.11	1.00	1.00
Prop In Lane		0760	1235	1273	131	117
Lane Grp Cap(c), veh/h		2768		0.42		
V/C Ratio(X)	0.17	0.54	0.42		0.37	0.29
Avail Cap(c_a), veh/h	514	2768	1235	1273	450	400
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh		3.4	6.2	6.2	52.5	52.2
Incr Delay (d2), s/veh	0.2	0.8	1.1	1.0	1.7	1.4
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh		10.3	9.9	10.1	2.7	4.0
Unsig. Movement Delay			_			
LnGrp Delay(d),s/veh	4.3	4.2	7.2	7.2	54.2	53.6
LnGrp LOS	Α	A	A	A	D	D
Approach Vol, veh/h		1581	1058		82	
Approach Delay, s/veh		4.2	7.2		53.9	
Approach LOS		A	A		D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc)	S	104.5		15.5	10.6	93.8
Change Period (Y+Rc),		* 5.8		*6.2	6.0	* 5.8
Max Green Setting (Gm		* 76		* 32	9.0	* 61
Max Q Clear Time (g c+		19.2		5.2	3.2	16.3
Green Ext Time (p c), s		43.8		0.4	0.1	24.8
u = 7.		40.0		0.4	0.1	24.0
Intersection Summary						
HCM 6th Ctrl Delay			6.9			
HCM 6th LOS			A			

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

HCM 6th TWSC 4: Clyde Avenue

enue	& Private	Access 3	

Intersection		_	_		_	_
Int Delay, s/veh	0.5					
		MDD	NDT	NDD	0.01	ODT
	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	1	1	-	111
Traffic Vol, veh/h	0	72	1345	76	0	851
Future Vol, veh/h	0	72	1345	76	0	851
Conflicting Peds, #/hr	0	9	0	9	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	450	-	-
Veh in Median Storage,		-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	2	1
Mvmt Flow	0	72	1345	76	0	851
		_		_		_
	linor1		Major1		Major2	
Conflicting Flow All	-	682	0		-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1				-		-
Critical Hdwy Stg 2	-			-		-
Follow-up Hdwy		3.32		-		-
Pot Cap-1 Maneuver	0	392	-	0	0	-
Stage 1	0			0	0	
Stage 2	Ő			0	Ő	
Platoon blocked, %	0			0	0	
Mov Cap-1 Maneuver	-	389				
Mov Cap-1 Maneuver Mov Cap-2 Maneuver	-	209				
				-		
Stage 1	1.1			-		-
Stage 2	-	-	-		-	-
Approach	WB		NB		SB	
HCM Control Delay, s	16.3	_	0	_	0	_
HCM LOS	10.5 C		0		0	
HGM LUS	U					
Minor Lane/Major Mvmt		NBTV	VBLn1	SBT		
Capacity (veh/h)			389			
HCM Lane V/C Ratio			0.185			
HCM Control Delay (s)			16.3			
HCM Lane LOS			10.5 C	- 2		
HCM 95th %tile Q(veh)			0.7			
Ven)			0.7	-		

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Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SE
ane Configurations	<u> </u>	††	1	5	† †	1	ሻሻ	≜ î≽			31	t t
raffic Volume (veh/h)	165	959	233	144	1262	580	326	840	108	34	404	6
uture Volume (veh/h)	165	959	233	144	1262	580	326	840	108	34	404	6
nitial Q (Qb), veh	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		0.95		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				1
Adj Sat Flow, veh/h/ln	1772	1772	1786	1786	1772	1786	1786	1786	1786		1786	180
Adj Flow Rate, veh/h	165	959	0	144	1262	0	326	840	102		404	65
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	2	2	1	1	2	1	1	1	1		1	
Cap, veh/h	149	1155		150	1155		366	771	94		366	71
Arrive On Green	0.09	0.34	0.00	0.09	0.34	0.00	0.11	0.25	0.25		0.11	0.2
Sat Flow, veh/h	1688	3367	1514	1701	3367	1514	3300	3026	367		3300	305
Grp Volume(v), veh/h	165	959	0	144	1262	0	326	471	471		404	36
Grp Sat Flow(s),veh/h/ln	1688	1683	1514	1701	1683	1514	1650	1697	1697		1650	171
Q Serve(g_s), s	11.5	34.0	0.0	11.0	44.6	0.0	12.7	33.1	33.1		14.4	26
Cycle Q Clear(g_c), s	11.5	34.0	0.0	11.0	44.6	0.0	12.7	33.1	33.1		14.4	26
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22		1.00	
Lane Grp Cap(c), veh/h	149	1155		150	1155		366	432	432		366	43
V/C Ratio(X)	1.11	0.83		0.96	1.09		0.89	1.09	1.09		1.11	0.8
Avail Cap(c_a), veh/h	149	1155		150	1155		366	432	432		366	43
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00		1.00	1.0
Uniform Delay (d), s/veh	59.2	39.2	0.0	59.0	42.7	0.0	57.0	48.5	48.5		57.8	45
Incr Delay (d2), s/veh	104.7	7.0	0.0	60.3	55.5	0.0	22.9	69.8	69.8		78.6	13
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
%ile BackOfQ(95%),veh/In	15.1	22.5	0.0	11.9	39.4	0.0	10.9	32.6	32.6		16.3	19
Unsig. Movement Delay, s/veh			14.50			48.70						
LnGrp Delay(d),s/veh	163.9	46.2	14.5	119.3	98.2	48.7	80.0	118.3	118.3		136.4	59
LnGrp LOS	F	D	В	F	F	D	E	F	F		F	
Approach Vol, veh/h		1357	A		1986	А		1268				113
Approach Delay, s/veh		55.1			85.3			108.4				86
Approach LOS		E			F			F				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	51.0	21.0	40.0	18.0	51.0	21.0	40.0				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	44.6	14.4	* 33	11.5	44.6	14.4	* 33				
Max Q Clear Time (g_c+l1), s	13.0	36.0	16.4	35.1	13.5	46.6	14.7	28.3				
Green Ext Time (p_c), s	0.0	6.6	0.0	0.0	0.0	0.0	0.0	3.3				
ntersection Summary												
HCM 6th Ctrl Delay			83.6									
HCM 6th LOS			F									
Votes	_	_		_		_	_	_			_	
Jser approved ignoring U-Turr	ning mov	ement.										
HCM 6th computational enginguitational enginguitation of the second seco	ne requi	es equal							lay.			
	1.					, .			.,			_

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

12/20/2019

Movement	SBR
Lanesconfigurations	700
Traffic Volume (veh/h)	84
Future Volume (veh/h)	84
Initial Q (Qb), veh	04
Ped-Bike Adj(A pbT)	0.94
Parking Bus, Adj	1.00
Work Zone On Approach	1.00
Adj Sat Flow, veh/h/ln	1800
Adj Flow Rate, veh/h	77
Peak Hour Factor	1.00
Percent Heavy Veh, %	0
Cap, veh/h	92
Arrive On Green	0.25
Sat Flow, veh/h	361
Grp Volume(v), veh/h	364
Grp Sat Flow(s), veh/h/ln	1706
Q Serve(g s), s	26.3
Cycle Q Clear(g c), s	26.3
Prop In Lane	0.21
Lane Grp Cap(c), veh/h	434
V/C Ratio(X)	0.84
Avail Cap(c a), veh/h	434
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	45.9
Incr Delay (d2), s/veh	45.9
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	19.6
Unsig. Movement Delay, s/ve	
LnGrp Delay(d),s/veh	59.5
Lindip Delay(u),s/veii	59.5 E
	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

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HCM 6th Signalized Intersection Summary

2: Baseline Road					1	,
	1	-	-	~	*	*
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	3	**	1		1	1
Traffic Volume (veh/h)	159	1449	1815	166	174	184
Future Volume (veh/h)	159	1449	1815	166	174	184
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	5	5	0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approact		No	No		No	1.00
	1772	1772	1772	1772	1772	1772
Adj Sat How, ven/h/h	159	1449	1815	161	174	95
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap. veh/h	184	2632	2163	189	212	189
Arrive On Green	0.04	2032	0.69	0.69	0.13	0.13
						1502
Sat Flow, veh/h	1688	3455	3216	273	1688	
Grp Volume(v), veh/h	159	1449	963	1013	174	95
Grp Sat Flow(s),veh/h/In		1683	1683	1717	1688	1502
Q Serve(g_s), s	3.6	21.4	53.5	57.7	13.1	7.7
Cycle Q Clear(g_c), s	3.6	21.4	53.5	57.7	13.1	7.7
Prop In Lane	1.00			0.16	1.00	1.00
Lane Grp Cap(c), veh/h		2632	1164	1187	212	189
V/C Ratio(X)	0.86	0.55	0.83	0.85	0.82	0.50
Avail Cap(c_a), veh/h	214	2632	1164	1187	415	370
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	n 32.0	5.4	14.4	15.1	55.4	53.0
Incr Delay (d2), s/veh	26.0	0.8	6.8	7.9	7.6	2.1
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%).veh		13.1	31.7	34.7	10.5	10.7
Unsig. Movement Delay			01.7	01.1	.0.0	
LnGrp Delay(d),s/veh	58.0	6.3	21.2	23.0	63.0	55.1
LnGrp LOS	50.U	0.3 A	21.2 C	23.0 C	63.0 E	55.T
Approach Vol. veh/h	L.	1608	1976	0	269	
		11.4	22.1		60.2	
Approach Delay, s/veh			22.1 C		60.2 E	
Approach LOS		В	U		E	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc)	, S	107.4		22.6	11.7	95.7
Change Period (Y+Rc),	s	* 5.8		* 6.2	6.0	* 5.8
Max Green Setting (Gm	ax), s	* 86		* 32	8.0	* 72
Max Q Clear Time (g_c+		23.4		15.1	5.6	59.7
Green Ext Time (p_c), s		45.5		1.3	0.2	12.2
u = <i>v</i> .						
Intersection Summary			00.0			
HCM 6th Ctrl Delay			20.3			
HCM 6th LOS			С			
otes						

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	mbe	1	44	1	001	444
Traffic Vol. veh/h	0	173	1466	153	٥	1110
Future Vol. veh/h	0	173	1466	153	0	1110
Conflicting Peds, #/hr	0	31	0	31	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized			-	Free	-	
Storage Length		0		450		-
Veh in Median Storage		-	0	+00		0
Grade, %	c, # 0 0		0			0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	100	100	0	0
Mymt Flow	0	173	1466	153	0	1110
IVIVITIL FIOW	0	175	1400	100	0	1110
	Minor1		Major1		Major2	
Conflicting Flow All	-	764	0	-		
Stage 1	-	-	-	-		-
Stage 2		-	-	-		
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-		
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32			-	-
Pot Cap-1 Maneuver	0	346	-	0	0	
Stage 1	0			0	0	
Stage 2	0	-	-	0	0	
Platoon blocked, %	-			-	-	
Mov Cap-1 Maneuver	-	336	-	-		
Mov Cap-2 Maneuver		-				
Stage 1		-	-	-		
Stage 2						
Oldge 2						
					0.0	
Approach	WB		NB 0		SB 0	
HCM Control Delay, s			0		0	
HCM LOS	D					
Minor Lane/Major Mvr	nt	NBTV	VBLn1	SBT		
Capacity (veh/h)		-	336	-		
HCM Lane V/C Ratio			0.515			
HCM Control Delay (s	6					
HCM Lane LOS	7		20.0 D			
HCM 95th %tile Q(veh	n)		2.8			
	·/		2.0			

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Appendix E Intersection Performance Worksheets January 17, 2020

2027 Ultimate Conditions – No Transit Signal Priority



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SB
ane Configurations	٦	^	1	٦	<u>†</u> †	1	ኘካ	≜ î≽			<u>ስ</u> ካ	*
Traffic Volume (veh/h)	178	1130	131	69	532	408	88	781	110	18	314	47
uture Volume (veh/h)	178	1130	131	69	532	408	88	781	110	18	314	47
nitial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	
Ped-Bike Adj(A pbT)	1.00		0.98	1.00		0.97	1.00		0.97		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				N
Adj Sat Flow, veh/h/ln	1800	1772	1758	1772	1730	1786	1730	1786	1786		1786	178
Adi Flow Rate, veh/h	178	1130	131	69	532	408	88	781	110		314	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	0	2	3	2	5	1	5	1	1		1	
Cap, veh/h	206	1146	496	88	895	400	138	820	115		369	106
Arrive On Green	0.12	0.34	0.34	0.05	0.27	0.27	0.04	0.28	0.28		0.11	0.3
Sat Flow, veh/h	1714	3367	1456	1688	3287	1470	3196	2974	419		3300	308
Grp Volume(v), veh/h	178	1130	131	69	532	408	88	446	445		314	25
Grp Sat Flow(s),veh/h/ln	1714	1683	1456	1688	1643	1470	1598	1697	1696		1650	169
Q Serve(g s), s	12.2	40.0	7.8	4.9	16.9	32.7	3.3	31.0	31.0		11.2	14
Cycle Q Clear(g_c), s	12.2	40.0	7.8	4.9	16.9	32.7	3.3	31.0	31.0		11.2	14
Prop In Lane	1.00	10.0	1.00	1.00	10.0	1.00	1.00	01.0	0.25		1.00	
ane Grp Cap(c), veh/h	206	1146	496	88	895	400	138	468	467		369	58
//C Ratio(X)	0.86	0.99	0.26	0.79	0.59	1.02	0.64	0.95	0.95		0.85	0.4
Avail Cap(c a), veh/h	250	1146	496	162	895	400	384	468	468		396	58
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Jniform Delay (d), s/veh	51.8	39.3	28.7	56.2	37.9	43.7	56.5	42.7	42.7		52.3	30.
ncr Delay (d2), s/veh	22.3	23.4	1.3	14.3	2.9	50.0	4.8	29.8	29.9		15.2	0.
nitial 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.
%ile BackOfQ(95%),veh/In	11.1	28.6	5.7	4.5	12.1	25.6	2.6	24.4	24.4		9.6	10.
Jnsig. Movement Delay, s/veh												
_nGrp Delay(d),s/veh	74.1	62.7	30.0	70.5	40.8	93.7	61.3	72.5	72.6		67.5	30.
InGrp LOS	E	E	С	E	D	F	E	E	E		E	
Approach Vol, veh/h		1439			1009			979				83
Approach Delay, s/veh		61.1			64.2			71.6				44.
Approach LOS		E			E			E				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	47.3	20.0	40.0	20.9	39.1	11.8	48.2				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	34.6	14.4	* 33	17.5	28.6	14.4	* 33				
Max Q Clear Time (g_c+I1), s	6.9	42.0	13.2	33.0	14.2	34.7	5.3	16.2				
Green Ext Time (p_c), s	0.1	0.0	0.2	0.1	0.2	0.0	0.2	6.8				
ntersection Summary												
HCM 6th Ctrl Delay			61.0									
ICM 6th LOS			E									
			-									
Votes												
Jser approved ignoring U-Turr												
HCM 6th computational engin	ne requir	es equal (clearance	times for	r the phas	es crossi	ng the ba	rrier.				

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

	-
Movement	SBR
Lanconfigurations	0011
Traffic Volume (veh/h)	50
Future Volume (veh/h)	50
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	50
Peak Hour Factor	1.00
Percent Heavy Veh, %	1
Cap, veh/h	112
Arrive On Green	0.34
Sat Flow, veh/h	326
Grp Volume(v), veh/h	263
Grp Sat Flow(s),veh/h/ln	1719
Q Serve(q s), s	14.2
Cycle Q Clear(g c), s	14.2
Prop In Lane	0.19
Lane Grp Cap(c), veh/h	592
V/C Ratio(X)	0.44
Avail Cap(c a), veh/h	592
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	30.5
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	10.7
Unsig. Movement Delay, s/v	
LnGrp Delay(d),s/veh	31.0
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

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HCM 6th Signalized Intersection Summary

2: Baseline Roa	d & F	Privat	te Ac	cess	1		01/08/
	۶	-	+	•	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	1	11	11		1	1	
Traffic Volume (veh/h)	66	1454	966	60	43	57	
Future Volume (veh/h)	66	1454	966	60	43	57	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approac	:h	No	No		No		
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	
Adj Flow Rate, veh/h	66	1454	966	60	43	57	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	84	2759	2317	144	136	121	
Arrive On Green	0.05	0.82	0.72	0.72	0.08	0.08	
Sat Flow, veh/h	1688	3455	3307	200	1688	1502	
Grp Volume(v), veh/h	66	1454	505	521	43	57	
Grp Sat Flow(s),veh/h/lr	n1688	1683	1683	1734	1688	1502	
Q Serve(g_s), s	4.6	16.5	14.4	14.4	2.9	4.4	
Cycle Q Clear(g_c), s	4.6	16.5	14.4	14.4	2.9	4.4	
Prop In Lane	1.00			0.12	1.00	1.00	
Lane Grp Cap(c), veh/h	84	2759	1212	1249	136	121	
V/C Ratio(X)	0.79	0.53	0.42	0.42	0.32	0.47	
Avail Cap(c_a), veh/h	127	2759	1212	1249	450	400	
HCM Platoon Ratio	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	1.00	
Uniform Delay (d), s/vel	h 56.4	3.4	6.7	6.7	52.1	52.7	
Incr Delay (d2), s/veh	17.1	0.7	1.1	1.0	1.3	2.9	
Initial Q Delay(d3),s/veł	n 0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh	n/in4.4	10.0	10.0	10.2	2.4	6.7	
Unsig. Movement Delay	/, s/veh						
LnGrp Delay(d),s/veh	73.6	4.2	7.8	7.7	53.4	55.6	
LnGrp LOS	E	A	A	A	D	E	
Approach Vol, veh/h		1520	1026		100		
Approach Delay, s/veh		7.2	7.8		54.7		
Approach LOS		A	A		D		
Timer - Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc)), s	104.2		15.8	11.9	92.2	
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8	
Max Green Setting (Gm		* 76		* 32	9.0	* 61	
Max Q Clear Time (g c				6.4	6.6	16.4	
Green Ext Time (p_c), s		42.9		0.5	0.0	23.9	
Intersection Summary							
HCM 6th Ctrl Delay			9.2				
HCM 6th LOS			A				
Notes		_	_	_	_	_	

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection	_		_			
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	- 11	1		^
Traffic Vol. veh/h	0	58	1313	72	0	819
Future Vol. veh/h	0	58	1313	72	0	819
Conflicting Peds, #/hr	0	9	0	9	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop		Free	-	None
Storage Length		0		450		-
Veh in Median Storage.	.# 0	-	0	-		0
Grade, %	0		0			0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	2	1
Mymt Flow	0	58	1313	72	0	819
WWWITCHIOW	0	00	1010	12	0	015
	Minor1		Major1	N	Major2	
Conflicting Flow All	-	666	0	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	402	-	0	0	-
Stage 1	0	-		0	0	-
Stage 2	0	-		0	0	-
Platoon blocked, %						
Mov Cap-1 Maneuver		399		-		-
Mov Cap-2 Maneuver						
Stage 1						
Stage 2						
Oldyo 2						
Approach	WB		NB		SB	
HCM Control Delay, s	15.6		0		0	
HCM LOS	С					
Minor Lane/Major Mvm	t	NBTV	VBI n1	SBT		
		NDTV	399	- 100		
Capacity (veh/h)						
HCM Lane V/C Ratio			0.145			
HCM Control Delay (s)		-		1.1		
HCM Lane LOS			C 0.5			
HCM 95th %tile Q(veh)		-	0.5			

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Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SE
ane Configurations	٦.	<u>††</u>	1	5	† †	1	ሻሻ	≜î ≽			31	t t
raffic Volume (veh/h)	160	926	226	133	1221	561	315	830	96	30	381	6
uture Volume (veh/h)	160	926	226	133	1221	561	315	830	96	30	381	63
nitial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.95		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Nork Zone On Approach		No			No			No				N
Adj Sat Flow, veh/h/ln	1772	1772	1786	1786	1772	1786	1786	1786	1786		1786	180
Adj Flow Rate, veh/h	160	926	226	133	1221	561	315	830	96		381	63
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	2	2	1	1	2	1	1	1	1		1	
Cap, veh/h	149	1155	499	150	1155	497	362	775	90		366	77
Arrive On Green	0.09	0.34	0.34	0.09	0.34	0.34	0.11	0.25	0.25		0.11	0.2
Sat Flow, veh/h	1688	3367	1454	1701	3367	1449	3300	3045	352		3300	302
Grp Volume(v), veh/h	160	926	226	133	1221	561	315	462	464		381	35
Grp Sat Flow(s),veh/h/ln	1688	1683	1454	1701	1683	1449	1650	1697	1701		1650	171
Q Serve(g s), s	11.5	32.4	15.7	10.1	44.6	44.6	12.2	33.1	33.1		14.4	25
Cycle Q Clear(g c), s	11.5	32.4	15.7	10.1	44.6	44.6	12.2	33.1	33.1		14.4	25
Prop In Lane	1.00	02.4	1.00	1.00	44.0	1.00	1.00	00.1	0.21		1.00	20
ane Grp Cap(c), veh/h	149	1155	499	150	1155	497	362	432	433		366	43
//C Ratio(X)	1.07	0.80	0.45	0.88	1.06	1.13	0.87	1.07	1.07		1.04	0.8
Avail Cap(c a), veh/h	149	1155	499	150	1155	497	366	432	433		366	43
HCM Platoon Ratio	149	1.00	1.00	1.00	1.00	1.00	1.00	4.52	433		1.00	43
Jostream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Jniform Delay (d), s/veh	59.2	38.7	33.2	58.6	42.7	42.7	57.0	48.5	48.5		57.8	45
	94.1	5.9	3.0	41.5	42.7	42.7	19.6	63.4	63.4		58.5	45
ncr Delay (d2), s/veh												
nitial Q Delay(d3),s/veh	0.0 14.3	0.0	0.0	0.0	0.0	0.0 40.0	0.0	0.0	0.0 31.4		0.0	0
%ile BackOfQ(95%),veh/In		21.5	10.0	10.4	36.1	40.0	10.4	31.3	31.4		14.6	18
Jnsig. Movement Delay, s/veh		44.6	36.2	100.1	85.7	123.4	76.6	444.0	111.8		116.3	56
_nGrp Delay(d),s/veh	153.4							111.8				
_nGrp LOS	F	D	D	F	F	F	E	F	F		F	
Approach Vol, veh/h		1312			1915			1241				109
Approach Delay, s/veh		56.4			97.7			102.9				77
Approach LOS		E			F			F				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	51.0	21.0	40.0	18.0	51.0	20.9	40.1				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	44.6	14.4	* 33	11.5	44.6	14.4	* 33				
Max Q Clear Time (g c+11), s	12.1	34.4	16.4	35.1	13.5	46.6	14.2	27.6				
Green Ext Time (p_c), s	0.0	8.0	0.0	0.0	0.0	40.0	0.0	3.7				
Intersection Summary												
HCM 6th Ctrl Delay			85.2									_
HCM 6th LOS			F									
	_				_		_	_		_	_	
Notes												
Jser approved ignoring U-Turr HCM 6th computational engin			clearance	times for	r the nha	ses crossi	na the ha	rrier				
rioni our computational origin	io i squii	oo oquun	orou.uno	/ 11133 101	and pride	100 010001						
												_

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

01/08/2020

	-
Movement	SBR
Lanconfigurations	
Traffic Volume (veh/h)	81
Future Volume (veh/h)	81
Initial Q (Qb), veh	0
Ped-Bike Adj(A pbT)	0.94
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1800
Adj Flow Rate, veh/h	81
Peak Hour Factor	1.00
Percent Heavy Veh, %	0
Cap, veh/h	99
Arrive On Green	0.26
Sat Flow, veh/h	388
Grp Volume(v), veh/h	355
Grp Sat Flow(s),veh/h/ln	1699
Q Serve(g_s), s	25.6
Cycle Q Clear(g_c), s	25.6
Prop In Lane	0.23
Lane Grp Cap(c), veh/h	434
V/C Ratio(X)	0.82
Avail Cap(c_a), veh/h	434
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	45.5
Incr Delay (d2), s/veh	11.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	18.8
Unsig. Movement Delay, s/ve	
LnGrp Delay(d),s/veh	57.1
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Timer - Awargheu Fills	

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HCM 6th Signalized Intersection Summary

Configurations Y A B	: Baseline Roa	d & I	Privat	te Ac	cess	1		
Configurations Y A Y Y Volume (veh)h 132 1400 1758 154 163 169 V(Dume (veh)h 132 1400 1758 154 163 169 V(Db), veh 0 0 0 0 0 0 0 g(Db), veh 0 0 0 0 0 0 0 g(Db), veh 0 0 0 0 0 0 0 g(Db), veh 0 0 0 0 0 0 0 0 0 g(Db), veh 0 0 0 100		1	-	+	*	1	1	
Valume (vehh) 132 1400 1758 154 163 169 Valume (vehh) 132 1400 1758 154 163 169 Valume (vehh) 100 100 100 100 100 100 As Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 Are Adj(A, pbf) 100 100 100 100 100 100 I Heavy (bhf) 12 2 2 2 2 2 2 2 2 2 2 2 <td>ovement</td> <td>EBL</td> <td>EBT</td> <td>WBT</td> <td>WBR</td> <td>SBL</td> <td>SBR</td> <td></td>	ovement	EBL	EBT	WBT	WBR	SBL	SBR	
Volume (vehh) 132 1400 1758 154 163 169 V(Duhue (vehh) 0	ne Configurations	3	44	≜t ₀		N,	1	
Volume (vehh) 132 140 175 154 163 169 (ke Adj(A, pbT) 1.00 0 0 0 0 0 0 ke Adj(A, pbT) 1.00 1.00 1.00 1.00 1.00 1.00 gBus, Adj 1.00 1.00 1.00 1.00 1.00 1.00 ref On Approach No No No No No No FBow, Vehh/m 172 1772 1772 1772 1772 1772 Grade 0.00 1.00 1.00 1.00 1.00 1.00 1.00 FHow, Vehh/m 158 2.2 2	affic Volume (veh/h)	132			154	163		
V(b), wh 0<	uture Volume (veh/h)							
ke Adj(ApDT) 1.00 0.98 1.00 1.00 JBus, Adj 1.00 1.00 1.00 1.00 1.00 Jone On Approach No No No No No JFBow, Yehhilm 1772 1772 1772 1772 1772 1772 JFBow, Yehhilm 1.00 1.00 1.00 1.00 1.00 1.00 Jour Factor 1.00 1.00 1.00 1.00 1.00 1.00 Jour Factor 1.00 1.00 1.00 1.00 1.00 1.00 On Green 0.9 0.77 0.63 1.00 1.02 1.02 Jume(v), vehh 1.82 1.00 2.13 5.6 6.38 1.20 1.42 O Clear(c, c), s 1.01 1.03 1.06 1.00 1.00 1.00 Jong Calc), wehh 1.82 1.083 1.01 1.00 1.00 1.00 1.00 1.00 Jong Calc), wehh 1.82 1	tial Q (Qb), veh	0	0	0	0	0	0	
j Buš, Agi 1.00 1.00 1.00 1.00 iFiow, wehhlm 1772 1772 1772 1772 1772 iFiow, wehhlm 1772 1772 1772 1772 1772 w Rate, wehhlm 1.00 1.00 1.00 1.00 1.00 1.00 un Factor 1.00 1.00 1.00 1.00 1.00 1.00 Heav, Yeh, % 2 2 2 2 2 2 w Rate, wehhlm 1.00 1.00 1.00 1.00 1.00 1.00 I Heav, Yeh, % 2 2 2 2 2 2 O'Gener, 0.09 0.77 0.63 0.51 0.14 0.14 wehhlm 132 1596 638 12.0 14.2 Outard(c), wehh 138 593 162 1083 232 206 to(x) 0.40 0.40 0.40 0.40 1.00 1.00 tapid Qi, weh 0	d-Bike Adj(A pbT)	1.00			0.98	1.00	1.00	
Cone On Approach No No No Efforw shehlin T12 T72	arking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
FFow, wehhn 1772 1772 1772 1772 1772 Wate, wehn 121 1400 158 154 163 169 Ident Factor 1.00 1.00 1.00 1.00 1.00 1.00 Ithery Verk, % 2 2 2 2 2 1.00 Inder Factor 1.00 1.00 1.00 1.00 1.00 1.00 Inderson 0.09 0.77 0.63 0.63 0.14 0.14 withit 158 293 397 163 169 1100 100 Itemery, Verkh 132 1400 933 979 163 169 Clearic c, I: 0.0 1.3 596 638 120 142 140	ork Zone On Approac	h	No	No		No		
w Rate, wehh 132 1400 1758 154 163 169 L Heavy Veh, % 2	j Sat Flow, veh/h/ln		1772	1772	1772	1772	1772	
Jour Factor 1.00 1.00 1.00 1.00 1.00 Heary Veh, S 2 <th2< th=""> 2 2</th2<>	Flow Rate, veh/h	132	1400		154	163	169	
bh 158 2583 1974 170 232 206 On Green 0.09 0.77 0.63 0.14 0.14 w. veh/h 1688 3455 3219 270 1688 1502 Uime(/), veh/h 132 1400 933 979 163 169 Ftbroki, sveh/h/mtB8 163 169 177 1688 1502 (eg. s), s 10.0 21.3 59.6 63.8 12.0 14.2 Cleartic, c), s 10.0 21.3 59.6 63.8 12.0 14.2 Cleartic, c), s 158 250.3 163.2 104.2 206 tdx/x) 0.84 0.54 0.82 0.90 0.70 0.82 ap(c, a), veh/h 158 250.3 163.3 150.7 10.0 1.00 120 ap(3), shvh 1.00 1.00 1.00 1.00 1.00 1.00 163 ap(3), synh 154 0.81 12.2 12.6	ak Hour Factor	1.00	1.00		1.00	1.00	1.00	
abh 158 2583 1974 170 232 206 On Green 0.09 0.77 0.63 0.14 0.14 w. vehnh 1688 3455 3219 270 1688 1502 tume(), vehnh 132 1400 933 979 163 169 Ftbroki, svehnhmte8 1683 163 171 1688 1502 (eg. s), s 10.0 21.3 59.6 63.8 12.0 14.2 Cleartic c, s) 100 12.3 59.6 63.8 12.0 14.2 Cleartic c, s) 108 293 170 188 100 14.2 Cleartic c, s) 176 1683 10.0 1.00 1.00 1.00 1.00 pic ca(s), vehn 184 203 115 370 130 130 aptic ca), vehnh 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Delay(G) Synch 105.0 1.02	cent Heavy Veh, %	2	2		2		2	
Dn Green 0.09 0.77 0.63 0.63 0.14 0.14 Dn Green 0.09 0.77 0.63 0.63 0.14 0.14 wehhn 168 3455 327 0.78 H Flow(s), vehhn 132 1400 933 979 163 160 H Flow(s), vehhn 138 1463 177 1688 1502 (eg.s), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 21.3 59.6 638 12.0 14.2 D Clear(g.), s 10.0 10.0 1.06 10.0 10.0 10.0 m Glear(g.), s 10.0 10.0 10.0 10.0 10.0 10.0 D Flow(s), vehn 53.5 19 19.2 20.6 53.5 54.5 D Flow(s), vehn 54.0 8 10.3 12.3 3.9 7.8 D Flow(s), vehn 154.0 0.0 0.0 0.0 0.0 0.0 0.0 D Flow(s), vehn 154.0 13.1 23.3 39.7 9.6 17.4 Movement D Flow, sveh D Flow(g.), vehn 152 1912 332 C C E E A C C C E E A S C C E E A S C C E E A S C C E E A S C C E E A S C C E E A S C C E E A S C E E A S C E E	p, veh/h		2593	1974		232	206	
w, wehn 1688 3458 3219 270 1688 1602 lume(v), vehn 132 1400 933 979 163 169 Flow(s), vehnhr1686 1683 1717 1688 1502 1400 143 169 e(g. s), s 10.0 213 59.6 638 12.0 14.2 142 142 142 142 142 142 142 142 142 142 143 142 143 143 143 142 143 140 142 144 144 144 144 144 144 144 144 144 144 144 144 144 145 140 140 140 140 140 140 140 140 144 145 146 145 140 140 140 140 140 140 140 140 140 140 140 140 140 140 140 140 140 140	rive On Green	0.09	0.77	0.63	0.63	0.14	0.14	
Jume(), vehh 132 1400 933 979 163 169 Fbos(s) vehh/m688 183 183 177 188 1502 velg.s), s 100 21.3 596 63.8 12.0 14.2 Desrig.o, s 100 21.3 596 63.8 12.0 14.2 Lame 1.00 1.03 595 63.8 12.0 14.2 Jacobic (), vehh 152 596 0.8 0.0 1.0 1.0 ip Cap(c), vehh 152 596 0.8 0.0 0.7 0.82 ap(c_a), vehh 24 0.53 10.0 1.00 1.00 1.00 ap(c_a), vehh 50 9 10.0 1.00 1.00 1.00 Delay(d), siveh 15.4 1.0.3 3.9 7.8 Delay(d), siveh 15.4 6.7 Delay(d), siveh 15.4 6.7 3.2 2.9 5.7.4 6.2 LOS E A	t Flow, veh/h							
LFDw(s) Verbulk MB3 1683	p Volume(v), veh/h							
eig.si, s 10.0 21.3 59.6 63.8 12.0 14.2 Lane 0.0 21.3 59.6 63.8 12.0 14.2 Lane 10.0 21.3 59.6 63.8 12.0 14.2 Lane 10.0 10.0 10.0 100 100 ipp Cap(c), whith 58 258.3 1062 108.3 232 206 iot(X) 0.84 0.54 0.88 0.90 0.70 0.82 206 ap(c. a), whith 24 258.3 1062 108.3 232 206 ap(c. a), whith 50.0 10.0 1.00 1.00 1.00 1.00 Delay(d), siveh 15.4 8 10.3 12.3 3.9 7.8 Delay(d), siveh 15.4 8 13.3 3.9 7.8 10.0 Delay(d), siveh 15.4 8 7.4 6.2.3 10.0 10.0 Delay(d), siveh 15.4 6								
2 Clearing (c), st 00 21.3 59.6 63.8 12.0 14.2 Lane 100 106 100 100 100 ticx) 0.44 0.54 0.80 0.90 100 100 ticx) 0.44 0.54 0.80 0.90 0.70 0.82 agic_a), welh 342 293 1062 1083 415 370 tation Ratio 1.00 1.00 1.00 1.00 1.00 1.00 piely(d), siveh 580 59 19.9 20.6 53.5 54.5 blakk/G1(s), siveh 580 59 19.3 12.3 39.7 7.8 Delay(d), siveh 51.4 18 12.3 39.7 9.6 17.4 Movernet Delay, siveh 0.00 0.0 0.0 10.7 42.9 Delay(d), siveh 73.4 6.7 32.2 32.9 57.4 62.3 LOS E A C C E E ch/ Vol, wehh	Serve(g_s), s							
Lane ************************************	cle Q Clear(g c), s							
ipic Cap(c), veh/h 158 2583 1062 1083 232 206 ipic Cap(c), veh/h 234 2593 1062 1083 415 370 iatoon Rato 1.00 1.00 1.00 1.00 1.00 1.00 iatoon Rato 1.00 1.00 1.00 1.00 1.00 1.00 Delay(d), siveh 1.00 1.00 1.00 1.00 1.00 1.00 Delay(d), siveh 1.4 1.23 3.9 7.8 2.4 2.4 Vermern Delay, siveh 1.31 3.3 3.7 9.6 17.4 Vermern Delay, siveh 1.23 3.9 7.8 2.9 57.4 62.3 LOS E A C C E E 4.3 5.9 9 cht Vol, weh/h 1532 1912 332 57.4 62.3 1.03 1.8 7.8 Delay(d)siveh 1.24 31.6 5.9 9 5.8 6	p In Lane		21.0	00.0				
ub(X) 0.84 <t< td=""><td></td><td></td><td>2593</td><td>1062</td><td></td><td></td><td></td><td></td></t<>			2593	1062				
ap(c a), webh 234 2583 1062 1083 415 370 Iabon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 Delay(0, sveh 580 5.9 19.3 20.6 55.5 54.5 Jelay(3, sveh 1.00 1.00 1.00 1.00 1.00 1.00 Jelay(3, sveh 1.54 0.8 1.23 3.9 7.8 20.6 Jelay(3), sveh 1.00 1.00 1.00 0.0 0.0 0.0 Delay(3), sveh 0.1 1.63 39.7 9.6 17.4 Movement Delay, s/sveh 6 7.32 2.9 57.4 62.3 LOS E A C C E E ch/ Vol, weh/h 1532 1912 332 sold 5.9 ch/ LOS B C E E E 6.0 ch/ Vol, weh/h 1532 1912 332 Sold E E	C Ratio(X)							
Value Value <th< td=""><td>ail Cap(c a), veh/h</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	ail Cap(c a), veh/h							
am Filler(1) 100 100 100 100 100 100 100 100 n Delay (d), siveh 580 59 19.9 20.6 535 54.5 (s) (d), siveh 580 59 19.9 20.6 535 54.5 (s) (d), siveh 51 0 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	M Platoon Ratio							
Delay (i), siveh S80 59 19.9 20.6 53.5 54.5 lagy (d2), siveh 15.4 0.8 10.3 12.3 3.9 7.8 Delay (d3), siveh 16.9 13.1 36.3 39.7 7.8 Delay (d3), siveh 16.9 13.1 36.3 39.7 7.8 Delay (d3), siveh 16.9 13.1 36.3 39.7 9.6 Movement Delay, siveh	stream Filter(I)							
Jay (d2), siveh 15.4 10.8 10.3 12.3 3.9 7.8 Delay(d3), siveh 10.0 0.0 0.0 0.0 0.0 0.0 Movement Delay, Jsveh 0.0 0.0 0.0 0.0 0.0 0.0 Delay(d3), siveh 7.8 3.39 7.6 17.4 Movement Delay, Jsveh LOS E A C C E E cholsy(Js, siveh 152 1912 332 C E E cholsy, siveh 152 1912 332 C E E E Assigned Phs 2 4 5 6 E E E Assigned Gress 5 8 C E <								
Dielay(dis), wehl 0.0 0.0 0.0 0.0 0.0 ackOfO(g5%), wehl 6.9 13.1 36.3 39.7 9.6 17.4 Wowmenn Ubelay, siveh	r Delay (d2), s/veh							
veckor(1) 1 36.3 39.7 9.6 17.4 Delay(d).siveh 73.4 6.7 30.2 32.9 57.4 62.3 LOS E A C C E E LOS E A C C E E ch Vol, vehh 1532 1912 332 - - ch Delsy, siveh 154 31.6 65.9 - - ch LOS B C E E - Assigned Phs 2 4 5 6 - Assigned Phs 2 4 5 6 - Cear Time (2, ch N), s 55.8 62.2 6.0 5.8 - Cear Time (2, ch N), s 43.9 1.6 0.3 0.0 - ction summary 45.3 1.6 0.3 0.0 -								
Movement Delay, siveh Job Strain Strain								
Delay(d)sveh 73.4 6.7 30.2 22.9 57.4 62.3 LOS E A C C E E C C E E C C E E C C E E C C E E C C E E C C E E C C E E C C E E C C E E C C C E E C C C C E E C <t< td=""><td></td><td></td><td></td><td>00.0</td><td>00.1</td><td>0.0</td><td></td><td></td></t<>				00.0	00.1	0.0		
LOS E A C C E E ch Vol, weh/h 1532 1912 332 -	Grp Delay(d),s/veh			30.2	32.9	57.4	62.3	
ch Vol, wehh 1532 1912 332 ch Delay, sveh 124 31.6 59.9 ch LOS B C E ration (G+Y+Rc), s 105.9 24.1 18.1 87.8 Period (Y+Rc), s 15.9 24.1 18.1 87.8 Period (Y+Rc), s 15.8 *6.2 6.0 *5.8 rean Setting (Gmax), s *66 *32 18.0 *62 Clear Time (g_c-H), s 23.3 16.2 12.0 65.8 Ext Time (p,c), s 43.9 1.6 0.3 0.0 etion Summary th Ch' Delay 26.3	Grp LOS							
Ich Delay, sveh 12.4 31.6 59.9 Assigned Phs 2 4 5 6 Assigned Phs 2 4 5 6 Period (V+Rc), s 105.9 24.1 18.1 87.8 Period (V+Rc), s 15.8 *6.2 6.0 *5.8 remost Hing (Gmask), s *8 *6.2 6.0 *6.2 Clear Time (g_c+I1), s 23.3 16.2 12.0 65.8 Ext Time (p, c), s 43.9 1.6 0.3 0.0 ction Summary V6.3 V6.3 V6.3 V6.3	roach Vol, veh/h	_						
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	ersection Summary							
th LOS C	CM 6th Ctrl Delay							
	M 6th LOS			С				
	s		_	_	_			

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

tit Delay, siveh 1.4 towement WBL WBR NBT NBR SBL SBT and Configurations 7 7 7 7 7 7 raffic Not, sehh 0 156 1436 145 0 1062 uture Vol, vehh 0 156 1436 145 0 1062 uture Vol, vehh 0 156 1436 145 0 002 gin Control Stop Stop Free Free Free Free Free None torage Length 0 -0 -0 -0 -0 -0 eak Hour Factor 100 100 100 100 100 100 eak Hour Factor 100 156 1436 145 0 1062 tagint/finicm Minorit Majorit 749 0 - - Stage 1 - - - - - - ottical Howy Stg 1 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							
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ane Configurations 7 ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	Movement	WBI	WBR	NBT	NBR	SBI	SBT
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Titlea H May Sig 2 -	Critical Hdwy	-	6.94	-	-	-	-
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lov Cap-2 Maneuver			344				-
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ICM 95th %tile Q(veh) - 2.3 -			-				

1357 Baseline Road 09/16/2019 2027 Ult_NoTSP_PM

01/08/2020

Appendix E Intersection Performance Worksheets January 17, 2020

2027 Ultimate Conditions – Soft Transit Signal Priority



Novement EBL EBR WBL WBT WBT NBT NBT NBR SBU SBL Lane Configurations 1<		۶	+	*	4	÷	•	1	t	r	L#	1	ŧ
ane Configurations Y <thy< th=""> Y <thy< th=""></thy<></thy<>	Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SB
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No. No. No. No. No. Vigi Sel Flow, Wehhlm 100 1772 1778 17730 1786 1776 17786 17786 17786 17786 17786 17786 17786 17786 17786 1778 178 110 100 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.10 1.00 1.10 1.00 1.01 1.00 1.02 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 2.28 0.09 0.00 </td <td></td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td>1.00</td> <td></td> <td>1.00</td> <td>1.0</td>		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
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nrive On Green 0.10 0.37 0.03 0.02 0.22 0.04 0.28 0.28 0.28 0.09 3ar How, whith 174 3367 1688 3687 1474 3196 2974 419 3300 3ar Volume(v), vehith 178 1130 131 69 532 408 88 446 445 3144 3ar Sar How, shith 1714 1683 1457 16188 1643 1474 1598 1697 1696 1650 32 408 88 446 445 314 100 10.0 <td< td=""><td></td><td>164</td><td>1231</td><td>533</td><td>88</td><td>1058</td><td>474</td><td>136</td><td>820</td><td>115</td><td></td><td>286</td><td>98</td></td<>		164	1231	533	88	1058	474	136	820	115		286	98
Sat Flow, weh/h 17/4 3397 1457 1688 3287 1474 3196 2974 419 3300 3rp Volume(v), weh/h 178 1130 131 69 532 408 84 446 445 3141 3rp Volume(v), weh/h 178 1130 131 69 532 408 844 445 3141 333 310 131 33 310 104 3300 310 104 3300 310 104 75 31.1 3.3 310 101 104 75 31.1 3.3 310 101 104 700 1.00<		0.10	0.37	0.37	0.05	0.32	0.32	0.04	0.28	0.28		0.09	0.3
3m Volume(v), vehih 178 1130 131 69 532 408 88 446 445 314 3m Sat Flow(s), vehihin 1714 1683 1474 1588 1647 1588 1647 1588 1667 1696 1650 Spreids, s), s 11.5 38.5 7.5 4.9 15.7 31.1 3.3 31.0 31.0 10.4 Sycle Q, Cleard, c), s 11.5 38.5 7.5 4.9 15.7 31.1 3.3 31.0 31.0 10.4 Sycle Q, Cleard, c), s 11.5 38.5 7.5 4.9 15.7 31.1 3.3 31.0 31.0 10.4 10.4 Sycle Q, Capit, vehih 164 1231 533 38.8 1058 47.4 136 468 467 256 10.0 1.00		1714	3367	1457	1688	3287	1474	3196	2974	419		3300	308
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arine Gro Cap(c), velvih. 164 1231 533 88 1058 474 136 488 467 286 V/C Ratio(X) 1.08 0.92 0.25 0.79 0.50 0.86 0.65 0.95 0.95 1.10 VirC Ratio(X) 1.08 0.92 0.25 0.79 0.50 0.86 0.65 0.95 0.95 1.10 VirC Ratio(X) 1.00			00.0			10.1			01.0				
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niai 0 Čelavjć3) sveh 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.					14.3		18.1		29.8	29.9			0.
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Jnsig, Movement Delay, Sveh		15.0	25.9	5.5	4.5	11.2	20.7	2.6	24.4	24.4		12.9	10.
Drog Delay(d), siven 148.5 48.6 27.6 70.5 34.6 56.3 61.7 72.5 72.6 138.8 LnGrp LOS F D C E C E E E F D C E C E E E F D C E C E E E F D Approach Vol, veh/h 1439 1009 97.9 Veh/h Approach Delay, siveh 59.0 45.8 71.6 Approach Delay, siveh 59.0 45.8 71.6 Approach Delay, Siveh 50.0 F D E E E Total Not		1											
Anchrig LOS F D C E C E E E F Approach Vol, veh/h 1439 1009 979 4009 979 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 4009 400 1009 979 4009			48.6	27.6	70.5	34.6	56.3	61.7	72.5	72.6		136.8	33.
Approach Delay, siveh 1439 1009 979 Approach Delay, siveh 59.0 45.8 71.6 Approach Delay, siveh 50.0 18.0 45.0 17.7 Approach Delay, siveh 6.5 6.4 6.6 *6.9 Ara Cire Setting (Gmax), s 11.5 38.6 10.4 *33 11.5 38.6 10.4 *33 Ara Cire Setting (Gmax), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Ara Cire Setting (Gmax), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Ara Cire Cire Time (g_o,e), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Are Cire Cire Time (g_o,e), s 0.1 0.0 0.1 0.0		F	D	C	E	С	E	E	E	E		F	
Approach LOS 59.0 45.8 71.6 Approach LOS E D E Physoch LOS E D E Physoch LOS 12.7 50.3 17.0 40.0 18.0 45.0 11.7 45.3 Phys Duration (G+Y+Rc), s 12.7 50.3 17.0 40.0 18.0 45.0 11.7 45.3 Change Period (Y+Rc), s 6.5 6.4 6.6 * 6.9 6.5 6.4 6.6 * 6.9 Max Ceen Setting (Grax), s 11.5 38.6 10.4 * 33 15.5 38.6 10.4 * 33 Max Ceen Ext Time (p, c), s 0.1 0.0 0.1 10.0 3.7 0.1 6.7 Intersection Summary E HCM 6th Ctl Delay 61.4 - Ser approved ignoring U-Turning movement. E <			1439			1009							83
Approach LOS E D E Immer - Assigned Phis 1 2 3 4 5 6 7 8 Preb Duration (G+V+Rc), s 1.7 50.3 17.0 40.0 18.0 45.0 17.7 45.3 Change Period (V+Rc), s 6.5 6.4 6.6 * 6.9 6.5 6.4 6.6 * 6.9 Vax Orear Time (g_o-ti), s 6.9 40.5 12.4 33.0 13.5 38.6 10.4 * 33 Green Ext Time (g_o,c), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Ot 6th Time Delay 61.4 - - - - - Ot 6th DLOS E - - - - - - Ser approved ignoring U-Turning movement. - - - - -													72
Immer - Assigned Phis 1 2 3 4 5 6 7 8 Phs Duration (6+V+Rc), s 12.7 50.3 17.0 40.0 18.0 45.0 11.7 45.3 Dhange Preid (V+Rc), s 5.6 4.6 6.5 9.4 6.6 *6.9 Max Green Setting (Gmax), s 11.5 38.6 10.4 *33 11.5 38.6 10.4 *33 Max O Clear Time (g_c+t), s 0.1 0.0 0.1 3.3 3.5 3.1 6.8 Green Exit Time (p, c), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 CM 6th Ch Delay 61.4 - - - - - CM 6th LOS E - - - - - - Ser approved ignoring U-Turning movement. - - - - - - -													
Phs Duration (G+Y+Rc), s 12.7 50.3 17.0 40.0 18.0 45.0 11.7 45.3 Change Period (Y+Rc), s 6.5 6.4 6.6 *6.9 6.5 6.4 6.6 *6.9 Max Cene Stelling (Gmax), s 11.5 38.6 10.4 *33 11.5 38.6 10.4 *33 Max Q Clear Time (g_c-1), s 6.9 40.5 12.4 33.0 13.5 33.1 5.3 16.8 Green Exit Time (p_c), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Intersection Summary 61.4 - - - - - HCM 6th Ct/I Delay 61.4 - - - - - Ser approved ignoring U-Turning movement. E - - - -													
Change Period (Y-Rc), s 6.5 6.4 6.6 * 6.9 Max Green Setting (Gmax), s 11.5 38.6 10.4 * 33 Max Orean Team (Gmax), s 11.5 38.6 10.4 * 33 Alwa C Otean Time (g.c)-t1), s 6.9 40.5 12.4 33.0 13.5 38.6 10.4 * 33 Breen Ext Time (g.c), s 0.1 0.0 0.1 10.0 3.7 0.1 6.7 Intersection Summary													
Max Green Setting (Gmax), s 11.5 38.6 10.4 *33 Max Q Clear Time (g_c-H), s 6.9 40.5 12.4 33.0 13.5 33.1 5.3 16.8 Sreen EXT Time (g_c, c), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Intersection Summary													
Max O Clear Time (g.c.+11), s 6.9 40.5 12.4 33.0 13.5 33.1 5.3 16.8 Streen Ext Time (p.c), s 0.1 0.0 0.1 0.0 3.7 0.1 6.7 Intersection Summary 1 1.4 1.4 1.4 1.4 1.4 HCM 6th Ctrl Delay 61.4 1.4 1.4 1.6 1.4 1.6 Ster approved ignoring U-Turning movement. E 1.4 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>													
Green Ext Time (p. e. s. 0.1 0.0 0.1 0.0 3.7 0.1 6.7 rtersection Summary													
Intersection Summary HCM 6th Ckrl Delay 61.4 HCM 6th LOS E Notes Jeer approved ignoring U-Turning movement.													
HCM 6th Ctrl Delay 61.4 HCM 6th LOS E Notes Jeer approved ignoring U-Turning movement.	Green Ext Time (p_c), s	0.1	0.0	0.0	0.1	0.0	3.7	0.1	6.7				
HCM 6th Ctrl Delay 61.4 HCM 6th LOS E Notes Jeer approved ignoring U-Turning movement.	ntersection Summarv												
HCM 6th LOS E Kotes Jser approved ignoring U-Turning movement.	HCM 6th Ctrl Delay			61.4									
Notes Jser approved ignoring U-Turning movement.				F									
Jser approved ignoring U-Turning movement.		_	_	-			_			_	_		_
HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.													
	HCM 6th computational engi	ne requir	es equal o	clearance	times for	r the phas	es crossi	ng the ba	irrier.				

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

	-
Movement	SBR
Lanconfigurations	0011
Traffic Volume (veh/h)	50
Future Volume (veh/h)	50
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1786
Adj Flow Rate, veh/h	50
Peak Hour Factor	1.00
Percent Heavy Veh, %	1
Cap, veh/h	104
Arrive On Green	0.32
Sat Flow, veh/h	326
Grp Volume(v), veh/h	263
Grp Sat Flow(s),veh/h/ln	1718
Q Serve(g_s), s	14.8
Cycle Q Clear(g_c), s	14.8
Prop In Lane	0.19
Lane Grp Cap(c), veh/h	550
V/C Ratio(X)	0.48
Avail Cap(c_a), veh/h	550
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	32.8
Incr Delay (d2), s/veh	0.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	11.1
Unsig. Movement Delay, s/\	
LnGrp Delay(d),s/veh	33.4
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
Timer - hasigiled Plis	

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HCM 6th Signalized Intersection Summary

2: Baseline Roa	uui		0 / 10	0000	·	
	٠	-	+	•	1	1
Novement	EBL	EBT	WBT	WBR	SBL	SBR
ane Configurations	1	44	≜î ≽		1	1
raffic Volume (veh/h)	66	1454	966	60	43	57
uture Volume (veh/h)	66	1454	966	60	43	57
nitial Q (Qb), veh	0	0	0	0	0	0
ed-Bike Adj(A pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Vork Zone On Approac	h	No	No		No	
dj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772
dj Flow Rate, veh/h	66	1454	966	60	43	57
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	83	2759	2318	144	136	121
vrive On Green	0.05	0.82	0.72	0.72	0.08	0.08
Sat Flow, veh/h	1688	3455	3307	200	1688	1502
Grp Volume(v), veh/h	66	1454	505	521	43	57
Grp Sat Flow(s),veh/h/li		1683	1683	1734	1688	1502
Serve(g s), s	4.6	16.5	14.4	14.4	2.9	4.4
Cycle Q Clear(g c), s	4.6	16.5	14.4	14.4	2.9	4.4
Prop In Lane	1.00	10.0		0.12	1.00	1.00
ane Grp Cap(c), veh/h		2759	1213	1249	136	121
//C Ratio(X)	0.79	0.53	0.42	0.42	0.32	0.47
vail Cap(c a), veh/h	98	2759	1213	1249	450	400
ICM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Jniform Delay (d), s/vel		3.4	6.7	6.7	52.1	52.7
ncr Delay (d2), s/veh	30.3	0.7	1.1	1.0	1.3	2.9
nitial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0
6ile BackOfQ(95%).vet		10.0	10.0	10.2	2.4	6.7
Jnsig. Movement Delay			.0.0	10.2	2.7	0.1
.nGrp Delay(d),s/veh	86.8	4.2	7.8	7.7	53.4	55.6
nGrp LOS	F	A	A	A	D	E
Approach Vol, veh/h		1520	1026		100	
pproach Delay, s/veh		7.7	7.7		54.7	
oproach LOS		A	A		D	
imer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc)		104.2		15.8	11.9	92.2
Change Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8
Nax Green Setting (Gm		* 76		* 32	7.0	* 63
/lax Q Clear Time (g_c		18.5		6.4	6.6	16.4
Green Ext Time (p_c), s	5	42.9		0.5	0.0	24.5
ntersection Summary						
ICM 6th Ctrl Delay			9.5			
ICM 6th LOS			A			

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

HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection						
Int Delay, s/veh	0.4					
	••••					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	- 11	1		† ††
Traffic Vol, veh/h	0	58	1313	72	0	819
Future Vol, veh/h	0	58	1313	72	0	819
Conflicting Peds, #/hr	0	9	0	9	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Free	-	None
Storage Length	-	0	-	450	-	-
Veh in Median Storage,		-	0	-	-	0
Grade, %	0	-	0	-		0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	1	1	2	1
Mvmt Flow	0	58	1313	72	0	819
Main Afran A	E		Antone		1	
	/inor1		Major1		Major2	
Conflicting Flow All	-	666	0	-		
Stage 1		-	-			-
Stage 2	-	-	-	-	-	-
Critical Hdwy		6.94	-	-		-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2			-	-		-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	402	-	0	0	-
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver		399	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1		-	-	-		-
Stage 2						
					0.0	
Approach	WB		NB		SB	
HCM Control Delay, s	15.6		0		0	
HCM LOS	С					
Minor Lane/Major Mvm	t	NBTV	VBLn1	SBT		
Capacity (veh/h)			399	-		
HCM Lane V/C Ratio			0.145			
HCM Control Delay (s)			15.6	-		
HCM Lane LOS			13.0 C			
HCM 95th %tile Q(veh)			0.5			

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	۶		\mathbf{r}	1	-	*	1	Ť	r	L#	1	÷
Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SE
ane Configurations	٦	<u>††</u>	1	٦	<u>†</u> †	1	ሻሻ	≜ î≽			31	t t
raffic Volume (veh/h)	160	926	226	133	1221	561	315	830	96	30	381	63
Future Volume (veh/h)	160	926	226	133	1221	561	315	830	96	30	381	63
nitial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.95		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Work Zone On Approach		No			No			No				Ν
Adj Sat Flow, veh/h/ln	1772	1772	1786	1786	1772	1786	1786	1786	1786		1786	180
Adj Flow Rate, veh/h	160	926	226	133	1221	561	315	830	96		381	63
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Percent Heavy Veh, %	2	2	1	1	2	1	1	1	1		1	
Cap, veh/h	149	1207	522	150	1207	520	315	775	90		315	76
Arrive On Green	0.09	0.36	0.36	0.09	0.36	0.36	0.10	0.25	0.25		0.10	0.2
Sat Flow, veh/h	1688	3367	1456	1701	3367	1451	3300	3045	352		3300	302
Grp Volume(v), veh/h	160	926	226	133	1221	561	315	462	464		381	35
Grp Sat Flow(s),veh/h/ln	1688	1683	1456	1701	1683	1451	1650	1697	1701		1650	171
Q Serve(q s), s	11.5	31.6	15.3	10.1	46.6	46.6	12.4	33.1	33.1		12.4	25
Cycle Q Clear(q c), s	11.5	31.6	15.3	10.1	46.6	46.6	12.4	33.1	33.1		12.4	25
Prop In Lane	1.00	31.0	1.00	1.00	40.0	40.0	12.4	33.1	0.21		12.4	20
	149	1207	522	150	1207	520	315	432	433		315	43
Lane Grp Cap(c), veh/h	1.07		0.43						433		1.21	43
V/C Ratio(X)		0.77		0.88	1.01	1.08	1.00	1.07				
Avail Cap(c_a), veh/h	149	1207	522	150	1207	520	315	432	433		315	43
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.0
Uniform Delay (d), s/veh	59.2	36.9	31.7	58.6	41.7	41.7	58.8	48.5	48.5		58.8	45.
Incr Delay (d2), s/veh	94.1	4.7	2.6	41.5	28.8	62.4	50.9	63.4	63.4		120.6	11
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
%ile BackOfQ(95%),veh/In	14.3	20.9	10.4	10.4	33.7	37.2	12.2	31.3	31.4		17.3	18
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	153.4	41.6	34.3	100.1	70.5	104.1	109.7	111.8	111.8		179.4	57
LnGrp LOS	F	D	С	F	F	F	F	F	F		F	
Approach Vol, veh/h		1312			1915			1241				109
Approach Delay, s/veh		54.0			82.4			111.3				100.
Approach LOS		D			F			F				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	53.0	19.0	40.0	18.0	53.0	19.0	40.0				
Change Period (Y+Rc), s	6.5	6.4	6.6	* 6.9	6.5	6.4	6.6	* 6.9				
Max Green Setting (Gmax), s	11.5	46.6	12.4	* 33	11.5	46.6	12.4	* 33				
Max Q Clear Time (g c+11), s	12.1	33.6	14.4	35.1	13.5	40.0	14.4	27.6				
Green Ext Time (p_c), s	0.0	9.8	0.0	0.0	0.0	40.0	0.0	3.7				
Intersection Summary												
HCM 6th Ctrl Delay			85.6									
HCM 6th LOS			03.0 F									
			г									
Notes												
Jser approved ignoring U-Turr HCM 6th computational engin			clearance	e times for	r the pha	ses cross	ing the ba	arrier.				

HCM 6th Signalized Intersection Summary 1: Clyde Avenue & Baseline Road 1

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	-
Novement	SBR
Lanconfigurations	
Traffic Volume (veh/h)	81
Future Volume (veh/h)	81
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.94
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1800
Adj Flow Rate, veh/h	81
Peak Hour Factor	1.00
Percent Heavy Veh, %	0
Cap, veh/h	99
Arrive On Green	0.25
Sat Flow, veh/h	388
Grp Volume(v), veh/h	355
Grp Sat Flow(s),veh/h/ln	1698
Q Serve(g_s), s	25.6
Cycle Q Clear(g_c), s	25.6
Prop In Lane	0.23
Lane Grp Cap(c), veh/h	432
V/C Ratio(X)	0.82
Avail Cap(c_a), veh/h	432
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	45.7
Incr Delay (d2), s/veh	12.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/In	18.9
Unsig. Movement Delay, s/v	
LnGrp Delay(d),s/veh	57.6
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	
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HCM 6th Signalized Intersection Summary

	1	-	+	*	1	1	
ovement	EBL	EBT	WBT	WBR	SBL	SBR	
ne Configurations	1	44	1		1	1	
affic Volume (veh/h)	132	1400	1758	154	163	169	
ture Volume (veh/h)	132	1400	1758	154	163	169	
tial Q (Qb), veh	0	0	0	0	0	0	
d-Bike Adj(A pbT)	1.00			0.98	1.00	1.00	
arking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
ork Zone On Approac	:h	No	No		No		
Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	
Flow Rate, veh/h	132	1400	1758	154	163	169	
ak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
rcent Heavy Veh, %	2	2	2	2	2	2	
p, veh/h	130	2593	2026	175	232	206	
ive On Green	0.08	0.77	0.65	0.65	0.14	0.14	
Flow, veh/h	1688	3455	3219	270	1688	1502	
volume(v), veh/h	132	1400	933	979	163	169	
p Sat Flow(s),veh/h/l		1683	1683	1717	1688	1502	
erve(g s), s	10.0	21.3	57.0	60.9	12.0	14.2	
le Q Clear(g c), s	10.0	21.3	57.0	60.9	12.0	14.2	
In Lane	1.00			0.16	1.00	1.00	
e Grp Cap(c), veh/h		2593	1089	1111	232	206	
C Ratio(X)	1.02	0.54	0.86	0.88	0.70	0.82	
ail Cap(c a), veh/h	130	2593	1089	1111	415	370	
M Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
stream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	
iform Delay (d), s/vel		5.9	18.1	18.8	53.5	54.5	
r Delay (d2), s/veh	83.5	0.8	8.7	10.1	3.9	7.8	
ial Q Delay(d3),s/vel		0.0	0.0	0.0	0.0	0.0	
e BackOfQ(95%).vel		13.1	34.4	37.4	9.6	17.4	
sig. Movement Delay			0	01.1	0.0		
Grp Delay(d),s/veh		6.7	26.8	29.0	57.4	62.3	
Srp LOS	F	A	C	C	E	E	
roach Vol, veh/h		1532	1912		332		
roach Delay, s/veh		18.5	27.9		59.9		
roach LOS		10.5 B	21.5 C		55.5 E		
			0				
ner - Assigned Phs		2		4	5	6	
Duration (G+Y+Rc		105.9		24.1	16.0	89.9	
ange Period (Y+Rc),		* 5.8		* 6.2	6.0	* 5.8	
Green Setting (Gr		* 86		* 32	10.0	* 70	
x Q Clear Time (g_c		23.3		16.2	12.0	62.9	
een Ext Time (p_c), s	5	43.9		1.6	0.0	7.2	
ersection Summary	_	_	_	_	_	_	
M 6th Ctrl Delay			26.9				
M 6th LOS			C				

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

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HCM 6th TWSC 4: Clyde Avenue & Private Access 3

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		1	^	1		^
Traffic Vol. veh/h	0	156	1436	145	0	1062
Future Vol. veh/h	0	156	1436	145	0	1062
Conflicting Peds, #/hr	0	31	0	31	0	0
Sign Control	Stop	Stop		Free	Free	Free
RT Channelized	-	Stop	-		-	None
Storage Length		0.00		450		-
Veh in Median Storage	e.#0	-	0	-		0
Grade. %	0		-			0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	100	100	0	0
Mymt Flow	0	156	1436	145	0	1062
WWWITH FIOW	0	100	1430	140	0	1002
	Minor1	1	Major1	N	Major2	
Conflicting Flow All	-	749	0	-	-	
Stage 1	-	-	-	-		-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1		-	-		-	-
Critical Hdwy Stg 2	-	-	-	-		
Follow-up Hdwy	-	3.32				
Pot Cap-1 Maneuver	0	354	-	0	0	-
Stage 1	0			0	0	
Stage 2	0	-		0	Ő	
Platoon blocked. %	0			0	0	
Mov Cap-1 Maneuver		344				
Mov Cap-2 Maneuver		- 344				
		-				
Stage 1		-	-	1.1		
Stage 2		-	-			
Approach	WB		NB		SB	
HCM Control Delay, s	23.9		0		0	
HCM LOS	С					
Minor Lane/Major Mvr	nt	NDTU	VBLn1	SBT		
	m				_	_
Capacity (veh/h)		-	344			
HCM Lane V/C Ratio			0.453			
HCM Control Delay (s)	-		-		
HCM Lane LOS		-				
HCM 95th %tile Q(veh	1)	-	2.3			

01/08/2020