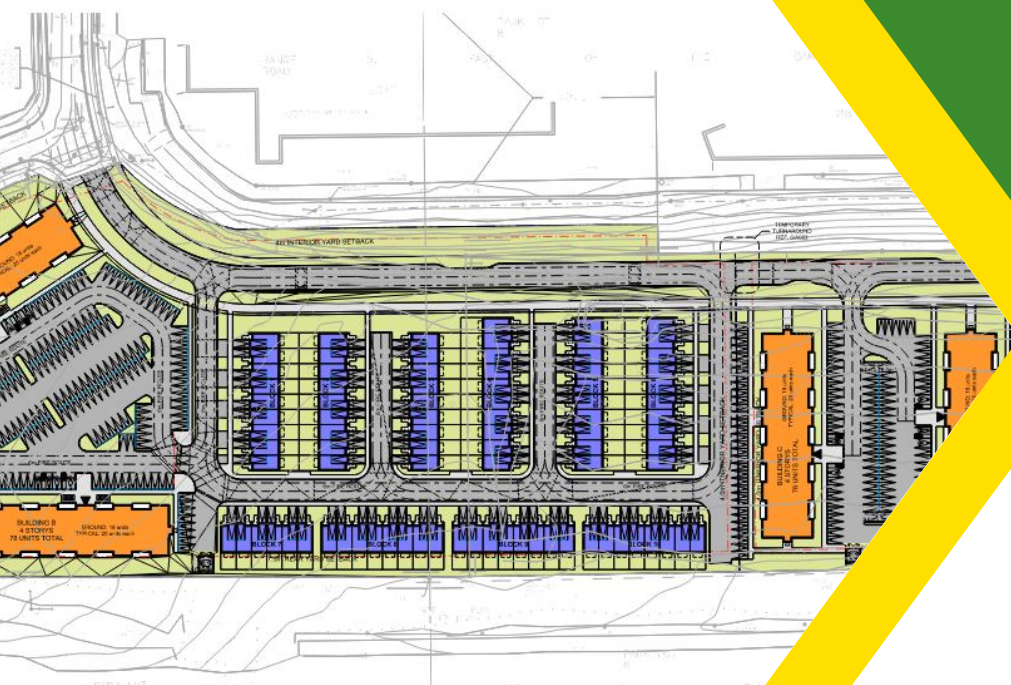


SmartCentres

1555 18th Avenue East

**Transportation
Impact
Study**



1555 18th Avenue East Owen Sound – SmartCentres Transportation Impact Study

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January 2023

PN: 2022-032

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1 Introduction

This Transportation Impact Study has been prepared to support the official plan amendment (OPA), and the zoning by-law amendment (ZBA) application for Phase 1 and Phase 2, and the Site Plan Application (SPA) for Phase 1 of the proposed development of the land east of 10th Street East, and south of the Owen Sound SmartCentres. The property is currently zoned as Low Density Residential with Holding Provision (R3(H)). The site development will be split into two phases; the first phase is proposed to include a total of 156 mid-rise units in two buildings and 87 townhouse units, and second phase is proposed to include a total of 234 mid-rise units in three buildings. A total of 369 surface parking spaces will be provided in Phase 1 of the project, and a total of 235 surface parking spaces will be provided in Phase 2 of the project. It is noted that Phase 2 is considered a preliminary concept at this time. The site context is provided in Figure 1 and the proposed Site Plan is provided in Figure 2.

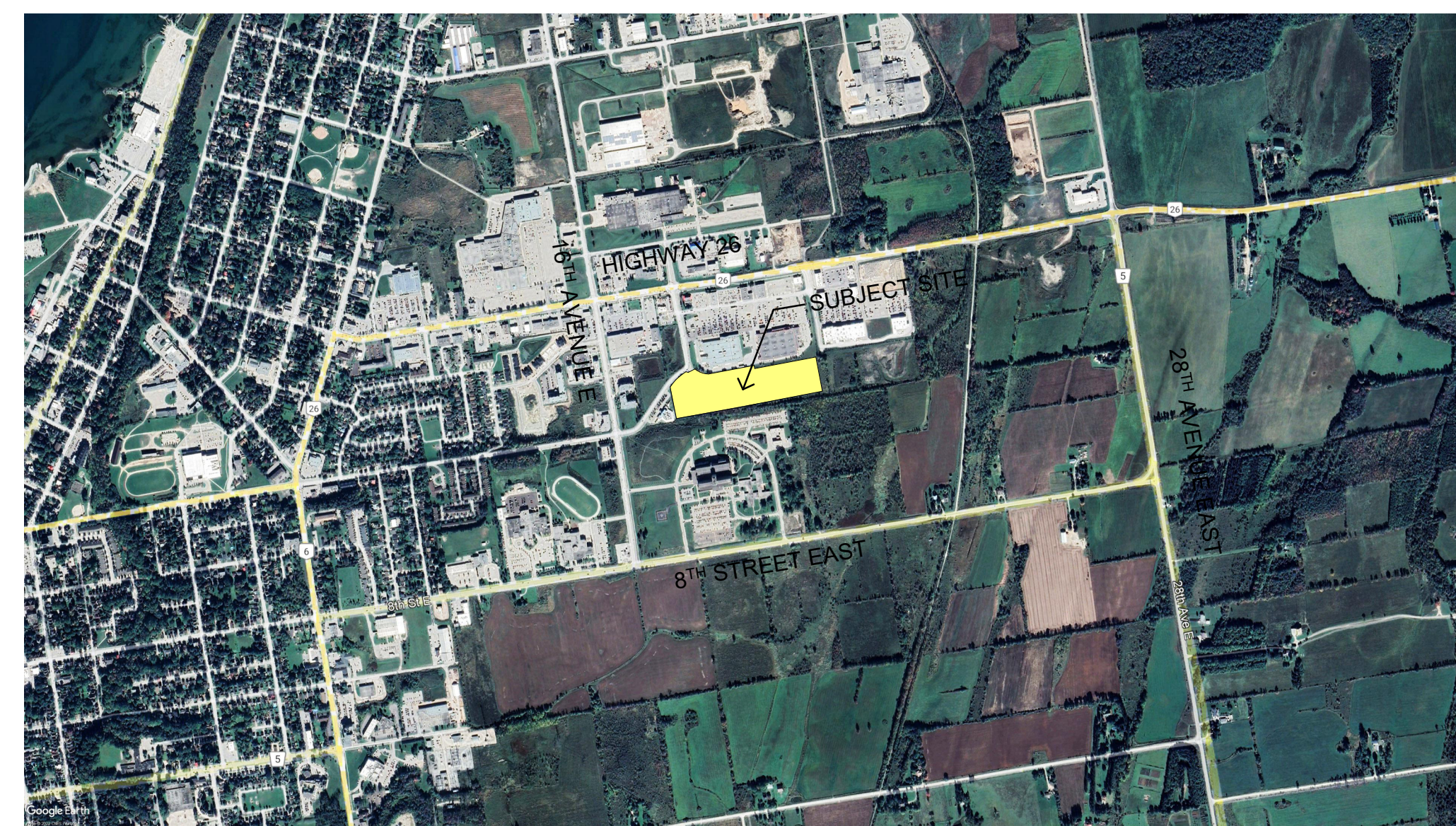
Figure 1: Site Context Plan



The proposed development will extend 10th Street East through the site, terminating at the future extension of 20th Avenue East. Four unsignalized access intersections are proposed within the subject lands along the extension of 10th Street East.

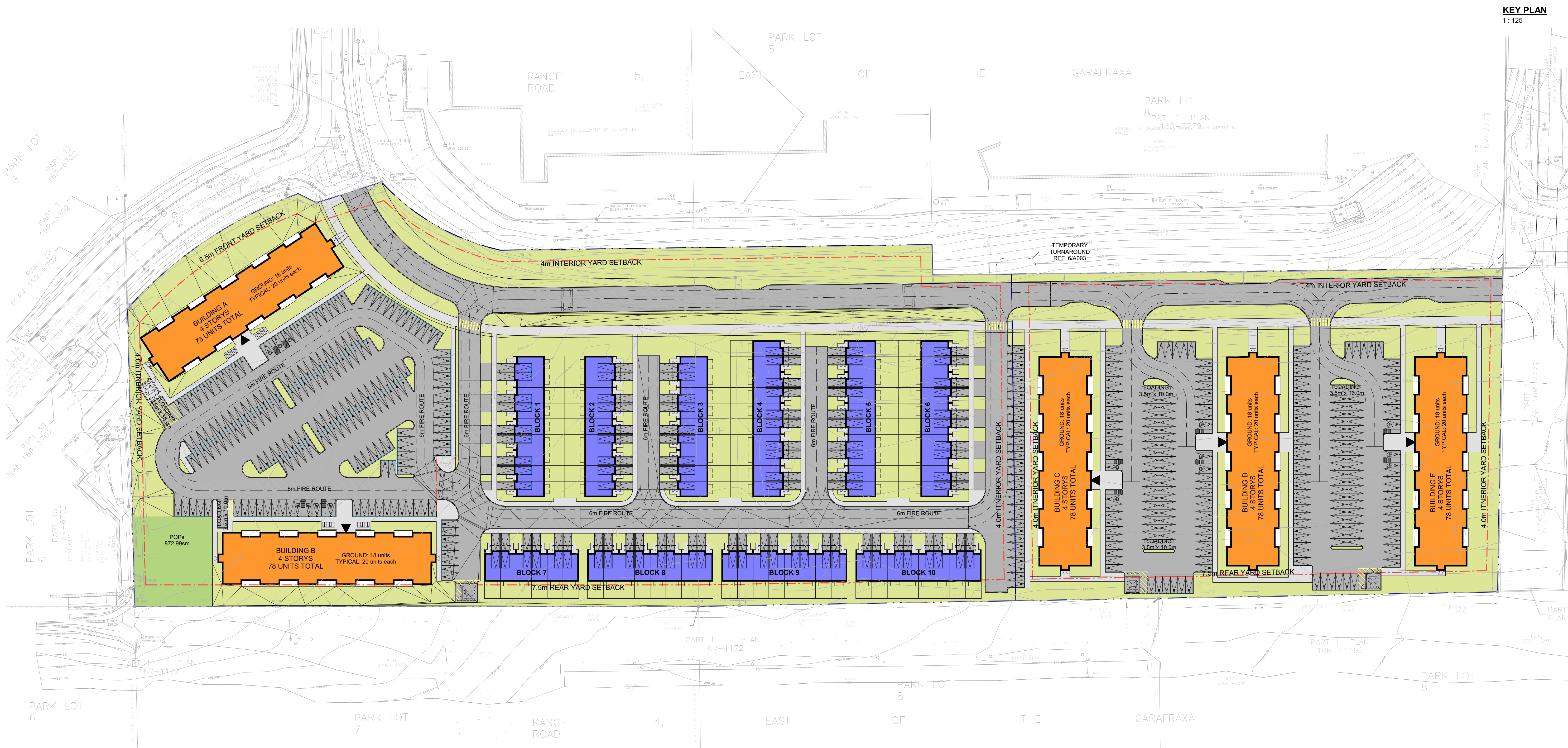
The anticipated build-out year for Phase 1 of the development is 2027, and the anticipated build-out year for Phase 2 of the development is 2032. The analysis will therefore include 2022 existing, 2027 and 2032 future background conditions, as well as 2027 and 2032 total future conditions. As the proposed development consist of residential land uses, the AM and PM peak periods have been selected as the analysis time periods. The scope of this TIS has been confirmed with transportation staff from the City of Owen Sound through the preparation of a Terms of Reference Document. The Terms of Reference as well as resulting email correspondence discussing the scope of work is included in Appendix A.

Figure 2: Site Plan



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NO.	ISSUED	DATE
1	ISSUED TO CLIENT	2022-09-19
2	FOR CO-ORDINATION	2022-12-07
3	DRAFT PACKAGE	2023-01-19
4	SPA SUBMISSION	2023-01-31



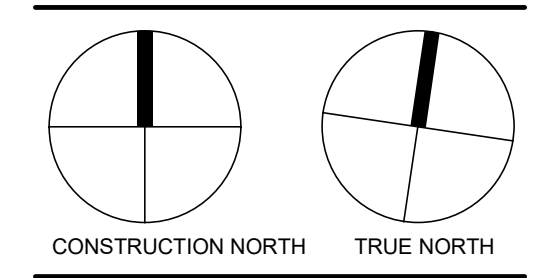
KEY PLAN
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SEAL



OWEN SOUND SMART CENTRES

10th STREET EAST & 18th AVENUE EAST
 OWEN SOUND, ON

SHEET NAME

MASTER PLAN

START DATE	2022.09.12
DRAWN BY	MMW/ SS
CHECKED BY	CC
SCALE	As indicated
PROJECT NO.	122038

DRAWING

6 Site Plan - MASTER
 A001 1: 700

A001

2 Existing Conditions

2.1 Area Road Network

8th Street East

8th Street East is a City of Owen Sound minor arterial road a two-lane rural cross-section. No pedestrian or cyclist facilities are provided along 8th Street East within the Study Area. The Owen Sound Official Plan notes a minimum right-of-way (ROW) of 30 metres for arterial roads. A 50 kilometre per hour posted speed limit applies around the Owen Sound Hospital and east of the future intersection of 8th Street East and 20th Avenue East, and an 80 kilometre per hour posted speed limit applies west of the future intersection of 8th Street East and 20th Avenue East.

10th Street East

10th Street East is a City of Owen Sound collector road with a two-lane urban cross-section. A sidewalk is present on the south side of the road and curbs and gutters are present on the north side of the road. The Owen Sound Official Plan notes a minimum right-of-way of 25 metres for collector roads, however within the Study Area, a 24-metre right-of-way is noted for 10th Street East. A 40 kilometre per hour posted speed limit applies.

16th Street East

16th Street East is a City of Owen Sound major arterial road with a four-lane urban cross-section west of 18th Avenue East and is a three-lane urban cross section east of 18th Avenue East. Within the Study Area, 16th Street East is considered a connecting link roadway, and outside of the City of Owen Sound, 16th Street East is called Highway 26 and is part of the Provincial Highway system. Within the Study Area, sidewalks are present on both sides of the road west of 18th Avenue East. East of 18th Avenue East, a sidewalk is present on the south side of the road, and a gravel shoulder is present on the north side of the road. The Owen Sound Official Plan notes a minimum right-of-way of 30 metres for arterial roads. The Owen Sound Transportation Master Plan notes this street as a truck route. A 50 kilometre per hour posted speed limit applies until approximately 290 metres east of the 18th Avenue East and 16th Street East intersection where a 60 kilometre per hour posted speed limit applies.

16th Avenue East

16th Avenue East is a City of Owen Sound minor arterial road with a three-lane urban cross-section until approximately 185 metres north of the northeast curb of the 10th Street East intersection where it becomes a four-lane urban cross section. South of 16th Street East, sidewalks are present on both sides of the road. North of 16th Street East, a sidewalk is present on the east side of the road and curbs and gutters are present on the west side of the road. The Owen Sound Official Plan notes a minimum right-of-way of 30 metres for arterial roads. A 50 kilometre per hour posted speed limit applies.

18th Avenue East

18th Avenue East is a City of Owen Sound collector road with a four-lane urban cross-section. North of 16th Street East, a sidewalk is present on the west side of the road and curbs and gutters are present on the east side of the road. South of 16th Street East, sidewalks are present on both sides of the road. The Owen Sound Official Plan notes a minimum right-of-way of 25 metres for collector roads. A 50 kilometre per hour unposted speed limit is assumed.

20th Avenue East

20th Avenue East is a City of Owen Sound collector road with a two-lane urban cross-section. Sidewalks are present on both sides of the road until approximately 58 metres south of the southwest curb of the 16th Street East and 20th Avenue East intersection where the sidewalk on the west side of the road transforms into a curb. The Owen Sound Official Plan notes a minimum right-of-way of 25 metres for collector roads. A 50 kilometre per hour unposted speed limit is assumed.

2.2 Existing Intersections

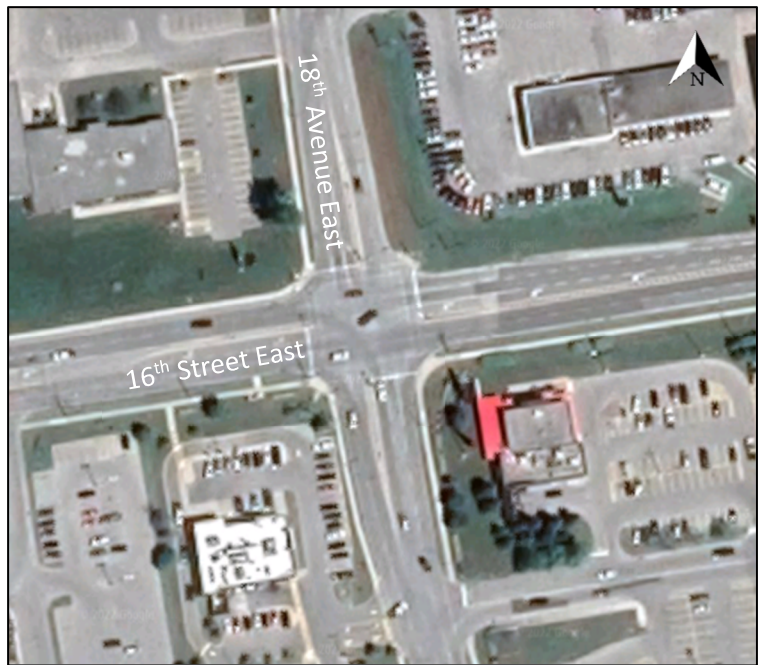
10th Street East at 18th Avenue East

The intersection of 10th Street East at 18th Avenue East is a two-legged unsignalized intersection with stop control on the northbound approach. The southbound approach consists of a right-turn lane and the northbound approach consists of a left-turn lane. Pedestrian crosswalks are located on the west and south legs. No turning restrictions are noted at this intersection.



18th Avenue East at 16th Street East

The intersection of 18th Avenue East at 16th Street East is a four-legged signalized intersection. All approaches consist of an auxiliary left-turn lane, a through lane, and a shared right-turn / through lane. Pedestrian signal heads are located on all legs of the intersection. Pedestrian call buttons are located on the east and west leg. No turn restrictions are noted.



10th Street East at 16th Avenue East

The intersection of 10th Street East at 16th Avenue East is a four-legged signalized intersection. The northbound, eastbound, and westbound approach consists of an auxiliary left-turn lane, and a shared through / right-turn lane. The southbound approach consists of a left-turn lanes, and a shared through / right-turn lane. Pedestrian signal heads and pedestrian call buttons are located on all legs of the intersection. No turn restrictions are noted.



16th Street East at 16th Avenue East

The intersection of 16th Street East at 16th Avenue East is a four-legged signalized intersection. All approaches consist of an auxiliary left-turn lane, a through lane, and a shared through / right-turn lane. Pedestrian signal heads and pedestrian call buttons are located on all legs of the intersection. No turn restrictions are noted.



20th Avenue East at 16th Street East

The intersection of 20th Avenue East at 16th Street East is a four-legged signalized intersection. The eastbound approach consists of a shared through / left-turn lane and a right-turn lane. The westbound approach consists of an auxiliary left-turn lane and a shared through / right-turn lane. The northbound approach consists of an auxiliary left-turn lane and a right turn lane. The southbound approach consists of a shared left-turn / through / right-turn lane. Pedestrian signal heads and pedestrian call buttons are located on the south leg. No turning restrictions are noted at this intersection.

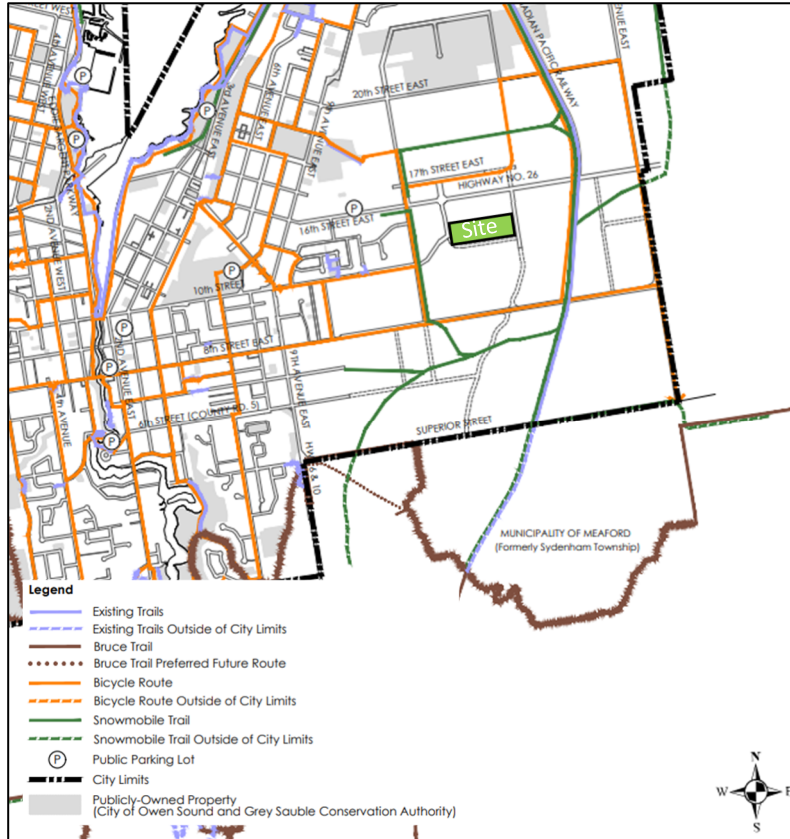


2.3 Cycling and Pedestrian Facilities

As discussed above, pedestrian sidewalks are present within the Study Area road network. Sidewalks can be found on both sides of 16th Avenue East, on both sides of 16th Street East west of 18th Avenue East, on the south side of 16th Street East east of 18th Avenue East, and on the south side of 10th Street East within the Study Area. As no cycling facilities are provided along the roads in the Study Area, cyclists will need to share the road with vehicles to facilitate cycling trips.

Figure 3 illustrates the existing active transportation network within the Study Area. An existing cycling route is shown along a portion of 16th Avenue East, as well as a portion of 8th Street East within the Study Area.

Figure 3: Active Transportation Network

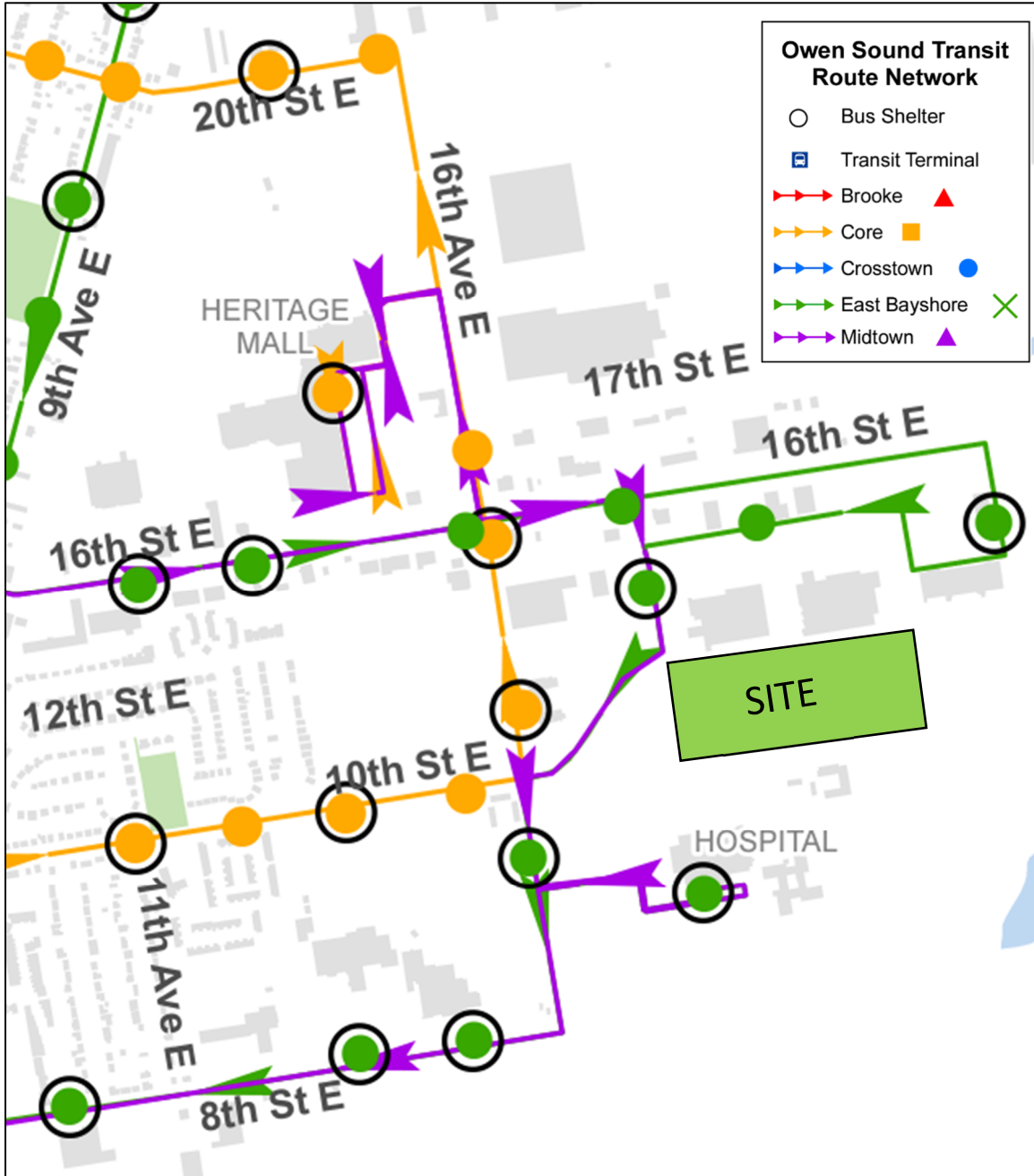


Source: Owen Sound Official Plan, Accessed: November 9, 2022

2.4 Existing Transit

As of November 2022, the City of Owen Sound’s conventional transit system has two routes within the Study Area which include the Core Route and East Bayshore Route. Within the Study Area, the Core Route has three stops on 16th Avenue East and one stop along 10th Street East. The East Bayshore Route has two stops on 16th Street East, one stop on 18th Avenue East and one stop on 16th Avenue East. Both routes have a 30-minute bus frequency and operate from 6:30 AM to 6:00 PM Monday to Friday, 9:00 AM to 4:00 PM on Saturday and are closed on Sundays. Figure 4 illustrates the Owen Sound transit route network within the Study Area.

Figure 4: Existing Study Area Transit Service



Source: <https://www.owensound.ca/en/resourcesGeneral/Documents/OSTransitMap---Combined-Routes-Map.pdf> Accessed: November 9, 2022

2.5 Existing Peak Hour Travel Demand

2.5.1 2022 Existing Traffic Volumes

Existing turning movement counts for the weekday AM Peak and weekday PM Peak were collected. Table 1 summarizes the intersection count dates and data source.

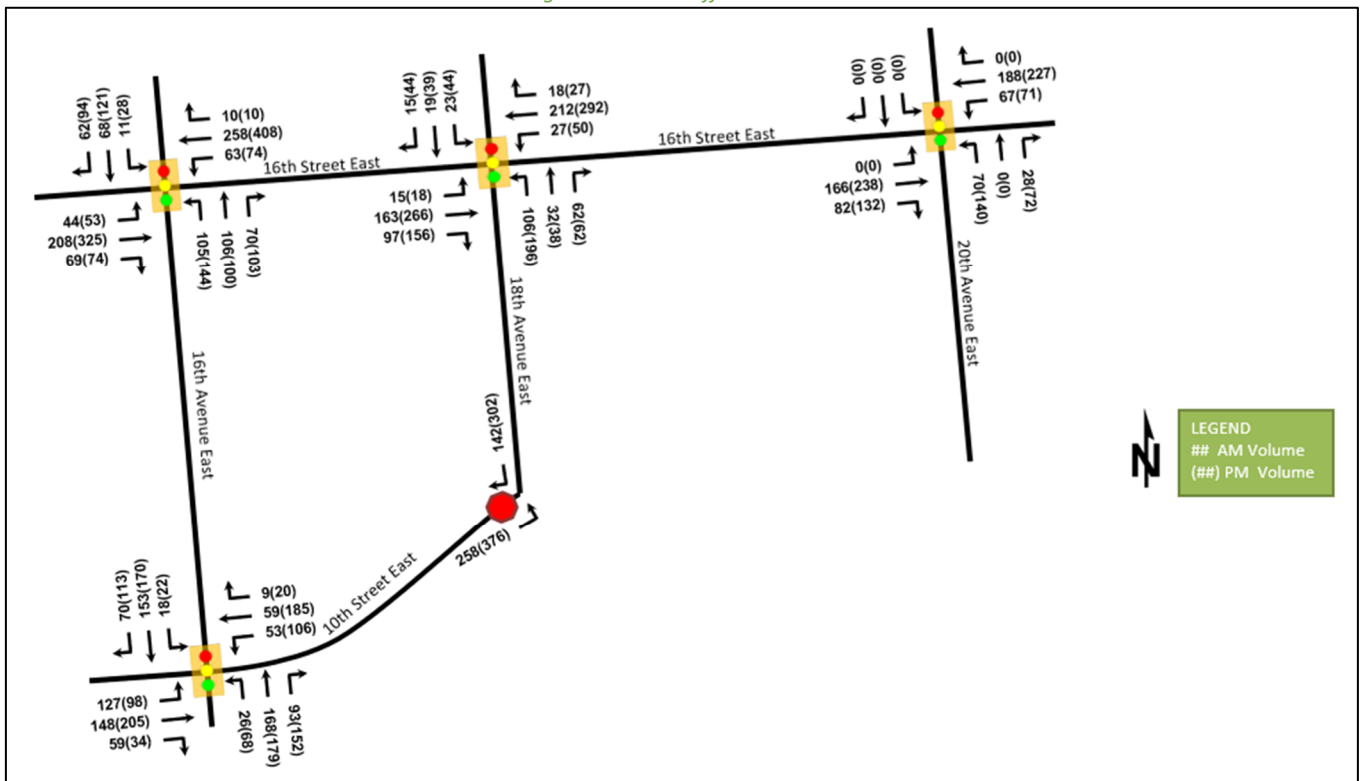
Table 1: Turning Movement Count Data Dates

Location	Count Date	Data Source
10 th Street East at 18 th Avenue East	Tuesday, October 4, 2022	Ontario Traffic Inc.
18 th Avenue East at 16 th Street East		
10 th Street East at 16 th Avenue East		
20 th Avenue East at 16 th Street East		
16 th Street East at 16 th Avenue East		

As shown above, all the traffic data has been collected on October 4, 2022. As such, no growth rate or volume balancing have been applied to the existing volumes.

Figure 5 illustrates the 2022 existing traffic volumes. Detailed turning movement count data can be found in Appendix B and signal timing plans can be found in Appendix C.

Figure 5: 2022 Traffic Volumes



2.5.2 2022 Existing Active Transportation Volumes

As discussed in Section 2.3, limited existing active transportation facilities are present within the Study Area. Pedestrian and cyclist volumes were provided for the Study Area intersections and do not indicate any significant pedestrian or cyclist volumes within the Study Area. As such, the 2022 existing pedestrian and cycling volume figures have been developed and are shown in Figure 6 and, Figure 7, respectively.

Figure 6: 2022 Existing Pedestrian Volumes

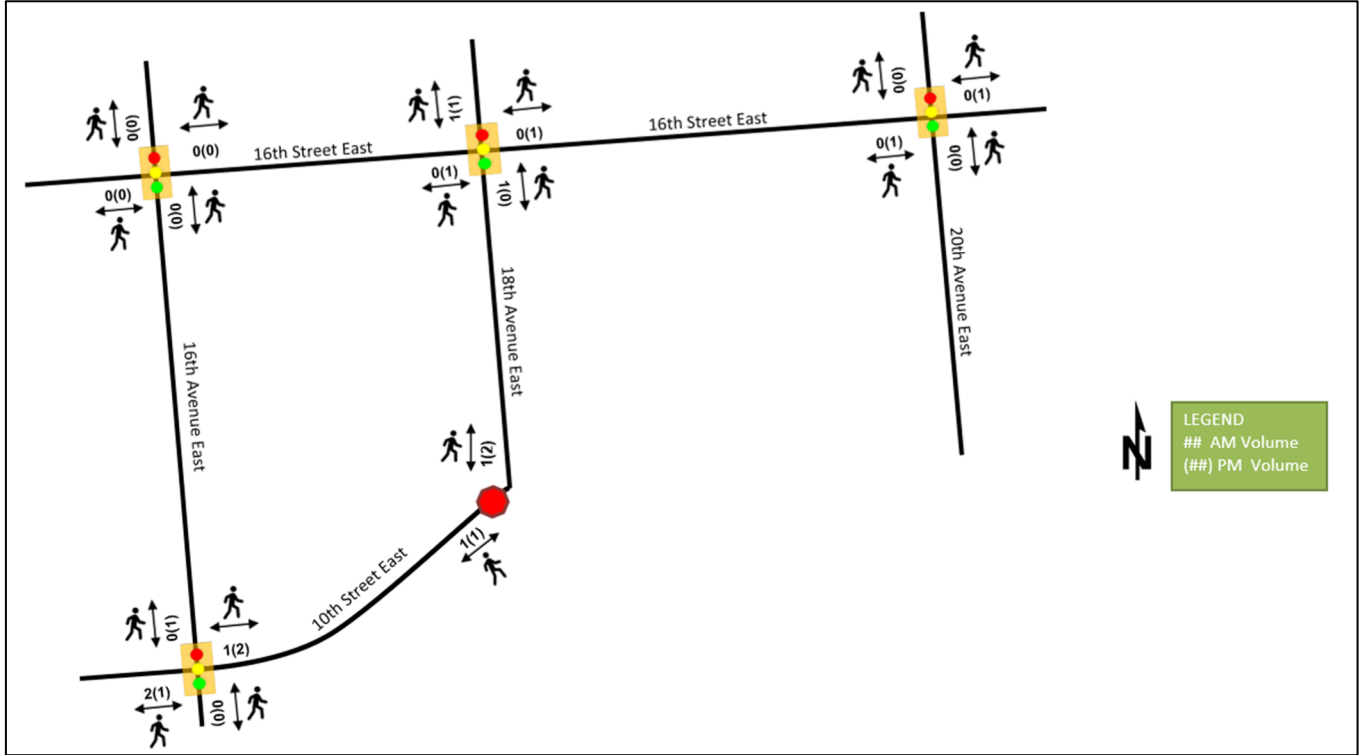
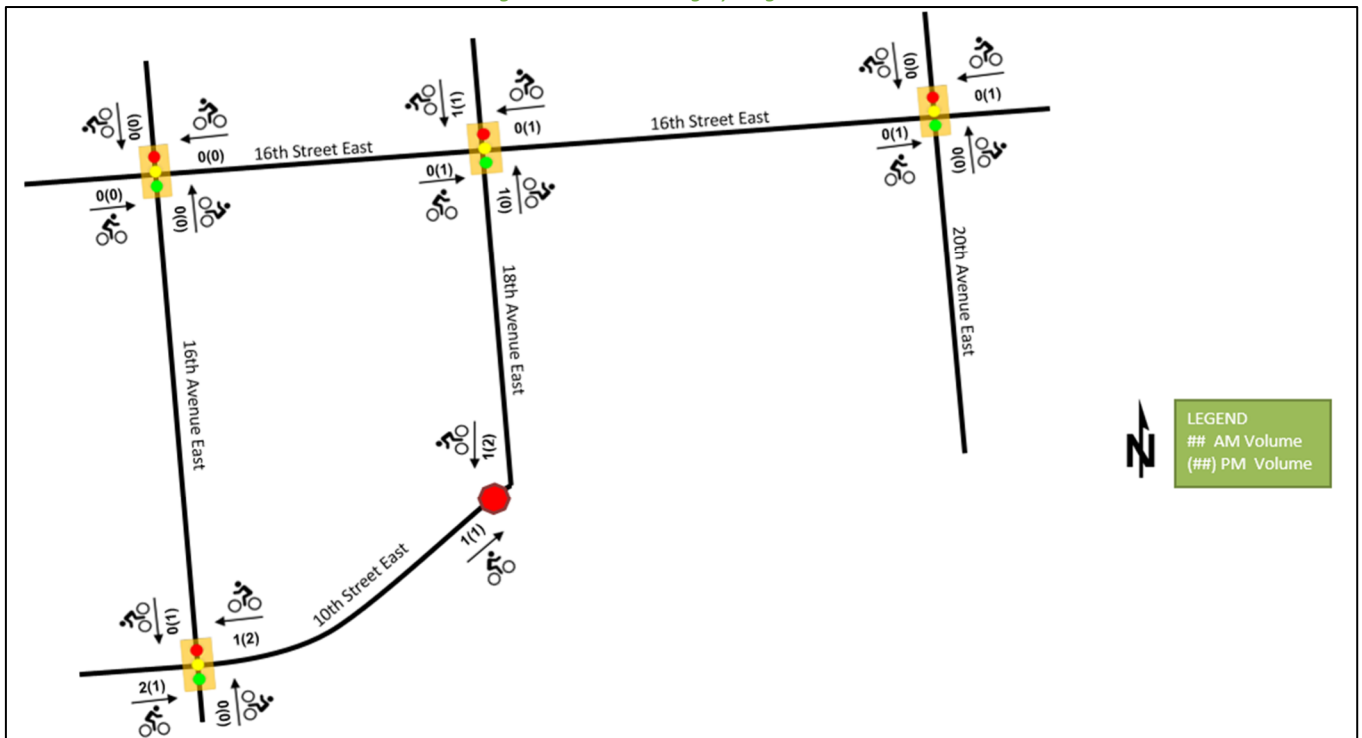


Figure 7: 2022 Existing Cycling Volumes



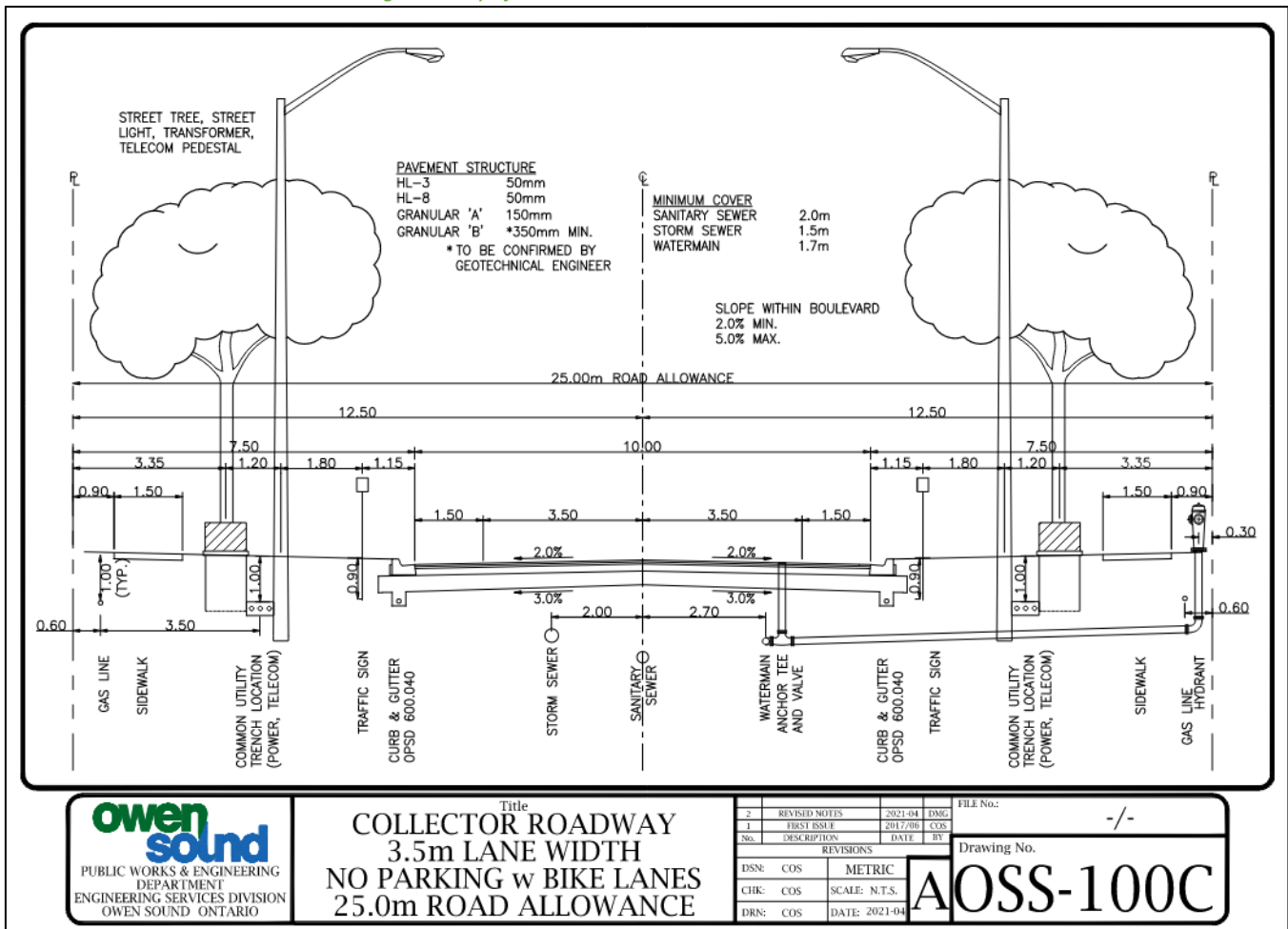
3 Future Background Conditions

3.1 Planned Conditions

3.1.1 20th Avenue East Extension

20th Avenue East is a City of Owen Sound north-south collector roadway to the northeast of the future subject development. The Owen Sound Official Plan indicates a planned extension of 20th Avenue East from its current location north to 17th Street East, and south to Superior Street. The extension of 20th Avenue East to 17th Street East will be completed to support the build-out of 1960 16th Street and as such, is anticipated to be completed by 2023. A posted speed limit of 50 kilometre per hour will apply. It is assumed that the proposed extension will proceed in accordance with the City of Owen Sound 25.0 metre collector roadway cross-section which can be seen in Figure 8 below.

Figure 8: City of Owen Sound 25-metre Collector Road ROW

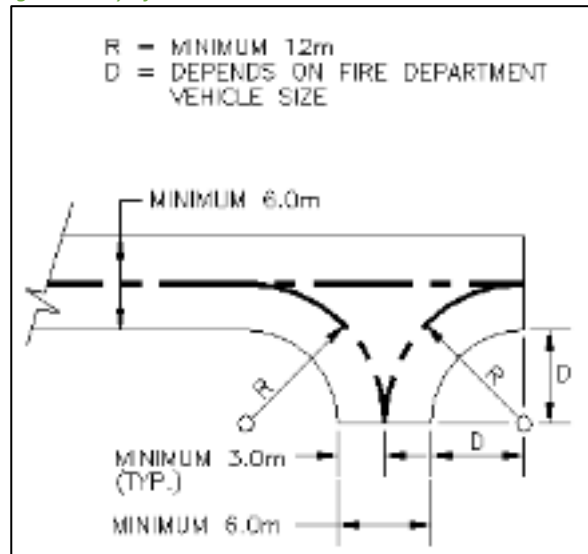


No timeline for this extension is mentioned in the Owen Sound Official Plan or Transportation Master Plan, however, based on assumptions made in other surrounding background development Transportation Impact Studies, the extension to the north and south has been assumed to be completed prior to the 2027 future build-out horizon for analysis purposes and will therefore be considered in both the 2027 and 2032 future analysis horizons.

3.1.2 10th Street East Extension

10th Street East is a City of Owen Sound east-west collector roadway to the west of the future subject development and terminates at 18th Avenue East at the time of this report. The planned extension of 10th Street East from 18th Avenue East to 20th Avenue East is anticipated to be completed in two phases and will proceed in conjunction with the subject development's build-out. A posted speed limit of 50 kilometres per hour will apply. Phase 1 of the 10th Street Extension will occur by the 2027 future horizon and will support the full build-out of Phase 1 of the subject development. Phase 2 of the 10th Street Extension will occur prior to the 2032 future horizon and will support the full build-out of Phase 2 of the subject development. The first phase will extend 10th Street East from the current terminus at 18th Avenue East to approximately 240 metres east of 18th Avenue East and will end in a temporary turnaround as requested by City of Owen Sound staff. Figure 9 below shows the standard used to develop the turnaround area from Figure 5.2 (a) from the City of Owen Sound Development Engineering Standards (2021).

Figure 9: City of Owen Sound Standard Turnaround Dimensions



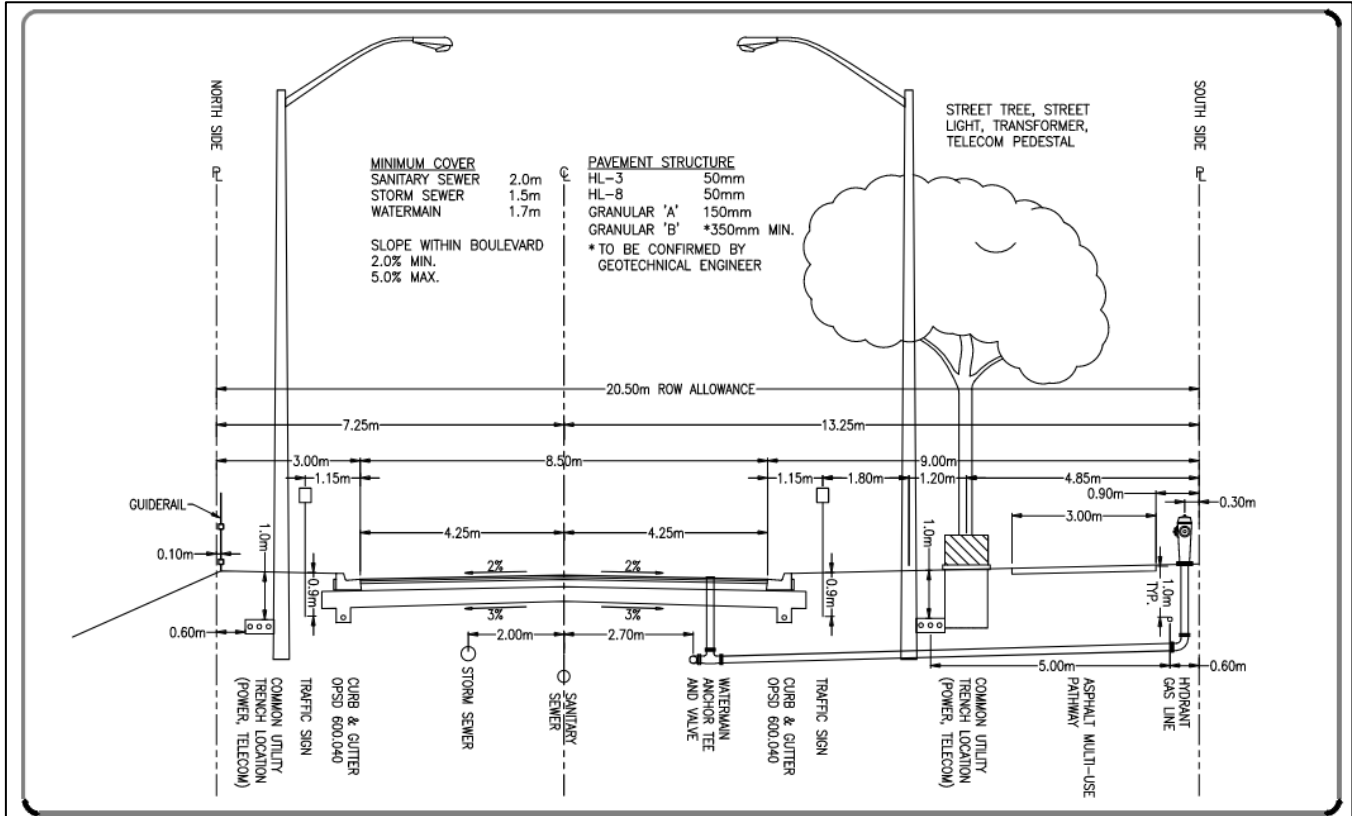
The second phase will extend 10th Street East from the temporary turnaround, east to the future extension of 20th Avenue East. This extension will form the future intersections of 10th Street East at 18th Avenue East, and 10th Street East at 20th Avenue East. The intersection of 10th Street East at 18th Avenue East will be considered in the 2027 and 2032 future total analysis horizons, and the intersection of 10th Street East at 20th Avenue East will be considered in the 2032 future total analysis horizon only. The configuration of both these intersections will be discussed in detail in Section 8 below.

A custom cross-section for the extension and roadway alignment for the 10th Street East extension through the residential site is proposed. Land use, the desired roadway alignment, geometric design elements, and existing conditions to be matched have been considered.

The City of Owen Sound typical 25m ROW collector roadway cross-section has been refined to better serve the nature of the proposed single loaded roadway. This roadway will always be single-loaded given the grading on the north side of the roadway within the subject site. As such, altered utility requirements allow the boulevard width on the north side of the roadway to be reduced. The proposed cross-section also removes active mode infrastructure on the north side of the collector road. The proposed cross section will instead accommodate bi-directional pedestrian and cycling facilities on the south side of the cross-section in the form of a multi-use pathway (MUP). By moving the proposed cycling facilities from on-road, at-grade bike lanes, to a separated MUP,

the pavement width can be narrowed, allowing for better traffic calming along this corridor. This single loaded cross-section combined with the multi-use pathway will reduce the amount of required maintenance along this corridor. The presence of an existing landscape buffer on the adjacent site to the north has also been considered. The resulting modified collector roadway cross section for a 20.5m ROW can be seen in Figure 10.

Figure 10: Proposed 20.5 Metre ROW 10th Street East Extension Cross-section



Through meetings between SmartCentres, its consultants, and City of Owen Sound staff, City of Owen Sound staff have indicated their support for an alignment which aligns the northern ROW of the corridor to the existing top of bank, in the vicinity of the 10th Street East and 18th Street intersection. A review of the required geometry to support this alignment has determined that the radius of the required curve (including reverse crown super-elevation) would be substandard for a design speed of 60 kilometres per hour (posted 50 kilometres per hour). The proposed alignment, that follows the top of bank, would require a centreline radius of 61.75 metres, which, accounting for a reverse crown super-elevation, would align with a design speed between 30 kilometre per hour and 40 kilometres per hour. A design speed of 30 kilometres per hour corresponds to a centreline radius of 30 metres, and a design speed of kilometre per hour corresponds to a centreline radius of 65 metres.

To promote low operating speeds on 10th Street East, a layered traffic calming approach has been proposed. This approach uses a combination of alternating horizontal and vertical traffic calming measures to encourage lower traveled speeds through horizontal and vertical deflections. For westbound traffic the collector will be free flowing towards this approach and as such, speed advisory signage is recommended on the approach to the curve for westbound traffic. Eastbound vehicles will be approaching the curve from a stop-controlled intersection and will be climbing a significant longitudinal grade as they head east, inherently reducing operating speeds, however, speed advisory signage will also be included for this direction.

To achieve the proposed horizontal traffic calming measures, the on-road cycle tracks cannot be accommodated, and have been proposed as a MUP, as previously discussed. These raised cycling facilities also create a safer cycling corridor.

Speed radar signs, which are typically used in conjunction with other traffic calming measures, should also be considered in this area. The proposed roadway alignment and discussed traffic calming measures will be illustrated in the pavement marking and signage plan shown in Section 7 below.

3.1.3 Active Transportation

The *Owen Sound Transportation Master Plan* (2010) includes the proposed regional cycling and walking networks as well as expected timelines for implementation. The following active transportation improvements have been proposed within the Study Area and are assumed to be implemented by the 2032 future horizon:

- Bike lanes on 8th Street East through the Study Area
- Bike lanes on 16th Avenue East from 8th Street East to 17th Street East

Along with the implementation of the previously mentioned cycling facilities, the *Owen Sound Transportation Master Plan* also recommends improved signage along cycling corridors.

Additionally, cycling and pedestrian facilities are proposed as part of the 20th Avenue East extension and 10th Street East extension discussed above and shown in their respective right-of-way cross-section figures.

3.1.4 Transit

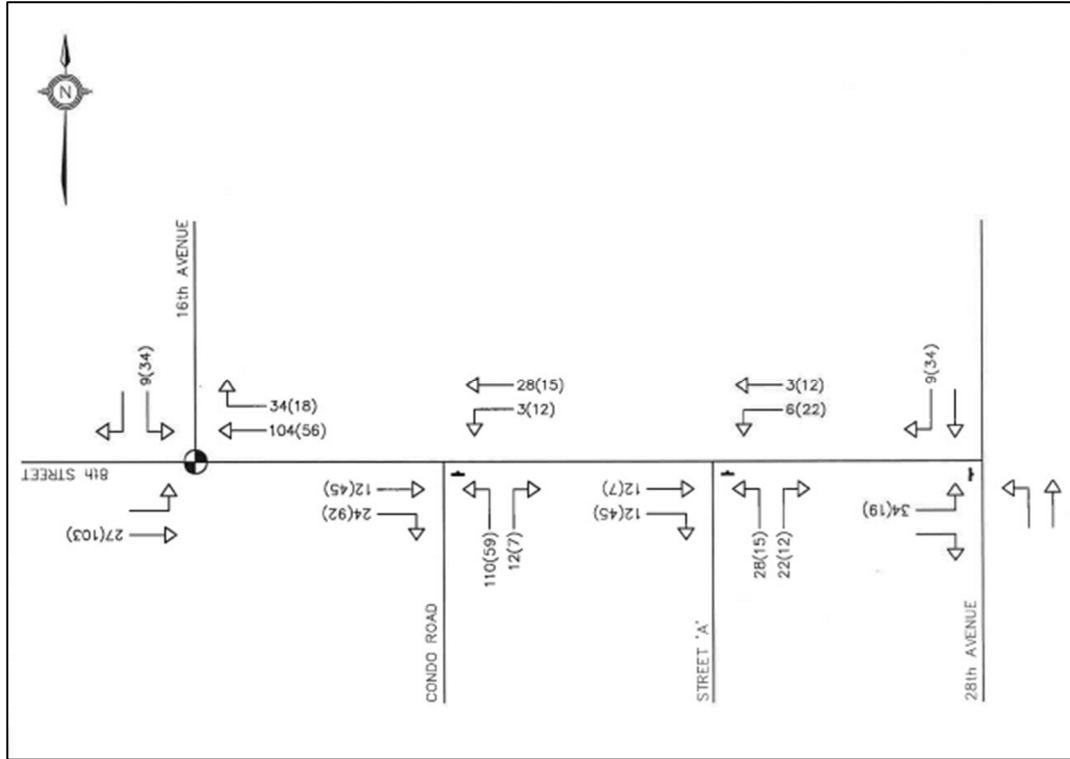
The *Owen Sound Transportation Master Plan* recommends express networks for key corridors in the North-South, and East-West directions in an effort to support commuter and shopping trips throughout the city. Of the key corridors identified in the *Owen Sound Transportation Master Plan*, 16th Avenue East between 8th Street East and 17th Street East, and 8th Street East between 2nd Avenue West and 28th Avenue East both have segments of each respective corridor within the Study Area. A transit stop is noted to be approximately 200 metres walking distance from Access #1 and will serve the proposed development. Additionally, it is also noted that City of Owen Sound staff have indicated that transit access through the site is not required, and as such no transit is proposed along the extension of 10th Street East.

3.1.5 Other Study Area Developments

3.1.5.1 8th Street East Development / Redhawk Subdivision

The proposed residential subdivision development by Redhawk Construction Co. Ltd. Has been indicated to have a build-out year of 2019, with a five-year horizon of 2024 used to determine the full impact of the development. The proposed development will include 66 townhouse units, 264 apartment units, and 36 single-family units for a total of 366 residential units. Accesses to the development will be on 8th Street East. One of the proposed accesses, shown as 'Street A' below, will form the south leg of the future intersection of the 20th Avenue East extension and 8th Street East. Based on aerial imagery, despite an indicated full build-out year of 2019, the subject development is not shown to be constructed, and as such, the site generated traffic will be considered in both the 2027 and 2032 future analysis horizons. The proposed development is projected to generate 217 and 264 new two-way vehicle trips in the AM and PM peak periods respectively. Figure 11 illustrates the site traffic and trip distribution for the proposed development.

Figure 11: 8th Street East Site Traffic

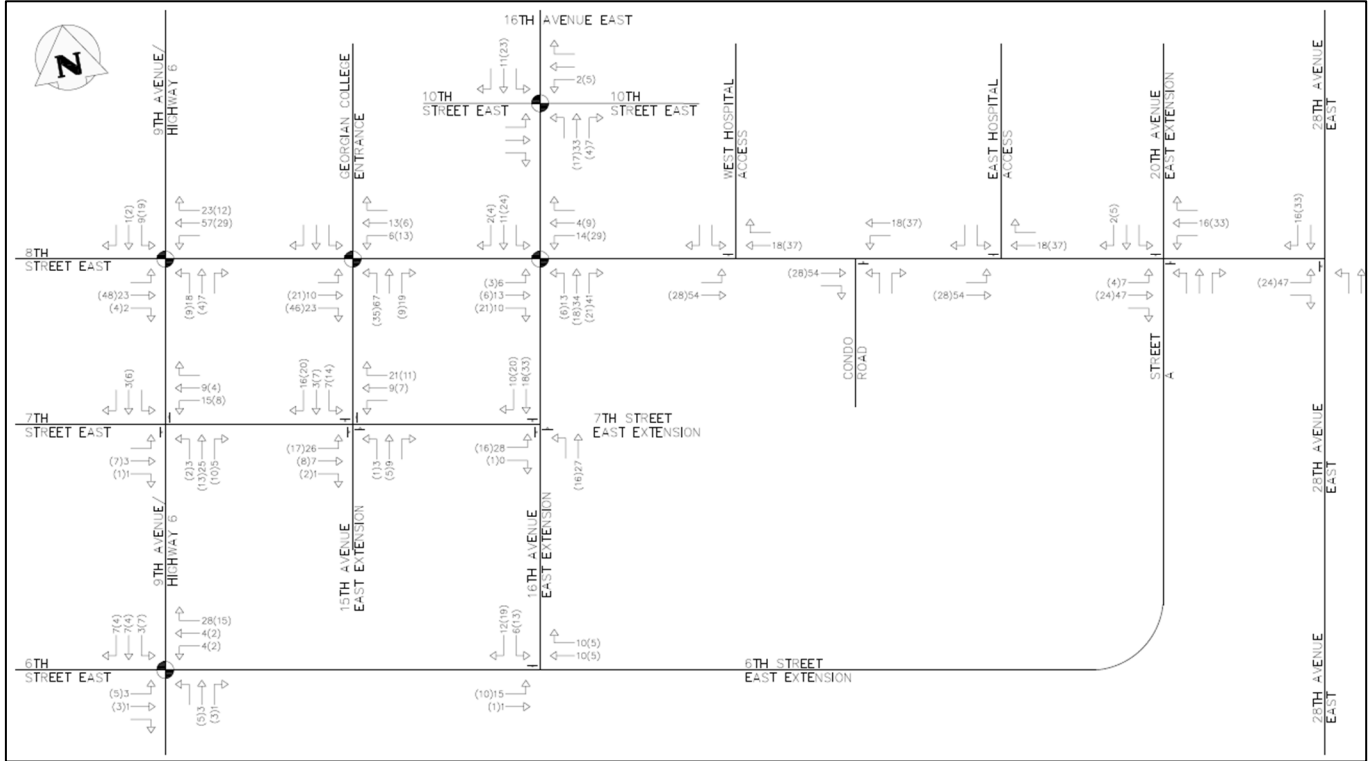


Source: Traffic Impact Study - 8th Street East Development; C.F. Crozier & Associates; June 2015

3.1.5.2 Greystone Village

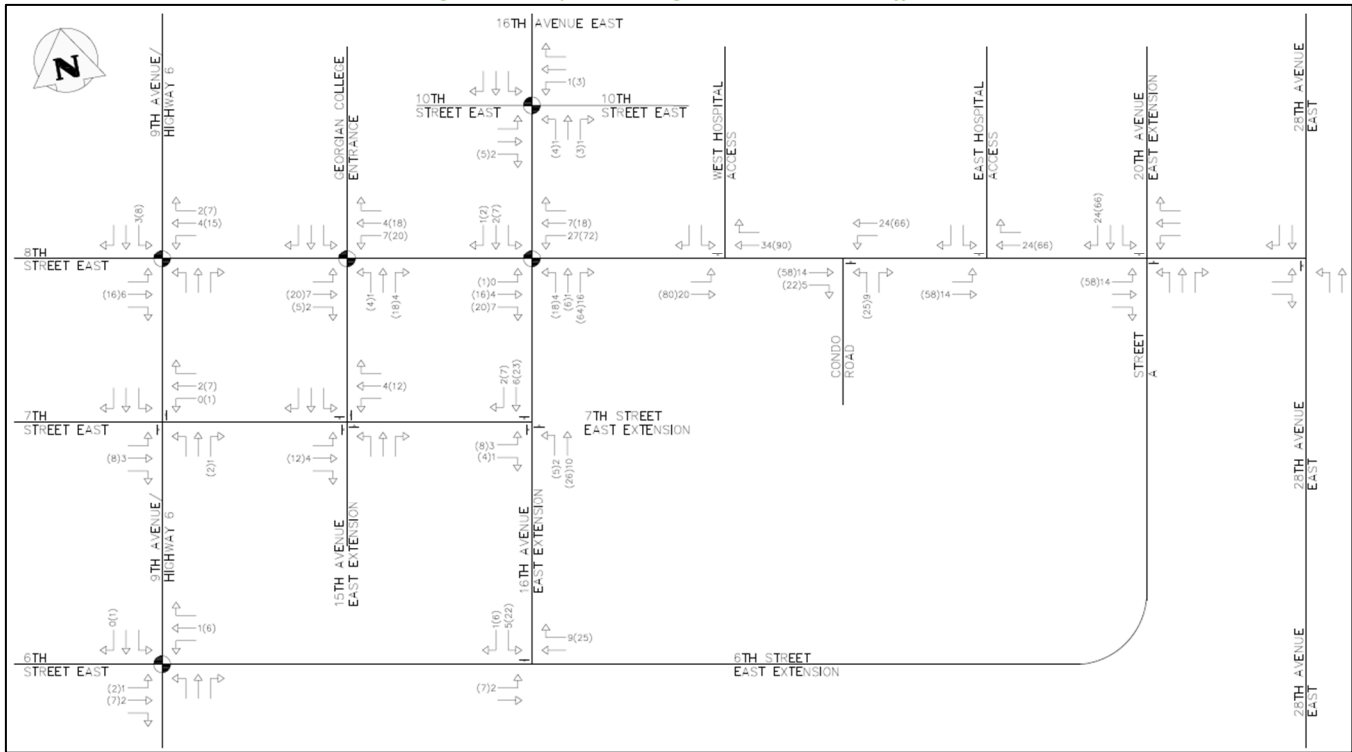
The Greystone Village development by Flato Developments Inc. is a mixed use residential-commercial development located at 1409 8th Street East, with a build-out year indicated as 2026, and five-year study horizon of 2031. The proposed development will include 118 single detached residential units, 96 on-street townhouse units, 60 rear lane townhouse units, 288 back-to-back townhouse units, and 160 apartment units, totalling 722 residential units, as well as 10000 m² (107639 ft²) of arterial commercial space. Access to the proposed development will be provided to the commercial portion of the proposed development via a dedicated full-movement access at the intersection of 8th Street East and the extension of 16th Avenue East, while access to the residential portion of the proposed development will be provided at a full-movement access on 8th Street East at the existing Georgian College driveway, as well as where the extensions of 7th Street East and 6th Street East meet the subject site. The proposed development is projected to generate 399 and 589 new two-way vehicle trips in the AM and PM peak periods, respectively. Figure 12 illustrates the site traffic for the residential portion of the proposed development, Figure 13 illustrates the site traffic for the commercial portion of the proposed development, and Figure 14 illustrates the commercial pass-by volumes.

Figure 12: Greystone Village Residential Site Traffic



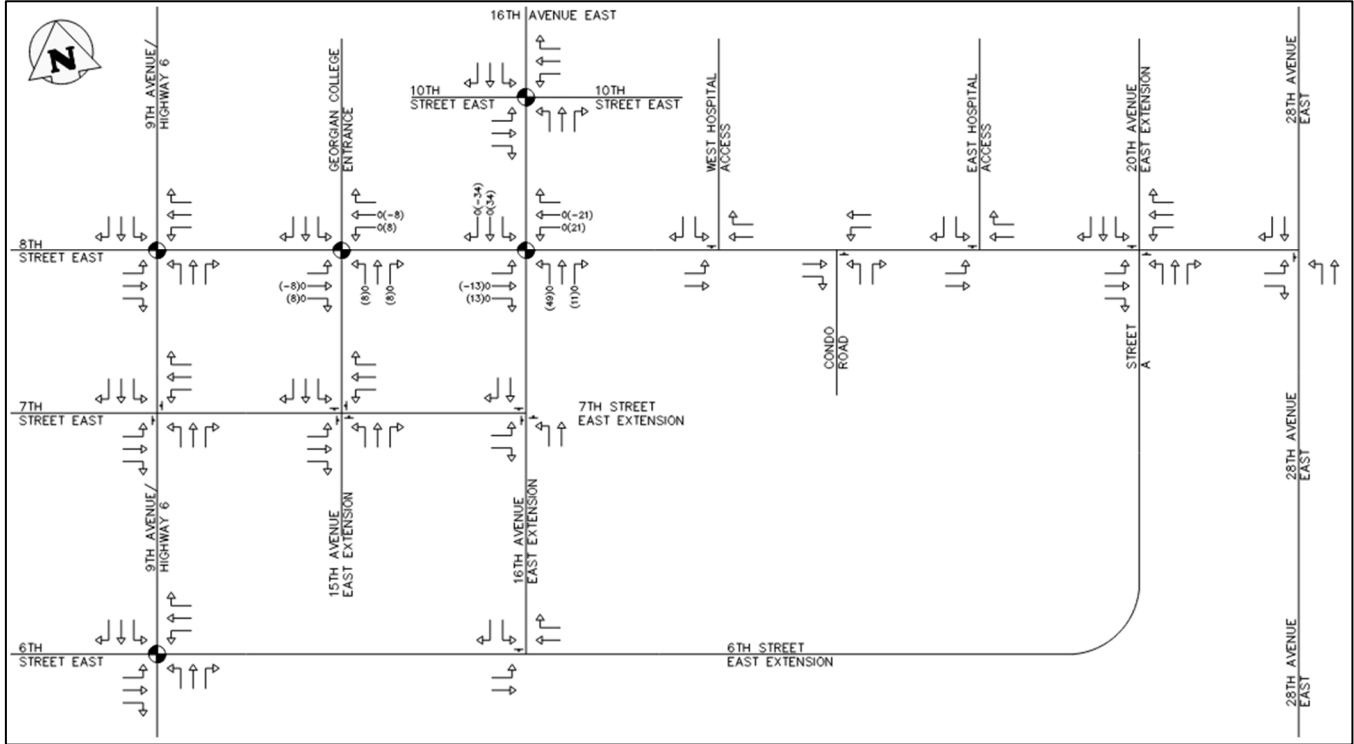
Source: Greystone Village Traffic Impact Study Addendum, C.F. Crozier & Associates; April 2022

Figure 13: Greystone Village Commercial Site Traffic



Source: Greystone Village Traffic Impact Study Addendum, C.F. Crozier & Associates; April 2022

Figure 14: Greystone Village Commercial Pass-by Site Traffic

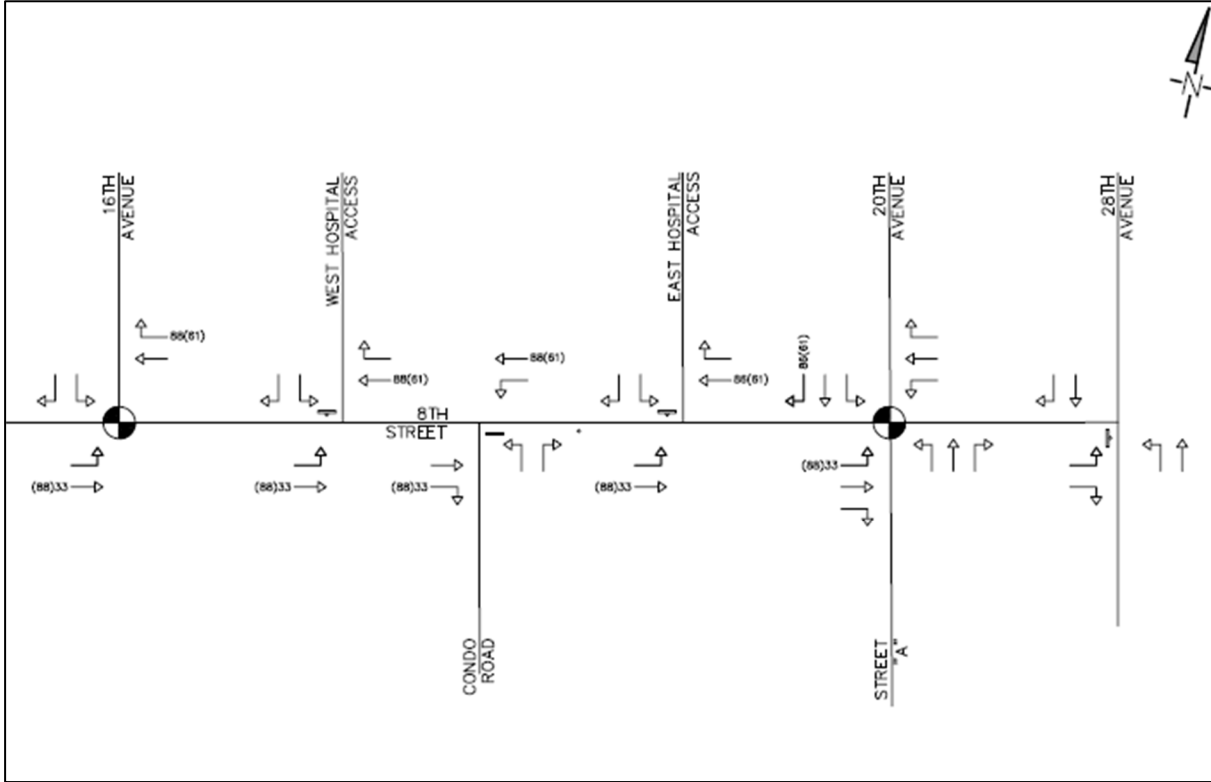


Source: Greystone Village Traffic Impact Study Addendum, C.F. Crozier & Associates; April 2022

3.1.5.3 Telfer Creek Subdivision

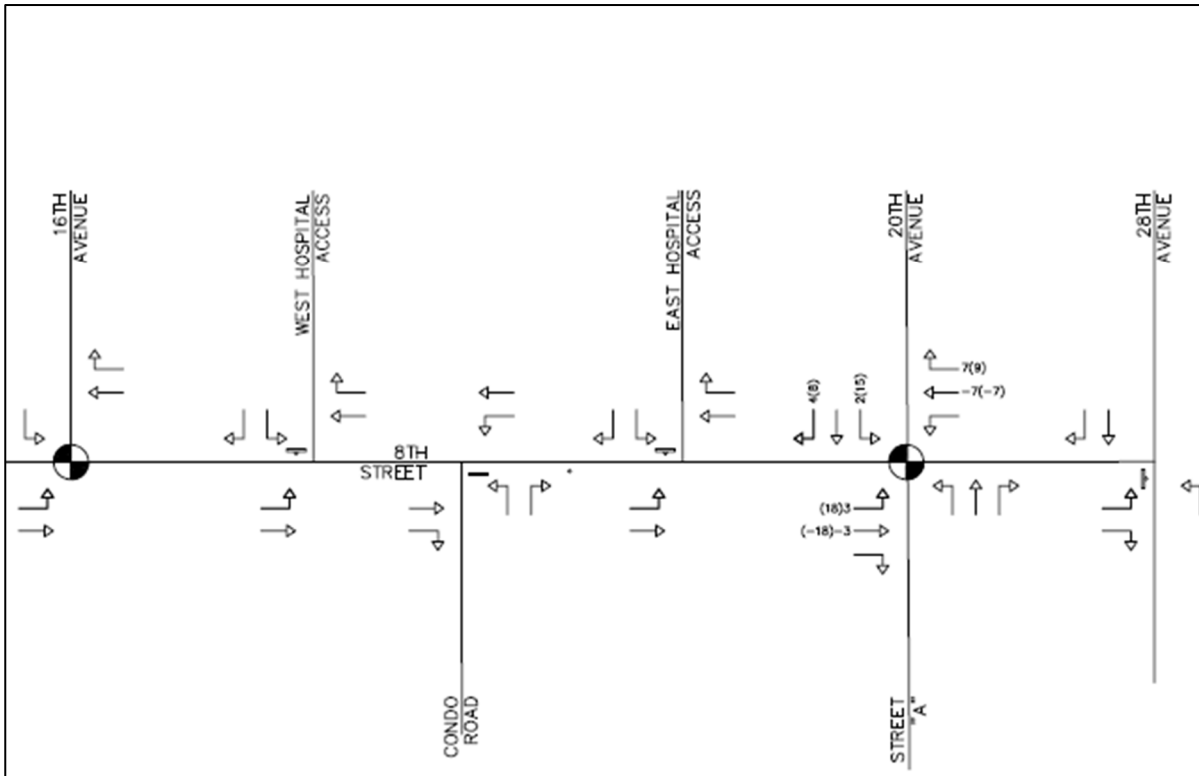
The Telfer Creek Subdivision is located on the south side of 8th Street East, and has a full build-out horizon year of 2029. The proposed development will include 43 single detached residential units, 20 semi-detached residential units, 31 townhouse units, and 236 condominium units, as well as 1393 m² (15000 ft²) of ground floor retail. Accesses to the proposed development will be located on the extension of 20th Avenue East, north of 8th Street East. The proposed development is projected to generate 185 and 345 new two-way vehicle trips in the AM and PM peak periods respectively. Figure 15 illustrates the site generated traffic for the proposed development and Figure 16 illustrates the pass-by volumes for the proposed development.

Figure 15: Telfer Creek Subdivision Site Traffic



Source: Telfer Creek Subdivision Traffic Update Memo, C.F. Crozier & Associates; July 2019

Figure 16: Telfer Creek Subdivision Pass-by Volumes



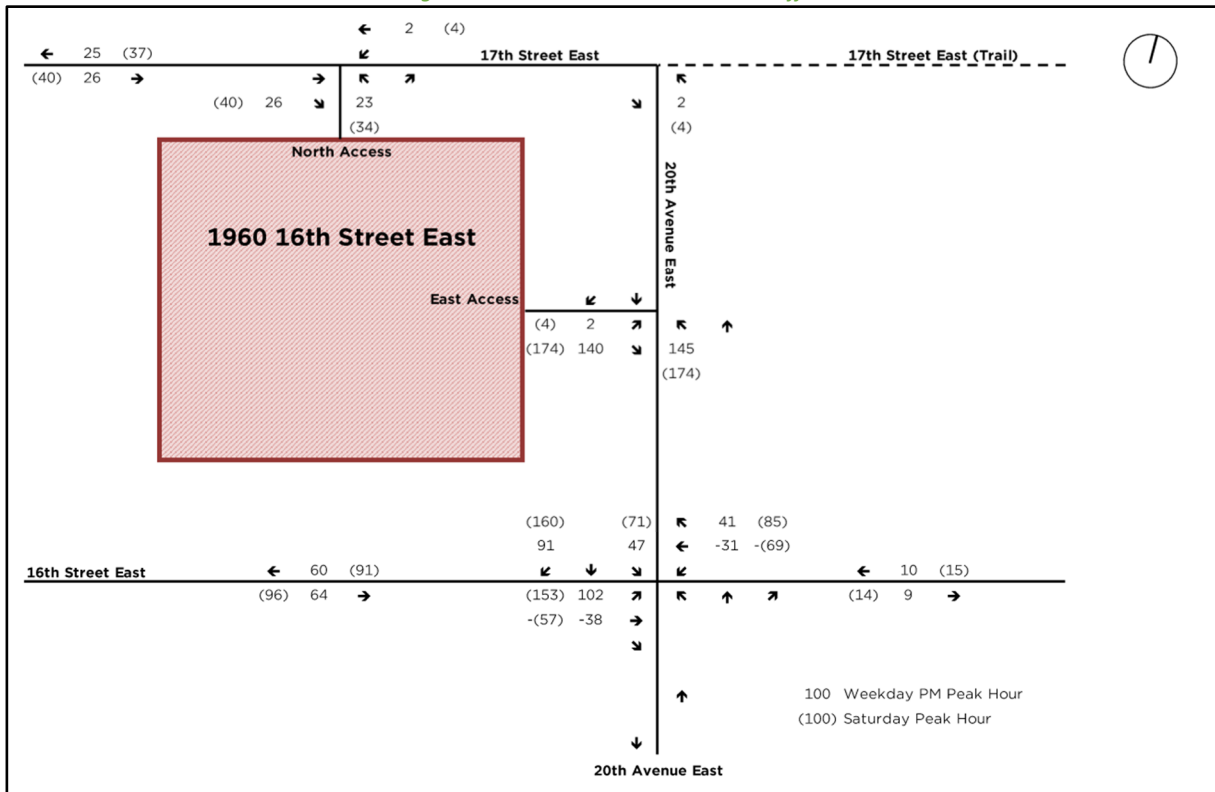
Source: Telfer Creek Subdivision Traffic Update Memo, C.F. Crozier & Associates; July 2019

3.1.5.4 1960 16th Street East

The proposed development by Thompson Centres is a commercial development with a build-out year indicated as 2023, with future horizon years of 2028 and 2033 addressing long-term impacts. The proposed development will include four commercial buildings: Building A will contain a fast-food restaurant with drive through (221 m² / 2386 ft²), Building B will contain five commercial spaces (575 m² / 6184 ft²), Building C will contain a fast-food restaurant with drive through (420 m² / 4517 ft²), and Building D will contain five commercial spaces (809 m² / 8710 ft²). Two accesses to the proposed development are proposed: one on 17th Street East, and one on the future extension of 20th Avenue East north of 16th Street East. The proposed development is projected to generate 196 new two-way trips in the PM peak period. Figure 17 illustrates the site generated traffic for the proposed development.

Given the commercial nature of this development, only PM and Saturday peak hour trips were considered. As no AM peak hour trips were considered, turning movements in and out of the north leg of the intersection of 16th Street East at 20th Avenue East are shown to be zero in the AM peak hour. As this is not an accurate projection of future AM volumes at this intersection, a conservative approach to developing volumes at any turning movement in the AM peak hour at the intersection of 16th Street East and 20th Avenue East with a value of zero has been implemented. The PM peak hour traffic volume for each respective turning movement has been reduced by 20%. This reduction has been determined based on the general rule of thumb that AM peak hour volumes represents approximately 8% of total daily traffic, and PM peak hour volumes represents approximately 10% of total daily traffic. As such, a ratio of 0.8 was created between the AM and PM peak hour traffic volumes, resulting in the conservative 20% reduction.

Figure 17: 1960 16th Street East Site Traffic

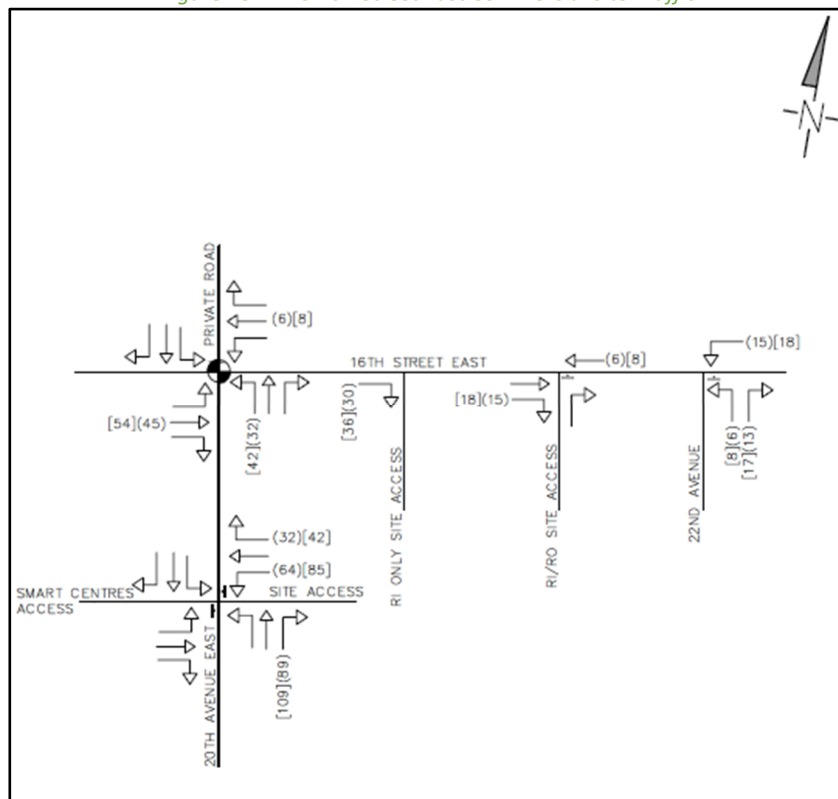


Source: 1960 16th Street East Traffic Impact Study; Tatham Engineering; October 2021

3.1.5.5 2125 16th Street East / Heritage Grove

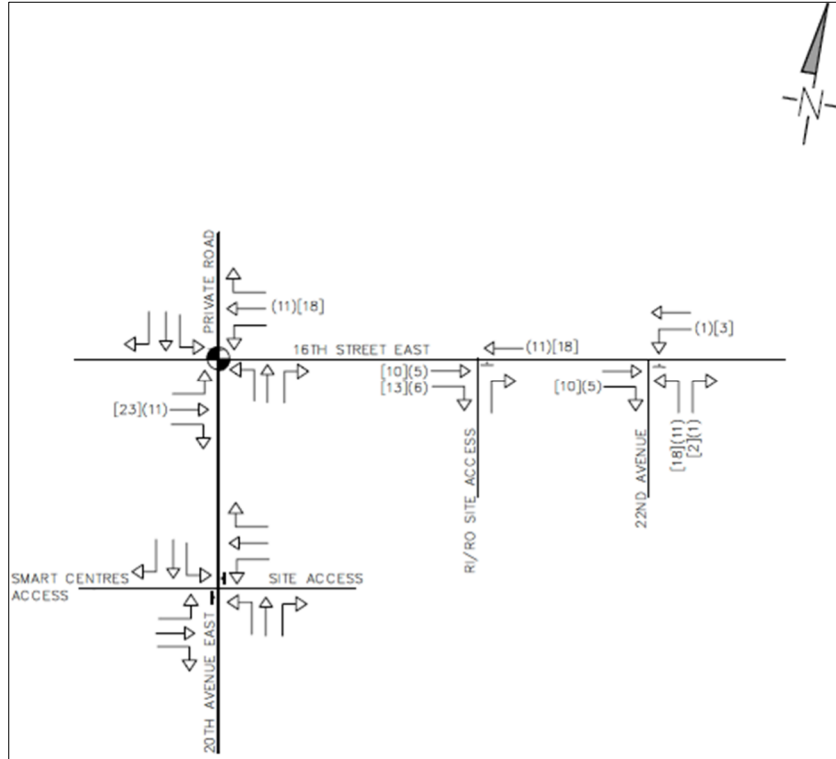
The proposed commercial development by Villarroit Holdings Limited has been indicated to have a full build-out date of 2024. The proposed development will include the addition of four commercial buildings: restaurants (2288 m² / 24628 ft²), a gas station with a shared convenience store and fast-food restaurant (381 m² / 4099 ft²), a hotel (3716 m² / 40000 ft²), and a building containing commercial space (2478 m² / 26672 ft²). Access to the proposed development will be provided at two existing points, and one future access point. The proposed development will utilize the existing full-movement access to 20th Avenue East and the existing right-in/right-out access to 16th Street East; additionally, the proposed development will include a third right-in only access from 16th Street East. The proposed development is projected to generate 231 net new two-way trips in the PM peak period. Figure 18 illustrates the site generated traffic for the commercial/retail portion of the proposed development and Figure 19 illustrates the site generated traffic for the hotel portion of the proposed development. Figure 20 illustrates the pass-by volumes for the proposed development.

Figure 18: 2125 16th Street East Commercial Site Traffic



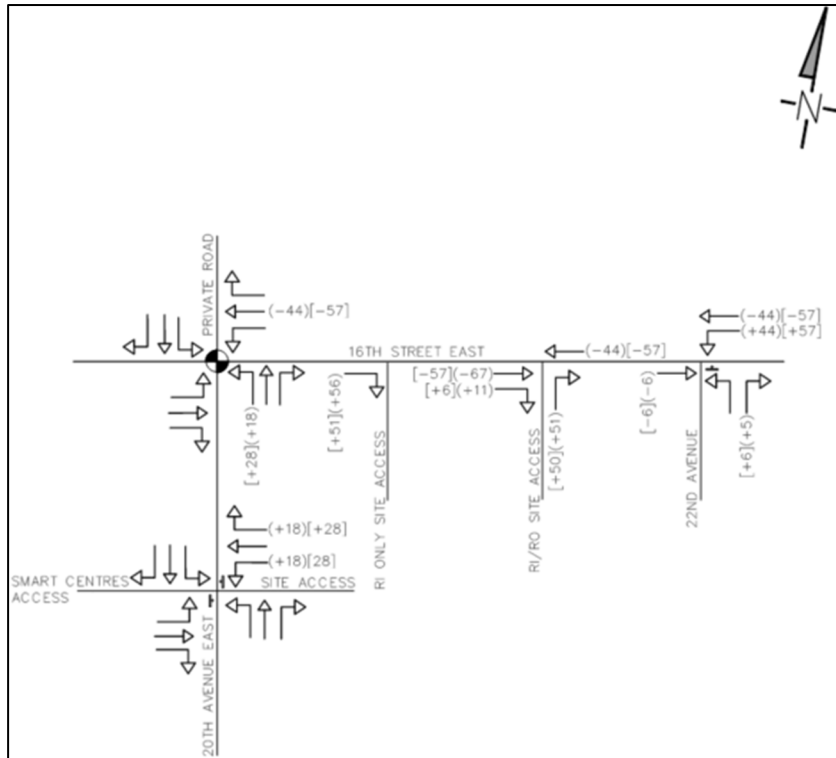
Source: 2125 16th Street East (Heritage Grove) Traffic Impact Study; C.F. Crozier & Associates; April 2019

Figure 19: 2125 16th Street East Hotel Site Traffic



Source: 2125 16th Street East (Heritage Grove) Traffic Impact Study; C.F. Crozier & Associates; April 2019

Figure 20: 2125 16th Street East Pass-by Traffic



Source: 2125 16th Street East (Heritage Grove) Traffic Impact Study; C.F. Crozier & Associates; April 2019

3.1.6 Background Growth

A growth rate of 1% per annum for five years for Phase 1 and 10 years for Phase 2, compounded annually, has been applied to all movements to determine the 2027 and 2032 background traffic volumes. This is consistent with the growth rate found in the County of Grey Official Plan and has been confirmed by the City of Owen Sound in the established Terms of Reference.

3.1.7 Future Background Traffic Volumes

Using the background growth rate established above, the 2022 existing AM and PM peak hour turning movement volumes (Figure 5), and the five background developments discussed in Section 3.1.5, the 2027 and 2032 future background horizon traffic volumes were projected. It is noted that at the future intersections of 8th Street East and 20th Avenue East, and 16th Street East and 20th Avenue East, any turning movements that were proposed to have a traffic volume of zero in both the AM and PM peak hours, a minimum of five vehicles per hour were assigned to both peak hours respectively. Any turning movements that were proposed to have an AM volume of zero while the PM volume was greater than zero, the AM volume was made to equal the PM volume for a conservative analysis.

The resulting 2027 future background volumes are shown in Figure 21 and the 2032 future background volumes are shown in Figure 22.

Figure 21: 2027 Future Background Traffic

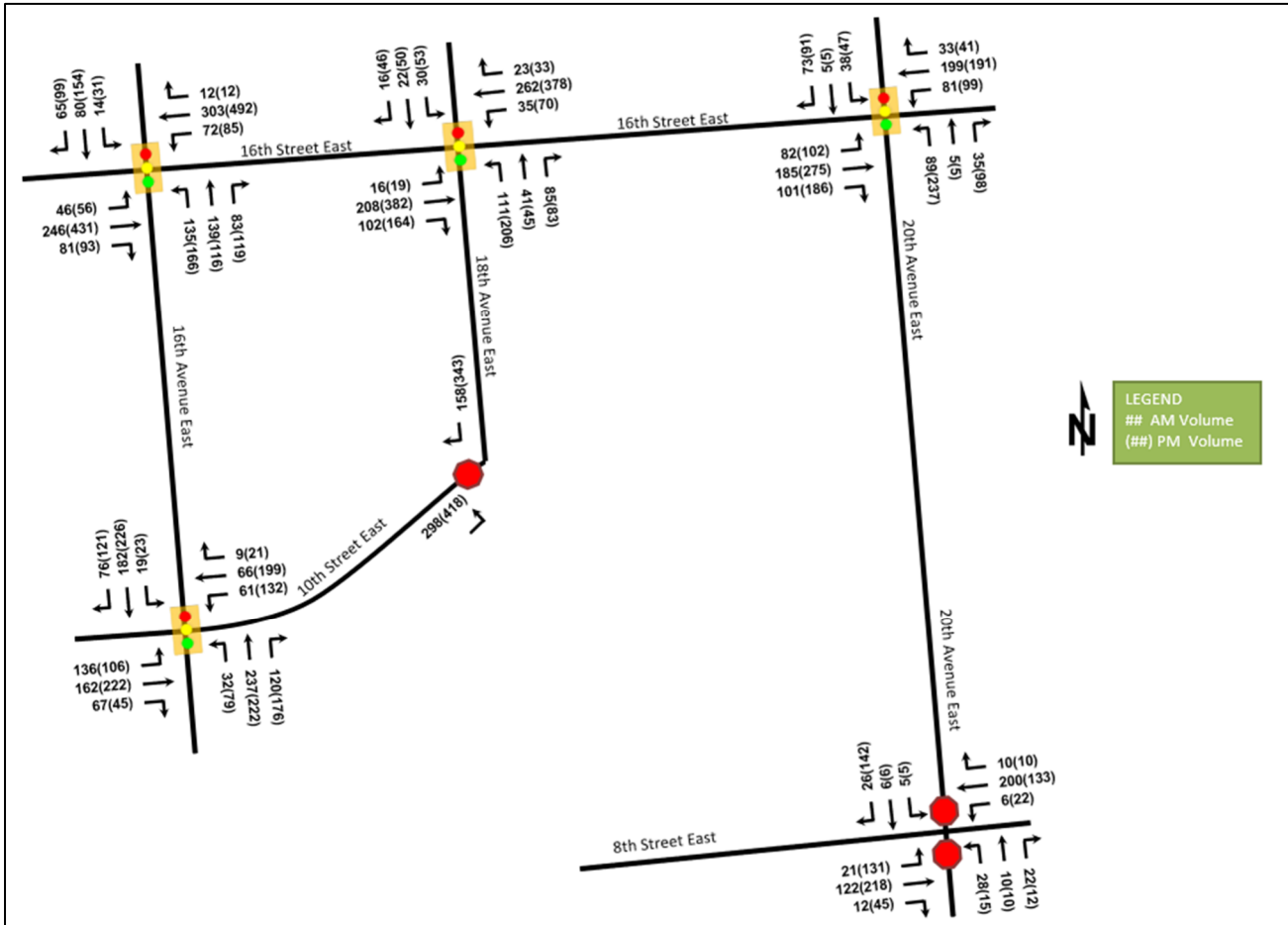
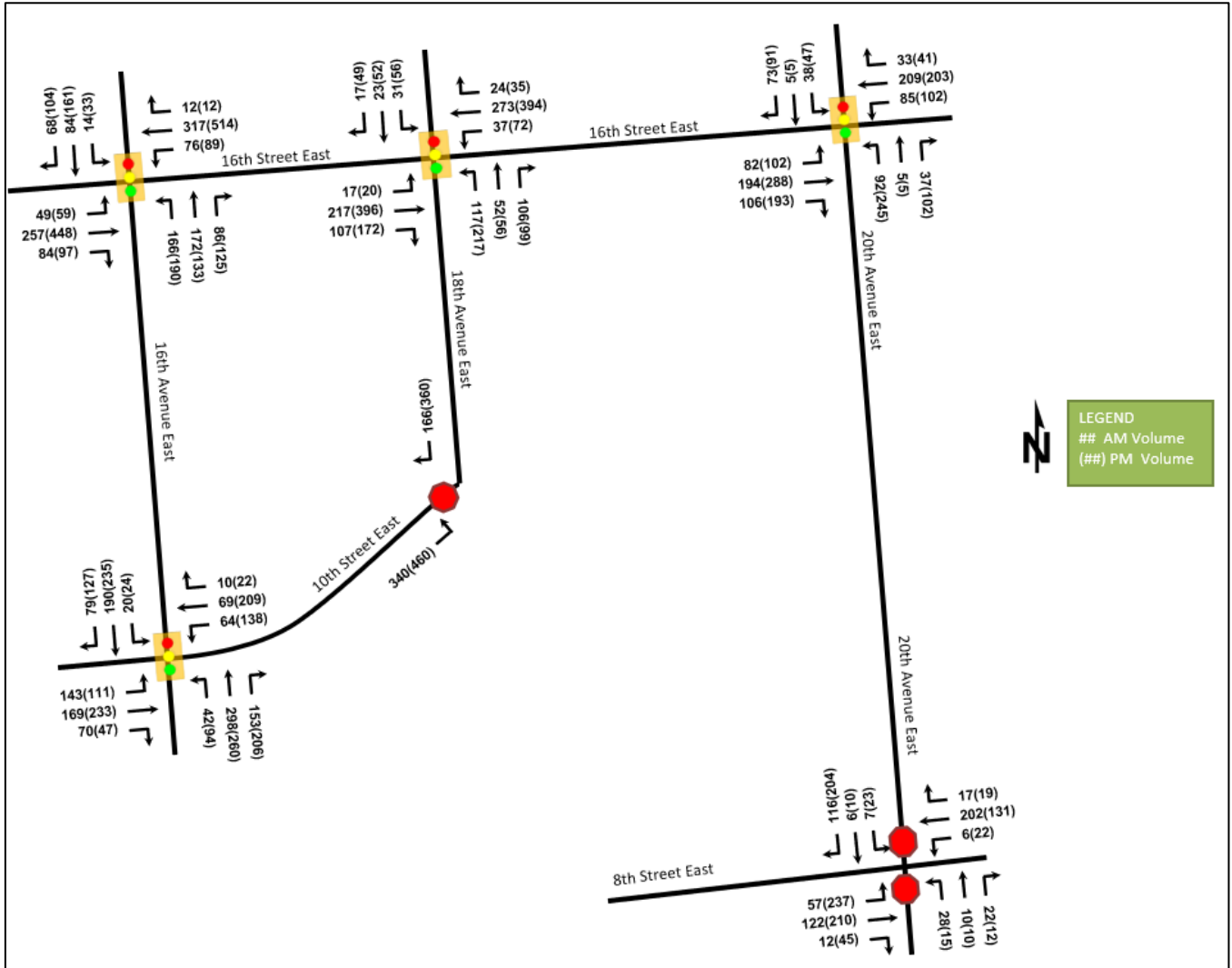


Figure 22: 2032 Future Background Traffic



4 Demand Forecasting

4.1 Site Trip Generation

The subject development will be split into two phases; the first phase is proposed to include a total of 156 mid-rise units in two buildings and 87 townhouse units, and second phase is proposed to include a total of 234 mid-rise units in three buildings. Appropriate trip generation rate equations for the proposed residential land uses were obtained from the 11th Edition of *Institute of Transportation Engineers (ITE) Trip Generation Manual* and are summarized in Table 2.

Table 2: ITE Trip Generation Rate

Phase	Land Use	Land Use Code	Peak Period	Directional Distribution		Estimation Method	Trip Rates
				In	Out		
1A & 1B	Multifamily Housing (Mid-Rise)	ITE 221	AM	In	23%	Fitted Curve Equation	T = 0.44(X) – 11.61
				Out	77%		
			PM	In	61%	Fitted Curve Equation	T = 0.39(X) + 0.34
				Out	39%		
1C	Single-Family Attached Housing	ITE 215	AM	In	31%	Fitted Curve Equation	T = 0.52(X) – 5.70
				Out	69%		
			PM	In	57%	Fitted Curve Equation	T = 0.60(X) – 3.93
				Out	43%		
2	Multifamily Housing (Mid-Rise)	ITE 221	AM	In	23%	Fitted Curve Equation	T = 0.44(X) – 11.61
				Out	77%		
			PM	In	61%	Fitted Curve Equation	T = 0.39(X) + 0.34
				Out	39%		

Based on the rate equations above, the total site trip generation during the weekday AM peak hour and the weekday PM peak hour are summarized in Table 3. Among the two estimation methods, weighted averages and fitted curve equations, the rates calculated using the fitted curve equations are applied because the equations for both AM and PM peak hours have sample sizes greater than 20 and a R² value greater than 0.75, indicating a good fit with the data points. Given that the proposed development consists of only residential uses, all trips are considered primary, and no synergy or pass-by effects have been considered.

Table 3: Vehicle Site Trip Generation

Phase	Land Use	Units	AM Peak (veh/hr)			PM Peak (veh/hr)		
			In	Out	Total	In	Out	Total
1A & 1B	Multifamily Housing (Mid-Rise)	156	13	45	58	37	24	61
1C	Single-Family Attached Housing	87	12	27	39	27	21	48
2	Multifamily Housing (Mid-Rise)	234	21	70	91	56	35	91
Total			46	142	188	120	80	200

As shown in Table 3, the resulting number of projected new two-way vehicle trips for the proposed development is approximately 188 vehicles per hour during the weekday AM peak hour and 200 vehicles per hour during the weekday PM peak hour. Phase 1 of the proposed development is projected to generate 97 two-way vehicle trips during the weekday AM peak hour and 109 two-way vehicle trips during the weekday PM peak hour, and Phase 2 of the project is expected to generate 91 two-way vehicle trips during the weekday AM peak hour and 91 two-way vehicle trips during the weekday PM peak hour.

4.2 Vehicle Traffic Distribution and Assignment

The distribution of projected site generated trips entering and exiting the proposed development was determined based on the trip distribution outlined in the TIS reports of the surrounding background developments, knowledge

of the Study Area, and the amenities and employment opportunities located both within and outside of Owen Sound. The resultant distribution is outlined in Table 4.

Table 4: Vehicle Trip Distribution

To/From	Residential % of Trips
North	20%
South	15%
East	5%
West	60%
Total	100%

Given the existing development pattern within the City of Owen, and the nearby outlying communities, the majority of trips to or from the proposed development are expected to come from or head to the west. It is expected that approximately 60% of trips will be to or from the west. North of the proposed development is a predominantly commercial strip along 16th Street East, with industrial employment areas north of 16th Street East. This commercial strip and large employment area are expected to draw approximately 20% of the total trips to and from the proposed development. Surrounding employment opportunities east of Owen Sound are limited, however, given the proposed development’s proximity to employment areas such as Meaford and the 4th Canadian Division Training Centre, approximately 5% of trips to and from the proposed development are expected to originate and/or terminate to the east. South of the proposed development, numerous institutional spaces including the Georgian College – Owen Sound Campus, an elementary school, and a hospital, are expected to result in approximately 15% of trips going to and coming from the south.

Phase1 will use the two western proposed accesses. Upon completion, Phase 2 will use the eastern two accesses. No vehicular connectivity is between Phase 1 and Phase 2 is contemplated, however Access #2 will provide access to vehicle parking spaces that will be part of Phase 2. The distribution of trips between the accesses is primarily based on the number of residential units, and parking spaces anticipated to be served by each of the accesses.

Based on this, new site-generated trips were assigned to the Study Area intersections; new Phase 1 site-generated trips are illustrated in Figure 23, and new Phase 2 site-generated trips are illustrated in Figure 24. Further information regarding the proposed access configuration can be found in Section 5.2.

Figure 23: Phase 1 Site Generated Traffic Volumes

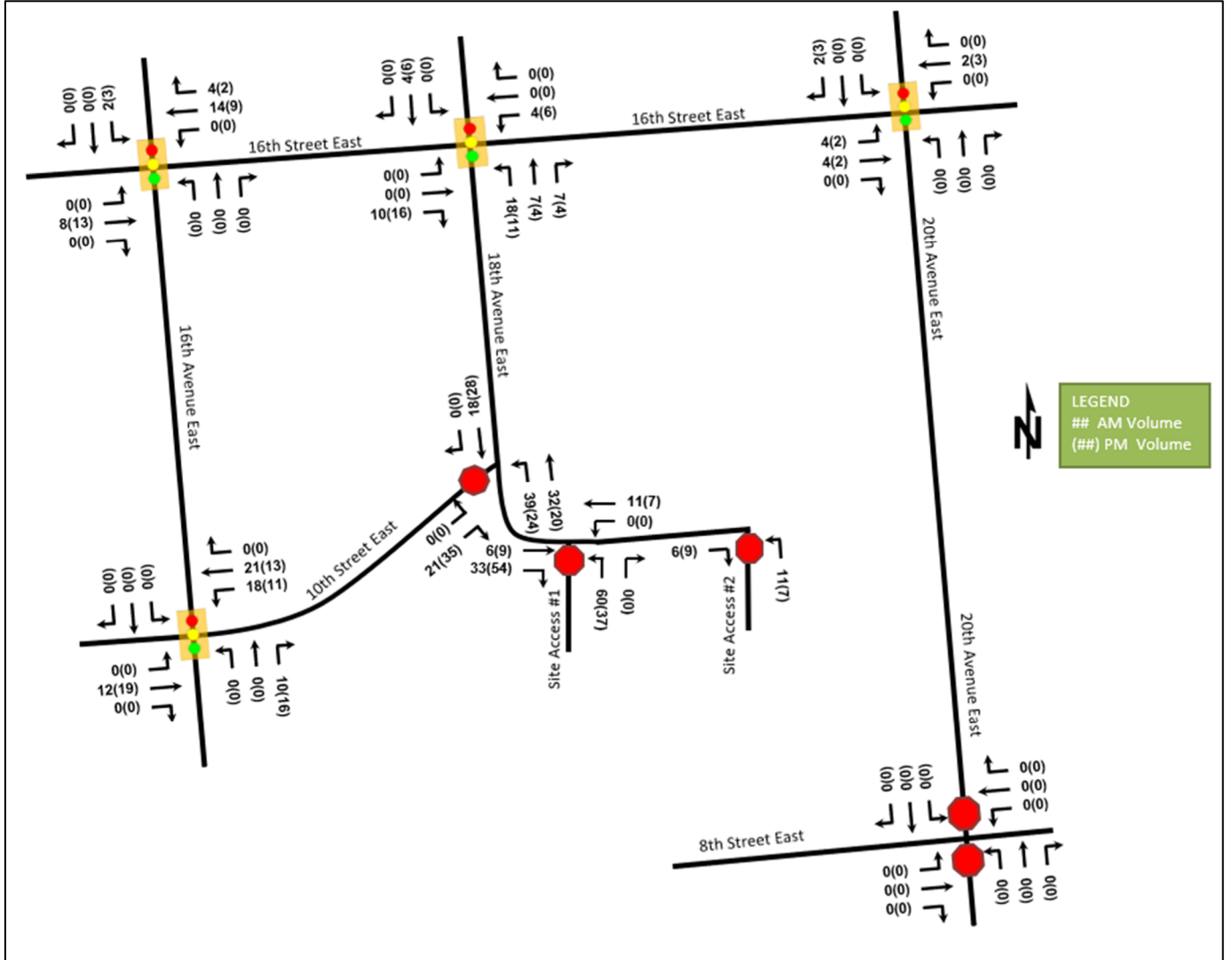
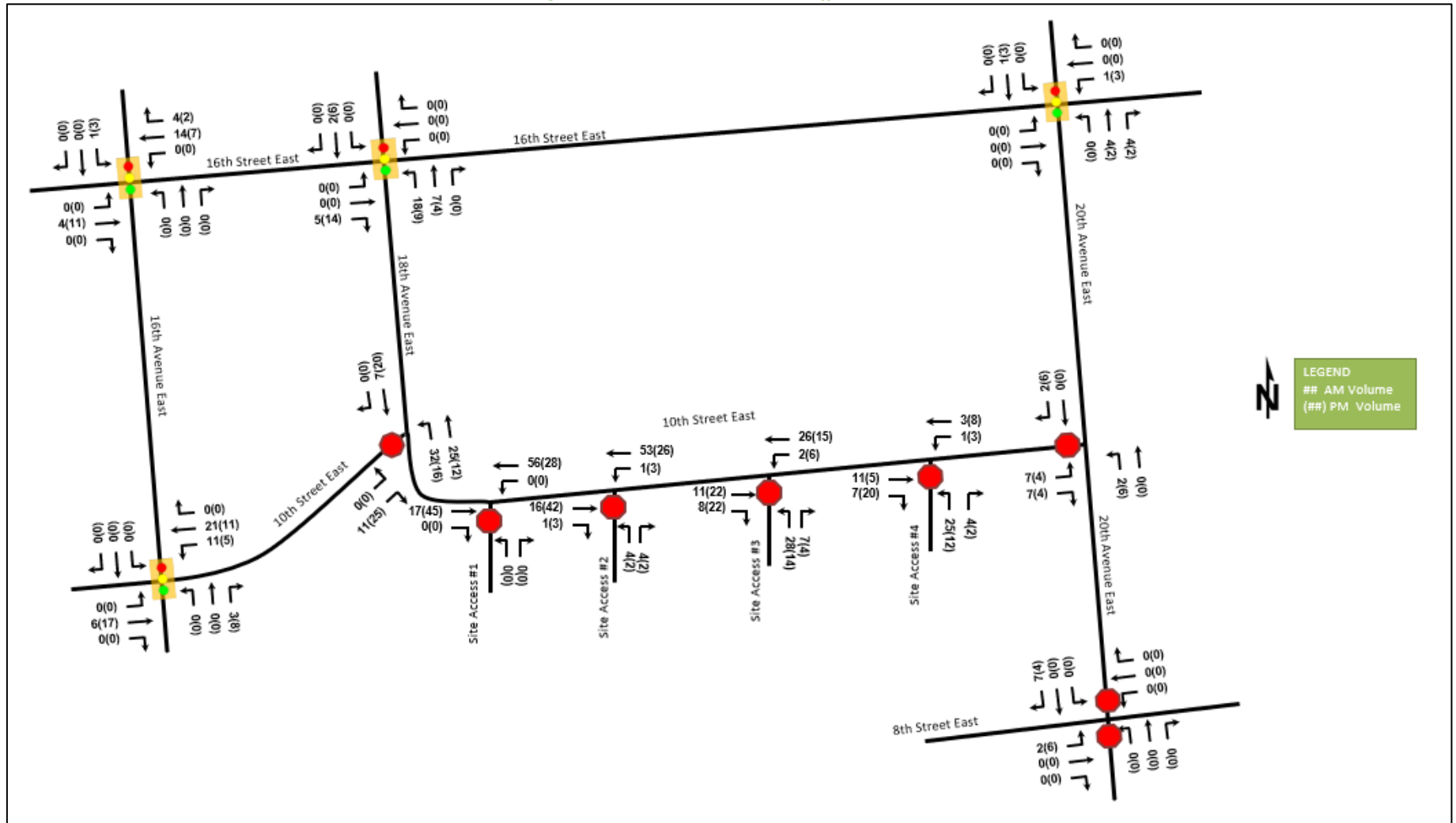


Figure 24: Phase 2 Site Generated Traffic Volumes



4.3 Future Total Travel Demands

The site generated traffic has been combined with the 2027 and 2032 future background traffic volumes to estimate the future total traffic volumes. The 2027 future total traffic volumes are illustrated in Figure 25, and the 2032 future total traffic volumes are illustrated in Figure 26.

Figure 25: 2027 Future Total Traffic

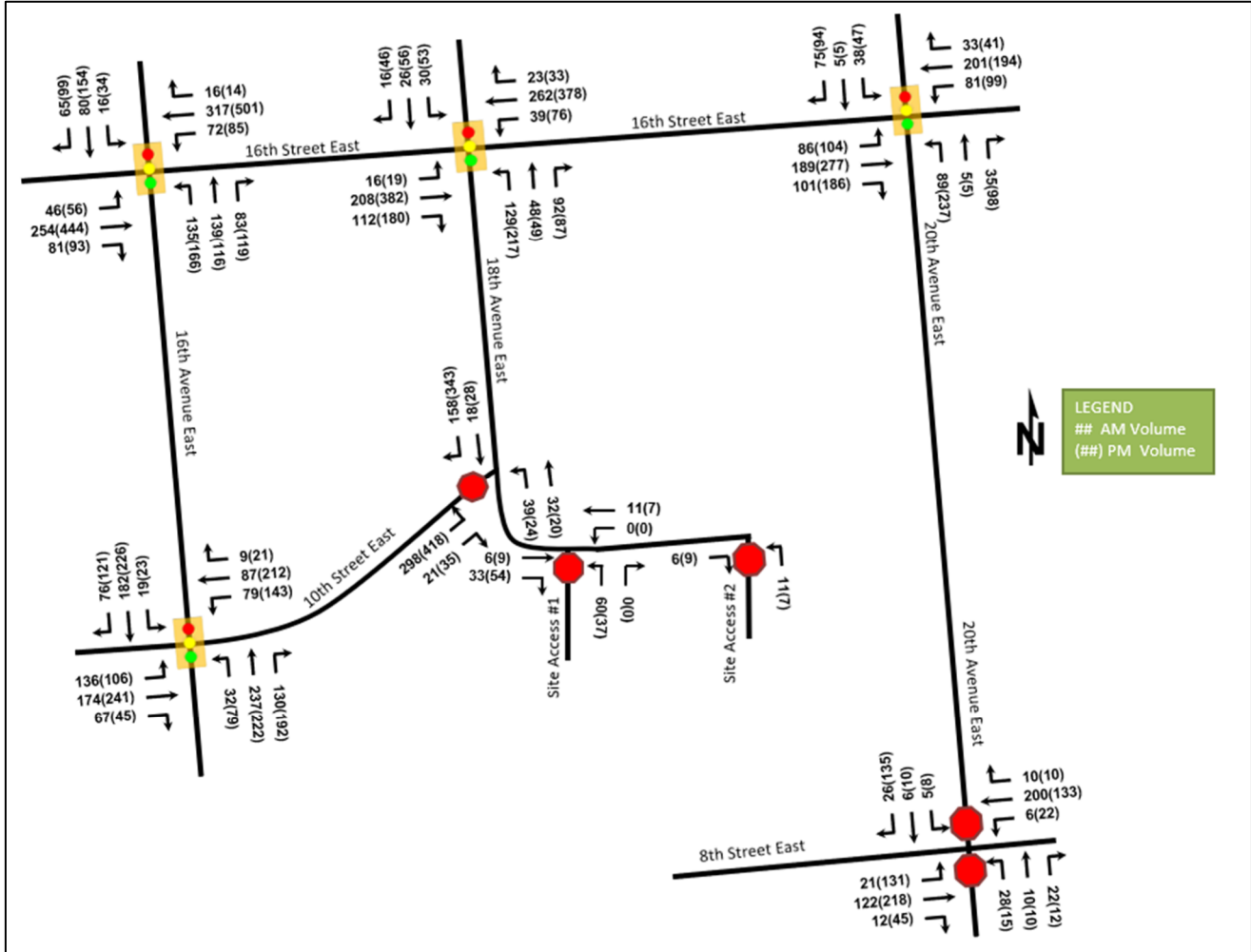
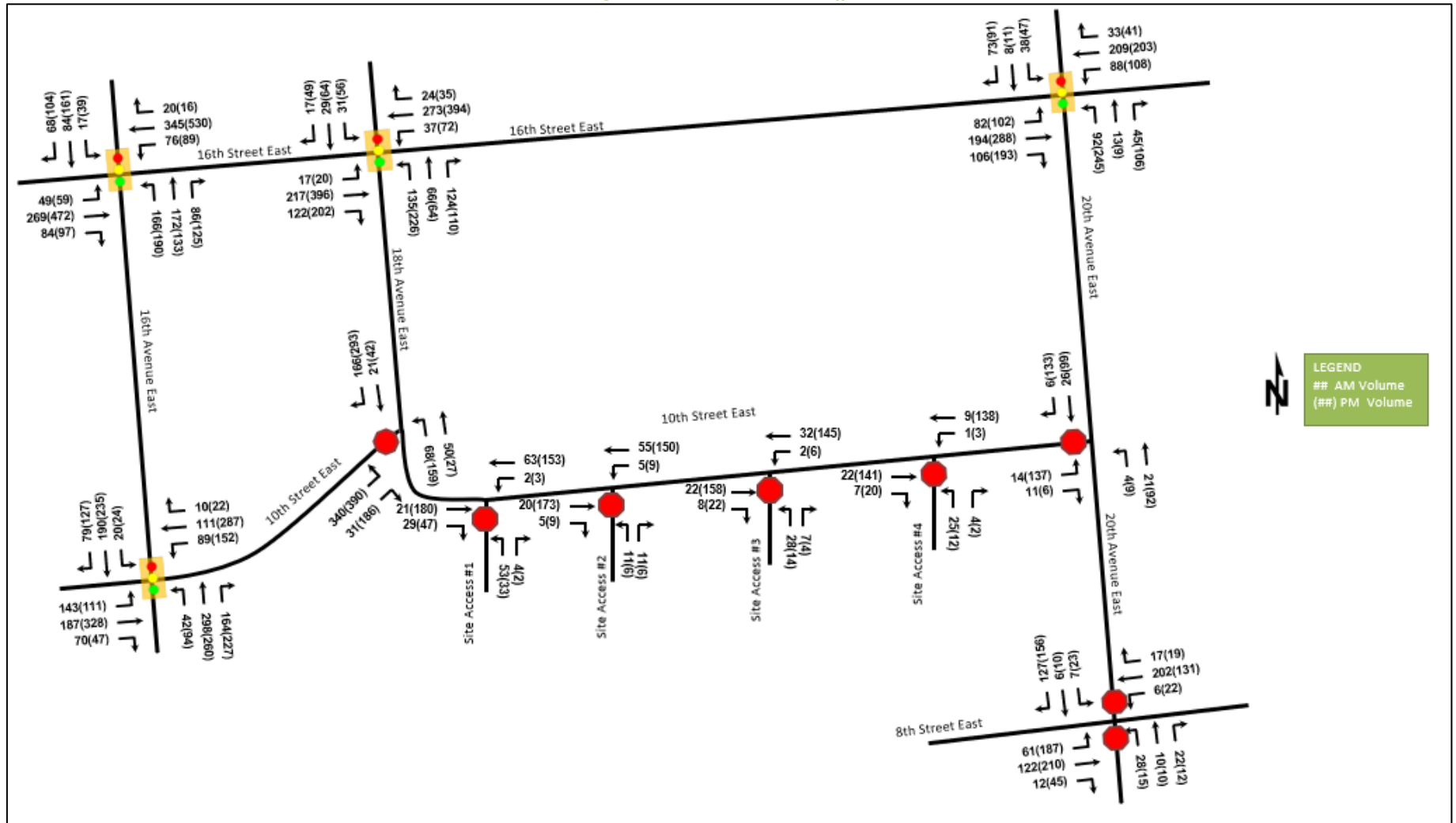


Figure 26: 2032 Future Total Traffic



5 Development Plan Review

This section provides an overview of site accesses, site circulation, and parking for both Phase 1 and Phase 2 of the subject site. The proposed Site Plan was previously illustrated in Figure 2.

As discussed above, this report has been prepared to support the ZBA application for the entire site, as well as the Site Plan Application for Phase 1 only. The Site Plan Application for Phase 2 will be submitted at a future date. As such, the proposed plan for Phase 2 is anticipated to be subject to future design changes and as such is to be considered a high-level depiction of the planned development. Therefore, the geometry of the driveways accessing Phase 2 will be refined through future submissions to ensure safe fire routes and servicing access. Phase 2 site circulation analysis will also be provided through future submissions as needed.

5.1 Site Circulation

Access to the site will be provided via four accesses along the 10th Street East extension. Each will provide access to and from the various buildings within the site. Site Access #1, located east of the intersection of 10th Street East and 18th Avenue East, will provide vehicle, pedestrian, and cyclist access to the site, and leads to the shared outdoor parking facility for Building A and Building B, as well as the private parking facilities for the townhouse units in Blocks 1-3 and Blocks 7-8. Site Access #2, located east of Site Access #1, will provide vehicle, pedestrian access to the site, and leads to one of the outdoor parking facilities for Building C, as well as the private parking facilities for the remaining townhouse units. Site Access #3, located east of Site Access #2, will provide vehicle, pedestrian, and cyclist access to the site, and leads to the shared outdoor parking facility for Building C and Building D. Site Access #4, located east of Site Access #3, will provide vehicle, pedestrian, and cyclist access to the site, and leads to the shared outdoor parking facility for Building D and Building E. All four access will allow for garbage trucks and loading vehicles to enter and exit the site.

Active transportation facilities, including sidewalks and multi-use paths, within the site are connected to those provided on the 10th Street East Extension. Further information regarding pedestrian and cyclist facilities will be discussed in Section 6 and Section 7.1.

5.2 Site Access

The proposed development will have four full-movement unsignalized accesses with stop-control on the minor legs. Two accesses will be present upon the completion of Phase 1, and the remaining two accesses will be built-out to support Phase 2. All four of the site accesses will be located on the extension of 10th Street East within the subject development land. The first access will be located approximately 60 metres east of the intersection of 10th Street East and 18th Avenue East, and the second access will be located approximately 240 metres from the intersection. The third and fourth full-movement accesses will be located east of the second access, with the exact location to be determined upon completion of the Phase 2 Site Plan.

5.3 Parking Supply

5.3.1 Vehicle Parking Supply

The proposed development will have a total of 604 parking spaces for residents and visitors. Parking spaces provided for the apartment dwellings are available in multiple surface lots, while the parking spaces provided for the semi-detached dwellings are available in private driveways. Table 5 below summarizes the provided parking rates as defined by Owen Sound Zoning By-law 2010-078.

Table 5: Vehicle Parking Statistics Summary

Phase	Land Use	Minimum Required Parking Rate	Provided Residential Units	Required Parking Spaces	Provided Parking Spaces	Difference
1A & 1B	Apartment Dwelling	1.25 spaces/unit	156	195	195	0
1C	Townhouses	1.25 spaces/unit	87	109	174	+65
Phase 1 Total				304	369	+65
2	Apartment Dwelling	1.25 spaces/unit	234	293	235*	-58*
Phase 2 Total				293	235*	-58*
Phase 1 and Phase 2 Total				597	604*	+7*
* Phase 2 is a preliminary concept at this time.						

The number of parking spaces provided in Phase 1 of the proposed development meets and exceeds the minimum required number of parking spaces.

Phase 2 of the proposed development does not meet the requirement for minimum parking spaces as outlined in the Zoning By-law and is provided at a rate of 1.004 spaces/unit. Given the site context, the existing pedestrian and transit facilities on 18th Avenue East, the planned pedestrian and cycling facilities on the extension of 20th Avenue East, and the groceries, amenities, and restaurants located directly north of the subject site, it is anticipated that the number of provided parking spaces for Phase 2 would be sufficient. Future transit facilities may also be required along the extension of 20th Avenue East and will provide additional service to Phase 2. By reducing parking, the need for single-occupant vehicles will be decreased which is consistent with the expected future trend of reduced reliance on single-occupant vehicles anticipated to be present at the time of build-out and occupancy of Phase 2. Additionally, it is noted that Phase 2 is a preliminary concept at this time.

Accessible parking spaces are provided based on the total number of parking spaces required by the proposed development, as required in the City of Owen Sound Zoning By-law 2010-078. Phases 1A and 1B share a parking facility and require a minimum of seven accessible parking stalls, and Phase 2 requires a minimum of eight accessible parking spaces. The minimum width of an accessible parking space must be 3.5 metres wide and 6.0 metres long. Table 6 below summarizes the required and provided accessible parking spaces.

Table 6: Accessible Vehicle Parking Statistics Summary

Phase	Minimum Required Parking Spaces	Provided Parking Spaces	Difference
1A & 1B	7	7	0
2	8	8	0
Total			

The number of the accessible parking spaces provided meets the minimum requirement in the Zoning By-law 2010-078.

5.3.2 Bicycle Parking Supply

According to City of Owen Sound Zoning By-law No. 2010-078 Section 5.20, the number of bicycle parking spaces provided shall be 10% of the required number of motor vehicle parking spaces at minimum. Table 7 below summarizes the bicycle parking statistics.

Table 7: Bicycle Parking Statistics Summary

Required Parking Rate	Phase	Required Vehicle Parking Spaces	Required Bicycle Parking Spaces	Provided Bicycle Parking Spaces	Provided Bicycle Parking Rate (spaces/unit)
10% of the required number of motor vehicle parking spaces	1A & 1B	195	20	28	0.14
	2	293	30	TBD*	TBD*
Phase 1 and Phase 2 Total		488	50	-	-
*Bicycle parking will be provided as part of the Phase 2 Site Plan application					

The number of bicycle parking spaces provided in Phase 1 of the proposed development exceeds the minimum requirement as outlined in Zoning By-law 2010-078 by an additional 8 spaces, and the number of bicycle parking spaces provided in Phase 2 of the proposed development will be finalized with the completion of the Phase 2 Site Plan. The townhouse units proposed for Phase 1C of the development will not require bicycle parking spaces as these will be provided in the garages of each townhouse unit.

5.3.3 Loading Space Requirements

The loading requirements for the proposed development have been determined using Owen Sound Zoning By-law 2010-078. The loading requirements for Phase 1 and Phase 2 of the proposed development are summarized in Table 8.

Table 8: Loading Requirements Summary

Loading Space Requirement	Phase	Required Loading Spaces	Provided Loading Spaces
1 space per multiple dwelling building over 25 units	1A & 1B	2	2
	2	3	3
Phase 1 and Phase 2 Total		5	5

The number of loading spaces provided in Phases 1A and 1B of the development meet the requirements outlined in the Zoning By-law and the number of loading spaces provided in Phase 2 of the development also meets the minimum requirement. The proposed placement of the loading spaces may be subject to change as part of the future Phase 2 Site Plan submission. Phase 1C of the development does not require loading spaces, as defined by Owen Sound Zoning By-law 2010-078.

6 Transportation Demand Management

Transportation Demand Management (TDM) is a set of measures and procedures implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant vehicle trips. The proposed development encourages and facilitates the use of pedestrian, cycling, and transit facilities where possible and is discussed below:

6.1 Transit Measures

The proposed development and surrounding Study Area is sufficiently serviced by existing transit provided by Owen Sound transit. As discussed in Section 2.4, two routes operate within the Study Area, with one route, East Bayshore, operating a stop approximately 200 metres west of Site Access #1. This transit stop can be accessed by

residents using the multi-use path located on the south side of 10th Street East, allowing for ease of access to transit for pedestrians and cyclists from the proposed development.

Transit maps and transit information will be provided using online links to residents to further encourage travel by transit.

6.2 Active Mode Measures

1555 10th Street East is well served by pedestrian and cycling facilities. Active mode facilities are proposed within the site, including a multi-use path along the 10th Street East extension, connecting to existing pedestrian facilities on 18th Avenue East, and future pedestrian and cycling facilities on the extension of 20th Avenue East. In order to further encourage cycling trips to and from the site, surface bicycle parking have been provided in excess of the City of Owen Sound Zoning By-law requirements, and as discussed in Section 5.3.2, an additional 8 bicycle parking spaces will be provided by the completion of Phase 1. By providing more bicycle spaces than is required, a reduction in auto dependence will be further encouraged.

7 Transportation Plan

7.1 Pedestrian & Cycling Circulation Plan

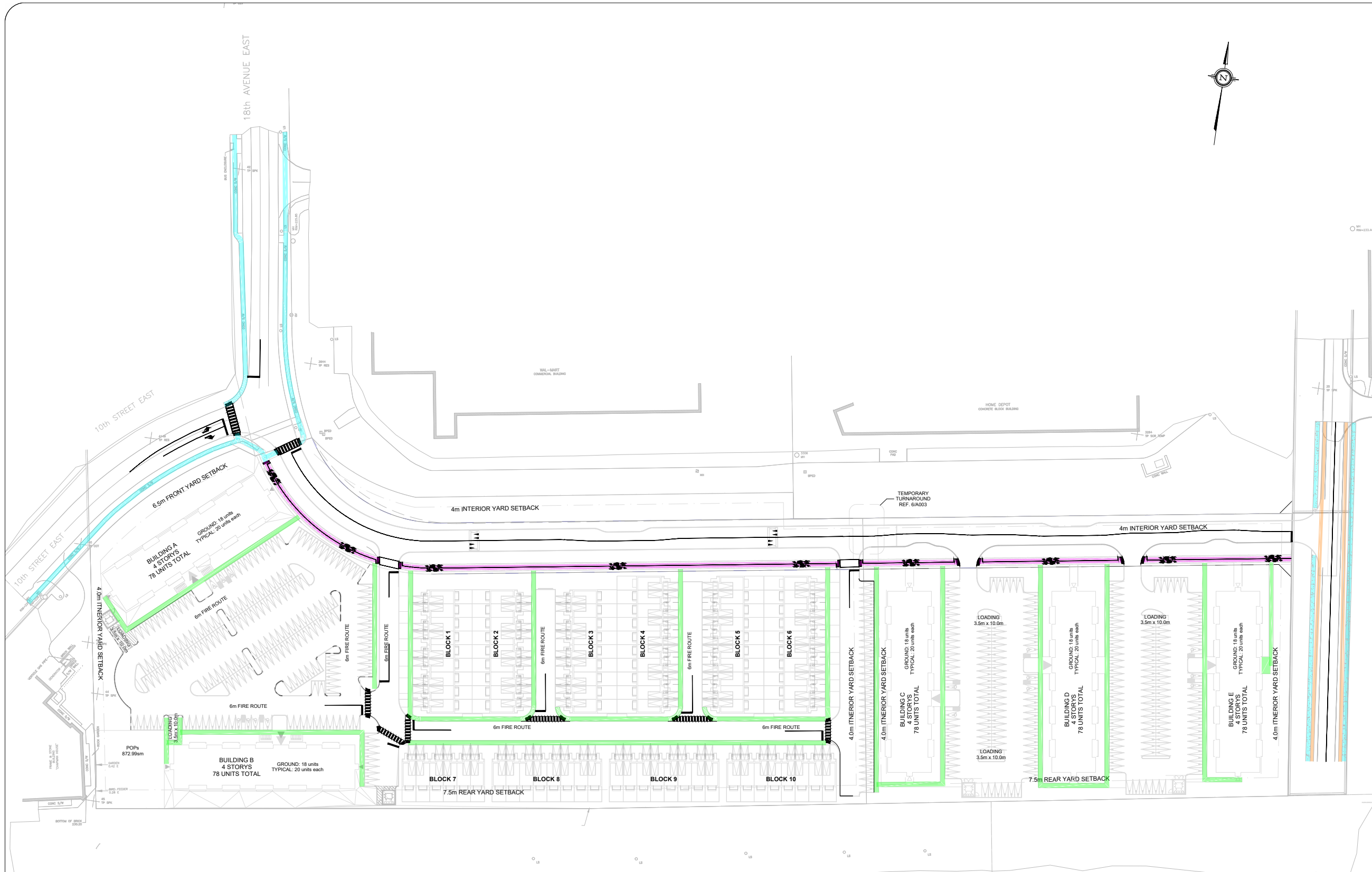
As part of the subject development, sidewalks have been proposed within the subject lands and provide pedestrian connections to 10th Street East, along internal roadways and parking areas, as well as to building entrances. Pedestrian crossings have also been proposed within the site to connect sidewalks and ensure the safe crossing of internal site roadways. A multi-use pathway is provided along the south side of the 10th Street East extension within the development lands, and will connect to a broader active transportation network provided by the City of Owen Sound. This multi-use pathway will connect to existing sidewalks along 10th Street East and 18th Avenue East, as well as future pedestrian and cycling facilities on the planned extension of 20th Avenue East.

These active mode facilities are illustrated in the pedestrian and cycling plan developed to satisfy the requirement for a Transportation Plan to support the site plan submission, shown in Figure 27.

7.2 Pavement Marking and Signage Plan

As requested by City of Owen Sound staff, a pavement marking and signage plan has been developed to satisfy the requirement for a Transportation Plan to support the site plan submission. The following signs have been included in the plan; stop signs, no parking signs, no exit signs, checkerboard signs, speed hump signs, object marker signs, multi-use pathway signage (dismount and walk signs, bicycles yield to pedestrian signs, and shared pathway signs). Pavement markings at the future intersection of 10th Street East and 18th Avenue East, and the future intersection of 10th Street East and 20th Avenue East are reflective of the intersection configurations discussed and analyzed in Section 8 below. Pavement markings have also been used within the site to denote pedestrian crossings, stop bars, lanes, speed humps, and the multi-use pathway. Further details can be seen in Figure 28 which illustrates the prepared pavement marking and signage plan.

Figure 27: Pedestrian and Cycling Circulation Plan



Notes:

Key Map:

Legend

Within Development Lands

- Sidewalk
- Multi-Use Pathway

Outside of Development Lands

- Sidewalk
- Cycle Lane

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
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STATUS:			

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: SmartCentres

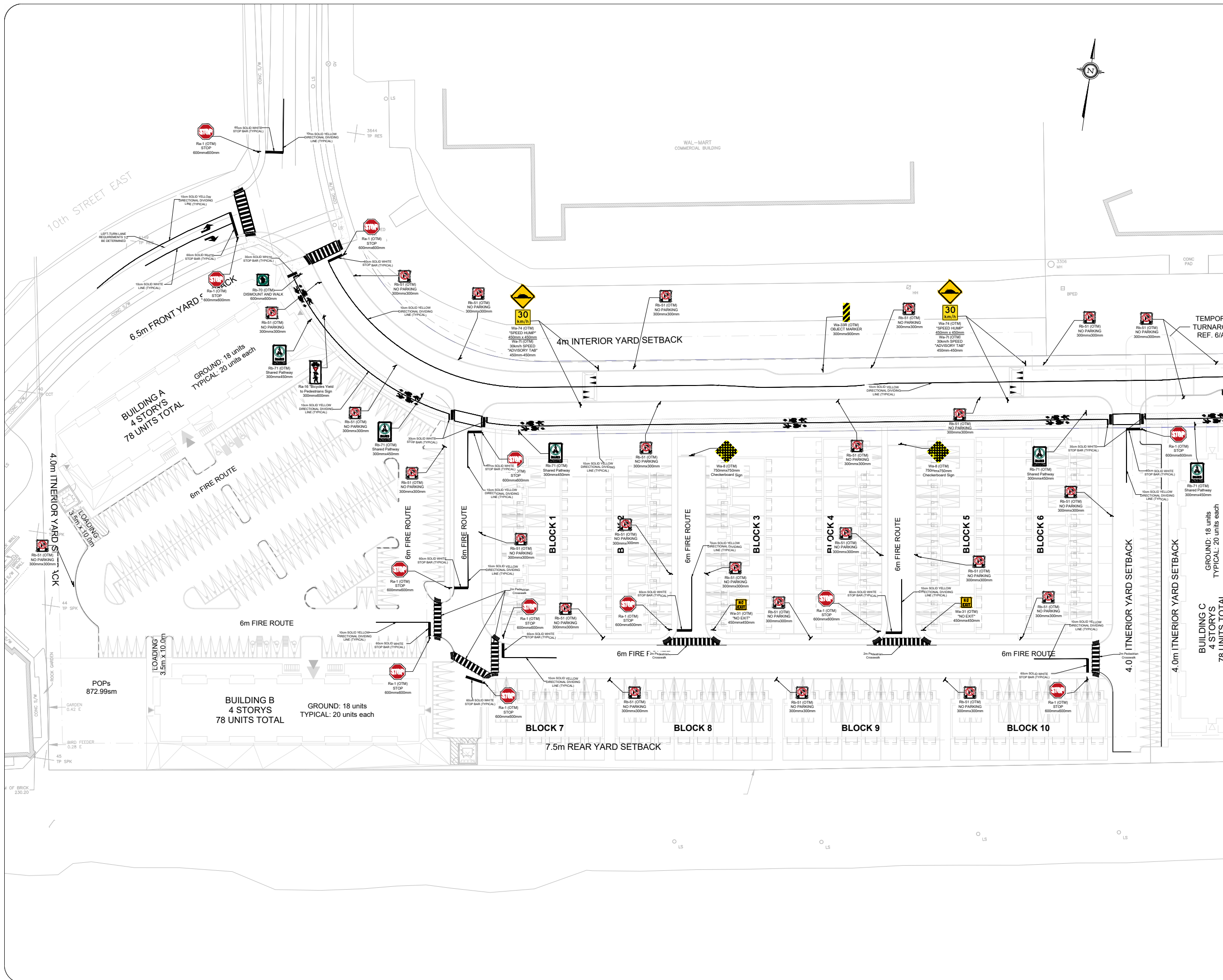
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PROJECT NO:	DRAWING NO:	REVISION:	
2022-032	009	05	

Figure 28: Pavement Marking and Signage Plan



Notes:

Key Map:

Legend

- TACTILE WALKING SURFACE INDICATOR (TWSI)
- Multi Use Path
- Depressed Curb

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04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
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STATUS:			

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

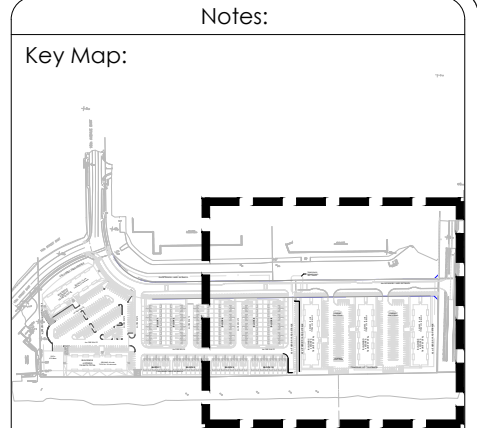
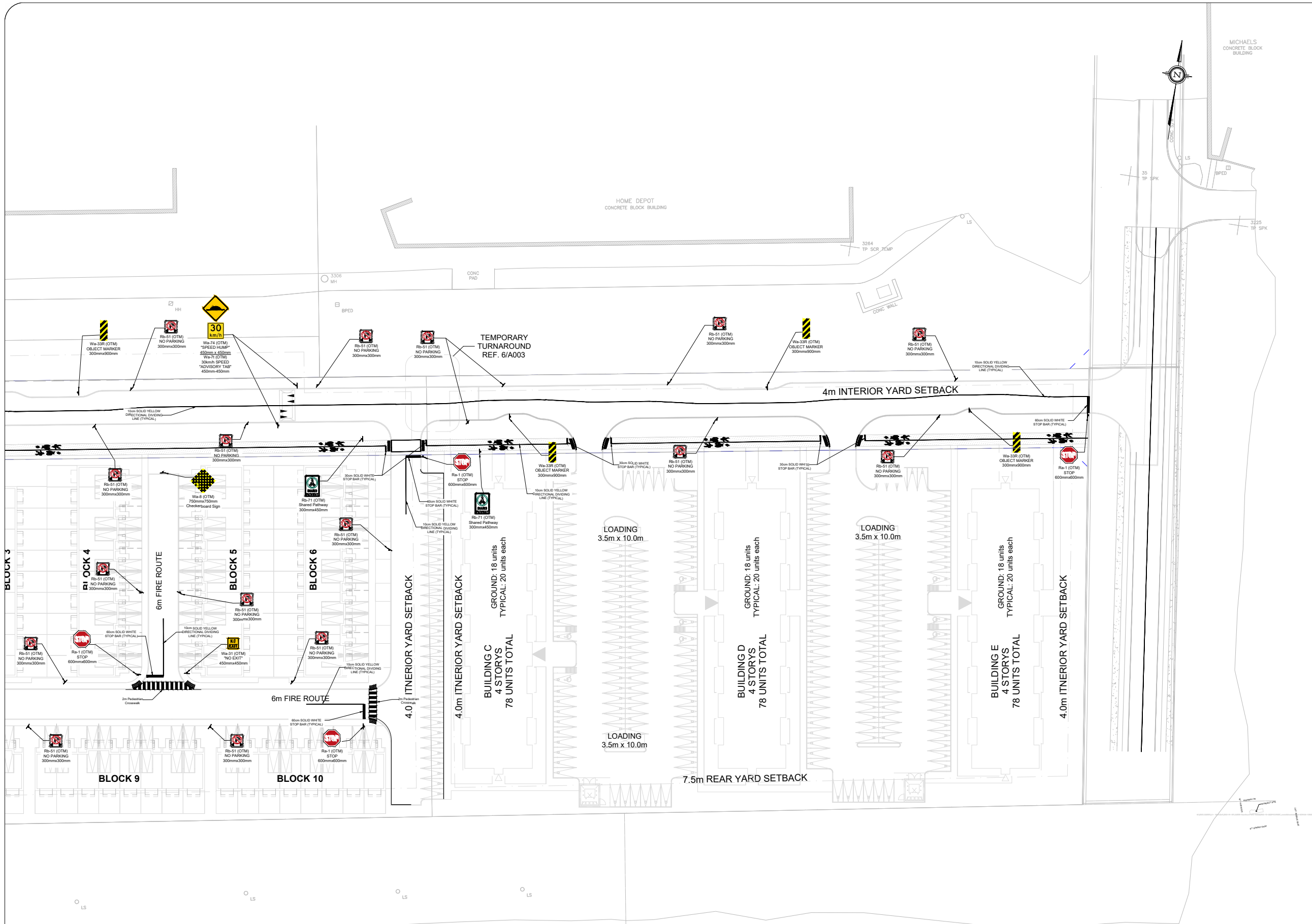
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PROJECT NO:	DRAWING NO:	REVISION:	
2022-032	001	05	



- Legend
- TACTILE WALKING SURFACE INDICATOR (TWSI)
 - Multi Use Path
 - Depressed Curb

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04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
 628 Haines Road
 Newmarket, ON
 L3Y 6V5
 (905) 251-4070

CLIENT: SmartCentres

ARCHITECT:

SITE:
 1555 18th Avenue East

TITLE:
 Pavement Marking & Signage Plan (2)

SCALE AT A3: 1:1000	DATE: 2023-01-30	DRAWN: AN	CHECKED: MC
PROJECT NO: 2022-032	DRAWING NO: 002	REVISION: 05	

7.3 Garbage and Loading Circulation

A site circulation assessment for Phase 1 of the subject development was completed using AutoTURN 11.0 to develop turning templates for garbage trucks and loading trucks.

Garbage trucks will enter and exit the site in a forward motion using the two site accesses on the 10th Street extension and have been tested pulling into both garbage areas. An HSU has been used to simulate these movements.

Loading vehicles will enter and exit the site in a forward motion using the two site accesses on the 10th Street extension and have been tested backing into both loading spaces. An MSU has been used to simulate these movements.

Turning templates can be found in Appendix D.

8 Operational Analysis

Synchro (Version 11) was used to model the Study Area intersections. Peak Hour Factors (PHF) have been calculated for the intersections of 16th Street East at 16th Avenue East, 16th Street East at 18th Avenue East, 16th Street East at 20th Avenue East, 10th Street East at 16th Avenue East, and 10th Street East at 18th Avenue East based on the existing turning movement counts and will be applied to both existing and future analysis horizons. At future intersections the calculated Peak Hour Factors from adjacent intersections have been used. The Peak Hour Factors applied at each intersection are summarized in Table 9 below.

Table 9: Peak Hour Factors

Intersection	Horizon	Peak Hour Factor	
		AM	PM
16 th Street East & 16 th Avenue East	Existing/Future	0.90	0.95
16 th Street East & 18 th Avenue East	Existing/Future	0.88	0.94
16 th Street East & 20 th Avenue East	Existing/Future	0.92	0.98
10 th Street East & 16 th Avenue East	Existing/Future	0.92	0.93
10 th Street East & 18 th Avenue East	Existing/Future	0.87	0.93
10 th Street East & 20 th Avenue East *	Future	0.92	0.98
10 th Street East & Site Access #1*	Future	0.87	0.93
10 th Street East & Site Access #2*	Future	0.87	0.93
10 th Street East & Site Access #3*	Future	0.87	0.93
10 th Street East & Site Access #4*	Future	0.87	0.93
8 th Street East & 20 th Avenue East*	Future	0.92	0.98

*PHF taken from adjacent existing intersections

Heavy Vehicle percentages (HV%) have been calculated for each movement based on the existing turning movement counts for the Study Area intersections. Any HV% calculated to be less than 2% was entered as 2% in Synchro to ensure a conservative analysis. At intersections where no Heavy Vehicle percentage is available, 2% has been used. Heavy Vehicle percentage calculations can be found in Appendix E.

Pedestrian volumes have been provided for the previously mentioned intersections with turning movement count information. The provided turning movement counts showed that the intersections within the Study Area experienced generally low pedestrian volumes. At future intersections in the Study Area with no pedestrian volume information, it will be assumed to have a volume of 25 pedestrians per hour. At future Study Area

intersections with no provided cycling information, a conservative assumption of 5 cyclists per hour has been used for each intersection leg in the existing conditions analysis.

The LOS has been defined using the HCM definition for LOS at signalized intersections as shown in Table 10 and unsignalized intersections as shown in Table 11.

Table 10: Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (Seconds/Vehicle)
A	≤10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	>80

Table 11: Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Second/Vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	>50

Criteria for critical movements and critical intersections for signalized intersections will be considered as outlined by the Owen Sound Site Development Engineering Standards (2021). Critical movements and critical intersections at signalized intersections have been defined as those with volume to capacity ratios of 0.90 or greater for overall intersection operations, through movements, or shared through/turning movements, or volume to capacity ratios of 1.00 or greater for exclusive movements, or if the queue for individual movements exceeds the available lane storage.

Critical movements and critical intersections at unsignalized intersections have been defined as individual movements with LOS F and/or v/c ratio of 1.00 or worse.

8.1 2022 Existing Conditions Operational Analysis

Table 12 summarizes the operational analysis for the 2022 existing conditions in both the AM and PM peak periods. Critical movements, as defined above, have been identified in red where applicable. Table 13 summarizes the 95th percentile queue of each movement for the 2022 existing conditions. Existing 2022 Synchro worksheets are included in Appendix F.

The Study Area intersections have been designed based on aerial photos and turning lane storage lengths have been rounded to the closest five-metre. All other parameters have been coded using accepted best practices and default parameters where applicable. The Synchro model has been coded using the existing traffic signal timing, which can be found in Appendix C.

Table 12: 2022 Existing Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.11	14.8	B	0.17	16.8
	EBT/R	B	0.27	18.7	C	0.42	23.2
	WBL	B	0.15	12.9	B	0.21	16.3
	WBT/R	B	0.25	17.4	C	0.45	23.1
	NBL	B	0.28	16.7	B	0.33	15.8
	NBT/R	B	0.15	20.2	B	0.15	19.7
	SBL	C	0.05	23.5	C	0.11	23.9
	SBT/R	C	0.15	25.1	C	0.24	26.9
	Overall	B	0.28	18.8	C	0.39	22.0
16 th Street East & 18 th Avenue East (Signalized)	EBL	C	0.05	22.7	C	0.06	24.2
	EBT/R	C	0.26	27.3	C	0.43	30.3
	WBL	C	0.08	20.4	C	0.17	20.1
	WBT/R	C	0.26	25.9	C	0.32	26.6
	NBL	B	0.19	13.1	B	0.32	14.9
	NBT/R	B	0.05	16.5	B	0.05	18.7
	SBL	B	0.06	18.4	B	0.09	19.9
	SBT/R	C	0.03	20.6	C	0.05	23.5
	Overall	C	0.22	22.8	C	0.36	24.6
16 th Street East & 20 th Avenue East (Signalized)	EBT	A	0.15	4.1	A	0.21	6.0
	EBR	A	0.06	3.7	A	0.09	5.3
	WBL	A	0.09	3.9	A	0.10	5.5
	WBT	A	0.17	4.2	A	0.21	6.0
	NBL	C	0.34	28.9	C	0.43	26.6
	NBR	C	0.02	25.9	C	0.05	23.0
	Overall	A	0.20	8.0	B	0.26	10.5
10 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.41	19.5	B	0.35	18.5
	EBT/R	B	0.43	19.2	B	0.49	19.3
	WBL	B	0.21	17.6	B	0.40	19.1
	WBT/R	B	0.14	16.8	B	0.43	18.6
	NBL	A	0.05	6.8	A	0.13	7.8
	NBT/R	A	0.29	8.5	A	0.37	9.6
	SBL	A	0.03	6.7	A	0.05	7.2
	SBT/R	A	0.25	8.2	A	0.31	9.0
	Overall	B	0.34	13.1	B	0.41	13.8
10 th Street East & 18 th Avenue East (Unsignalized)	EBL	A	0.29	10.0	B	0.39	10.8
	SBR	A	0.10	0.0	A	0.19	0.0
	Overall	A	-	6.4	A	-	6.0

Table 13: 2022 Existing Conditions Queue Lengths

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16 th Street East & 16 th Avenue East (Signalized)	EBL	25	10.2	14.1
	EBT/R	N/A	25.5	51.6
	WBL	40	13.5	18.2
	WBT/R	N/A	28.2	54.6
	NBL	40	19.4	28.5
	NBT/R	N/A	13.9	15.7
	SBL	30	3.7	7.7
	SBT/R	N/A	10.4	20.0

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16th Street East & 18th Avenue East (Signalized)	EBL	35	5.6	6.8
	EBT/R	N/A	25.7	47.0
	WBL	30	8.5	14.0
	WBT/R	25*	30.1	42.3
	NBL	40	20.8	34.8
	NBT/R	N/A	7.7	8.1
	SBL	25	6.5	9.9
	SBT/R	N/A	5.1	8.7
16th Street East & 20th Avenue East (Signalized)	EBT	N/A	15.6	23.9
	EBR	N/A	4.2	5.9
	WBL	45	7.7	8.9
	WBT	N/A	17.4	23.2
	NBL	N/A	18.0	29.9
	NBR	N/A	5.9	8.8
10th Street East & 16th Avenue East (Signalized)	EBL	40	23.5	18.9
	EBT/R	N/A	30.5	37.3
	WBL	35	11.5	20.5
	WBT/R	N/A	12.2	32.7
	NBL	30	6.6	13.8
	NBT/R	N/A	38.7	47.5
	SBL	N/A	5.3	6.0
	SBT/R	N/A	33.1	40.5
10th Street East & 18th Avenue East (Unsignalized)	EBL	N/A	9.2	14.5
	SBR	N/A	0.0	0.0

* storage length for the outer lane of the shared through/right movement

As shown above, all existing intersections within the Study Area operate effectively, with no intersections experiencing critical movements in either the AM or PM peak hour periods. The 95th percentile queues at the Study Area intersections are not shown to exceed the available turning lane storage length identified for each auxiliary turn lane. It is noted that while the shared westbound through/right lane at the intersection of 16th Street East and 18th Avenue East is indicated to have a storage length of 25 metres, this applies only to the outer lane, and not to the inner through lane. As such, any queues extending beyond 25 metres for this movement are not considered critical. This is applicable to all future analysis horizons as well.

8.2 Future Background Conditions

8.2.1 Future Background Intersection Control

Using the Ontario Traffic Manual (OTM) Book 12 Justification 7 methodology for examining traffic control signal warrants, applicable Study Area intersections were reviewed. A summary of the traffic control signal warrant analysis for future background conditions can be found in Table 14. Signal warrant sheets have been included in Appendix G.

Table 14: Future Background Signalization Warrant Summary

Intersection	Horizon	Warranted?
8th Street East at 20th Avenue East	2027 FB	No
	2032 FB	No
10th Street East at 18th Avenue East	2027 FB	No
	2032 FB	No

As indicated above, intersection signalization warrants are not met at any of the intersections considered in the future background analysis for 2027 or 2032. As such, the intersection of 8th Street East and 20th Avenue East, as

well as the intersection of 10th Street East and 20th Avenue East will be analyzed as unsignalized intersections in the 2027 and 2032 future background horizons.

8.2.2 Future Background Intersection Design

The intersections of 16th Street East at 16th Avenue East, 16th Street East at 18th Avenue East, 10th Street East at 16th Avenue East, and 10th Street East at 18th Avenue East are expected to maintain their current design in both the 2027 and 2032 future background horizons. The following two intersections will experience a change in their respective geometry in comparison to existing conditions, and their configurations analyzed in the future background horizons are therefore described below.

8.2.2.1 16th Street East at 20th Avenue East

The signalized intersection of 16th Street East and 20th Avenue East has been designed with consideration given to the extension of 20th Avenue East north of 16th Street East, forming the fourth leg of the intersection. The intersection geometry and configuration are based on existing intersection geometry, as well as the future intersection geometry provided by City of Owen Sound staff which is included in Appendix H. The south leg of the intersection will have a left-turn lane, and a shared through / right lane. The east leg will have a left-turn lane, and a shared through / right lane. The west leg will consist of an auxiliary left-turn lane, a through lane, and a shared through / right lane, and the north leg will consist of a left-turn lane, and a shared through / right lane. This new intersection design is expected to be completed prior to 2027 and has therefore been considered in both the 2027 and 2032 future background analysis.

8.2.2.2 8th Street East at 20th Avenue East

The unsignalized intersection of 8th Street East and 20th Avenue East has been designed with consideration given to the extension of 20th Avenue East south from its present terminus, through 8th Street East, forming a four-legged intersection. Stop-control on the north and south legs of the intersection has been assumed which is consistent with assumptions made in other background development reports. The Ministry of Transportation Ontario (MTO) Geometric Design Standards for Ontario Highways (GDSOH) has been reviewed to determine the need for an eastbound left-turn lane and westbound left-turn lane for the 2027 and 2032 future background analysis horizons. Using the GDSOH methodology and a 60 kilometre per hour design speed, it was found that an eastbound left-turn lane will be warranted based on the projected AM peak hour traffic volume in both future analysis horizons. Although a dedicated westbound left-turn lane is not shown to be warranted, it has been assumed that one would be included at the intersection of 8th Street East and 20th Avenue East to mirror the eastbound left-turn lane. Left turn lane warrant analysis sheets have been included in Appendix I.

The northern and southern legs of the intersection will have a shared left / through / right lane, while the eastern and western legs of the intersection will have a dedicated left-turn lane with 15 metres of storage and a 15 m taper, and a shared through / right lane. These left-turn lanes have been designed for analysis purposes only. This new intersection design is expected to be completed by 2027 and has therefore been considered in both the 2027 and 2032 future background analysis horizons.

8.2.3 2027 Future Background Operational Analysis

The 2027 future background intersection volumes and surrounding background development traffic volumes have been analyzed to allow for a comparison between the future volumes with and without the proposed development. Signal timing splits, and cycle lengths of all signalized intersections have been based on the provided signal timing except for the intersection of 16th Street East and 20th Avenue East. As a result of the change in intersection geometry, slight changes to the signal timing of this intersection have been made based on the recommendations found in the *20th Avenue East and 16th Street East Signal Timing Plan Technical Memorandum*

(2022), prepared by CGH Transportation. The recommended future signal timing plan also uses the four phases identified on the existing timing plan to make up a cycle length of 90 seconds. The minimum green times, total phase splits, yellow/amber times, all red times, and vehicle extension times have not been changed for any phase. Flash Don't Walk Times have been increased from 20 seconds for each phase to 23 seconds for phases 2 and 6, and 22 seconds for phases 4 and 8 based on the future intersection configuration, and an assumed walking speed of 1.2 m/s as suggested in OTM Book 12. In order to maintain a total Walk and Flash Don't Walk Time as what was shown in the existing signal timing plan, the Walk Time for phase 2 and 6 has been changed to 17 seconds, and the walk time for phase 4 and 8 has been changed to 13 seconds. Additionally, all signal timing plan elements discussed have been checked against the minimum interval time requirements shown in Table 3 of OTM Book 12.

Table 15 summarizes the operational analysis for the 2027 future background conditions in both the AM and PM peak periods. Critical movements, as defined above in Section 8, have been identified. The intersections have been analyzed based on the identified signal control and intersection configurations in Section 8.2.1 and Section 8.2.2, respectively. The 95th percentile queue of each movement for the 2027 future background conditions is shown in Table 16. 2027 Future Background Synchro worksheets are included in Appendix J.

Table 15: 2027 Future Background Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.13	17.0	B	0.20	17.5
	EBT/R	C	0.34	21.8	C	0.56	25.5
	WBL	B	0.19	14.7	B	0.28	16.9
	WBT/R	C	0.31	20.0	C	0.52	24.4
	NBL	B	0.31	16.1	B	0.37	16.6
	NBT/R	B	0.18	19.4	C	0.18	21.4
	SBL	C	0.07	24.9	C	0.11	24.4
	SBT/R	C	0.17	26.6	C	0.31	29.2
	Overall	C	0.33	20.4	C	0.46	23.7
16 th Street East & 18 th Avenue East (Signalized)	EBL	C	0.05	22.3	C	0.07	24.0
	EBT/R	C	0.35	27.8	C	0.59	32.3
	WBL	C	0.11	20.3	C	0.28	20.8
	WBT/R	C	0.32	26.2	C	0.41	27.1
	NBL	B	0.20	13.2	B	0.34	15.3
	NBT/R	B	0.07	17.9	C	0.07	20.4
	SBL	B	0.08	17.5	B	0.11	19.2
	SBT/R	C	0.03	20.8	C	0.07	24.1
	Overall	C	0.26	23.4	C	0.44	26.0
16 th Street East & 20 th Avenue East (Signalized)	EBL	A	0.12	4.7	A	0.17	9.0
	EBT/R	A	0.13	4.6	A	0.21	8.9
	WBL	A	0.13	4.8	A	0.20	9.5
	WBT/R	A	0.22	5.2	A	0.25	9.4
	NBL	C	0.49	30.2	C	0.68	30.7
	NBT/R	C	0.05	24.5	C	0.07	20.2
	SBL	C	0.20	25.4	C	0.14	20.6
	SBT/R	C	0.07	24.5	C	0.07	20.1
	Overall	B	0.27	10.6	B	0.39	14.8

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
10th Street East & 16th Avenue East (Signalized)	EBL	B	0.43	19.3	B	0.39	18.7
	EBT/R	B	0.47	19.2	B	0.53	19.8
	WBL	B	0.25	17.6	C	0.53	21.4
	WBT/R	B	0.15	16.4	B	0.45	18.6
	NBL	A	0.06	7.1	A	0.17	8.5
	NBT/R	A	0.42	10.0	B	0.46	11.0
	SBL	A	0.04	7.0	A	0.06	7.5
	SBT/R	A	0.30	8.8	B	0.39	10.2
	Overall	B	0.43	13.3	B	0.48	14.6
10th Street East & 18th Avenue East (Unsignalized)	EBL	B	0.34	10.3	B	0.44	11.2
	SBR	-	0.11	0.0	-	0.22	0.0
	Overall	A	-	6.7	A	-	6.2
8th Street East & 20th Avenue East (Unsignalized)	EBL	A	0.02	7.9	A	0.10	7.9
	EBT/R	-	0.09	0.0	-	0.16	0.0
	WBL	A	0.01	7.6	A	0.02	8.0
	WBT/R	-	0.13	0.0	-	0.09	0.0
	NBL/T/R	B	0.13	13.0	C	0.14	20.3
	SBL/T/R	B	0.07	11.3	B	0.22	11.5
Overall	A	-	3.0	A	-	5.0	

Table 16: 2027 Future Background Conditions Queues Lengths

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16th Street East & 16th Avenue East (Signalized)	EBL	25	10.8	14.8
	EBT/R	N/A	36.0	70.8
	WBL	40	15.3	20.7
	WBT/R	N/A	35.7	68.1
	NBL	40	26.7	36.5
	NBT/R	N/A	19.2	19.1
	SBL	30	4.9	9.2
	SBT/R	N/A	14.3	27.3
16th Street East & 18th Avenue East (Signalized)	EBL	35	5.8	7.1
	EBT/R	N/A	34.8	69.3
	WBL	30	10.3	18.3
	WBT/R	25*	37.2	55.1
	NBL	40	21.7	38.5
	NBT/R	N/A	9.2	9.6
	SBL	25	7.8	11.9
	SBT/R	N/A	5.4	10.5
16th Street East & 20th Avenue East (Signalized)	EBL	30	10.7	18.6
	EBT/R	N/A	10.4	21.6
	WBL	45	10.7	19.1
	WBT/R	N/A	24.4	35.0
	NBL	N/A	22.9	52.2
	NBT/R	N/A	7.4	10.1
	SBL	35	11.4	12.2
	SBT/R	N/A	10.2	9.8

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
10th Street East & 16th Avenue East (Signalized)	EBL	40	25.1	20.5
	EBT/R	N/A	34.0	41.7
	WBL	35	12.9	26.3
	WBT/R	N/A	13.2	34.9
	NBL	30	7.8	16.1
	NBT/R	N/A	57.2	61.9
	SBL	N/A	5.5	6.2
	SBT/R	N/A	39.6	53.5
10th Street East & 18th Avenue East (Unsignalized)	EBL	N/A	11.3	17.2
	SBR	N/A	0.0	0.0
8th Street East & 20th Avenue East (Unsignalized)	EBL	15	0.4	2.5
	EBT/R	N/A	0.0	0.0
	WBL	15	0.1	0.4
	WBT/R	N/A	0.0	0.0
	NBL/T/R	N/A	3.3	3.5
	SBL/T/R	N/A	1.6	6.3

* storage length for the outer lane of the shared through/right movement

With the addition of background growth to reflect the 2027 horizon, the Study Area intersections operate well with no critical movements, and in a similar manner to the 2022 existing conditions horizon.

As shown above, all intersections within the Study Area operate effectively, with no intersections experiencing critical movements in either the AM or PM peak hour periods. The 95th percentile queues at the Study Area intersections are not shown to exceed the available turning lane storage length identified for each auxiliary turn lane.

8.2.4 2032 Future Background Operational Analysis

The 2032 future background intersection volumes and surrounding background development traffic volumes have been analyzed to allow for a comparison between the future volumes with and without the proposed development. Signal timing splits, and cycle lengths of all signalized intersections have been based on the provided signal timing except for the intersection of 16th Street East and 20th Avenue East. Changes to the signal timing of this intersection have been discussed in Section 8.2.3 above.

Table 17 summarizes the operational analysis for the 2032 future background conditions in both the AM and PM peak periods. Critical movements, as defined above in Section 8, have been identified. The intersections have been analyzed based on the identified signal control and intersection configurations in Section 8.2.1 and Section 8.2.2, respectively. The 95th percentile queue of each movement for the 2032 future background conditions is shown in Table 18. 2032 Future Background Synchro worksheets are included in Appendix K.

Table 17: 2032 Future Background Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16th Street East & 16th Avenue East (Signalized)	EBL	B	0.14	17.6	B	0.20	17.8
	EBT/R	C	0.37	22.7	C	0.55	25.8
	WBL	B	0.20	15.2	B	0.28	17.2
	WBT/R	C	0.33	20.8	C	0.53	24.8
	NBL	B	0.37	16.4	B	0.40	16.7
	NBT/R	B	0.23	19.7	C	0.19	21.3
	SBL	C	0.07	25.8	C	0.12	24.9
	SBT/R	C	0.19	27.7	C	0.31	29.6
	Overall	C	0.37	20.9	C	0.47	23.9

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16th Street East & 18th Avenue East (Signalized)	EBL	C	0.05	22.5	C	0.07	24.3
	EBT/R	C	0.37	28.1	C	0.62	33.1
	WBL	C	0.12	20.4	C	0.30	21.3
	WBT/R	C	0.34	26.5	C	0.43	27.6
	NBL	B	0.21	13.3	B	0.36	15.4
	NBT/R	B	0.09	18.0	C	0.09	20.4
	SBL	B	0.08	17.5	B	0.12	19.5
	SBT/R	C	0.03	20.9	C	0.07	24.4
	Overall	C	0.27	23.4	C	0.46	26.4
16th Street East & 20th Avenue East (Signalized)	EBL	A	0.12	4.8	A	0.17	9.3
	EBT/R	A	0.14	4.6	A	0.23	9.2
	WBL	A	0.14	4.9	A	0.22	10.0
	WBT/R	A	0.23	5.3	A	0.26	9.8
	NBL	C	0.51	30.4	C	0.68	30.9
	NBT/R	C	0.05	24.5	C	0.08	20.0
	SBL	C	0.20	25.4	C	0.13	20.4
	SBT/R	C	0.07	24.6	B	0.07	19.9
	Overall	B	0.28	10.6	B	0.41	15.0
10th Street East & 16th Avenue East (Signalized)	EBL	B	0.44	19.3	B	0.40	18.8
	EBT/R	B	0.48	19.2	B	0.54	19.8
	WBL	B	0.27	17.7	C	0.56	22.1
	WBT/R	B	0.16	16.3	B	0.46	18.5
	NBL	A	0.09	7.5	A	0.22	9.3
	NBT/R	B	0.54	11.9	B	0.55	12.8
	SBL	A	0.06	7.3	A	0.07	8.0
	SBT/R	A	0.32	9.2	B	0.42	10.8
	Overall	A	0.52	13.8	B	0.55	15.2
10th Street East & 18th Avenue East (Unsignalized)	EBL	B	0.38	10.7	B	0.48	11.7
	SBR	-	0.11	0.0	-	0.23	0.0
	Overall	A	-	7.2	A	-	6.6
8th Street East & 20th Avenue East (Unsignalized)	EBL	A	0.05	8.0	A	0.18	8.2
	EBT/R	-	0.09	0.0	-	0.15	0.0
	WBL	A	0.01	7.6	A	0.02	7.9
	WBT/R	-	0.14	0.0	-	0.09	0.0
	NBL/T/R	C	0.17	16.5	D	0.22	33.0
	SBL/T/R	B	0.21	12.0	C	0.44	16.6
	Overall	A	-	5.0	A	-	7.7

Table 18: 2032 Future Background Conditions Queues Lengths

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16th Street East & 16th Avenue East (Signalized)	EBL	25	11.3	15.2
	EBT/R	N/A	37.9	71.0
	WBL	40	15.9	21.1
	WBT/R	N/A	37.4	68.5
	NBL	40	32.4	39.4
	NBT/R	N/A	25.1	20.2
	SBL	30	4.9	9.4
	SBT/R	N/A	15.3	27.3

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16th Street East & 18th Avenue East (Signalized)	EBL	35	6.1	7.4
	EBT/R	N/A	37.1	73.4
	WBL	30	10.7	19.2
	WBT/R	25*	38.8	58.1
	NBL	40	22.7	40.6
	NBT/R	N/A	10.6	11.1
	SBL	25	8.0	12.6
	SBT/R	N/A	5.6	11.0
16th Street East & 20th Avenue East (Signalized)	EBL	30	10.8	19.0
	EBT/R	N/A	11.0	23.0
	WBL	45	11.3	20.2
	WBT/R	N/A	25.7	37.6
	NBL	N/A	23.3	53.8
	NBT/R	N/A	7.7	10.2
	SBL	35	11.4	12.2
	SBT/R	N/A	10.2	9.7
10th Street East & 16th Avenue East (Signalized)	EBL	40	26.2	21.5
	EBT/R	N/A	35.7	44.1
	WBL	35	13.6	27.9
	WBT/R	N/A	13.7	36.8
	NBL	30	9.6	18.9
	NBT/R	N/A	78.5	78.2
	SBL	N/A	5.8	6.5
	SBT/R	N/A	41.6	56.5
10th Street East & 18th Avenue East (Unsignalized)	EBL	N/A	13.8	20.4
	SBR	N/A	0.0	0.0
8th Street East & 20th Avenue East (Unsignalized)	EBL	15	1.2	4.9
	EBT/R	N/A	0.0	0.0
	WBL	15	0.1	0.4
	WBT/R	N/A	0.0	0.0
	NBL/T/R	N/A	4.7	6.3
	SBL/T/R	N/A	6.1	16.9

* storage length for the outer lane of the shared through/right movement

With the addition of background growth to reflect the 2032 horizon, the Study Area intersections operate well with minimal critical movements, and in a similar manner to the 2027 future background conditions horizon.

As shown above, all intersections within the Study Area operate effectively, with no intersections experiencing critical movements in either the AM or PM peak hour periods. The 95th percentile queues at the Study Area intersections are not shown to exceed the available turning lane storage length identified for each auxiliary turn lane, with the exception of the northbound left-turn lane in the PM peak period at the intersection of 16th Street East and 18th Avenue East. It is noted that while the 95th percentile queue exceeds the storage length of 40 metres by 0.6 metres, no mitigation measures are proposed to address this as this excess queue can be accommodated in the taper length of the auxiliary left-turn lane. Additionally, the 95th percentile is unlikely to occur and will clear within one cycle. It is also noted that the 50th percentile queue for this movement is 24.1 metres which does not exceed the storage length. As such, no mitigation measures are proposed as a result of this queue.

8.3 Future Total Conditions

8.3.1 Future Total Intersection Control

Using the Ontario Traffic Manual (OTM) Book 12 Justification 7 methodology for examining traffic control signal warrants, applicable Study Area intersections were reviewed. A summary of the traffic control signal warrant

analysis for future background conditions can be found in Table 19. Signal warrant sheets have been included in Appendix G.

Table 19: Future Total Signalization Warrant Summary

Intersection	Horizon	Warranted?
8 th Street East at 20 th Avenue East	2027 FT	No
	2032 FT	No
10 th Street East at 18 th Avenue East	2027 FT	No
	2032 FT	No
10 th Street East at 20 th Avenue East	2027 FT	No
	2032 FT	No
10 th Street East at Site Access #1	2027 FT	No
	2032 FT	No
10 th Street East at Site Access #2	2027 FT	No
	2032 FT	No
10 th Street East at Site Access #3	2027 FT	No
	2032 FT	No
10 th Street East at Site Access #4	2027 FT	No
	2032 FT	No

As indicated above, intersection signalization warrants are not met at any of the intersections considered in the future total analysis for 2027 or 2032. As such, the intersection of 8th Street East and 20th Avenue East, the intersection of 10th Street East and 20th Avenue East, 10th Street East at 20th Avenue East, 10th Street East at Site Access #1, 10th Street East at Site Access #2, 10th Street East at Site Access #3, and 10th Street East at Site Access #4 will be analyzed as unsignalized intersections in the 2027 and 2032 future total horizons.

8.3.2 Future Total Intersection Design

The intersections of 16th Street East at 16th Avenue East, 16th Street East at 18th Avenue East, and 10th Street East at 16th Avenue East are expected to maintain their current geometric configuration in both the 2027 and 2032 future total horizons. The following intersections will experience a change in their respective geometry in comparison to existing conditions, and their configurations analyzed in the future background horizons are therefore described below.

8.3.2.1 16th Street East at 20th Avenue East

The signalized intersection of 16th Street East and 20th Avenue East has been designed with consideration given to the extension of 20th Avenue East north of 16th Street East, forming the fourth leg of the intersection. The intersection geometry and configuration are based on existing intersection geometry, as well as the future intersection geometry provided by City of Owen Sound staff which is included in Appendix H. The south leg of the intersection will have a left-turn lane, and a shared through / right lane. The east leg will have a left-turn lane, and a shared through / right lane. The west leg will consist of an auxiliary left-turn lane, a through lane, and a shared through / right lane, and the north leg will consist of a left-turn lane, and a shared through / right lane. This new intersection design is expected to be completed prior to 2027 and has therefore been considered in both the 2027 and 2032 future total analysis. This configuration is consistent with what has been considered in the 2027 and 2032 future background horizon analysis.

8.3.2.2 8th Street East at 20th Avenue East

The unsignalized intersection of 8th Street East and 20th Avenue East has been designed with consideration given to the extension of 20th Avenue East south from its present terminus, through 8th Street East, forming a four-legged intersection. Stop-control on the north and south legs of the intersection has been assumed which is consistent with assumptions made in other background development reports. The Ministry of Transportation

Ontario (MTO) Geometric Design Standards for Ontario Highways (GDSOH) has been reviewed to determine the need for an eastbound left-turn lane and westbound left-turn lane for the 2027 and 2032 future total analysis horizons. Using the GDSOH methodology and a 60 kilometre per hour design speed, it was found that an eastbound left-turn lane will be warranted based on the projected AM peak hour traffic volume in both future analysis horizons. Although a dedicated westbound left-turn lane is not shown to be warranted, it has been assumed that one would be included at the intersection of 8th Street East and 20th Avenue East to mirror the eastbound left-turn lane. Left turn lane warrant analysis sheets have been included in Appendix I.

The northern and southern legs of the intersection will have a shared left / through / right lane, while the eastern and western legs of the intersection will have a dedicated left-turn lane with 15 metres of storage and a 15 m taper, and a shared through / right lane. These left-turn lanes have been designed for analysis purposes only. This new intersection design is expected to be completed by 2027 and has therefore been considered in both the 2027 and 2032 future total analysis horizons. This configuration is consistent with what has been considered in the 2027 and 2032 future background horizon analysis.

8.3.2.3 10th Street East at 18th Avenue East

The unsignalized, stop-controlled intersection of 10th Street East and 18th Avenue East has been designed with consideration given to the extension of 10th Street East south and east of 18th Avenue East, forming the third leg of the intersection by the 2027 future horizon. Despite both the 2027 future total and the 2032 future volumes indicating the minor approach should be the south leg, the unique geometry of the intersection necessitates stop-control be kept on the west leg. Additionally, the Ministry of Transportation Ontario (MTO) Geometric Design Standards for Ontario Highways (GDSOH) has been reviewed to determine the need for a northbound left-turn lane in the 2027 and 2032 future total analysis horizons. Using the GDSOH methodology and a 60 kilometre per hour design speed, it was found that a northbound left-turn lane will not be warranted. As such, the initial intersection configuration considered in both the 2027 future total and 2032 future total analysis horizons is as follows: the north leg of the intersection will have a shared through / right-turn lane, the west leg of the intersection will have a shared left / right-turn lane, and the south leg of the intersection will have a shared left / through lane.

As shown below in Table 22, the intersection operates poorly in the 2032 future total PM peak period with the shared eastbound left-turn / right-turn lane shown to have a LOS F, V/C ratio greater than 1.00, long delay and extended queues. Therefore, the eastbound approach was considered with an auxiliary left-turn lane and a right-turn lane instead. This eastbound left-turn lane has been designed for operational purposes only. As signalization is not warranted, the need for all-way stop control was analyzed. In both the 2027 future total and 2032 future total analysis horizons, all-way stop control was not shown to be warranted a result of the total vehicle volume on the intersection approaches not exceeding 375 vehicles, despite the volume ratio not exceeding the 75/25 volume split. Given the unique intersection configuration, and intersection volumes, all-way stop control has been considered for this intersection in both the 2027 and 2032 future total conditions to address the operational issues at this intersection in the 2032 future total analysis horizon. In reality, Phase 2 may be developed sooner than five years after Phase 1 and as a result it is recommend that all-way stop-control be implemented in the 2027 future total horizon as well. Appendix L shows the all-way stop control warrants for both the 2027 and 2032 future total analysis horizons.

8.3.2.4 10th Street East at 20th Avenue East

The unsignalized intersection of 10th Street East and 20th Avenue East has been designed with consideration given to the extension of 20th Avenue East south from its existing terminus, through 8th Street East, forming a four

legged, stop-controlled intersection, and the extension of 10th Street East east from its existing terminus at the intersection of 10th Street East and 18th Avenue East, to 20th Avenue East, forming a three legged, unsignalized intersection with stop-control on the west leg. The Ministry of Transportation Ontario (MTO) Geometric Design Standards for Ontario Highways (GDSOH) has been reviewed to determine the need for a northbound left-turn lane for the 2032 future total analysis horizons. Using the GDSOH methodology and a 60 kilometre per hour design speed, it was found that a northbound left-turn lane will not be warranted based on either the AM or the PM peak hour traffic volumes in the 2032 future analysis horizon.

As such, the north leg of the intersection will have a shared through / right-turn lane. The south leg of the intersection will have a shared left / through lane, and the western leg of the intersection will consist of a shared left / right-turn lane. This new intersection design is expected to be completed in conjunction with the development and build-out of Phase 2 of the proposed development and has therefore been considered in the 2032 future total operational analysis only.

8.3.2.5 10th Street East at Site Accesses

The proposed development will have four full-movement intersections along 10th Street East. Phase 1 will result in the completion of Site Access #1 and Site Access #2, and Phase 2 will result in the completion of Site Access #3 and Site Access #4. As a result, Site Access #1 and Site Access #2 have been considered in the 2027 future total analysis horizon, and all four site access intersections have been considered in the 2032 future total analysis horizons. The unsignalized intersections of 10th Street East and the Site Accesses have been designed with consideration given to the extension of 10th Street East east from its present terminus at the intersection of 10th Street East and 18th Avenue East, forming four three-legged, unsignalized intersections with stop-control on the south leg of each intersection. Westbound left-turn lane warrants were performed at each of the site access intersections. All four analyses did not warrant auxiliary left-turn lanes. Each access intersection consists of a shared through / right-turn lane on the west leg, a shared left-turn / through lane on the east leg, and a shared left-turn / right-turn lane on the south leg.

8.3.3 2027 Future Total Operational Analysis

The 2027 future total intersection volumes and surrounding background development traffic volumes have been analyzed to allow for an assessment of the impact of the new traffic on the future road network. Signal timing splits, and cycle lengths of all signalized intersections have been based on the provided signal timing except for the intersection of 16th Street East and 20th Avenue East. Changes to the signal timing of this intersection have been discussed in Section 8.2.3 above.

Table 20 summarizes the operational analysis for the 2027 future total conditions in both the AM and PM peak periods. Critical movements, as defined above in Section 8, have been identified. The intersections have been analyzed based on the identified signal control and intersection configurations in Section 8.3.1 and Section 8.3.2, respectively. The 95th percentile queue of each movement for the 2027 future total conditions is shown in Table 21. 2027 Future Total Synchro worksheets are included in Appendix M.

Table 20: 2027 Future Total Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.13	17.0	B	0.19	17.0
	EBT/R	C	0.35	21.9	C	0.53	24.6
	WBL	B	0.19	14.8	B	0.26	16.4
	WBT/R	C	0.33	20.3	C	0.50	23.6
	NBL	B	0.31	16.1	B	0.36	16.6
	NBT/R	B	0.18	19.5	C	0.18	21.5
	SBL	C	0.08	24.9	C	0.13	24.1
	SBT/R	C	0.17	26.6	C	0.29	28.7
	Overall	C	0.34	20.5	C	0.44	23.2
16 th Street East & 18 th Avenue East (Signalized)	EBL	C	0.05	22.6	C	0.07	24.2
	EBT/R	C	0.35	28.1	C	0.60	33.3
	WBL	C	0.13	20.6	C	0.31	21.2
	WBT/R	C	0.32	26.5	C	0.41	27.6
	NBL	B	0.23	13.4	B	0.36	15.6
	NBT/R	B	0.08	17.9	C	0.08	20.5
	SBL	B	0.08	17.7	B	0.11	19.7
	SBT/R	C	0.03	21.1	C	0.07	24.7
	Overall	C	0.28	23.3	C	0.46	26.5
16 th Street East & 20 th Avenue East (Signalized)	EBL	A	0.13	4.8	A	0.17	9.0
	EBT/R	A	0.13	4.6	A	0.21	8.9
	WBL	A	0.13	4.8	A	0.21	9.5
	WBT/R	A	0.22	5.2	A	0.25	9.5
	NBL	C	0.49	30.3	C	0.68	30.8
	NBT/R	C	0.05	24.5	C	0.07	20.2
	SBL	C	0.20	25.4	C	0.14	20.6
	SBT/R	C	0.07	24.6	C	0.08	20.1
	Overall	B	0.27	10.6	C	0.39	14.8
10 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.43	19.2	B	0.38	18.5
	EBT/R	B	0.49	19.3	B	0.55	19.7
	WBL	B	0.33	18.4	C	0.58	22.7
	WBT/R	B	0.20	16.6	B	0.45	18.4
	NBL	A	0.06	7.3	A	0.18	9.0
	NBT/R	B	0.43	10.4	B	0.48	11.9
	SBL	A	0.04	7.2	A	0.06	8.0
	SBT/R	A	0.31	9.1	B	0.40	10.7
	Overall	B	0.45	13.7	B	0.52	15.1
10 th Street East & 18 th Avenue East (Unsignalized)	EBL/R	C	0.53	15.9	C	0.74	24.6
	NBL/T	A	0.03	4.4	A	0.02	4.6
	SBT/R	-	0.12	0.0	-	0.23	0.0
	Overall	A	-	9.5	B	-	13.1
<i>Mitigation Measure: All-Way Stop Control, Auxiliary Eastbound Left-turn Lane</i>							
10 th Street East & 18 th Avenue East (Unsignalized)	EBL	B	0.54	9.1	D	0.77	27.5
	EBR	A	0.03	15.0	A	0.05	8.0
	NBL/T	A	0.12	7.4	A	0.08	9.8
	SBT/R	A	0.26	9.2	B	0.55	14.1
	Overall	B	-	12.2	C	-	20.1
8 th Street East & 20 th Avenue East (Unsignalized)	EBL	A	0.02	7.9	A	0.10	7.9
	EBT/R	-	0.09	0.0	-	0.16	0.0
	WBL	A	0.01	7.6	A	0.02	8.0
	WBT/R	-	0.13	0.0	-	0.09	0.0
	NBL/T/R	B	0.13	13.0	C	0.14	20.3
	SBL/T/R	B	0.07	11.3	B	0.22	11.5
	Overall	A	-	3.0	A	-	5.0

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
10th Street East & Site Access #1 (Unsignalized)	EBT/R	-	0.03	0.0	-	0.04	0.0
	WBL/T	-	0.0	0.0	-	0.0	0.0
	NBL/R	A	0.08	9.2	A	0.04	9.1
	Overall	A	-	5.0	A	-	3.2
10th Street East & Site Access #2 (Unsignalized)	EBT/R	-	0.0	0.0	-	0.01	0.0
	WBL/T	-	0.0	0.0	-	0.0	0.0
	NBL/R	A	0.01	8.8	A	0.01	8.8
	Overall	A	-	5.7	A	-	3.9

Table 21: 2027 Future Total Conditions Queues Lengths

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16th Street East & 16th Avenue East (Signalized)	EBL	25	10.8	14.2
	EBT/R	N/A	37.1	67.6
	WBL	40	15.4	19.5
	WBT/R	N/A	37.8	64.7
	NBL	40	26.8	34.7
	NBT/R	N/A	19.3	18.3
	SBL	30	5.4	9.7
	SBT/R	N/A	14.4	25.3
16th Street East & 18th Avenue East (Signalized)	EBL	35	6.0	7.2
	EBT/R	N/A	35.6	71.6
	WBL	30	11.3	20.1
	WBT/R	25*	37.8	55.6
	NBL	40	24.8	40.6
	NBT/R	N/A	10.1	10.1
	SBL	25	7.8	11.8
	SBT/R	N/A	6.1	11.4
16th Street East & 20th Avenue East (Signalized)	EBL	30	11.0	19.0
	EBT/R	N/A	10.6	21.7
	WBL	45	10.7	19.2
	WBT/R	N/A	24.6	35.5
	NBL	N/A	22.9	52.0
	NBT/R	N/A	7.4	10.1
	SBL	35	11.4	12.2
	SBT/R	N/A	10.3	10.0
10th Street East & 16th Avenue East (Signalized)	EBL	40	25.2	20.7
	EBT/R	N/A	36.2	45.0
	WBL	35	16.4	29.2
	WBT/R	N/A	16.5	37.1
	NBL	30	7.8	16.1
	NBT/R	N/A	58.9	64.6
	SBL	N/A	5.5	6.3
	SBT/R	N/A	39.6	53.5
10th Street East & 18th Avenue East (Unsignalized)	EBL/R	N/A	23.8	50.1
	NBL/T	N/A	0.8	0.5
	SBT/R	N/A	0.0	0.0
<i>Mitigation Measure: All-Way Stop Control, Auxiliary Eastbound Left-turn Lane</i>				
10th Street East & 18th Avenue East (Unsignalized)	EBL	15	3.2	7.2
	EBR	N/A	0.1	0.2
	NBL/T	N/A	0.4	0.3
	SBT/R	N/A	1.0	3.4

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
8th Street East & 20th Avenue East (Unsignalized)	EBL	15	0.4	2.5
	EBT/R	N/A	0.0	0.0
	WBL	15	0.1	0.4
	WBT/R	N/A	0.0	0.0
	NBL/T/R	N/A	3.3	3.5
	SBL/T/R	N/A	1.6	6.3
10th Street East & Site Access #1 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.0	0.0
	NBL/R	N/A	1.8	1.0
10th Street East & Site Access #2 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.0	0.0
	NBL/R	N/A	0.3	0.2

* storage length for the outer lane of the shared through/right movement

With the addition of the site generated traffic volumes to reflect the 2027 future total horizon, the Study Area intersections operate well with minimal critical movements, and in a similar manner to the 2027 future background analysis horizon.

As shown above, all existing intersections within the Study Area operate effectively in both the AM and PM peak hour periods, with only one intersection experiencing a critical movement. The 95th percentile queues at the Study Area intersections are not shown to exceed the available turning lane storage length identified for each auxiliary turn lane, with the exception of the northbound left-turn lane in the PM peak period at the intersection of 16th Street East and 18th Avenue East. It is noted that while the 95th percentile queue exceeds the storage length of 40 metres by 0.6 metres, no mitigation measures are proposed to address this as this excess queue can be accommodated in the taper length of the auxiliary left-turn lane. Additionally, the 95th percentile is unlikely to occur and will clear within one cycle. It is also noted that the 50th percentile queue for this movement is 24.1 metres which does not exceed the storage length. As such, no mitigation measures are proposed as a result of this queue.

As discussed above, the intersection of 10th Street East and 18th Avenue East has been analyzed as an all-way stop-controlled intersection as a result of the anticipated 2032 future total operation of the intersection and is recommended to be implemented to support Phase 1.

8.3.4 2032 Future Total Operational Analysis

The 2032 future total intersection volumes and surrounding background development traffic volumes have been analyzed to allow for an assessment of the impact of the new traffic on the future road network. Signal timing splits, and cycle lengths of all signalized intersections have been based on the provided signal timing except for the intersection of 16th Street East and 20th Avenue East. Changes to the signal timing of this intersection have been discussed in Section 8.2.3 above.

Table 22 summarizes the operational analysis for the 2032 future total conditions in both the AM and PM peak periods. Critical movements, as defined above in Section 8, have been identified. The intersections have been analyzed based on the identified signal control and intersection configurations in Section 8.3.1 and Section 8.3.2, respectively. The 95th percentile queue of each movement for the 2032 future total conditions is shown in Table 23. 2032 Future Total Synchro worksheets are included in Appendix N.

Table 22: 2032 Future Total Conditions Operational Analysis

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
16 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.14	17.6	B	0.21	17.8
	EBT/R	C	0.38	22.8	C	0.57	26.1
	WBL	B	0.21	15.2	B	0.29	17.3
	WBT/R	C	0.36	21.1	C	0.54	25.0
	NBL	B	0.37	16.5	B	0.40	16.8
	NBT/R	B	0.23	19.8	C	0.19	21.6
	SBL	C	0.09	25.9	C	0.15	25.0
	SBT/R	C	0.19	27.7	C	0.31	29.7
	Overall	C	0.39	21.1	C	0.48	24.2
16 th Street East & 18 th Avenue East (Signalized)	EBL	C	0.05	22.7	C	0.07	24.3
	EBT/R	C	0.37	28.5	C	0.64	32.2
	WBL	C	0.13	20.7	C	0.31	20.9
	WBT/R	C	0.34	26.7	C	0.43	27.4
	NBL	B	0.24	13.4	B	0.38	15.3
	NBT/R	B	0.11	18.1	C	0.10	20.7
	SBL	B	0.08	17.8	B	0.12	20.0
	SBT/R	C	0.04	21.2	C	0.08	25.0
	Overall	C	0.29	23.4	C	0.48	27.0
16 th Street East & 20 th Avenue East (Signalized)	EBL	A	0.12	4.8	A	0.17	9.4
	EBT/R	A	0.14	4.7	A	0.22	9.3
	WBL	A	0.15	5.0	B	0.23	10.2
	WBT/R	A	0.23	5.3	A	0.26	9.9
	NBL	C	0.50	30.3	C	0.68	30.7
	NBT/R	C	0.09	24.8	C	0.09	20.1
	SBL	C	0.20	25.4	C	0.14	20.4
	SBT/R	C	0.09	24.6	B	0.09	20.0
	Overall	B	0.28	10.9	B	0.41	15.1
10 th Street East & 16 th Avenue East (Signalized)	EBL	B	0.45	19.4	B	0.44	18.9
	EBT/R	B	0.51	19.4	C	0.65	21.3
	WBL	B	0.38	19.0	C	0.71	30.9
	WBT/R	B	0.25	16.8	B	0.54	18.8
	NBL	A	0.09	7.7	B	0.24	11.1
	NBT/R	B	0.56	12.4	B	0.61	15.7
	SBL	A	0.06	7.5	A	0.08	9.6
	SBT/R	A	0.32	9.4	B	0.44	12.8
	Overall	B	0.54	14.4	B	0.65	17.8
10 th Street East & 18 th Avenue East (Unsignalized)	EBL/R	C	0.71	24.0	F	1.34	191.4
	NBL/T	A	0.06	4.8	A	0.15	7.6
	SBT/R	-	0.13	0.0	-	0.21	0.0
	Overall	B	-	14.0	F	-	101.8
<i>Mitigation Measure: All-Way Stop Control, Auxiliary Eastbound Left-turn Lane</i>							
10 th Street East & 18 th Avenue East (Unsignalized)	EBL	C	0.64	19.0	B	0.77	28.3
	EBR	A	0.05	7.7	B	0.30	10.5
	NBL/T	B	0.21	10.2	D	0.35	12.8
	SBT/R	A	0.29	9.9	B	0.54	14.7
	Overall	B	-	14.5	C	-	18.5
8 th Street East & 20 th Avenue East (Unsignalized)	EBL	A	0.05	8.0	A	0.14	8.1
	EBT/R	-	0.09	0.0	-	0.15	0.0
	WBL	A	0.01	7.6	A	0.02	7.9
	WBT/R	-	0.14	0.0	-	0.09	0.0
	NBL/T/R	C	0.18	17.0	C	0.17	24.7
	SBL/T/R	B	0.23	12.1	B	0.35	14.9
	Overall	A	-	5.2	A	-	6.4

Intersection	Mvmnt	AM Peak Hour			PM Peak Hour		
		LOS	V/C	Del (s)	LOS	V/C	Del. (s)
10 th Street East & Site Access #1 (Unsignalized)	EBT/R	-	0.03	0.0	-	0.14	0.0
	WBL/T	A	0.0	0.2	A	0.0	0.2
	NBL/R	A	0.08	9.7	B	0.06	11.6
	Overall	A	-	3.3	A	-	1.0
10 th Street East & Site Access #2 (Unsignalized)	EBT/R	-	0.02	0.0	-	0.12	0.0
	WBL/T	A	0.0	0.7	A	0.01	0.5
	NBL/R	A	0.03	9.9	B	0.02	10.4
	Overall	A	-	2.3	A	-	0.6
10 th Street East & Site Access #3 (Unsignalized)	EBT/R	-	0.02	0.0	-	0.11	0.0
	WBL/T	A	0.0	0.4	A	0.0	0.3
	NBL/R	A	0.04	9.2	B	0.03	10.8
	Overall	A	-	3.4	A	-	0.7
10 th Street East & Site Access #4 (Unsignalized)	EBT/R	-	0.02	0.0	-	0.10	0.0
	WBL/T	A	0.0	0.7	A	0.0	0.02
	NBL/R	A	0.04	9.0	B	0.02	10.6
	Overall	A	-	4.0	A	-	0.5
10 th Street East & 20 th Avenue East (Unsignalized)	EBL/R	A	0.03	9.0	B	0.22	11.9
	NBL/T	A	0.0	1.1	A	0.01	0.7
	SBT/R	-	0.02	0.0	-	0.14	0.0
	Overall	A	-	3.1	A	-	3.7

Table 23: 2032 Future Total Conditions Queues Lengths

Intersection	Mvmnt	Storage Dist (m)	AM Q (95 th)	PM Q (95 th)
16 th Street East & 16 th Avenue East (Signalized)	EBL	25	11.3	15.2
	EBT/R	N/A	39.6	74.4
	WBL	40	16.0	21.1
	WBT/R	N/A	41.5	71.3
	NBL	40	32.4	39.6
	NBT/R	N/A	25.2	20.4
	SBL	30	5.6	10.6
	SBT/R	N/A	15.4	27.2
16 th Street East & 18 th Avenue East (Signalized)	EBL	35	6.3	7.4
	EBT/R	N/A	37.7	77.0
	WBL	30	10.9	19.4
	WBT/R	25*	39.5	58.7
	NBL	40	25.8	42.1
	NBT/R	N/A	12.3	12.1
	SBL	25	8.0	12.5
	SBT/R	N/A	6.4	12.6
16 th Street East & 20 th Avenue East (Signalized)	EBL	30	10.9	19.1
	EBT/R	N/A	11.0	23.1
	WBL	45	11.8	21.3
	WBT/R	N/A	25.8	37.9
	NBL	N/A	23.3	54.0
	NBT/R	N/A	9.8	10.9
	SBL	35	11.5	12.2
	SBT/R	N/A	10.7	10.6

10th Street East & 16th Avenue East (Signalized)	EBL	40	26.5	23.1
	EBT/R	N/A	38.9	62.3
	WBL	35	18.5	36.4
	WBT/R	N/A	20.2	50.2
	NBL	30	9.6	19.1
	NBT/R	N/A	81.2	82.5
	SBL	N/A	5.8	6.6
	SBT/R	N/A	41.6	56.5
10th Street East & 18th Avenue East (Unsignalized)	EBL/R	N/A	43.6	212.0
	NBL/T	N/A	1.5	4.0
	SBT/R	N/A	0.0	0.0
<i>Mitigation Measure: All-Way Stop Control, Auxiliary Eastbound Left-turn Lane</i>				
10th Street East & 18th Avenue East (Unsignalized)	EBL	15	4.7	7.0
	EBR	N/A	0.1	1.3
	NBL/T	N/A	0.8	1.6
	SBT/R	N/A	1.2	1.3
8th Street East & 20th Avenue East (Unsignalized)	EBL	15	1.2	3.7
	EBT/R	N/A	0.0	0.0
	WBL	15	0.1	0.4
	WBT/R	N/A	0.0	0.0
	NBL/T/R	N/A	4.9	4.5
	SBL/T/R	N/A	6.8	11.7
10th Street East & Site Access #1 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.0	0.1
	NBL/R	N/A	1.9	1.5
10th Street East & Site Access #2 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.1	0.2
	NBL/R	N/A	0.7	0.4
10th Street East & Site Access #3 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.0	0.1
	NBL/R	N/A	1.1	0.7
10th Street East & Site Access #4 (Unsignalized)	EBT/R	N/A	0.0	0.0
	WBL/T	N/A	0.0	0.1
	NBL/R	N/A	0.9	0.5
10th Street East & 20th Avenue East (Unsignalized)	EBL/R	N/A	0.7	6.3
	NBL/T	N/A	0.1	0.2
	SBT/R	N/A	0.0	0.0

* storage length for the outer lane of the shared through/right movement

With the addition of the site generated traffic volumes to reflect the 2032 future total horizon, the Study Area intersections operate well with minimal critical movements, and in a similar manner to the 2032 future background analysis horizon.

As shown above, all intersections within the Study Area operate effectively, with only a couple intersections experiencing critical movements. The intersection of 10th Street East at 18th Avenue East experiences a LOS F, V/C ratio of 1.34, and long delays on the eastbound shared left-turn / right-turn lane in the PM peak period. Additionally, the overall intersection is shown to have a LOS F in the PM peak period as well. As discussed above to address these operational issues, the eastbound approach is proposed to be improved to an auxiliary eastbound left-turn lane and a right-turn lane, and all-way stop-control will be implemented. With the implementation of these mitigation measures, the intersection 10th Street East at 18th Avenue East operates well.

The 95th percentile queues at the Study Area intersections are not shown to exceed the available turning lane storage length identified for each auxiliary turn lane, with the exception of the northbound left-turn lane in the

PM peak period at the intersection of 16th Street East and 18th Avenue East, and the westbound left-turn in the PM peak period at the intersection of 10th Street East and 16th Avenue East. It is noted that while the 95th percentile queue of the northbound left-turn lane at the intersection of 16th Street East and 18th Avenue East exceeds the storage length of 40 metres by 2.1 metres. It is also noted that the 50th percentile queue for this movement is 25.5 metres which does not exceed the storage length. The 95th percentile queue of the westbound left-turn lane at the intersection of 10th Street East and 16th Avenue East exceeds the storage length of 35 metres by 1.4 metres. It is also noted that the 50th percentile queue for this movement is 16.3 metres which does not exceed the storage length. Additionally, for both movements, the 95th percentile is unlikely to occur and will clear within one cycle, and the excess queue can be accommodated in the taper length of both auxiliary left-turn lanes. As such, no mitigation measures are proposed as a result of these queues.

9 Findings and Recommendations

Based on the foregoing analysis of the proposed development, the following transportation-related conclusions are offered:

- a) The development, referred to as 1555 18th Avenue East Owen Sound SmartCentres, is to be completed in two phases, and will include five four-storey mid-rise residential towers composed of 390 apartment units, as well as 87 town house units, and 604 surface parking spaces.
- b) The 2022, future 2027 and future 2032 horizon years were analyzed, representing the existing conditions as well as the full build-out date of phase one and phase two of the development.
- c) The proposed development is projected to generate new two-way vehicle volumes of 188 and 200 during the weekday AM and PM peak hours, respectively.
- d) The proposed development will have four, three-legged full movement unsignalized accesses. All four access will be stop-controlled on the southern legs of each intersection. Each of the four accesses are located on 10th Street East following its extension through the development to 20th Avenue East.
- e) A 1% compound annual growth rate was applied to generate the 2027 and 2032 future background traffic volumes.
- f) The nearby developments of Redhawk Subdivision, Greystone Village, Telfer Creek Subdivision, 1960 16th Street East, and Heritage Grove have all been included in the background traffic projections.
- g) Using the 2022 existing traffic volumes, an operational analysis of existing conditions was undertaken. Through this analysis it was determined that all Study Area intersections operate with good overall LOS and delay. The queues are also contained by the storage lengths with the exception of the shared westbound through/right lane at the intersection of 16th Street East and 18th Avenue East in the AM peak period, and the northbound left turn lane at the same intersection in PM peak period.
- h) The Ministry of Transportation Ontario (MTO) Geometric Design Standards for Ontario Highways (GDSOH) has been reviewed to determine the need for an eastbound left-turn lane and westbound left-turn lane at the intersection of 8th Street East and 20th Avenue East for the 2027 future background analysis horizon. Using the GDSOH methodology and a 60 kilometre per hour design speed, it was found that an eastbound left-turn lane will be warranted. Although a dedicated westbound left-turn lane was not warranted based on the GDSOH methodology, it has been assumed that one would be included at the intersection of 8th Street East and 20th Avenue East due to the wider geometry of the intersection.
- i) The 2027 future background traffic volumes, including the background growth, were analyzed. It was found that turning movements operated with a reasonable LOS and delay. Through this analysis it was determined that all Study Area intersections operated with good overall LOS and delay. The queues were

also contained by the storage lengths, with the exception of the shared westbound through/right lane at the intersection of 16th Street East and 18th Avenue East in both the AM and PM peak periods.

- j) The 2032 future background traffic volumes, including the background growth, were analyzed. It was found that turning movements operated with a reasonable LOS and delay. Through this analysis it was determined that all Study Area intersections operated with good overall LOS and delay. The queues were also contained by the storage lengths, with a couple exceptions.
- k) A 20.5 metre modified collector roadway cross-section has been proposed for the 10th Street extension through the subject development.
- l) With the addition of the 2027 future total (Phase 1) site traffic volumes to the Study Area intersections, the intersections operate in a similar manner to the 2027 future background analysis horizon.
- m) With the addition of the 2032 future total (Phase 1 and Phase 2) site traffic volumes to the Study Area intersections, the intersections operate in a similar manner to the 2032 future background analysis horizon with the exception of the intersection of 10th Street East and 18th Avenue East. At this intersection a LOS F, V/C ratio greater than 1.00, high delays and extended queues were noted in the PM peak period. Mitigation measures are recommended in the form of a separated eastbound left-turn lane and all-way stop-control at the intersection. This recommendation is also intended for the 2027 future total analysis horizon.
- n) Traffic volumes within the Study Area are relatively low, and as such, signalization was not warranted at any analysed intersection.
- o) The proposed development will provide 604 surface parking spaces. Phase 1 will have a total of 369 parking spaces, exceeding the required number of spaces as per the City of Owen Sound Zoning By-law. Phase 2 will have a total of 235 parking spaces.
- p) Phase 1 will have a total of 28 bicycle parking spaces, exceeding the number of required bicycle parking spaces as per the City of Owen Sound Zoning By-law. The number of bicycle parking spaces provided in Phase 2 will be proposed with the future submission of the Phase 2 Site Plan.
- q) A Transportation Plan consisting of a Pedestrian and Cycling Circulation Plan, a Pavement Marking and Signage Plan, and a Garbage and Loading Circulation Analysis has been performed.

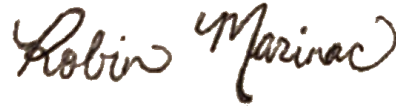
The Owen Sound SmartCentres development will have a minor impact on the Study Area road network. The proposed accesses will operate with an overall reasonable LOS and delay on the turning movements into and out of the site, with further mitigation measures proposed to reduce the impact. It is recommended that, from a transportation perspective, the proposed development application proceed.

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Appendix A

TOR and Correspondence



Technical Memorandum

To:	Sabine Robart – City of Owen Sound Chris Webb - City of Owen Sound	Date:	2022-08-23
Cc:	Mark Crockford – CGH Transportation		
From:	Robin Marinac	Project Number:	2022-032

Re: 1555 18th Avenue East Owen Sound Transportation Impact Study Terms of Reference

We have been asked to undertake the Transportation Impact Study and Transportation Plan to support the SmartCentres residential development at 1555 18th Avenue in Owen Sound, Ontario. The proposed development lands are currently zoned as Low Density Residential. The development is proposed to be split into two phases, with the first phase further subdivided into minor phases. Phase 1 is anticipated to include approximately 150 mid-rise units and 85 townhouse units and will have a build-out and occupancy horizon of **2027**. Phase 2 is projected to include approximately 175 mid-rise units and will have a build-out and occupancy horizon of **2032**.

Access to the subject property is proposed via an extension of the 10th Street East at 18th Avenue East intersection. This access will be completed to support Phase 1. This road is considered a collector road in the Owen Sound Official Plan, and the Transportation Impact Study will determine the appropriate roadway classification. A second access connection to the extension of 20th Avenue East will support the entire proposed development and will be built-out in conjunction with Phase 2 of the development.

Attachment 1 includes the proposed concept plan. We have prepared the following scope of work for review. Please let us know if you have any comments or additions.

Transportation Impact Study and Transportation Plan Requirements:

The Transportation Impact Study and Transportation Plan will be in accordance with ITE's Transportation Impact Analyses for Site Development.

Study Area:

- An overview of the transportation system existing conditions will be documented (including transit, cycling, pedestrian and automobile modes).
- A summary of existing transportation policies within the Study Area will be identified.
- An overview of the Study Area road network will be provided including the road classification and descriptions of:
 - 10th Street East
 - 16th Street East
 - 16th Avenue East
 - 18th Avenue East
 - 20th Avenue East

The following intersections will be included in the Transportation Impact Assessment:

- 10th Street East at 18th Avenue East (existing)
- 18th Avenue East at 16th Street East (existing)
- 10th Street East at 16th Avenue East (existing)
- 16th Street East at 16th Avenue East (existing)
- 20th Avenue East at 16th Street East (existing)
- 20th Avenue East Extension at Roadway Connection (future) **10th Street East**
- **20th Avenue East at 8th Street East**

Study Horizons:

- Base year 2022, followed by a Phase 1 build-out future horizon of **2027 (10th Street East extension to cul-de-sac on-site)**, and a Phase 2 build-out future horizon of **2032 (10th Street East intersection with 20th Avenue East)**
- AM and PM peak hours for all horizons

Existing Traffic Data:

- Traffic data at the five existing Study Area intersections will be collected as it has been indicated by City of Owen Sound staff that no TMCs are available.
- Signal Timing Plans have been received for the applicable Study Area intersections from City of Owen Sound staff.

Background Growth:

- A 1% compound annual background growth rate will be used to determine the **2027** and the **2032** future horizon background traffic volumes. This growth rate has been determined based on the growth rate used in the **County of Grey Official Plan** to account for future background traffic growth. While the TMP indicates this growth rate was used for arterial roadways only and a 0.5% compound annual growth rate was used for collector roadways, a 1% compound annual growth rate will be applied on all turning movement counts at every Study Area intersection to ensure a conservative analysis is undertaken. Additionally, a 1% compound annual growth rate has been used in the *1960 16th Street East Traffic Impact Study* (2021) prepared by Tatham Engineering.
- Surrounding development traffic impact assessments and reports will be used as reference to identify growth from surrounding future developments in the area. The following background development in the surrounding Study Area will be considered:
 - 1960 16th Street East (based on the *1960 16th Street East Traffic Impact Study* (2021) prepared by Tatham Engineering) (**Sydenham Heights Centre**)
 - 2125 16th Street East (**Heritage Grove Centre**)
 - **Telfer Creek Subdivision (20th Avenue East & 8th Street East)**.
 - **Greystone Village (8th Street East, 16th Avenue East, 20th Avenue East**
 - **Redhawk Subdivision (8th Street East, 20th Avenue East)**

Changes to the Study Area Road Network:

- 20th Avenue East extension from 17th Street East to 8th Street East
 - This collector roadway is assumed to have a speed limit of 50 km/h

- The intersection configuration of 20th Avenue East and 16th Street East is assumed to be consistent with the proposed intersection configuration within the *1960 16th Street East Traffic Impact Study* (2021) prepared by Tatham Engineering **Have confirmed intersection design - will forward to you.**
- *Request: Please identify any additional changes to the roadway network that you would like us to consider.*

Development Site Traffic:

- Trip generation: ITE Trip Generation Manual 11th Edition.
- Modal Split: No transit, pedestrian, or cycling mode split will be considered.
- Trip distribution and assignment of auto trips: existing traffic routing patterns and surrounding area characteristics.

Traffic Analysis:

- Traffic analysis to be performed using Synchro 11 on Study Area network intersections to determine the LOS, delay, V / C ratio and the 95th percentile queues for overall intersections as well as individual movements using Highway Capacity Manual (HCM) methodology.
 - Heavy Vehicle %, Peak Hour Factors, pedestrian volumes, and cyclist volumes will be taken from the collected TMC data. Where information is not available, a pedestrian volume of **25** pedestrians/hour, a cyclist volume of 5 cyclists/hour, and a Heavy Vehicle % of 2%, and the Peak Hour Factor of an adjacent intersection will be applied.
 - Other Synchro inputs will be based on Synchro default parameters.
 - Critical movements and intersections will be identified and defined as those with LOS F and/or V/C ratio of 1.00 or worse.
- Qualitative transit, cycling, and pedestrian analysis

Transportation Plan:

- The following tasks have been identified to satisfy the requirement of a Transportation Plan:
 - Pavement Marking and Signage Drawing – using Owen Sound standards and the Ontario Traffic Manual, from MTO, a drawing will be created illustrating all required or recommended pavement markings and signage to support the proposed development. This will be presented in the TIS
 - Pedestrian and Cycling Circulation Plan – using the provided concept plan the pedestrian and cycling desire lines will be drawn and sidewalks / multi-use pathways will be recommended to accommodate these desired paths of travel. This will be presented in the TIS.
 - Truck Turning Templates – Using AutoTurn Vehicle Turning Simulation Software and the proposed concept plan, to be provided to scale in CAD format, appropriate design vehicles will be tested. The proposed concept plan for Phase 1 will be tested using Garbage and Loading design vehicles.

Please provide us with the additional information below that we will need to consider in order to complete the outlined terms of reference:

- Any other guidelines you would like us to consider
- The Traffic Impact Study for 2125 16th Street East
- Any other relevant Traffic Impact Studies for future developments that may influence the background growth within the proposed Study Area
- Specific changes to the Study Area Road network that you would like us to consider

Appendix B

Turning Movement Counts



Traffic Count Summary

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

10th St E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	0	0	0	0	0	0	123	0	0	0	123	1	123
08:00 - 09:00	0	0	0	0	0	0	204	0	0	0	204	1	204
09:00 - 10:00	0	0	0	0	0	0	258	0	0	0	258	0	258
BREAK													
15:00 - 16:00	0	0	0	0	0	0	318	0	0	0	318	0	318
16:00 - 17:00	0	0	0	0	0	0	358	0	0	0	358	0	358
17:00 - 18:00	0	0	0	0	0	0	307	0	0	0	307	0	307
GRAND TOTAL	0	0	0	0	0	0	1568	0	0	0	1568	2	1568



Traffic Count Data

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	0	0	8	0	8	0	0	1	0	1	0	0	0	0	0	0
07:15	0	0	10	0	10	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	25	0	25	0	0	2	0	2	0	0	0	0	0	0
07:45	0	0	12	0	12	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	12	0	12	0	0	1	0	1	0	0	0	0	0	0
08:15	0	0	23	0	23	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	17	0	17	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	22	0	22	0	0	2	0	2	0	0	0	0	0	0
09:00	0	0	28	0	28	0	0	1	0	1	0	0	0	0	0	0
09:15	0	0	45	0	45	0	0	5	0	5	0	0	1	0	1	0
09:30	0	0	27	0	27	0	0	2	0	2	0	0	0	0	0	0
09:45	0	0	32	0	32	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	0	0	261	0	261	0	0	15	0	15	0	0	1	0	1	0



Traffic Count Data

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	0	0	73	0	73	0	0	3	0	3	0	0	0	0	0	0
15:15	0	0	70	0	70	0	0	2	0	2	0	0	0	0	0	0
15:30	0	0	74	0	74	0	0	3	0	3	0	0	0	0	0	0
15:45	0	0	66	0	66	0	0	1	0	1	0	0	0	0	0	0
16:00	0	0	62	0	62	0	0	2	0	2	0	0	0	0	0	0
16:15	0	0	75	0	75	0	0	1	0	1	0	0	0	0	0	0
16:30	0	0	60	0	60	0	0	2	0	2	0	0	1	0	1	0
16:45	0	0	79	0	79	0	0	1	0	1	0	0	1	0	1	0
17:00	0	0	80	0	80	0	0	2	0	2	0	0	0	0	0	0
17:15	0	0	76	0	76	0	0	1	0	1	0	0	0	0	0	0
17:30	0	0	75	0	75	0	0	1	0	1	0	0	0	0	0	0
17:45	0	0	65	0	65	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	0	0	855	0	855	0	0	20	0	20	0	0	2	0	2	0
GRAND TOTAL	0	0	1116	0	1116	0	0	35	0	35	0	0	3	0	3	0



Traffic Count Data

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	24	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0
07:15	21	0	0	0	21	0	0	0	0	0	0	0	0	0	0	1
07:30	35	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0
07:45	43	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0
08:00	40	0	0	0	40	1	0	0	0	1	0	0	0	0	0	0
08:15	39	0	0	0	39	0	0	0	0	0	0	0	0	0	0	1
08:30	47	0	0	0	47	1	0	0	0	1	0	0	0	0	0	0
08:45	74	0	0	0	74	2	0	0	0	2	0	0	0	0	0	0
09:00	63	0	0	0	63	0	0	0	0	0	1	0	0	0	1	0
09:15	62	0	0	0	62	2	0	0	0	2	0	0	0	0	0	0
09:30	57	0	0	0	57	0	0	0	0	0	0	0	0	0	0	0
09:45	71	0	0	0	71	2	0	0	0	2	0	0	0	0	0	0
SUBTOTAL	576	0	0	0	576	8	0	0	0	8	1	0	0	0	1	2



Traffic Count Data

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	66	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0
15:15	88	0	0	0	88	0	0	0	0	0	0	0	0	0	0	0
15:30	88	0	0	0	88	1	0	0	0	1	0	0	0	0	0	0
15:45	74	0	0	0	74	0	0	0	0	0	1	0	0	0	1	0
16:00	80	0	0	0	80	0	0	0	0	0	2	0	0	0	2	0
16:15	81	0	0	0	81	1	0	0	0	1	0	0	0	0	0	0
16:30	97	0	0	0	97	1	0	0	0	1	0	0	0	0	0	0
16:45	94	0	0	0	94	1	0	0	0	1	1	0	0	0	1	0
17:00	100	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
17:15	74	0	0	0	74	1	0	0	0	1	0	0	0	0	0	0
17:30	64	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0
17:45	67	0	0	0	67	0	0	0	0	0	1	0	0	0	1	0
SUBTOTAL	973	0	0	0	973	5	0	0	0	5	5	0	0	0	5	0
GRAND TOTAL	1549	0	0	0	1549	13	0	0	0	13	6	0	0	0	6	2

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 09:00:00
To: 10:00:00

Intersection: 10th St E & 18th Ave E
Site Code: 2233100001
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: 18th Ave E runs N/S

North Approach

	Out	In	Total
	132	253	385
	9	4	13
	1	1	2
Totals	142	258	400

18th Ave E

	1	0
	9	0
	132	0
Totals	142	0

10th St E

			Totals
0	0	0	0
1	4	253	258

Peds: 0



Peds: 0

Peds: 0

Peds: 0

West Approach

	Out	In	Total
	253	132	385
	4	9	13
	1	1	2
Totals	258	142	400

Totals	

South Approach

	Out	In	Total
	0	0	0
	0	0	0
	0	0	0
Totals	0	0	0

18th Ave E

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Count Date: Oct 04, 2022
 Period: 07:00 - 10:00

Peak Hour Data (09:00 - 10:00)

Start Time	North Approach 18th Ave E					South Approach 18th Ave E					East Approach					West Approach 10th St E					Total Vehicles				
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑		→	↻	Peds	Total
09:00			29	0	0	29					0	0					0		64			0	0	64	93
09:15			51	0	0	51					0	0					0		64			0	0	64	115
09:30			29	0	0	29					0	0					0		57			0	0	57	86
09:45			33	0	0	33					0	0					0		73			0	0	73	106
Grand Total			142	0	0	142					0	0					0	0	258			0	0	258	400
Approach %			100	0	-	-					-	-					-	-	100			0	-	-	-
Totals %			35.5	0	-	35.5					0	0					0	0	64.5			0	-	64.5	-
PHF			0.7	0	0	0.7					0	0					0	0	0.88			0	0	0.88	0.87
Cars			132	0	-	132					0	0					0	0	253			0	-	253	385
% Cars			93	0	-	93					0	0					0	0	98.1			0	-	98.1	96.3
Trucks			9	0	-	9					0	0					0	0	4			0	-	4	13
% Trucks			6.3	0	-	6.3					0	0					0	0	1.6			0	-	1.6	3.3
Bicycles			1	0	-	1					0	0					0	0	1			0	-	1	2
% Bicycles			0.7	0	-	0.7					0	0					0	0	0.4			0	-	0.4	0.5
Peds					0	-					0	-					0	-				0	-		0
% Peds					0	-					0	-					0	-				0	-		-

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00




Intersection: 10th St E & 18th Ave E
Site Code: 2233100001
Count Date: Oct 04, 2022

Weather conditions: Clear




**** Unsignalized Intersection ****

Major Road: 18th Ave E runs N/S




North Approach

	Out	In	Total
	294	372	666
	6	3	9
	2	1	3
Totals	302	376	678

18th Ave E

	2	0
	6	0
	294	0
Totals	302	0

10th St E

			Totals
0	0	0	0
1	3	372	376

Peds: 0






Peds: 0

Peds: 0

Peds: 0




West Approach

	Out	In	Total
	372	294	666
	3	6	9
	1	2	3
Totals	376	302	678


Totals	
	
	
	

18th Ave E

South Approach

	Out	In	Total
	0	0	0
	0	0	0
	0	0	0
Totals	0	0	0

 - Cars

 - Trucks

 - Bicycles

Comments



Peak Hour Summary

Intersection: 10th St E & 18th Ave E
 Site Code: 2233100001
 Count Date: Oct 04, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:15 - 17:15)

Start Time	North Approach 18th Ave E					South Approach 18th Ave E					East Approach					West Approach 10th St E					Total Vehic es				
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑		→	↻	Peds	Total
16:15			76	0	0	76					0	0					0	0	82			0	0	82	158
16:30			63	0	0	63					0	0					0	0	98			0	0	98	161
16:45			81	0	0	81					0	0					0	0	96			0	0	96	177
17:00			82	0	0	82					0	0					0	0	100			0	0	100	182
Grand Total			302	0	0	302					0	0					0	0	376			0	0	376	678
Approach %			100	0	-	-					-	-					100	0	-			-	-	-	-
Totals %			44.5	0	-	44.5					0	0					55.5	0	-			-	-	55.5	-
PHF			0.92	0	0	0.92					0	0					0.94	0	0.94			0	0	0.94	0.93
Cars			294	0	-	294					0	0					0	0	372			0	0	372	666
% Cars			97.4	0	-	97.4					0	0					98.9	0	-			-	-	98.9	98.2
Trucks			6	0	-	6					0	0					0	0	3			0	0	3	9
% Trucks			2	0	-	2					0	0					0.8	0	-			-	-	0.8	1.3
Bicycles			2	0	-	2					0	0					0	0	1			0	0	1	3
% Bicycles			0.7	0	-	0.7					0	0					0.3	0	-			-	-	0.3	0.4
Peds					0	-					0	-						0	-				0	-	0
% Peds					0	-					0	-						0	-				0	-	-

Traffic Count Summary

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

18th Ave E - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	5	6	5	0	16	1	27	22	41	0	90	0	106
08:00 - 09:00	8	16	13	0	37	1	65	31	44	0	140	0	177
09:00 - 10:00	23	19	15	0	57	1	106	32	62	0	200	2	257
BREAK													
15:00 - 16:00	39	45	35	0	119	5	197	43	64	0	304	0	423
16:00 - 17:00	36	37	44	0	117	2	190	32	59	0	281	1	398
17:00 - 18:00	36	44	21	0	101	2	172	35	68	0	275	1	376
GRAND TOTAL	147	167	133	0	447	12	757	195	338	0	1290	4	1737

Traffic Count Summary

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

16th St E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	11	151	13	0	175	1	8	103	29	0	140	0	315
08:00 - 09:00	34	197	25	0	256	2	16	138	53	0	207	1	463
09:00 - 10:00	27	212	18	0	257	1	15	163	97	0	275	5	532
BREAK													
15:00 - 16:00	45	258	40	0	343	5	24	244	131	0	399	2	742
16:00 - 17:00	50	299	33	0	382	3	22	256	144	0	422	1	804
17:00 - 18:00	41	253	14	0	308	3	14	281	146	0	441	0	749
GRAND TOTAL	208	1370	143	0	1721	15	99	1185	600	0	1884	9	3605



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:15	3	0	1	0	4	1	0	0	0	1	0	0	1	0	1	0
07:30	1	3	3	0	7	0	0	0	0	0	0	0	0	0	0	1
07:45	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
08:00	1	1	3	0	5	0	0	0	0	0	0	0	0	0	0	0
08:15	1	5	2	0	8	0	0	1	0	1	0	0	0	0	0	1
08:30	2	4	5	0	11	0	0	0	0	0	0	0	0	0	0	0
08:45	3	6	2	0	11	1	0	0	0	1	0	0	0	0	0	0
09:00	2	5	4	0	11	0	1	0	0	1	0	0	0	0	0	0
09:15	3	3	3	0	9	2	0	0	0	2	0	1	0	0	1	0
09:30	7	6	2	0	15	1	0	0	0	1	0	0	0	0	0	1
09:45	7	2	5	0	14	1	1	1	0	3	0	0	0	0	0	0
SUBTOTAL	30	38	30	0	98	6	2	2	0	10	0	1	1	0	2	3

Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	7	11	7	0	25	1	0	0	0	1	0	0	0	0	0	1
15:15	11	8	10	0	29	0	0	0	0	0	0	0	0	0	0	1
15:30	13	12	9	0	34	0	0	0	0	0	0	0	0	0	0	1
15:45	7	14	9	0	30	0	0	0	0	0	0	0	0	0	0	2
16:00	6	9	7	0	22	0	0	0	0	0	0	0	1	0	1	0
16:15	8	4	12	0	24	0	0	0	0	0	0	1	0	0	1	1
16:30	10	13	13	0	36	0	0	0	0	0	0	0	0	0	0	0
16:45	12	10	11	0	33	0	0	0	0	0	0	0	0	0	0	1
17:00	14	11	8	0	33	0	0	0	0	0	0	0	0	0	0	2
17:15	9	12	7	0	28	0	0	0	0	0	0	1	0	0	1	0
17:30	7	10	5	0	22	0	0	0	0	0	0	0	0	0	0	0
17:45	6	10	1	0	17	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	110	124	99	0	333	1	0	0	0	1	0	2	1	0	3	9
GRAND TOTAL	140	162	129	0	431	7	2	2	0	11	0	3	2	0	5	12



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
07:00	2	4	13	0	19	0	0	0	0	0	0	0	0	0	0	0	0
07:15	8	1	5	0	14	2	1	0	0	3	0	0	0	0	0	0	0
07:30	3	6	11	0	20	1	0	0	0	1	0	0	0	0	0	0	0
07:45	8	10	11	0	29	3	0	1	0	4	0	0	0	0	0	0	0
08:00	13	9	9	0	31	2	0	0	0	2	0	0	0	0	0	0	0
08:15	13	8	13	0	34	2	0	1	0	3	0	0	0	0	0	0	0
08:30	16	5	10	0	31	0	0	1	0	1	0	0	0	0	0	0	0
08:45	19	9	10	0	38	0	0	0	0	0	0	0	0	0	0	0	0
09:00	22	5	12	0	39	2	0	1	0	3	0	0	0	0	0	0	0
09:15	25	6	17	0	48	2	0	0	0	2	0	0	0	0	0	0	1
09:30	27	5	17	0	49	2	0	1	0	3	0	0	0	0	0	0	0
09:45	26	15	14	0	55	0	0	0	0	0	0	1	0	0	1	0	1
SUBTOTAL	182	83	142	0	407	16	1	5	0	22	0	1	0	0	1	0	2



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 18th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	55	8	16	0	79	0	0	0	0	0	0	0	0	0	0	0
15:15	46	14	15	0	75	0	0	0	0	0	0	0	0	0	0	0
15:30	51	11	19	0	81	1	0	0	0	1	0	0	0	0	0	0
15:45	43	10	14	0	67	0	0	0	0	0	1	0	0	0	1	0
16:00	44	7	19	0	70	0	0	0	0	0	0	0	0	0	0	1
16:15	43	8	14	0	65	1	1	0	0	2	0	0	0	0	0	0
16:30	50	9	15	0	74	0	0	0	0	0	0	0	0	0	0	0
16:45	52	7	10	0	69	0	0	1	0	1	0	0	0	0	0	0
17:00	49	11	22	0	82	1	2	0	0	3	0	0	0	0	0	0
17:15	39	11	17	0	67	0	0	0	0	0	0	1	0	0	1	0
17:30	33	7	18	0	58	0	0	0	0	0	0	0	0	0	0	0
17:45	50	3	11	0	64	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	555	106	190	0	851	3	3	1	0	7	1	1	0	0	2	2
GRAND TOTAL	737	189	332	0	1258	19	4	6	0	29	1	2	0	0	3	4



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	1	23	2	0	26	0	2	0	0	2	0	0	0	0	0	0
07:15	3	33	4	0	40	0	0	1	0	1	0	0	0	0	0	0
07:30	2	35	4	0	41	0	2	0	0	2	0	0	0	0	0	1
07:45	5	51	2	0	58	0	5	0	0	5	0	0	0	0	0	0
08:00	6	45	4	0	55	0	3	0	0	3	0	0	0	0	0	1
08:15	10	48	8	0	66	1	4	1	0	6	0	0	0	0	0	1
08:30	9	45	6	0	60	2	1	0	0	3	0	0	0	0	0	0
08:45	6	49	5	0	60	0	2	1	0	3	0	0	0	0	0	0
09:00	11	53	2	0	66	0	2	0	0	2	0	0	0	0	0	0
09:15	4	41	6	0	51	0	2	0	0	2	0	0	0	0	0	0
09:30	4	53	3	0	60	0	3	2	0	5	0	0	0	0	0	1
09:45	7	55	5	0	67	1	3	0	0	4	0	0	0	0	0	0
SUBTOTAL	68	531	51	0	650	4	29	5	0	38	0	0	0	0	0	4



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	8	69	4	0	81	0	3	0	0	3	0	0	1	0	1	0
15:15	16	70	12	0	98	0	1	0	0	1	0	0	0	0	0	1
15:30	11	54	16	0	81	0	2	0	0	2	0	0	0	0	0	3
15:45	10	58	7	0	75	0	1	0	0	1	0	0	0	0	0	1
16:00	12	69	6	0	87	0	3	0	0	3	0	1	0	0	1	1
16:15	10	80	9	0	99	2	3	0	0	5	0	0	0	0	0	1
16:30	10	63	12	0	85	0	2	0	0	2	0	0	0	0	0	0
16:45	16	70	5	0	91	0	7	1	0	8	0	1	0	0	1	1
17:00	10	63	0	0	73	2	3	0	0	5	0	0	0	0	0	3
17:15	10	57	3	0	70	1	2	1	0	4	0	0	0	0	0	0
17:30	8	71	4	0	83	0	3	0	0	3	0	0	0	0	0	0
17:45	10	53	6	0	69	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	131	777	84	0	992	5	31	2	0	38	0	2	1	0	3	11
GRAND TOTAL	199	1308	135	0	1642	9	60	7	0	76	0	2	1	0	3	15



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	2	21	2	0	25	0	4	2	0	6	0	0	0	0	0	0
07:15	4	18	5	0	27	0	1	1	0	2	0	0	0	0	0	0
07:30	1	18	10	0	29	0	4	2	0	6	0	0	0	0	0	0
07:45	1	32	6	0	39	0	5	1	0	6	0	0	0	0	0	0
08:00	3	22	13	0	38	0	3	0	0	3	0	0	0	0	0	0
08:15	2	30	8	0	40	1	2	1	0	4	0	0	0	0	0	0
08:30	4	29	11	0	44	0	6	0	0	6	0	0	0	0	0	0
08:45	6	45	19	0	70	0	1	1	0	2	0	0	0	0	0	1
09:00	2	39	19	0	60	0	3	1	0	4	0	0	0	0	0	0
09:15	3	29	21	0	53	0	4	3	0	7	0	0	0	0	0	1
09:30	4	43	21	0	68	0	4	0	0	4	0	0	0	0	0	0
09:45	6	41	31	0	78	0	0	1	0	1	0	0	0	0	0	4
SUBTOTAL	38	367	166	0	571	1	37	13	0	51	0	0	0	0	0	6



Traffic Count Data

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	8	52	26	0	86	0	2	0	0	2	0	0	0	0	0	1
15:15	4	74	37	0	115	0	2	0	0	2	0	0	0	0	0	0
15:30	5	54	35	0	94	0	6	0	0	6	0	0	0	0	0	0
15:45	7	53	33	0	93	0	1	0	0	1	0	0	0	0	0	1
16:00	9	61	36	0	106	0	1	1	0	2	0	0	0	0	0	0
16:15	3	62	35	0	100	0	1	0	0	1	0	0	0	0	0	0
16:30	5	45	35	0	85	0	4	0	0	4	0	0	0	0	0	1
16:45	4	81	37	0	122	1	1	0	0	2	0	0	0	0	0	0
17:00	5	71	49	0	125	0	0	0	0	0	0	1	0	0	1	0
17:15	4	64	28	0	96	0	1	0	0	1	0	0	0	0	0	0
17:30	4	72	37	0	113	0	3	0	0	3	0	0	0	0	0	0
17:45	1	66	31	0	98	0	3	1	0	4	0	0	0	0	0	0
SUBTOTAL	59	755	419	0	1233	1	25	2	0	28	0	1	0	0	1	3
GRAND TOTAL	97	1122	585	0	1804	2	62	15	0	79	0	1	0	0	1	9

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 09:00:00
To: 10:00:00

Intersection: 18th Ave E & 16th St E
Site Code: 2233100002
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th St E runs E/W

North Approach

	Out	In	Total
	49	62	111
	7	2	9
	1	1	2
Totals	57	65	122

18th Ave E

	0	1	0	0
	1	2	4	0
	14	16	19	0
Totals	15	19	23	0

East Approach

	Out	In	Total
	244	231	475
	13	17	30
	0	0	0
Totals	257	248	505

16th St E

				Totals
	0	0	0	0
	0	0	15	15
	0	11	152	163
	0	5	92	97

Peds: 1

Peds: 5



Peds: 1

16th St E

Totals			
0	0	0	0
18	16	2	0
212	202	10	0
27	26	1	0

Peds: 2

West Approach

	Out	In	Total
	259	316	575
	16	17	33
	0	0	0
Totals	275	333	608

Totals				
106	106	32	62	0
	100	31	60	0
	6	0	2	0
	0	1	0	0

18th Ave E

South Approach

Out	In	Total	
	191	134	325
	8	8	16
	1	1	2
Totals	200	143	343

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Count Date: Oct 04, 2022
 Period: 07:00 - 10:00

Peak Hour Data (09:00 - 10:00)

Start Time	North Approach 18th Ave E						South Approach 18th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
09:00	2	6	4	0	0	12	24	5	13	0	0	42	11	55	2	0	0	68	2	42	20	0	0	64	186
09:15	5	4	3	0	0	12	27	6	17	0	1	50	4	43	6	0	0	53	3	33	24	0	1	60	175
09:30	8	6	2	0	1	16	29	5	18	0	0	52	4	56	5	0	1	65	4	47	21	0	0	72	205
09:45	8	3	6	0	0	17	26	16	14	0	1	56	8	58	5	0	0	71	6	41	32	0	4	79	223
Grand Total	23	19	15	0	1	57	106	32	62	0	2	200	27	212	18	0	1	257	15	163	97	0	5	275	789
Approach %	40.4	33.3	26.3	0	-	-	53	16	31	0	-	-	10.5	82.5	7	0	-	-	5.5	59.3	35.3	0	-	-	
Totals %	2.9	2.4	1.9	0	7.2	13.4	4.1	7.9	0	25.3	3.4	26.9	2.3	0	32.6	1.9	20.7	12.3	0	34.9					
PHF	0.72	0.79	0.63	0	0.84	0.91	0.5	0.86	0	0.89	0.61	0.91	0.75	0	0.9	0.63	0.87	0.76	0	0.87	0.88				
Cars	19	16	14	0	49	100	31	60	0	191	26	202	16	0	244	15	152	92	0	259	743				
% Cars	82.6	84.2	93.3	0	86	94.3	96.9	96.8	0	95.5	96.3	95.3	88.9	0	94.9	100	93.3	94.8	0	94.2	94.2				
Trucks	4	2	1	0	7	6	0	2	0	8	1	10	2	0	13	0	11	5	0	16	44				
% Trucks	17.4	10.5	6.7	0	12.3	5.7	0	3.2	0	4	3.7	4.7	11.1	0	5.1	0	6.7	5.2	0	5.8	5.6				
Bicycles	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2				
% Bicycles	0	5.3	0	0	1.8	0	3.1	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0.3				
Peds					1	-				2	-				1	-				5	-	9			
% Peds					11.1	-				22.2	-				11.1	-				55.6	-				

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Intersection: 18th Ave E & 16th St E
Site Code: 2233100002
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th St E runs E/W

North Approach

	Out	In	Total
	126	78	204
	0	5	5
	1	0	1
Totals	127	83	210

18th Ave E

	0	1	0	0
	0	0	0	0
	44	38	44	0
Totals	44	39	44	0

East Approach

	Out	In	Total
	348	364	712
	20	7	27
	1	1	2
Totals	369	372	741

16th St E

				Totals
	0	0	0	0
	0	1	17	18
	1	6	259	266
	0	0	156	156

Peds: 4

Peds: 1



Peds: 5

Peds: 0

16th St E

Totals			
0	0	0	0
27	26	1	0
292	276	15	1
50	46	4	0

West Approach

	Out	In	Total
	432	514	946
	7	17	24
	1	1	2
Totals	440	532	972

Totals				
196	194	35	61	0
2	2	3	1	0
0	0	0	0	0

18th Ave E

South Approach

Out	In	Total
290	240	530
6	4	10
0	1	1
296	245	541

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 18th Ave E & 16th St E
 Site Code: 2233100002
 Count Date: Oct 04, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:15 - 17:15)

Start Time	North Approach 18th Ave E						South Approach 18th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:15	8	5	12	0	1	25	44	9	14	0	0	67	12	83	9	0	1	104	3	63	35	0	0	101	297
16:30	10	13	13	0	0	36	50	9	15	0	0	74	10	65	12	0	0	87	5	49	35	0	1	89	286
16:45	12	10	11	0	1	33	52	7	11	0	0	70	16	78	6	0	1	100	5	82	37	0	0	124	327
17:00	14	11	8	0	2	33	50	13	22	0	0	85	12	66	0	0	3	78	5	72	49	0	0	126	322
Grand Total	44	39	44	0	4	127	196	38	62	0	0	296	50	292	27	0	5	369	18	266	156	0	1	440	1232
Approach %	34.6	30.7	34.6	0	-	-	66.2	12.8	20.9	0	-	-	13.6	79.1	7.3	0	-	-	4.1	60.5	35.5	0	-	-	
Totals %	3.6	3.2	3.6	0	10.3	15.9	3.1	5	0	24	4.1	23.7	2.2	0	30	1.5	21.6	12.7	0	35.7					
PHF	0.79	0.75	0.85	0	0.88	0.94	0.73	0.7	0	0.87	0.78	0.88	0.56	0	0.89	0.9	0.81	0.8	0	0.87	0.94				
Cars	44	38	44	0	126	194	35	61	0	290	46	276	26	0	348	17	259	156	0	432	1196				
% Cars	100	97.4	100	0	99.2	99	92.1	98.4	0	98	92	94.5	96.3	0	94.3	94.4	97.4	100	0	98.2	97.1				
Trucks	0	0	0	0	0	2	3	1	0	6	4	15	1	0	20	1	6	0	0	7	33				
% Trucks	0	0	0	0	0	1	7.9	1.6	0	2	8	5.1	3.7	0	5.4	5.6	2.3	0	0	1.6	2.7				
Bicycles	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3				
% Bicycles	0	2.6	0	0	0.8	0	0	0	0	0	0	0.3	0	0	0.3	0	0.4	0	0	0.2	0.2				
Peds					4	-				0	-				5	-				1	-	10			
% Peds					40	-				0	-				50	-				10	-				

Traffic Count Summary

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

16th Ave E - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	1	124	41	0	166	0	27	90	31	0	148	8	314
08:00 - 09:00	14	149	51	0	214	1	22	138	71	0	231	1	445
09:00 - 10:00	11	146	73	0	230	0	23	156	104	0	283	5	513
BREAK													
15:00 - 16:00	16	168	84	0	268	1	53	210	143	0	406	12	674
16:00 - 17:00	20	158	95	0	273	0	73	195	162	0	430	9	703
17:00 - 18:00	14	154	103	0	271	1	44	161	116	0	321	3	592
GRAND TOTAL	76	899	447	0	1422	3	242	950	627	0	1819	38	3241

Traffic Count Summary

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

10th St E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	27	30	3	0	60	1	83	94	105	0	282	1	342
08:00 - 09:00	26	42	9	0	77	2	123	121	103	0	347	1	424
09:00 - 10:00	64	68	10	0	142	4	115	148	45	0	308	2	450
BREAK													
15:00 - 16:00	121	152	19	0	292	3	100	157	44	0	301	5	593
16:00 - 17:00	108	161	19	0	288	6	95	180	35	0	310	0	598
17:00 - 18:00	121	167	13	0	301	1	81	177	22	0	280	1	581
GRAND TOTAL	467	620	73	0	1160	17	597	877	354	0	1828	10	2988



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	1	25	11	0	37	0	2	0	0	2	0	0	0	0	0	0
07:15	0	24	11	0	35	0	1	0	0	1	0	0	0	0	0	0
07:30	0	38	10	0	48	0	1	0	0	1	0	1	0	0	1	0
07:45	0	30	9	0	39	0	2	0	0	2	0	0	0	0	0	0
08:00	2	21	9	0	32	0	0	1	0	1	0	1	0	0	1	0
08:15	2	39	10	0	51	0	4	0	0	4	0	0	0	0	0	0
08:30	4	42	12	0	58	0	6	0	0	6	0	0	0	0	0	0
08:45	6	32	19	0	57	0	4	0	0	4	0	0	0	0	0	1
09:00	3	29	16	0	48	0	3	0	0	3	0	0	0	0	0	0
09:15	5	36	22	0	63	0	1	1	0	2	0	0	0	0	0	0
09:30	2	34	16	0	52	0	1	1	0	2	0	0	0	0	0	0
09:45	1	41	15	0	57	0	1	2	0	3	0	0	0	0	0	0
SUBTOTAL	26	391	160	0	577	0	26	5	0	31	0	2	0	0	2	1



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	3	42	18	0	63	0	4	1	0	5	0	0	0	0	0	0
15:15	9	43	26	0	78	0	2	1	0	3	0	1	0	0	1	0
15:30	3	34	15	0	52	0	3	0	0	3	0	0	0	0	0	1
15:45	1	39	23	0	63	0	0	0	0	0	0	0	0	0	0	0
16:00	3	39	18	0	60	0	0	0	0	0	0	0	0	0	0	0
16:15	7	35	21	0	63	0	0	0	0	0	0	0	0	0	0	0
16:30	8	41	25	0	74	0	0	1	0	1	0	0	0	0	0	0
16:45	2	41	30	0	73	0	2	0	0	2	0	0	0	0	0	0
17:00	5	49	36	0	90	0	1	0	0	1	0	1	0	0	1	0
17:15	3	42	29	0	74	0	0	0	0	0	0	0	0	0	0	0
17:30	5	28	19	0	52	0	0	0	0	0	0	0	0	0	0	0
17:45	1	33	19	0	53	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	50	466	279	0	795	0	12	3	0	15	0	2	0	0	2	2
GRAND TOTAL	76	857	439	0	1372	0	38	8	0	46	0	4	0	0	4	3



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	9	13	9	0	31	0	1	0	0	1	0	0	0	0	0	2
07:15	7	19	5	0	31	0	1	0	0	1	0	0	0	0	0	2
07:30	4	23	7	0	34	0	2	0	0	2	0	0	0	0	0	2
07:45	7	31	10	0	48	0	0	0	0	0	0	0	0	0	0	2
08:00	3	23	18	0	44	1	1	0	0	2	0	0	0	0	0	0
08:15	3	28	8	0	39	0	0	0	0	0	0	0	0	0	0	1
08:30	9	42	12	0	63	0	1	1	0	2	0	0	0	0	0	0
08:45	5	40	31	0	76	1	3	1	0	5	0	0	0	0	0	0
09:00	5	43	24	0	72	0	3	1	0	4	0	0	0	0	0	1
09:15	6	35	22	0	63	0	1	1	0	2	0	0	0	0	0	0
09:30	8	36	28	0	72	0	1	2	0	3	0	0	0	0	0	0
09:45	4	34	26	0	64	0	3	0	0	3	0	0	0	0	0	4
SUBTOTAL	70	367	200	0	637	2	17	6	0	25	0	0	0	0	0	14



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	14	48	35	0	97	1	1	0	0	2	0	1	0	0	1	4
15:15	12	55	37	0	104	1	4	0	0	5	0	0	0	0	0	5
15:30	10	45	39	0	94	0	4	1	0	5	0	0	0	0	0	1
15:45	14	51	31	0	96	0	1	0	0	1	1	0	0	0	1	2
16:00	24	63	42	0	129	0	2	0	0	2	0	0	1	0	1	2
16:15	21	45	30	0	96	0	1	0	0	1	0	0	0	0	0	4
16:30	19	43	47	0	109	0	1	0	0	1	0	0	0	0	0	2
16:45	9	39	41	0	89	0	1	1	0	2	0	0	0	0	0	1
17:00	19	43	33	0	95	0	6	0	0	6	0	0	0	0	0	0
17:15	7	40	29	0	76	0	0	0	0	0	0	0	0	0	0	2
17:30	7	36	26	0	69	1	0	0	0	1	0	0	0	0	0	0
17:45	10	35	27	0	72	0	1	0	0	1	0	0	1	0	1	1
SUBTOTAL	166	543	417	0	1126	3	22	2	0	27	1	1	2	0	4	24
GRAND TOTAL	236	910	617	0	1763	5	39	8	0	52	1	1	2	0	4	38



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	3	6	0	0	9	1	0	0	0	1	0	0	0	0	0	0
07:15	0	8	2	0	10	1	0	0	0	1	0	0	0	0	0	1
07:30	14	9	1	0	24	0	0	0	0	0	0	0	0	0	0	0
07:45	7	7	0	0	14	1	0	0	0	1	0	0	0	0	0	0
08:00	1	7	3	0	11	0	0	0	0	0	0	0	0	0	0	0
08:15	7	13	3	0	23	1	0	0	0	1	0	0	0	0	0	0
08:30	7	9	2	0	18	0	0	0	0	0	0	0	0	0	0	0
08:45	9	12	1	0	22	1	1	0	0	2	0	0	0	0	0	2
09:00	10	15	1	0	26	1	0	0	0	1	0	0	0	0	0	1
09:15	21	21	4	0	46	4	0	1	0	5	0	1	0	0	1	2
09:30	9	18	1	0	28	1	1	0	0	2	0	0	0	0	0	1
09:45	16	12	3	0	31	2	0	0	0	2	0	0	0	0	0	0
SUBTOTAL	104	137	21	0	262	13	2	1	0	16	0	1	0	0	1	7



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	35	33	3	0	71	1	1	1	0	3	0	0	0	0	0	0
15:15	25	43	3	0	71	0	1	1	0	2	0	0	0	0	0	1
15:30	37	37	4	0	78	0	1	1	0	2	0	0	0	0	0	1
15:45	22	36	5	0	63	1	0	1	0	2	0	0	0	0	0	1
16:00	23	28	2	0	53	2	0	0	0	2	0	0	0	0	0	2
16:15	32	42	6	0	80	1	0	0	0	1	0	0	0	0	0	0
16:30	22	37	5	0	64	0	0	0	0	0	1	0	0	0	1	1
16:45	26	53	3	0	82	1	0	3	0	4	0	1	0	0	1	3
17:00	23	51	3	0	77	0	1	0	0	1	0	0	0	0	0	0
17:15	46	35	4	0	85	1	0	0	0	1	0	0	0	0	0	0
17:30	23	40	4	0	67	1	1	0	0	2	0	0	0	0	0	0
17:45	27	39	2	0	68	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	341	474	44	0	859	8	5	7	0	20	1	1	0	0	2	10
GRAND TOTAL	445	611	65	0	1121	21	7	8	0	36	1	2	0	0	3	17



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	9	15	21	0	45	1	0	0	0	1	0	0	0	0	0	0
07:15	21	20	17	0	58	0	0	0	0	0	0	0	0	0	0	0
07:30	20	27	26	0	73	1	0	0	0	1	0	0	0	0	0	0
07:45	30	32	41	0	103	1	0	0	0	1	0	0	0	0	0	1
08:00	20	28	23	0	71	1	1	0	0	2	0	0	0	0	0	0
08:15	33	19	33	0	85	1	0	3	0	4	0	0	0	0	0	0
08:30	26	35	21	0	82	1	0	1	0	2	0	0	1	0	1	1
08:45	38	37	20	0	95	3	1	1	0	5	0	0	0	0	0	0
09:00	34	41	5	0	80	1	0	0	0	1	0	1	0	0	1	0
09:15	23	33	10	0	66	1	0	0	0	1	0	0	0	0	0	0
09:30	24	26	18	0	68	1	0	0	0	1	0	0	0	0	0	2
09:45	31	47	11	0	89	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	309	360	246	0	915	12	2	6	0	20	0	1	1	0	2	4



Traffic Count Data

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 10th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	20	30	10	0	60	1	0	1	0	2	0	0	0	0	0	2
15:15	33	40	10	0	83	0	0	4	0	4	0	0	0	0	0	1
15:30	21	38	10	0	69	1	0	1	0	2	0	0	0	0	0	2
15:45	22	48	8	0	78	2	0	0	0	2	0	1	0	0	1	0
16:00	19	34	9	0	62	1	0	0	0	1	0	1	0	0	1	0
16:15	22	40	5	0	67	3	1	0	0	4	0	0	0	0	0	0
16:30	26	46	8	0	80	4	1	0	0	5	0	0	0	0	0	0
16:45	20	56	13	0	89	0	0	0	0	0	0	1	0	0	1	0
17:00	22	60	8	0	90	1	0	0	0	1	0	0	0	0	0	0
17:15	19	38	3	0	60	1	1	0	0	2	0	0	0	0	0	0
17:30	19	35	7	0	61	1	0	0	0	1	0	0	0	0	0	0
17:45	17	43	4	0	64	1	0	0	0	1	0	0	0	0	0	1
SUBTOTAL	260	508	95	0	863	16	3	6	0	25	0	3	0	0	3	6
GRAND TOTAL	569	868	341	0	1778	28	5	12	0	45	0	4	1	0	5	10

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 08:30:00
To: 09:30:00




Intersection: 10th St E & 16th Ave E
Site Code: 2233100003
Count Date: Oct 04, 2022

Weather conditions: Clear




**** Signalized Intersection ****





Major Road: 16th Ave E runs N/S

North Approach




	Out	In	Total
	226	289	515
	15	15	30
	0	0	0
Totals	241	304	545

16th Ave E




	0	0	0	0
	1	14	0	0
	69	139	18	0
Totals	70	153	18	0










East Approach

	Out	In	Total
	112	253	365
	8	5	13
	1	1	2
Totals	121	259	380

10th St E

				Totals
	0	0	0	0
	0	6	121	127
	1	1	146	148
	1	2	56	59

Peds: 1




Peds: 1







Peds: 5




Peds: 1





10th St E

Totals			
0	0	0	0
9	8	1	0
59	57	1	1
53	47	6	0




West Approach

	Out	In	Total
	323	151	474
	9	3	12
	2	1	3
Totals	334	155	489


Totals				
26	25	160	89	0
168	1	8	4	0
93	0	0	0	0

16th Ave E

South Approach

	Out	In	Total
	274	242	516
	13	22	35
	0	1	1
Totals	287	265	552

 - Cars

 - Trucks

 - Bicycles

Comments

Peak Hour Summary

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Count Date: Oct 04, 2022
 Period: 07:00 - 10:00

Peak Hour Data (08:30 - 09:30)

Start Time	North Approach 16th Ave E						South Approach 16th Ave E						East Approach 10th St E						West Approach 10th St E						Total Vehi es
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
08:30	4	48	12	0	0	64	9	43	13	0	0	65	7	9	2	0	0	18	27	35	23	0	1	85	232
08:45	6	36	19	0	1	61	6	43	32	0	0	81	10	13	1	0	2	24	41	38	21	0	0	100	266
09:00	3	32	16	0	0	51	5	46	25	0	1	76	11	15	1	0	1	27	35	42	5	0	0	82	236
09:15	5	37	23	0	0	65	6	36	23	0	0	65	25	22	5	0	2	52	24	33	10	0	0	67	249
Grand Total	18	153	70	0	1	241	26	168	93	0	1	287	53	59	9	0	5	121	127	148	59	0	1	334	983
Approach %	7.5	63.5	29	0	-	-	9.1	58.5	32.4	0	-	-	43.8	48.8	7.4	0	-	-	38	44.3	17.7	0	-	-	-
Totals %	1.8	15.6	7.1	0	24.5	29.2	2.6	17.1	9.5	0	29.2	5.4	6	0.9	0	12.3	12.9	15.1	6	0	34	34			
PHF	0.75	0.8	0.76	0	0.93	0.89	0.72	0.91	0.73	0	0.89	0.53	0.67	0.45	0	0.58	0.77	0.88	0.64	0	0.84	0.92			
Cars	18	139	69	0	226	274	25	160	89	0	274	47	57	8	0	112	121	146	56	0	323	935			
% Cars	100	90.8	98.6	0	93.8	95.5	96.2	95.2	95.7	0	95.5	88.7	96.6	88.9	0	92.6	95.3	98.6	94.9	0	96.7	95.1			
Trucks	0	14	1	0	15	13	1	8	4	0	13	6	1	1	0	8	6	1	2	0	9	45			
% Trucks	0	9.2	1.4	0	6.2	4.5	3.8	4.8	4.3	0	4.5	11.3	1.7	11.1	0	6.6	4.7	0.7	3.4	0	2.7	4.6			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	2	3			
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	0	0.8	0	0.7	1.7	0	0.6	0.3			
Peds					1	-					1	-					5	-					1	-	8
% Peds					12.5	-					12.5	-					62.5	-					12.5	-	

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Intersection: 10th St E & 16th Ave E
Site Code: 2233100003
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th Ave E runs N/S

North Approach

	Out	In	Total
	300	277	577
	4	20	24
	1	0	1
Totals	305	297	602

16th Ave E

	0	1	0	0
	1	3	0	0
	112	166	22	0
Totals	113	170	22	0

East Approach

	Out	In	Total
	303	375	678
	6	3	9
	2	1	3
Totals	311	379	690

10th St E

				Totals
	0	0	0	0
	0	8	90	98
	1	2	202	205
	0	0	34	34

Peds: 0

Peds: 0



Peds: 4

10th St E

Totals			
0	0	0	0
20	17	3	0
185	183	1	1
106	103	2	1

Peds: 7

West Approach

	Out	In	Total
	326	363	689
	10	2	12
	1	1	2
Totals	337	366	703

Totals				
68	179	152	0	
	68	170	151	0
	0	9	1	0
	0	0	0	0

16th Ave E

South Approach

	Out	In	Total
	389	303	692
	10	5	15
	0	2	2
Totals	399	310	709

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 10th St E & 16th Ave E
 Site Code: 2233100003
 Count Date: Oct 04, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:15 - 17:15)

Start Time	North Approach 16th Ave E						South Approach 16th Ave E						East Approach 10th St E						West Approach 10th St E						Total Vehicles	
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total		
16:15	7	35	21	0	0	63	21	46	30	0	4	97	33	42	6	0	0	81	25	41	5	0	0	71	312	
16:30	8	41	26	0	0	75	19	44	47	0	2	110	23	37	5	0	1	65	30	47	8	0	0	85	335	
16:45	2	43	30	0	0	75	9	40	42	0	1	91	27	54	6	0	3	87	20	57	13	0	0	90	343	
17:00	5	51	36	0	0	92	19	49	33	0	0	101	23	52	3	0	0	78	23	60	8	0	0	91	362	
Grand Total	22	170	113	0	0	305	68	179	152	0	7	399	106	185	20	0	4	311	98	205	34	0	0	337	1352	
Approach %	7.2	55.7	37	0	-	-	17	44.9	38.1	0	-	-	34.1	59.5	6.4	0	-	-	29.1	60.8	10.1	0	-	-	-	
Totals %	1.6	12.6	8.4	0	-	22.6	5	13.2	11.2	0	-	29.5	7.8	13.7	1.5	0	-	23	7.2	15.2	2.5	0	-	-	24.9	
PHF	0.69	0.83	0.78	0	-	0.83	0.81	0.91	0.81	0	-	0.91	0.8	0.86	0.83	0	-	0.89	0.82	0.85	0.65	0	-	-	0.93	0.93
Cars	22	166	112	0	-	300	68	170	151	0	-	389	103	183	17	0	-	303	90	202	34	0	-	326	1318	
% Cars	100	97.6	99.1	0	-	98.4	100	95	99.3	0	-	97.5	97.2	98.9	85	0	-	97.4	91.8	98.5	100	0	-	96.7	97.5	
Trucks	0	3	1	0	-	4	0	9	1	0	-	10	2	1	3	0	-	6	8	2	0	0	-	10	30	
% Trucks	0	1.8	0.9	0	-	1.3	0	5	0.7	0	-	2.5	1.9	0.5	15	0	-	1.9	8.2	1	0	0	-	3	2.2	
Bicycles	0	1	0	0	-	1	0	0	0	0	-	0	1	1	0	0	-	2	0	1	0	0	-	1	4	
% Bicycles	0	0.6	0	0	-	0.3	0	0	0	0	-	0	0.9	0.5	0	0	-	0.6	0	0.5	0	0	-	0.3	0.3	
Peds					0	-					7	-					4	-					0	-	11	
% Peds					0	-					63.6	-					36.4	-					0	-	-	

Traffic Count Summary

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

16th Ave E - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	5	56	37	0	98	0	29	104	36	0	169	0	267
08:00 - 09:00	11	95	40	0	146	1	86	130	47	0	263	2	409
09:00 - 10:00	11	68	62	0	141	3	105	106	70	0	281	3	422
BREAK													
15:00 - 16:00	32	107	66	0	205	4	139	131	102	0	372	2	577
16:00 - 17:00	20	92	73	0	185	7	156	96	77	0	329	4	514
17:00 - 18:00	26	105	83	0	214	1	116	85	106	0	307	1	521
GRAND TOTAL	105	523	361	0	989	16	631	652	438	0	1721	12	2710



Traffic Count Summary

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

16th St E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	35	152	4	0	191	0	38	107	41	0	186	0	377
08:00 - 09:00	47	248	14	0	309	0	38	164	57	0	259	3	568
09:00 - 10:00	63	258	10	0	331	1	44	208	69	0	321	0	652
BREAK													
15:00 - 16:00	71	394	7	0	472	2	54	295	56	0	405	5	877
16:00 - 17:00	66	455	12	0	533	0	44	312	67	0	423	5	956
17:00 - 18:00	78	381	5	0	464	4	45	314	60	0	419	0	883
GRAND TOTAL	360	1888	52	0	2300	7	263	1400	350	0	2013	13	4313



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	2	18	14	0	34	0	1	2	0	3	0	0	0	0	0	0
07:15	0	8	5	0	13	0	2	0	0	2	0	0	0	0	0	0
07:30	1	16	8	0	25	0	2	0	0	2	0	0	0	0	0	0
07:45	2	7	6	0	15	0	1	2	0	3	0	1	0	0	1	0
08:00	2	15	10	0	27	1	3	0	0	4	0	0	0	0	0	1
08:15	3	21	9	0	33	0	4	2	0	6	0	0	0	0	0	0
08:30	0	30	8	0	38	1	4	0	0	5	0	0	0	0	0	0
08:45	4	16	11	0	31	0	2	0	0	2	0	0	0	0	0	0
09:00	2	14	9	0	25	1	2	1	0	4	0	0	0	0	0	1
09:15	5	11	16	0	32	0	2	2	0	4	0	0	0	0	0	1
09:30	1	22	13	0	36	0	3	1	0	4	0	0	0	0	0	1
09:45	2	13	18	0	33	0	1	2	0	3	0	0	0	0	0	0
SUBTOTAL	24	191	127	0	342	3	27	12	0	42	0	1	0	0	1	4



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

North Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	4	30	13	0	47	0	5	0	0	5	0	0	0	0	0	1
15:15	9	19	17	0	45	1	5	0	0	6	0	0	0	0	0	1
15:30	7	18	20	0	45	0	2	2	0	4	0	0	0	0	0	1
15:45	11	28	14	0	53	0	0	0	0	0	0	0	0	0	0	1
16:00	4	21	13	0	38	0	1	1	0	2	0	0	0	0	0	1
16:15	4	28	13	0	45	0	0	1	0	1	0	0	0	0	0	2
16:30	10	27	23	0	60	0	0	0	0	0	0	0	0	0	0	2
16:45	2	14	19	0	35	0	1	3	0	4	0	0	0	0	0	2
17:00	11	41	28	0	80	0	0	0	0	0	0	0	0	0	0	1
17:15	5	36	18	0	59	0	2	3	0	5	0	0	0	0	0	0
17:30	5	13	13	0	31	1	0	1	0	2	0	0	0	0	0	0
17:45	4	13	20	0	37	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	76	288	211	0	575	2	16	11	0	29	0	0	0	0	0	12
GRAND TOTAL	100	479	338	0	917	5	43	23	0	71	0	1	0	0	1	16



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	12	15	9	0	36	0	4	0	0	4	0	0	0	0	0	0
07:15	3	21	7	0	31	0	1	0	0	1	0	0	0	0	0	0
07:30	9	17	10	0	36	0	1	0	0	1	0	0	0	0	0	0
07:45	5	43	10	0	58	0	2	0	0	2	0	0	0	0	0	0
08:00	18	22	9	0	49	2	1	0	0	3	0	0	0	0	0	1
08:15	13	33	12	0	58	0	2	0	0	2	0	0	0	0	0	1
08:30	24	37	10	0	71	1	3	0	0	4	0	0	0	0	0	0
08:45	28	28	16	0	72	0	4	0	0	4	0	0	0	0	0	0
09:00	22	29	15	0	66	1	4	0	0	5	0	0	0	0	0	0
09:15	30	22	12	0	64	1	0	0	0	1	0	0	0	0	0	2
09:30	19	20	17	0	56	0	1	0	0	1	0	0	0	0	0	1
09:45	32	30	25	0	87	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	215	317	152	0	684	5	23	1	0	29	0	0	0	0	0	5



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 16th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	35	32	24	0	91	0	2	1	0	3	0	0	0	0	0	1
15:15	31	25	26	0	82	1	4	0	0	5	0	0	0	0	0	1
15:30	32	32	23	0	87	0	2	0	0	2	0	0	0	0	0	0
15:45	40	30	28	0	98	0	4	0	0	4	0	0	0	0	0	0
16:00	46	16	13	0	75	0	3	1	0	4	0	0	0	0	0	3
16:15	38	19	15	0	72	1	3	1	0	5	0	0	0	0	0	0
16:30	39	27	21	0	87	0	5	0	0	5	0	0	0	0	0	0
16:45	32	20	25	0	77	0	3	1	0	4	0	0	0	0	0	1
17:00	34	22	39	0	95	0	6	0	0	6	0	0	0	0	0	0
17:15	39	17	17	0	73	0	0	0	0	0	0	0	0	0	0	1
17:30	23	14	22	0	59	2	1	2	0	5	0	0	0	0	0	0
17:45	18	23	26	0	67	0	2	0	0	2	0	0	0	0	0	0
SUBTOTAL	407	277	279	0	963	4	35	6	0	45	0	0	0	0	0	7
GRAND TOTAL	622	594	431	0	1647	9	58	7	0	74	0	0	0	0	0	12



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	4	25	1	0	30	1	1	0	0	2	0	0	0	0	0	0
07:15	4	27	0	0	31	0	3	0	0	3	0	0	0	0	0	0
07:30	12	39	1	0	52	0	2	0	0	2	0	0	0	0	0	0
07:45	13	49	2	0	64	1	6	0	0	7	0	0	0	0	0	0
08:00	11	51	3	0	65	0	4	0	0	4	0	0	0	0	0	0
08:15	11	57	4	0	72	0	8	0	0	8	0	1	0	0	1	0
08:30	13	56	4	0	73	1	0	0	0	1	0	0	0	0	0	0
08:45	11	68	3	0	82	0	3	0	0	3	0	0	0	0	0	0
09:00	7	61	1	0	69	1	3	0	0	4	0	0	0	0	0	0
09:15	15	61	3	0	79	1	2	0	0	3	0	0	0	0	0	1
09:30	19	56	3	0	78	0	5	0	0	5	0	0	0	0	0	0
09:45	20	65	3	0	88	0	5	0	0	5	0	0	0	0	0	0
SUBTOTAL	140	615	28	0	783	5	42	0	0	47	0	1	0	0	1	1



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	15	109	2	0	126	0	2	1	0	3	0	0	0	0	0	0
15:15	24	107	2	0	133	0	1	0	0	1	0	0	0	0	0	1
15:30	14	91	1	0	106	1	3	0	0	4	0	0	0	0	0	1
15:45	17	80	1	0	98	0	0	0	0	0	0	1	0	0	1	0
16:00	17	119	3	0	139	0	2	0	0	2	0	1	0	0	1	0
16:15	13	111	1	0	125	1	4	0	0	5	1	0	0	0	1	0
16:30	18	104	3	0	125	0	1	2	0	3	0	0	0	0	0	0
16:45	16	107	3	0	126	0	6	0	0	6	0	0	0	0	0	0
17:00	26	75	2	0	103	0	4	0	0	4	0	0	0	0	0	2
17:15	14	107	0	0	121	0	4	0	0	4	0	0	0	0	0	0
17:30	17	96	2	0	115	0	1	0	0	1	0	0	0	0	0	0
17:45	21	92	0	0	113	0	1	1	0	2	0	1	0	0	1	2
SUBTOTAL	212	1198	20	0	1430	2	29	4	0	35	1	3	0	0	4	6
GRAND TOTAL	352	1813	48	0	2213	7	71	4	0	82	1	4	0	0	5	7



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	9	16	1	0	26	1	5	0	0	6	0	0	0	0	0	0
07:15	5	23	11	0	39	2	2	1	0	5	0	0	0	0	0	0
07:30	11	23	10	0	44	0	5	0	0	5	0	0	0	0	0	0
07:45	9	26	18	0	53	1	7	0	0	8	0	0	0	0	0	0
08:00	15	23	10	0	48	0	2	0	0	2	0	0	0	0	0	2
08:15	5	33	10	0	48	1	4	0	0	5	0	0	0	0	0	0
08:30	8	39	14	0	61	0	4	0	0	4	0	0	0	0	0	1
08:45	9	55	22	0	86	0	4	1	0	5	0	0	0	0	0	0
09:00	12	45	13	0	70	0	4	0	0	4	0	0	0	0	0	0
09:15	13	37	23	0	73	1	5	1	0	7	0	0	0	0	0	0
09:30	14	57	13	0	84	0	3	0	0	3	0	0	0	0	0	0
09:45	4	54	19	0	77	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	114	431	164	0	709	6	48	3	0	57	0	0	0	0	0	3



Traffic Count Data

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	9	58	10	0	77	1	2	0	0	3	0	0	0	0	0	1
15:15	14	78	23	0	115	1	2	0	0	3	0	0	0	0	0	0
15:30	13	76	10	0	99	0	4	0	0	4	0	0	0	0	0	1
15:45	14	75	13	0	102	1	0	0	0	1	1	0	0	0	1	3
16:00	7	68	16	0	91	1	2	0	0	3	0	0	0	0	0	2
16:15	9	82	11	0	102	4	2	1	0	7	0	0	0	0	0	1
16:30	11	61	14	0	86	2	2	0	0	4	0	0	0	0	0	2
16:45	9	94	25	0	128	1	1	0	0	2	0	0	0	0	0	0
17:00	14	81	20	0	115	0	0	1	0	1	0	0	0	0	0	0
17:15	15	84	14	0	113	1	2	0	0	3	0	0	0	0	0	0
17:30	6	69	13	0	88	1	1	0	0	2	0	0	0	0	0	0
17:45	8	74	12	0	94	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	129	900	181	0	1210	13	21	2	0	36	1	0	0	0	1	10
GRAND TOTAL	243	1331	345	0	1919	19	69	5	0	93	1	0	0	0	1	13

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 09:00:00
To: 10:00:00




Intersection: 16th St E & 16th Ave E
Site Code: 2233100004
Count Date: Oct 04, 2022

Weather conditions: Clear




**** Signalized Intersection ****





Major Road: 16th St E runs E/W

North Approach




	Out	In	Total
	126	154	280
	15	6	21
	0	0	0
Totals	141	160	301

16th Ave E








	0	0	0	0
	6	8	1	0
	56	60	10	0
Totals	62	68	11	0

East Approach

	Out	In	Total
	314	272	586
	17	17	34
	0	0	0
Totals	331	289	620

16th St E

				Totals	
0	0	0	0	0	
0	1	43	44	44	
0	15	193	208	208	
0	1	68	69	69	




Peds: 3

Peds: 0






Peds: 1








16th St E

Totals			
0	0	0	0
10	10	0	0
258	243	15	0
63	61	2	0

Peds: 3




West Approach

	Out	In	Total
	304	402	706
	17	23	40
	0	0	0
Totals	321	425	746


Totals				
105	105	106	70	0
	103	101	69	0
	2	5	1	0
	0	0	0	0

16th Ave E

South Approach

Out	In	Total	
	273	189	462
	8	11	19
	0	0	0
Totals	281	200	481

 - Cars

 - Trucks

 - Bicycles

Comments



Peak Hour Summary

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Count Date: Oct 04, 2022
 Period: 07:00 - 10:00

Peak Hour Data (09:00 - 10:00)

Start Time	North Approach 16th Ave E						South Approach 16th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehic es
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
09:00	3	16	10	0	1	29	23	33	15	0	0	71	8	64	1	0	0	73	12	49	13	0	0	74	247
09:15	5	13	18	0	1	36	31	22	12	0	2	65	16	63	3	0	1	82	14	42	24	0	0	80	263
09:30	1	25	14	0	1	40	19	21	17	0	1	57	19	61	3	0	0	83	14	60	13	0	0	87	267
09:45	2	14	20	0	0	36	32	30	26	0	0	88	20	70	3	0	0	93	4	57	19	0	0	80	297
Grand Total	11	68	62	0	3	141	105	106	70	0	3	281	63	258	10	0	1	331	44	208	69	0	0	321	1074
Approach %	7.8	48.2	44	0	-	-	37.4	37.7	24.9	0	-	-	19	77.9	3	0	-	-	13.7	64.8	21.5	0	-	-	
Totals %	1	6.3	5.8	0	13.1	26.2	9.8	9.9	6.5	0	26.2	5.9	24	0.9	0	30.8	4.1	19.4	6.4	0	29.9				
PHF	0.55	0.68	0.78	0	0.88	0.8	0.82	0.8	0.67	0	0.8	0.79	0.92	0.83	0	0.89	0.79	0.87	0.72	0	0.92	0.9			
Cars	10	60	56	0	126	273	103	101	69	0	273	61	243	10	0	314	43	193	68	0	304	1017			
% Cars	90.9	88.2	90.3	0	89.4	97.2	98.1	95.3	98.6	0	97.2	96.8	94.2	100	0	94.9	97.7	92.8	98.6	0	94.7	94.7			
Trucks	1	8	6	0	15	8	2	5	1	0	8	2	15	0	0	17	1	15	1	0	17	57			
% Trucks	9.1	11.8	9.7	0	10.6	2.8	1.9	4.7	1.4	0	2.8	3.2	5.8	0	0	5.1	2.3	7.2	1.4	0	5.3	5.3			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peds					3	-					3	-					1	-					0	-	7
% Peds					42.9	-					42.9	-					14.3	-					0	-	

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Intersection: 16th St E & 16th Ave E
Site Code: 2233100004
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th St E runs E/W

North Approach

	Out	In	Total
	234	143	377
	9	20	29
	0	0	0
Totals	243	163	406

16th Ave E

	0	0	0	0
	6	3	0	0
	88	118	28	0
Totals	94	121	28	0

East Approach

	Out	In	Total
	475	450	925
	17	6	23
	0	0	0
Totals	492	456	948

16th St E

				Totals
	0	0	0	0
	0	4	49	53
	0	5	320	325
	0	1	73	74

Peds: 5

Peds: 2



Peds: 2

16th St E

Totals			
0	0	0	0
10	8	2	0
408	393	15	0
74	74	0	0

Peds: 2

West Approach

	Out	In	Total
	442	625	1067
	10	21	31
	0	0	0
Totals	452	646	1098

Totals				
144	144	86	102	0
0	0	14	1	0
0	0	0	0	0

16th Ave E

South Approach

	Out	In	Total
	332	265	597
	15	4	19
	0	0	0
Totals	347	269	616

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 16th St E & 16th Ave E
 Site Code: 2233100004
 Count Date: Oct 04, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:30 - 17:30)

Start Time	North Approach 16th Ave E						South Approach 16th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehi es
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:30	10	27	23	0	2	60	39	32	21	0	0	92	18	105	5	0	0	128	13	63	14	0	2	90	370
16:45	2	15	22	0	2	39	32	23	26	0	1	81	16	113	3	0	0	132	10	95	25	0	0	130	382
17:00	11	41	28	0	1	80	34	28	39	0	0	101	26	79	2	0	2	107	14	81	21	0	0	116	404
17:15	5	38	21	0	0	64	39	17	17	0	1	73	14	111	0	0	0	125	16	86	14	0	0	116	378
Grand Total	28	121	94	0	5	243	144	100	103	0	2	347	74	408	10	0	2	492	53	325	74	0	2	452	1534
Approach %	11.5	49.8	38.7	0	-	-	41.5	28.8	29.7	0	-	-	15	82.9	2	0	-	-	11.7	71.9	16.4	0	-	-	
Totals %	1.8	7.9	6.1	0	15.8	22.6	9.4	6.5	6.7	0	22.6	32.1	4.8	26.6	0.7	0	32.1	29.5	3.5	21.2	4.8	0	29.5	29.5	
PHF	0.64	0.74	0.84	0	0.76	0.86	0.92	0.78	0.66	0	0.86	0.93	0.71	0.9	0.5	0	0.93	0.87	0.83	0.86	0.74	0	0.87	0.95	
Cars	28	118	88	0	234	332	144	86	102	0	332	475	74	393	8	0	475	442	49	320	73	0	442	1483	
% Cars	100	97.5	93.6	0	96.3	95.7	100	86	99	0	95.7	96.5	100	96.3	80	0	96.5	97.8	92.5	98.5	98.6	0	97.8	96.7	
Trucks	0	3	6	0	9	15	0	14	1	0	15	17	0	15	2	0	17	10	4	5	1	0	10	51	
% Trucks	0	2.5	6.4	0	3.7	4.3	0	14	1	0	4.3	3.5	0	3.7	20	0	3.5	2.2	7.5	1.5	1.4	0	2.2	3.3	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peds					5	-					2	-					2	-					2	-	11
% Peds					45.5	-					18.2	-					18.2	-					18.2	-	

Traffic Count Summary

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

20th Ave E - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	0	0	0	0	0	0	5	0	13	0	18	1	18
08:00 - 09:00	0	0	0	0	0	0	15	0	15	0	30	0	30
09:00 - 10:00	0	0	0	0	0	0	70	0	28	0	98	0	98
BREAK													
15:00 - 16:00	0	0	0	0	0	0	156	0	76	0	232	6	232
16:00 - 17:00	0	0	0	0	0	0	151	0	64	0	215	0	215
17:00 - 18:00	0	0	0	0	0	0	126	0	44	0	170	0	170
GRAND TOTAL	0	0	0	0	0	0	523	0	240	0	763	7	763

Traffic Count Summary

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

16th St E - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	20	171	0	0	191	0	0	141	6	0	147	0	338
08:00 - 09:00	34	240	0	0	274	0	0	158	35	0	193	0	467
09:00 - 10:00	67	188	0	0	255	0	0	166	82	0	248	0	503
BREAK													
15:00 - 16:00	50	185	1	0	236	1	0	207	144	0	351	1	587
16:00 - 17:00	74	231	0	0	305	0	0	220	126	0	346	0	651
17:00 - 18:00	57	185	0	0	242	0	0	255	128	0	383	1	625
GRAND TOTAL	302	1200	1	0	1503	1	0	1147	521	0	1668	2	3171



Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 20th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0
07:15	2	0	5	0	7	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1
07:45	1	0	3	0	4	0	0	1	0	1	0	0	0	0	0	0
08:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
08:15	3	0	5	0	8	0	0	0	0	0	0	0	0	0	0	0
08:30	5	0	2	0	7	0	0	0	0	0	0	0	0	0	0	0
08:45	6	0	5	0	11	0	0	2	0	2	0	0	0	0	0	0
09:00	13	0	5	0	18	0	0	0	0	0	0	0	0	0	0	0
09:15	17	0	5	0	22	1	0	1	0	2	0	0	0	0	0	0
09:30	18	0	9	0	27	1	0	0	0	1	0	0	0	0	0	0
09:45	20	0	8	0	28	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	88	0	52	0	140	2	0	4	0	6	0	0	0	0	0	1

Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

South Approach - 20th Ave E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	37	0	24	0	61	0	0	2	0	2	0	0	1	0	1	2
15:15	44	0	21	0	65	1	0	1	0	2	0	0	0	0	0	0
15:30	34	0	13	0	47	0	0	0	0	0	0	0	0	0	0	0
15:45	40	0	13	0	53	0	0	1	0	1	0	0	0	0	0	4
16:00	43	0	12	0	55	0	0	0	0	0	0	0	0	0	0	0
16:15	39	0	17	0	56	0	0	0	0	0	0	0	0	0	0	0
16:30	42	0	14	0	56	1	0	0	0	1	0	0	0	0	0	0
16:45	26	0	20	0	46	0	0	1	0	1	0	0	0	0	0	0
17:00	32	0	20	0	52	0	0	0	0	0	0	0	0	0	0	0
17:15	30	0	9	0	39	0	0	0	0	0	0	0	0	0	0	0
17:30	32	0	9	0	41	0	0	0	0	0	0	0	0	0	0	0
17:45	32	0	6	0	38	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	431	0	178	0	609	2	0	5	0	7	0	0	1	0	1	6
GRAND TOTAL	519	0	230	0	749	4	0	9	0	13	0	0	1	0	1	7



Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	5	30	0	0	35	0	2	0	0	2	0	0	0	0	0	0
07:15	3	32	0	0	35	0	1	0	0	1	0	0	0	0	0	0
07:30	3	41	0	0	44	0	2	0	0	2	0	0	0	0	0	0
07:45	8	58	0	0	66	1	5	0	0	6	0	0	0	0	0	0
08:00	9	54	0	0	63	0	4	0	0	4	0	0	0	0	0	0
08:15	2	55	0	0	57	0	5	0	0	5	0	0	0	0	0	0
08:30	7	63	0	0	70	0	3	0	0	3	0	0	0	0	0	0
08:45	16	53	0	0	69	0	3	0	0	3	0	0	0	0	0	0
09:00	12	46	0	0	58	2	2	0	0	4	0	0	0	0	0	0
09:15	15	41	0	0	56	0	1	0	0	1	0	0	0	0	0	0
09:30	15	44	0	0	59	0	5	0	0	5	0	0	0	0	0	0
09:45	23	46	0	0	69	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	118	563	0	0	681	3	36	0	0	39	0	0	0	0	0	0



Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

East Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	17	52	0	0	69	1	2	0	0	3	0	1	0	0	1	0
15:15	10	46	0	0	56	1	1	0	0	2	0	0	0	0	0	0
15:30	12	47	0	0	59	0	2	0	0	2	0	0	1	0	1	1
15:45	9	33	0	0	42	0	1	0	0	1	0	0	0	0	0	0
16:00	22	47	0	0	69	0	4	0	0	4	0	1	0	0	1	0
16:15	21	57	0	0	78	0	4	0	0	4	0	0	0	0	0	0
16:30	19	58	0	0	77	0	3	0	0	3	0	0	0	0	0	0
16:45	11	50	0	0	61	1	6	0	0	7	0	1	0	0	1	0
17:00	19	43	0	0	62	0	5	0	0	5	0	0	0	0	0	0
17:15	16	37	0	0	53	0	4	0	0	4	0	0	0	0	0	0
17:30	11	52	0	0	63	0	3	0	0	3	0	0	0	0	0	0
17:45	11	40	0	0	51	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	178	562	0	0	740	3	36	0	0	39	0	3	1	0	4	1
GRAND TOTAL	296	1125	0	0	1421	6	72	0	0	78	0	3	1	0	4	1



Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	0	32	1	0	33	0	6	0	0	6	0	0	0	0	0	0
07:15	0	28	1	0	29	0	1	0	0	1	0	0	0	0	0	0
07:30	0	28	1	0	29	0	3	0	0	3	0	0	0	0	0	0
07:45	0	38	3	0	41	0	5	0	0	5	0	0	0	0	0	0
08:00	0	31	3	0	34	0	4	0	0	4	0	0	0	0	0	0
08:15	0	39	6	0	45	0	3	0	0	3	0	0	0	0	0	0
08:30	0	33	8	0	41	0	5	1	0	6	0	0	0	0	0	0
08:45	0	40	17	0	57	0	3	0	0	3	0	0	0	0	0	0
09:00	0	39	15	0	54	0	2	0	0	2	0	0	0	0	0	0
09:15	0	31	17	0	48	0	5	3	0	8	0	0	0	0	0	0
09:30	0	45	23	0	68	0	4	0	0	4	0	0	0	0	0	0
09:45	0	37	24	0	61	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	0	421	119	0	540	0	44	4	0	48	0	0	0	0	0	0



Traffic Count Data

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Municipality: Owen Sound
 Count Date: Oct 04, 2022

West Approach - 16th St E

Start Time	Cars					Trucks					Bicycles					Total Peds
	←	↑	→	↺	Total	←	↑	→	↺	Total	←	↑	→	↺	Total	
15:00	0	39	36	0	75	0	3	0	0	3	0	0	0	0	0	1
15:15	0	66	33	0	99	0	2	0	0	2	0	0	0	0	0	0
15:30	0	43	41	0	84	0	3	0	0	3	0	0	0	0	0	0
15:45	0	47	34	0	81	0	4	0	0	4	0	0	0	0	0	0
16:00	0	47	33	0	80	0	1	0	0	1	0	0	0	0	0	0
16:15	0	56	28	0	84	0	1	0	0	1	0	0	0	0	0	0
16:30	0	49	32	0	81	0	3	2	0	5	0	0	0	0	0	0
16:45	0	62	31	0	93	0	1	0	0	1	0	0	0	0	0	0
17:00	0	65	39	0	104	0	0	0	0	0	0	1	0	0	1	0
17:15	0	65	24	0	89	0	1	0	0	1	0	0	0	0	0	0
17:30	0	65	30	0	95	0	3	0	0	3	0	0	0	0	0	0
17:45	0	52	35	0	87	0	3	0	0	3	0	0	0	0	0	1
SUBTOTAL	0	656	396	0	1052	0	25	2	0	27	0	1	0	0	1	2
GRAND TOTAL	0	1077	515	0	1592	0	69	6	0	75	0	1	0	0	1	2

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 09:00:00
To: 10:00:00

Intersection: 16th St E & 20th Ave E
Site Code: 2233100005
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th St E runs E/W

North Approach

	Out	In	Total
	0	0	0
	0	0	0
	0	0	0
Totals	0	0	0

20th Ave E

	0	0	0	0
	0	0	0	0
	0	0	0	0
Totals	0	0	0	0

East Approach

	Out	In	Total
	242	179	421
	13	15	28
	0	0	0
Totals	255	194	449

16th St E

				Totals
	0	0	0	0
	0	0	0	0
	0	14	152	166
	0	3	79	82

Peds: 0

Peds: 0



Peds: 0

Peds: 0

16th St E

Totals			
0	0	0	0
0	0	0	0
188	177	11	0
67	65	2	0

West Approach

	Out	In	Total
	231	245	476
	17	13	30
	0	0	0
Totals	248	258	506

Totals				
	70	0	28	0
	68	0	27	0
	2	0	1	0
	0	0	0	0

20th Ave E

South Approach

	Out	In	Total
	95	144	239
	3	5	8
	0	0	0
Totals	98	149	247

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Count Date: Oct 04, 2022
 Period: 07:00 - 10:00

Peak Hour Data (09:00 - 10:00)

Start Time	North Approach 20th Ave E						South Approach 20th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
09:00	0	0	0	0	0	0	13	0	5	0	0	18	14	48	0	0	0	62	0	41	15	0	0	56	136
09:15	0	0	0	0	0	0	18	0	6	0	0	24	15	42	0	0	0	57	0	36	20	0	0	56	137
09:30	0	0	0	0	0	0	19	0	9	0	0	28	15	49	0	0	0	64	0	49	23	0	0	72	164
09:45	0	0	0	0	0	0	20	0	8	0	0	28	23	49	0	0	0	72	0	40	24	0	0	64	164
Grand Total	0	0	0	0	0	0	70	0	28	0	0	98	67	188	0	0	0	255	0	166	82	0	0	248	601
Approach %	0	0	0	0	-	-	71.4	0	28.6	0	-	-	26.3	73.7	0	0	-	0	66.9	33.1	0	-	-		
Totals %	0	0	0	0	0	11.6	0	4.7	0	16.3	11.1	31.3	0	0	42.4	0	27.6	13.6	0	41.3					
PHF	0	0	0	0	0	0.88	0	0.78	0	0.88	0.73	0.96	0	0	0.89	0	0.85	0.85	0	0.86	0.92				
Cars	0	0	0	0	0	68	0	27	0	95	65	177	0	0	242	0	152	79	0	231	568				
% Cars	0	0	0	0	0	97.1	0	96.4	0	96.9	97	94.1	0	0	94.9	0	91.6	96.3	0	93.1	94.5				
Trucks	0	0	0	0	0	2	0	1	0	3	2	11	0	0	13	0	14	3	0	17	33				
% Trucks	0	0	0	0	0	2.9	0	3.6	0	3.1	3	5.9	0	0	5.1	0	8.4	3.7	0	6.9	5.5				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peds					0	-				0	-				0	-				0	-	0			
% Peds					0	-				0	-				0	-				0	-				

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Intersection: 16th St E & 20th Ave E
Site Code: 2233100005
Count Date: Oct 04, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: 16th St E runs E/W

North Approach

	Out	In	Total
	0	0	0
	0	0	0
	0	0	0
Totals	0	0	0

20th Ave E

	0	0	0	0
	0	0	0	0
	0	0	0	0
Totals	0	0	0	0

East Approach

	Out	In	Total
	278	303	581
	19	6	25
	1	1	2
Totals	298	310	608

16th St E

				Totals
	0	0	0	0
	0	0	0	0
	1	5	232	238
	0	2	130	132

Peds: 0

Peds: 0



Peds: 0

Peds: 0

16th St E

Totals			
0	0	0	0
0	0	0	0
227	208	18	1
71	70	1	0

West Approach

	Out	In	Total
	362	347	709
	7	19	26
	1	1	2
Totals	370	367	737

Totals				
	140	0	72	0
	139	0	71	0
	1	0	1	0
	0	0	0	0

20th Ave E

South Approach

	Out	In	Total
	210	200	410
	2	3	5
	0	0	0
Totals	212	203	415

- Cars

- Trucks

- Bicycles

Comments



Peak Hour Summary

Intersection: 16th St E & 20th Ave E
 Site Code: 2233100005
 Count Date: Oct 04, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:15 - 17:15)

Start Time	North Approach 20th Ave E						South Approach 20th Ave E						East Approach 16th St E						West Approach 16th St E						Total Vehi es
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:15	0	0	0	0	0	0	39	0	17	0	0	56	21	61	0	0	0	82	0	57	28	0	0	85	223
16:30	0	0	0	0	0	0	43	0	14	0	0	57	19	61	0	0	0	80	0	52	34	0	0	86	223
16:45	0	0	0	0	0	0	26	0	21	0	0	47	12	57	0	0	0	69	0	63	31	0	0	94	210
17:00	0	0	0	0	0	0	32	0	20	0	0	52	19	48	0	0	0	67	0	66	39	0	0	105	224
Grand Total	0	0	0	0	0	0	140	0	72	0	0	212	71	227	0	0	0	298	0	238	132	0	0	370	880
Approach %	0	0	0	0	-	-	66	0	34	0	-	-	23.8	76.2	0	0	-	0	64.3	35.7	0	-	-		
Totals %	0	0	0	0	0	0	15.9	0	8.2	0	24.1	8.1	25.8	0	0	33.9	0	27	15	0	42				
PHF	0	0	0	0	0	0	0.81	0	0.86	0	0.93	0.85	0.93	0	0	0.91	0	0.9	0.85	0	0.88	0.98			
Cars	0	0	0	0	0	0	139	0	71	0	210	70	208	0	0	278	0	232	130	0	362	850			
% Cars	0	0	0	0	0	0	99.3	0	98.6	0	99.1	98.6	91.6	0	0	93.3	0	97.5	98.5	0	97.8	96.6			
Trucks	0	0	0	0	0	0	1	0	1	0	2	1	18	0	0	19	0	5	2	0	7	28			
% Trucks	0	0	0	0	0	0	0.7	0	1.4	0	0.9	1.4	7.9	0	0	6.4	0	2.1	1.5	0	1.9	3.2			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2			
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0.3	0	0.4	0	0	0.3	0.2			
Peds					0	-					0	-					0	-					0	-	0
% Peds					0	-					0	-					0	-					0	-	

Appendix C

Signal Timing Plans

Robin Marinac

From: Peter Paquette <ppaquette@owensound.ca>
Sent: November 8, 2022 2:07 PM
To: Robin Marinac
Subject: RE: 2022-032 Signal Timing Plan Requests

Robin
See answers below in red.

From: Robin Marinac <robin.marinac@cghtransportation.com>
Sent: Tuesday, November 8, 2022 12:10 PM
To: Peter Paquette <ppaquette@owensound.ca>
Cc: Alexander McPherson <alex.mcpherson@cghtransportation.com>
Subject: RE: 2022-032 Signal Timing Plan Requests

Hi Peter,

Thank you for providing the signal timing plan information below. I have a couple questions which I have summarized below that I am hoping you can help me with.

16th Street & 18th Avenue (#19)

- We will use minimum green, amber, and red times from OTM Book 12 unless otherwise indicated. Please advise if there are times you would prefer that we use which deviate from what is required in OTM Book 12. **Here are the left turn times.** This is from an old time card but I expect it should be ok.

1. TIMING DATA

controller

CONTROLLER TIMING DATA 16 & 18	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
PHASE												
MIN GRN	10	10	10	25	10	10	10	25				
BIKE GRN												
CS MGRN												
WALK		15		15		15		15				
PED CLR		10		10		10		10				
VEH EXT	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
VEH EXT 2	0	0	0	0	0	0	0	0				
MAX EXT	0	0	0	0	0	0	0	0				
MAX1	30	30	10	35	30	30	10	35				
MAX2	40	40	40	40	40	40	40	40				
MAX3	0	0	0	0	0	0	0	0				
DET MAX												
YELLOW	3	4	3	4	3	4	3	4				
RED CLR	1	2	1	2	1	2	1	2				
RD RVT	2	2	2	2	2	2	2	2				
ACT B4	0	0	0	0	0	0	0	0				
SEC/ACT	0	0	0	0	0	0	0	0				
MAX INI	30	30	30	30	30	30	30	30				
TIME B4	0	0	0	0	0	0	0	0				
CARS WT	0	0	0	0	0	0	0	0				
TTREDUC	0	0	0	0	0	0	0	0				
MIN GAP	0	0	0	0	0	0	0	0	0	0	0	0

[click here for main menu](#)

[click here for sub-menu](#)

- The split time allocated to phase 1 and phase 5 is 35 seconds, and the split time allocated to phase 2 and phase 6 is 21 seconds. Should these times be switched or is this correct? **This is correct**
- Additionally, we would expect the main phases (2&6) to be assigned to the EBT and WBT phases. As shown below, this is not the case. Is this correct? **This is also correct.**
- What does PIU stand for? **Phase in Use.**

16th Street & 16th Avenue (#20)

- What max green time should be used for the left-turn phases? **(25 sec)**
- We will use amber, and red times from OTM Book 12 unless otherwise indicated. Please advise if there are times you would prefer that we use which deviate from what is required in OTM Book 12.

Amber times are 4 sec for phase 2468 and 3 sec for Left turns All red is 2 sec for everything

Thank you in advance for your help!

Kind regards,
Robin Marinac



Robin Marinac, EIT
CGH Transportation Inc.
 P: 437-242-5183
 E: robin.marinac@cghtransportation.com

From: Peter Paquette <ppaquette@owensound.ca>
Sent: July 27, 2022 2:08 PM

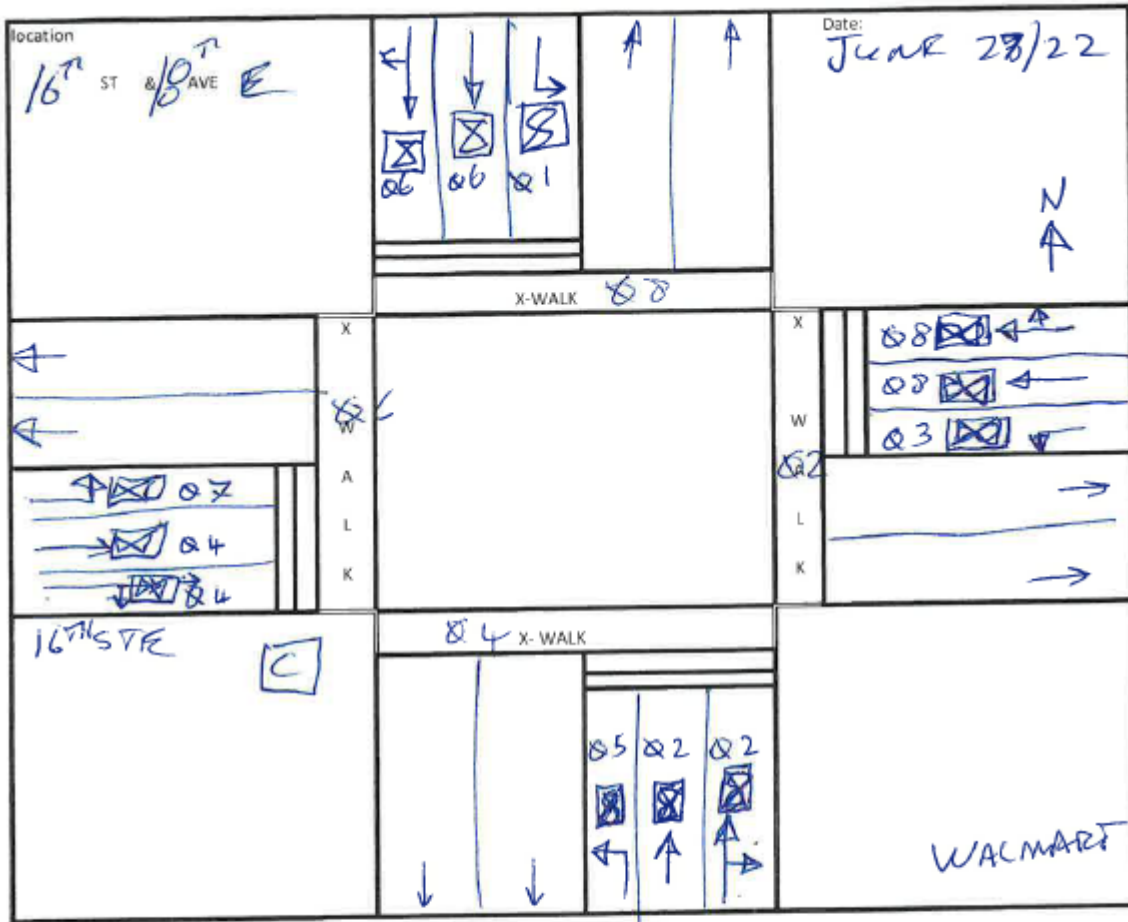
To: Robin Marinac <robin.marinac@cghtransportation.com>

Subject: FW: 2022-032 Signal Timing Plan Requests

Robin

Please find the signal time plans below

19



Signal timing

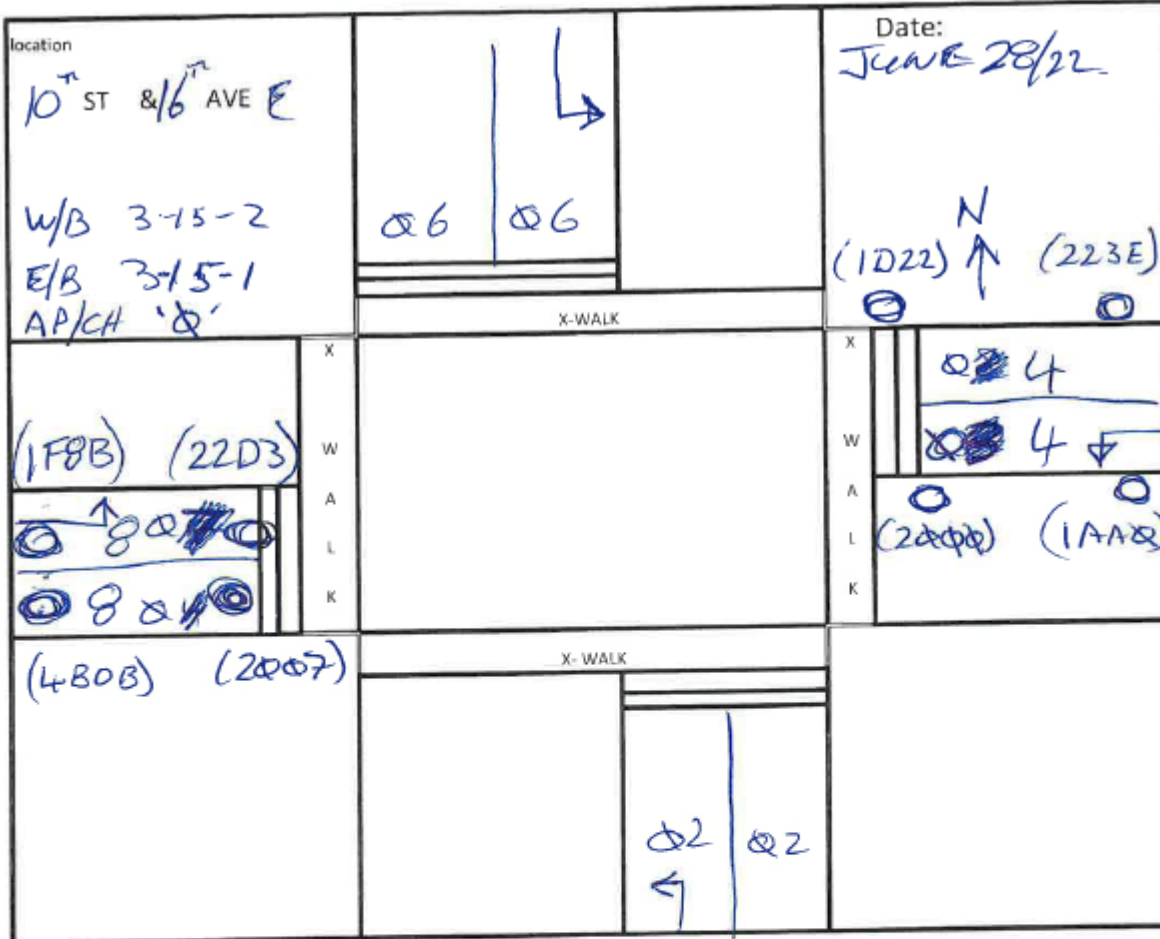
PHASE	1	2	3	4	5	6	7	8
MIN GR		10		25		10		25
YELLOW		4		4		4		4
ALL RED		2		2		2		2
WALK		15		15		15		15
DON'T W		10		10		10		10
Max								
EXT		5		5		5		5
SAT	35	21	10	34	35	21	10	34
Cycle length	100							
Offset								
	X	X	X	X	X	X	X	X

DIU

BULL DOG BUTTONS

12 LOOPS -

#6

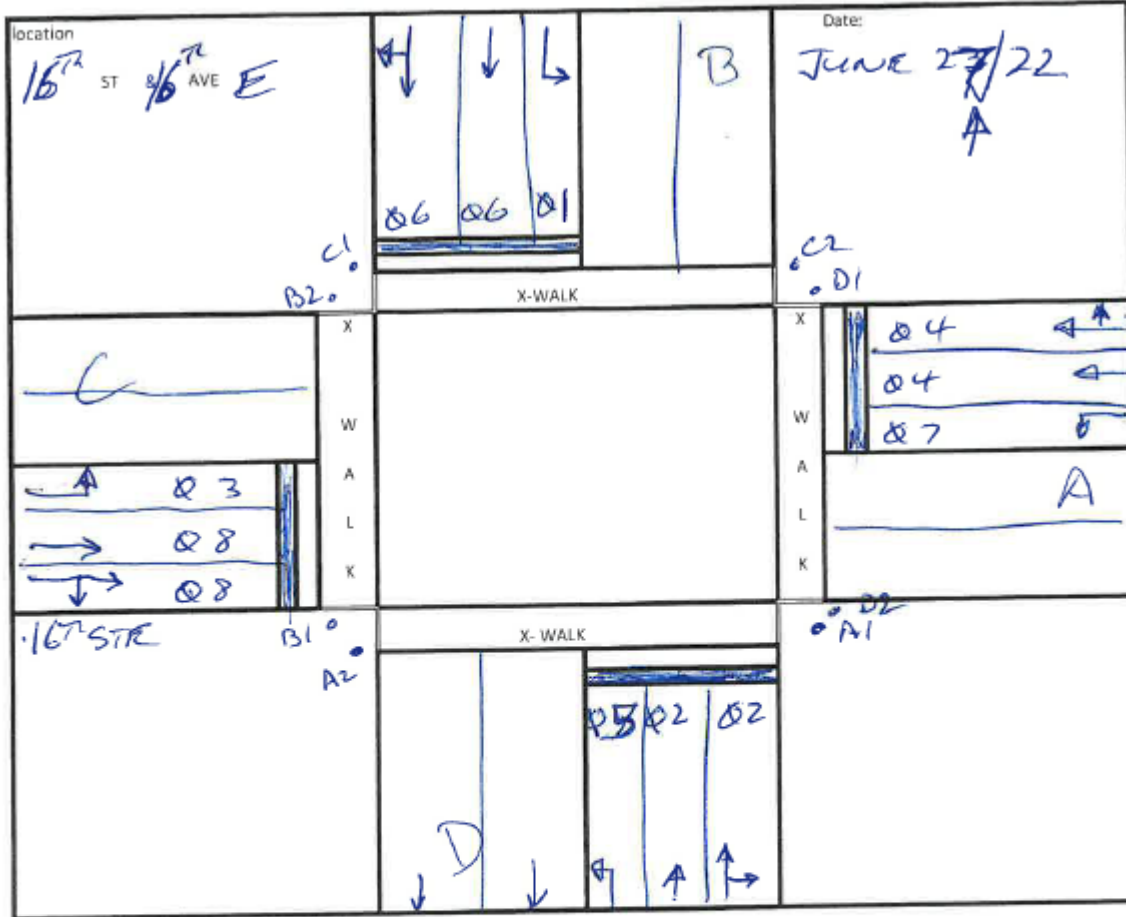


ALL 8 Pucks
INSTALLED
MARCH 18/
2019

PHASE	Signal timing							
	1	2	3	4	5	6	7	8
MIN GR	5	30	5	10	5	30	5	10
YELLOW		4		4		4		4
ALL RED		2		2		2		2
WALK		10		10		10		10
DON'T W		20		20		20		20
Max		30		30		30		30
EXT		5		5		5		5
PIU		X		X		X		X
Cycle length								
Offset								
REC	V	X				X		
	P	X				X		

SENSORS PUCKS

#20



Signal timing

PHASE	1	2	3	4	5	6	7	8
MIN GR	5	10	5	23	5	10	5	23
YELLOW	4		4		4		4	
ALL RED	2		2		2		2	
WALK	15		13		15		13	
DON'T W	10		10		10		10	
Max	25		30		25		30	
EXT	5		5		5		5	
DK	X	X	X	X	X	X	X	X
Cycle length								
Offset								

PROVISION 2020
POLAR BUTTON
Control

NO RECALL

From: Robin Marinac <robin.marinac@cghtransportation.com>
Sent: Wednesday, July 27, 2022 1:54 PM
To: Peter Paquette <ppaquette@owensound.ca>
Cc: Alexander McPherson <alex.mcpherson@cghtransportation.com>
Subject: RE: 2022-032 Signal Timing Plan Requests

Hi Peter,

I just wanted to follow-up on this. Would you be able to provide these at your earliest convenience?

Kind regards,
Robin Marinac



Robin Marinac, EIT
CGH Transportation Inc.
P: 437-242-5183
E: robin.marinac@cghtransportation.com

From: Robin Marinac
Sent: June 16, 2022 9:17 AM
To: Peter Paquette <ppaquette@owensound.ca>
Cc: Alexander McPherson <alex.mcpherson@cghtransportation.com>
Subject: 2022-032 Signal Timing Plan Requests

Good morning Peter,

We would like to request the signal timing plans for the three intersections listed below:

- 18th Avenue East at 16th Street East
- 10th Street East at 16th Avenue East
- 16th Street East at 16th Avenue East

This information will be used within a Traffic Impact Study being prepared in the area.

Kind regards,
Robin Marinac



Robin Marinac, EIT
CGH Transportation Inc.
P: 437-242-5183
E: robin.marinac@cghtransportation.com

PROGRAMMING REFERENCE

ASC/2 MAIN MENU

- | | |
|----------------------------------|-----------------------------------|
| 1. CONFIGURATION | 6. DETECTORS |
| 2. CONTROLLER | 7. STATUS DISPLAY |
| 3. COORDINATOR | 8.UTILITIES |
| 4.PREEMPTOR | 9.DIAGNOSTICS |
| 5. NIC/TOD | |

CONFIGURATION SUB-MENU

- | | |
|------------------------------------|--|
| 1. CONTROLLER SEQ | 6. PORT 3 |
| 2. PHASES IN USE | 7. ENABLE LOGGING |
| 3. PH TO LS ASSIGN | 8. OPTIONS |
| 4. SDLC OPTIONS | 9. MMU PROGRAM |
| 5. PORT 2 | click here for main menu |

CONTROLLER SUB-MENU

- | | |
|--------------------------------------|--|
| 1. TIMING DATA | 6. START / FLASH DATA |
| 2. PH OVERLAP ASSIGN | 7. NO SERVE PHASES |
| 3. PED CARRYOVER | 8. DIMMING |
| 4. RECALL DATA | 9. OPTION DATA |
| 5. OVERLAP DATA | click here for main menu |

COORDINATOR SUBMENU

- | | |
|--|--|
| 1. OPTIONS | |
| 2. MANUAL AND SPLIT DEMAND | |
| 3. AUTO PERM MIN GREEN | |
| 4. PATTERN DATA | click here for main menu |

PREEMPTOR SUBMENU

- | | |
|---------------------------------------|--|
| 1. PRIORITY PREEMPT 1 | 5. PRIORITY PREEMPT 5 |
| 2. PRIORITY PREEMPT 2 | 6. PRIORITY PREEMPT 6 |
| 3. PRIORITY PREEMPT 3 | 7. BUS PREEMPTORS |
| 4. PRIORITY PREEMPT 4 | click here for main menu |

NIC / TOD SUBMENU

- [1. CLOCK / CALENDAR](#)
- [2. WEEKLY PROGRAM](#)
- [3. YEARLY PROGRAM](#)
- [4. HOLIDAYS](#)
- [5. NIC PROG STEPS](#)
- [6. TOD PROG STEPS](#) [click here for main menu](#)

DETECTOR SUBMENU

- | | |
|-------------------------------------|-----------------------------------|
| 1. TYPE / TIMERS | 5. SPEED DETS |
| 2. PHASE ASSIGN | 6. VEH DIAG PLANS |
| 3. PED / SYS ASSIGN | 7. PED DIAG PLANS |
| 4. CROSS SWITCHING | 8. DIAG INTERVALS |

STATUS DISPLAY SUBMENU

- | | |
|----------------|--|
| 1. CONTROLLER | 5. TELEMETRY |
| 2. COORDINATOR | 6. DETECTORS |
| 3. PLREEMPTOR | 7. FLASH / MMU STATUS |
| 4. NIC / TOD | click here for main menu |

UTILITIES SUBMENU

- | | |
|-----------------|----------------|
| 1. COPY | 5. SIGN ON |
| 2. MEMORY CLEAR | 6. LOG BUFFERS |
| 3. PRINT | 7. SEND D.M. |
| 4. RESERVED | 8. CUSTOM APPL |

DIAGNOSTICS SUBMENU

- | | |
|-------------|--------------------|
| 1. INPUTS | 5. OVERLAP PROGRAM |
| 2. OUTPUTS | 6. TELEMETRY |
| 3. DISPLAY | 7. LOOPBACK |
| 4. KEYBOARD | |

1.CONTROLLER SEQ

CONTROLLER SEQUENCE												<i>configuratioin</i>	
.....PRIORITY.....													
	1..	2..	3..	4..	5..	6..	7..	8..	9..	0..	1..	2..	
R1	1	2	3	4	9	10	0	0	0	0	0	0	1 1 1
R2	5	6	7	8	11	12	0	0	0	0	0	0	
CG	.	.	.	.	.	.	.	.	.	.	.	.

R1, R2 = RING 1 AND 2 PHASE ASSIGNMENT

CG = BARRIER LOCATION BETWEEN
CONCURRENT PHASE TIMING GROUPS

[click here for main menu](#) [click here for sub-menu](#)

2. PHASES IN USE

PHASES IN USE												<i>configuratioin</i>	
.....PHASE NUMBERS.....													
	1..	2..	3..	4..	5..	6..	7..	8..	9..	0..	1..	2..	
PHASES IN USE		x		x		x		x					1 1 1
EXCLUSIVE PED													

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3. PH TO LS ASSIGN

PHASE TO LOAD SWITCH (MMU) ASSIGNMENT						<i>configuratioin</i>
LOAD SWITCH (MMU) CHANNEL	SIGNAL DRIVER GROUP PH/OLAP	PED	LOAD SWITCH (MMU) CHANNEL	SIGNAL DRIVER GROUP PH/OLAP	PED	
1	1	.	9	2	x	
2	13	.	10	4	x	
3	3	.	11	6	x	
4	4	.	12	8	x	
5	5	.	13	10		
6	6	.	14	14		
7	7	.	15	15		
8	8	.	16	16		

ENTER 13 -16 FOR OVERLAPS A - D

[click here for main menu](#) [click here for sub-menu](#)

4. SLDC OPTIONS

SLDC OPTIONS / ENABLES								
	<i>configuration</i>							
	1	2	3	4	5	6	7	8
TERM AND FACILITIES	x	x						
DETECTOR RACK	x							
TYPE 2 RUNS AS TYPE 1							<input checked="" type="checkbox"/>
MMU DISABLE							<input type="checkbox"/>
DIAGNOSTIC ENABLE (TEST FIXTURE)	.....						
PEER TO PEER ENABLE	.....						
PEER TO PEER ADDRESSES								
1) 255	2) 255	3) 255	4) 255	5) 255				
6) 255	7) 255	8) 255	9) 255	10) 255				

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5. PORT 2

PORT 2 CONFIGURATION	
	<i>configuration</i>
PORT2 PROTOCOL.....	TERMNL
PORT2 ENABLE.....	NO
AB3418 ADDRESS.....	0
AB3418 GROUP ADDRESS.....	0
AB3418 RESPONSE DELAY.....	0
AB3418 SINGLE FLAG ENABLE.....	NO
AB3418 DROP-OUT TIME.....	0
AB3418 TOD SF SELECT.....	0
DTE / DCE SELECT.....	1200
DATA, PARITY, STOP.....	7,E,1

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[click here for sub-menu](#)

6. PORT 3

PORT 3 CONFIGURATION	
	<u>configuration</u>
PORT 2 PROTOCOL.....	TELEM
PORT2 ENABLE.....	YES
TELEMETRY ADDRESS.....	2
SYSTEM DETECTOR 9 -16 ADDRESS.....	0
TELEMETRY RESPONSE DELAY.....	6000
AB3418 ADDRESS.....	0
AB3418 GROUP ADDRESS.....	0
AB3418 RESPONSE DELAY.....	0
AB3418 SINGLE FLAG ENABLE.....	NO
AB3418 DROP-OUT TIME.....	0
AB3418 TOD SF SELECT.....	0
DUPLEX - HALF OR FULL.....	FULL
MODEM DATA RATE (BPS).....	1200
DATA, PARITY, STOP.....	8,O,1
click here for main menu	click here for sub-menu

7. ENABLE LOGGING

ENABLE EVENT LOGS	
	<u>configuration</u>
CRITICAL RFE'S (MMU/TF).....	X
NON-CRITICAL RFE'S (DET/TEST).....	X
DETECTOR ERRORS.....	X
MMU FLASH FAULTS.....	X
LOCAL FLASH FAULTS.....	X
PREEMPT.....	
POWER ON/OFF.....	
LOW BATTERY.....	
SPARE.....	
ALARM 1.....	
ALARM 2.....	
ALARM 3.....	
ALARM 4.....	
ALARM 5.....	
ALARM 6.....	
ALARM 7.....	
ALARM 8.....	
ALARM 9.....	
ALARM 10.....	
click here for main menu	click here for sub-menu

8. OPTIONS

OPTIONS

configuration

SUPERVISOR ACCESS CODE..... 0000
 DATA CHANGE ACCESS CODE..... 0000
 KEY CLICK ENABLE..... YES
 BACKLIGHT ENABLE..... YES

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9. MMU PROGRAM

MMU PROGRAM

configuration

CAN SERVE WITH

PHASE	1 1 1 1 1 1 1														
	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2
1															
2						X		X			X				
3					X				X	X					
4					X		X		X	X					
5															
6						X		X							
7							X								
8					X		X								
9						X									
10					X										
11															
12															
13															
14															
15															

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1. TIMING DATA

controller

CONTROLLER TIMING DATA												
PHASE	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
MIN GRN		40		10		40		10				
BIKE GRN												
CS MGRN												
WALK		20		0		20		15				
PED CLR		20		20		20		20				
VEH EXT		5.0		5.0		5.0		5.0				
VEH EXT 2												
MAX EXT												
MAX1		40		35		40		35				
MAX2		40		35		40		35				
MAX3		40		35		40		35				
DET MAX												
YELLOW		4		4		4		4				
RED CLR		3		2		3		2				
RD RVT		2		2		2		2				
ACT B4												
SEC/ACT												
MAX INI												
TIME B4												
CARS WT												
TTREDUC												
MIN GAP	0	0	0	0	0	0	0	0	0	0	0	0

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2. PH OVLP ASSIGN

PHASE OVERLAP ASSIGNMENTS

OVERLAP CONSISTS OF PHASES controller

OVLP PHASE	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
1	X											
2		X										
3			X									
4				X								
5					X							
6						X						
7							X					
8								X				
9									X			
10										X		
11											X	
12												X

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3. PED CARRYOVER

PED TIMING CARRYOVER		controller
PHASE	CARRYOVER PHASE	
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	

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4. RECALL DATA

CONTROLLER RECALL DATA												
PHASE	controller											
	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
LOCKING MEMORY												
VEHICLE RECALL		X				X						
PED RECALL		X				X						
RECALL TO MAX												
SOFT RECALL												
DON'T REST HERE												
PED DARK N/CALL												

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5. OVERLAP DATA

controller

OVERLAP A	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD	X	X										
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>ADVANCE GREEN TIMER 0.0</p> <p>LAG / LEAD GREEN TIMER 0.0</p> <p>LAG / LEAD YELLOW TIMER 0.0</p> <p>LAG / LEAD RED TIMER 0.0</p> </div> <div style="width: 50%; text-align: center;"> <p>click here for main menu click here for sub-menu</p> </div> </div>												

OVERLAP B	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>ADVANCE GREEN TIMER 0.0</p> <p>LAG / LEAD GREEN TIMER 0.0</p> <p>LAG / LEAD YELLOW TIMER 0.0</p> <p>LAG / LEAD RED TIMER 0.0</p> </div> <div style="width: 50%; text-align: center;"> <p>click here for main menu click here for sub-menu</p> </div> </div>												

OVERLAP C	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>ADVANCE GREEN TIMER 0.0</p> <p>LAG / LEAD GREEN TIMER 0.0</p> <p>LAG / LEAD YELLOW TIMER 0.0</p> <p>LAG / LEAD RED TIMER 0.0</p> </div> <div style="width: 50%; text-align: center;"> <p>click here for main menu click here for sub-menu</p> </div> </div>												

OVERLAP D	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG / LEAD GREEN TIMER	0.0											
LAG / LEAD YELLOW TIMER	0.0											
LAG / LEAD RED TIMER	0.0								controller			
click here for main menu click here for sub-menu												

6. START / FLASH DATA

CONTROLLER START / FLASH DATA												
												controller
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
POWER START		X				X						
EXTERNAL START		X				X						
ENTRY REM FLASH		X				X						
EXIT REM FLASH		X				X						
REM FLASH YELLOW												
FL TOGETHER PHASES		X		X		X		X				
FL TOGETHER OVERLAPS	A:		B:	X	C:		D:	X				
POWER START.....	YELLOW											
EXTERNAL START.....	YELLOW											
POWER START ALL RED TIME.....	0 SECONDS											
POWER START FLASH TIME	0 SECONDS											
OUT OF FLASH YELLOW.....												
OUT OF FLASH ALL RED.....												
MINIMUM RECALL.....												
SPARE.....												
FLASH THRU LOAD SWITCHES....												
CYCLE THROUGH PHASES.....												
click here for main menu click here for sub-menu												

7. NO SERVE PHASES

controller

CAN NOT SERVE WITH

PHASE	12	11	10	9	8	7	6	5	4	3	2
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

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8. DIMMING

controller

LOAD SWITCH
DIM GRM / WLK
DIM YEL / PC
DIM RED / DW

	1	2	3	4	5	6	7	8

LOAD SWITCH
DIM GRM / WLK
DIM YEL / PC
DIM RED / DW

	9	10	11	12	13	14	15	16

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9.OPTION DATA

controller

CONTROLLER OPTION DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12
GUAR PASSAGE												
NONACTUATED 1		X				X						
NONACTUATED 2				X				X				
DUAL ENTRY		X		X		X		X				
COND SERVICE												
COND RESERVICE												
REST IN WALK		X				X						
FLASHING WALK												

FIVE SECTION LEFT TURN HEADS

5&2 7&4 1&6
3&8 11&10 9&12

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OPTION DATA CONTINUED

controller

DUAL ENTRY.....	ON
COND SERVICE ENABLE.....	OFF
COND SERVICE DET X SWITCHES..	OFF
PED CLR PROTECT.....	OFF
SPEC PREEMPT OVLP FLASH.....	OFF
LOCK DETECTORS IN RED ONLY....	OFF
RESERVED.....	OFF
RESERVED.....	OFF
BACKUP PROTECTION GROUP 1....	ON
BACKUP PROTECTION GROUP 2....	OFF
BACKUP PROTECTION GROUP 3....	OFF
SIMULTANEOUS GAP GROUP 1.....	OFF
SIMULTANEOUS GAP GROUP 2.....	OFF
SIMULTANEOUS GAP GROUP 3.....	OFF

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1. COORDINATOR OPTIONS

coordinator

SPLIT UNITS	SEC	ACT CRD PHASE	
OFFSET UNITS	SEC	ACT WALK/REST	
INTERCNT FMT	STD	INHIBIT MAX	X
INTERCNT SRC	TLM	MAX2 SELECT	
RESYNC COUNT	3	MULTISYNC	
TRANSITION	SMOOTH	FLOAT FORCE OFF	
DWELL PERIOD	0s		
FREE ALTERNATE SEQUENCE	A	B	C D E F

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2. COOR MANUAL AND SPLIT DEMAND

coordinator

MANUAL ENABLE	OFF	MANUAL PATTERN	0
		DEMAND 1	DEMAND 2
SPLIT DEMAND		0s	0
DEMAND CALL TIME		0s	0
DEMAND CYCLE COUNT			
DEMAND PHASE	1	2	3 4 5 6 7 8 9 10 11 12
DEMAND 1 PHASE			
DEMAND 2 PHASE			

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3. COORD AUTO PERM MIN GREEN

coordinator

PHASE	AUTO PERM MIN GRN
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0

click here for main menu [click here for sub-menu](#)

[click here for continuation of coordinator sub-menu Pattern Data](#)

4. PATTERN DATA

coordinator

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS												
PHASE 1		2		3		4						
PHASE 5		6		7		8						
PHASE 9		10		11		12						
VEH PERMISSIVE												
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION RING												
SPL DMD PATTERN												
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASE												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												
click here for main menu click here for sub-menu												

1. PRIORITY PREEMPT 1

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

2. PRIORITY PREEMPT 2

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

3. PRIORITY PREEMPT 3

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES		X				X						
EXIT PHASES				X				X				
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK				NO		
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH				GREEN		
MAX TIME						0	DURATION TIME					
MIN HOLD TIME						10	DELAY TIME					
MIN PED CLEAR						7	INHIBIT TIME					
EXIT MAX						0	HLD DELAY TIME					
						GRN		YEL			RED	
MINIMUM						14	4			2		
TRACK CLEAR						0	0			0		
HOLD						0	0			0		
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

4. PRIORITY PREEMPT 4

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

5. PRIORITY PREEMPT 5

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
<p align="center"> click here for main menu click here for sub-menu preemptor </p>												

6. PRIORITY PREEMPT 6

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
<p align="center"> click here for main menu click here for sub-menu preemptor </p>												

7. BUS PREEMPTORS

	BUS PREEMPTOR											
	1	2	3	4								
PREEMPTOR ACTIVE												
DETECTOR LOCK												
MAXIMUM TIME												
RESERVICE TIME												
DELAY TIME												
INHIBIT TIME												
ENTRANCE GREEN												
ENTRANCE PED CLEAR												
ENTRANCE YELLOW												
ENTRANCE RED												
MIN HOLD TIME												
	HOLD PHASE											
	1	2	3	4	5	6	7	8	9	10	11	12
PREEMPTOR 1												
PREEMPTOR 2												
PREEMPTOR 3												
PREEMPTOR 4												
click here for main menu click here for sub-menu preemptor												

5.NIC/TOD SUBMENU

1. NIC/TOD CLOCK CALENDAR DATA

DATE SET:	YES
TIME SET:	YES
MANUAL NIC PROGRAM STEP	0
MANUAL TOD PROGRAM STEP	0
SYNC REFERENCE TIME	000
SYNC REFERENCE	TIME
WEEK 1 BEGINS ON 1ST SUNDAY	
DISABLE DAYLIGHT SAVINGS	
DST BEGINS LAST SUNDAY	

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2. NIC/TOD WEEKLY PROGRAMS

WEEK	SUN	MION	TUES	WED	THURS	FRI	SAT
1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1

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3. NIC/TOD YEARLY PROGRAMS

WEEK OF YEAR	1	2	3	4	5	6	7	8
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	9	10	11	12	13	14	15	16
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	17	18	19	20	21	22	23	24
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	25	26	27	28	29	30	31	32
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	33	34	35	36	37	38	39	40
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	41	42	43	44	45	46	47	48
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR				49	50	51	52	53
WEEKLY				1	1	1	1	1

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4. NIC/TOD HOLIDAY PROGRAM

HOLIDAY	FLOAT/ FIXED	MON/ MON/	DOW/ DOM	WOM/ YEAR	PROG
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					

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5. NIC PROGRAM STEP

STEP	PGM	TIME	PATTERN	OVER RIDE
1	1	0:00	1	

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to continue with TOD PROGRAM STEPS click here

TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH						DIM ENABLE						
RED REST						ALT VEH EXTSN						
SPARE 5						DET LOG ENABLE						
SPARE 3						SPARE 4						
TYPE 0 DELAY EN						SPARE 2						
DET DIAG PLAN						SPARE 2						
ALTERNATE SEQUENCE		A	B	C	D	E	F					
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERVE INH												
PHASE OMIT												
SPECIAL FCTNS												(1-8)

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TOD PROGRAM STEP												
DAY PGM NUM												
STEP BEGINS												
FLASH						DIM ENABLE						
RED REST						ALT VEH EXTSN						
SPARE 5						DET LOG ENABLE						
SPARE 3						SPARE 4						
TYPE 0 DELAY EN						SPARE 2						
DET DIAG PLAN						SPARE 2						
ALTERNATE SEQUENCE		A	B	C	D	E	F					
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
MAX2 ENABLE												
MAX3 ENABLE												
VEH RECALL												
VEH MAX RECALL												
PED RECALL												
COND SERVE INH												
PHASE OMIT												
SPECIAL FCTNS												(1-8)

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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6.DETECTORS

1. DETECTORS TYPE / TIMERS

DET	TYPE	LOCK	EXTEND	DELAY	NO RESET	LOG ENABLE
1						
2						
3						
4	1			5		
5						
6						
7						
8						
9						
10						
11						
12						

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2. DETECTOR PHASE ASSIGNMENT

DETECTOR	PHASE ASSIGNMENT											
	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

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3. PED AND SYSTEM DETECTOR LOCAL ASSIGNMENT

DETECTOR INTERVAL				MINUTES		
LOCAL PED DET NUMBER	PHASE DETECTOR					
	1	2	3	4	5	6
	1	2	3	4	5	6
	7	8	9	10	11	12
NUMBER	7	8	9	10	11	12
LOCAL SYSTEM NUMBER						
LOCAL PED DET NUMBER	PHASE DETECTOR					
	1	2	3	4	5	6
	0	0	0	0	0	0
	7	8	9	10	11	12
NUMBER	0	0	0	0	0	0

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4. CROSS SWITCHING

DETECTOR	PHASES											
	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												

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5. SPEED DETECTORS

SPEED DET NUMBER	1	2	3	4	5	6	7	8
ONE DETECTOR SPEED								
LOCAL DET NUMBER	0	0	0	0	0	0	0	0
VEHICLE LENGTH	0	0	0	0	0	0	0	0
LOOP LENGTH	0	0	0	0	0	0	0	0
TWO DETECTOR SPEED	0	0	0	0	0	0	0	0
LOCAL DET NUMBER	0	0	0	0	0	0	0	0
SPEED TRAP LENGTH	0	0	0	0	0	0	0	0
ENABLE LOG								
UNITS								

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[click here for VEHICLE DETECTOR DIAGNOSTIC PLAN](#)

6. VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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7. PED DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO	1	2	3	4	5	6	7	8	9	10	11	12
1	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
2	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
3	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
4	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
5	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
6	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
7	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
8	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1

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8. DETECTOR DIAGNOSTIC INTERVAL

DETECTOR DIAGNOSTIC INTERVAL

DIAGNOSTIC NUMBER	NO ACTIVITY	MAX PRES	ERRATIC COUNTS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			

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PROGRAMMING REFERENCE

ASC/2 MAIN MENU

- | | |
|----------------------------------|-----------------------------------|
| 1. CONFIGURATION | 6. DETECTORS |
| 2. CONTROLLER | 7. STATUS DISPLAY |
| 3. COORDINATOR | 8.UTILITIES |
| 4.PREEMPTOR | 9.DIAGNOSTICS |
| 5. NIC/TOD | |

CONFIGURATION SUB-MENU

- | | |
|------------------------------------|--|
| 1. CONTROLLER SEQ | 6. PORT 3 |
| 2. PHASES IN USE | 7. ENABLE LOGGING |
| 3. PH TO LS ASSIGN | 8. OPTIONS |
| 4. SDLC OPTIONS | 9. MMU PROGRAM |
| 5. PORT 2 | click here for main menu |

CONTROLLER SUB-MENU

- | | |
|--------------------------------------|--|
| 1. TIMING DATA | 6. START / FLASH DATA |
| 2. PH OVERLAP ASSIGN | 7. NO SERVE PHASES |
| 3. PED CARRYOVER | 8. DIMMING |
| 4. RECALL DATA | 9. OPTION DATA |
| 5. OVERLAP DATA | click here for main menu |

COORDINATOR SUBMENU

- | | |
|--|--|
| 1. OPTIONS | |
| 2. MANUAL AND SPLIT DEMAND | |
| 3. AUTO PERM MIN GREEN | |
| 4. PATTERN DATA | click here for main menu |

PREEMPTOR SUBMENU

- | | |
|---------------------------------------|--|
| 1. PRIORITY PREEMPT 1 | 5. PRIORITY PREEMPT 5 |
| 2. PRIORITY PREEMPT 2 | 6. PRIORITY PREEMPT 6 |
| 3. PRIORITY PREEMPT 3 | 7. BUS PREEMPTORS |
| 4. PRIORITY PREEMPT 4 | click here for main menu |

NIC / TOD SUBMENU

- [1. CLOCK / CALENDAR](#)
- [2. WEEKLY PROGRAM](#)
- [3. YEARLY PROGRAM](#)
- [4. HOLIDAYS](#)
- [5. NIC PROG STEPS](#)
- [6. TOD PROG STEPS](#) [click here for main menu](#)

DETECTOR SUBMENU

- | | |
|-------------------------------------|-----------------------------------|
| 1. TYPE / TIMERS | 5. SPEED DETS |
| 2. PHASE ASSIGN | 6. VEH DIAG PLANS |
| 3. PED / SYS ASSIGN | 7. PED DIAG PLANS |
| 4. CROSS SWITCHING | 8. DIAG INTERVALS |

STATUS DISPLAY SUBMENU

- | | |
|----------------|--|
| 1. CONTROLLER | 5. TELEMETRY |
| 2. COORDINATOR | 6. DETECTORS |
| 3. PLREEMPTOR | 7. FLASH / MMU STATUS |
| 4. NIC / TOD | click here for main menu |

UTILITIES SUBMENU

- | | |
|-----------------|----------------|
| 1. COPY | 5. SIGN ON |
| 2. MEMORY CLEAR | 6. LOG BUFFERS |
| 3. PRINT | 7. SEND D.M. |
| 4. RESERVED | 8. CUSTOM APPL |

DIAGNOSTICS SUBMENU

- | | |
|-------------|--------------------|
| 1. INPUTS | 5. OVERLAP PROGRAM |
| 2. OUTPUTS | 6. TELEMETRY |
| 3. DISPLAY | 7. LOOPBACK |
| 4. KEYBOARD | |

1.CONTROLLER SEQ

CONTROLLER SEQUENCE												<i>configuration</i>	
.....PRIORITY.....													
	1..	2..	3..	4..	5..	6..	7..	8..	9..	0..	1..	2..	
R1	1	2	3	4	9	10	0	0	0	0	0	0	1 1 1
R2	5	6	7	8	11	12	0	0	0	0	0	0	
CG	.	.	.	.	.	.	.	.	.	.	.	.

R1, R2 = RING 1 AND 2 PHASE ASSIGNMENT

CG = BARRIER LOCATION BETWEEN
CONCURRENT PHASE TIMING GROUPS

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2. PHASES IN USE

PHASES IN USE												<i>configuration</i>	
.....PHASE NUMBERS.....													
	1..	2..	3..	4..	5..	6..	7..	8..	9..	0..	1..	2..	
PHASES IN USE		x		x		x		x					1 1 1
EXCLUSIVE PED													

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3. PH TO LS ASSIGN

PHASE TO LOAD SWITCH (MMU) ASSIGNMENT						<i>configuration</i>
LOAD SWITCH (MMU) CHANNEL	SIGNAL DRIVER GROUP PH/OLAP	PED	LOAD SWITCH (MMU) CHANNEL	SIGNAL DRIVER GROUP PH/OLAP	PED	
1	1	.	9	2	x	
2	13	.	10	4	x	
3	3	.	11	6	x	
4	4	.	12	8	x	
5	5	.	13	10		
6	6	.	14	14		
7	7	.	15	15		
8	8	.	16	16		

ENTER 13 -16 FOR OVERLAPS A - D

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4. SLDC OPTIONS

SLDC OPTIONS / ENABLES								
	<i>configuration</i>							
	1	2	3	4	5	6	7	8
TERM AND FACILITIES	x	x						
DETECTOR RACK	x							
TYPE 2 RUNS AS TYPE 1							<input checked="" type="checkbox"/>
MMU DISABLE							<input type="checkbox"/>
DIAGNOSTIC ENABLE (TEST FIXTURE)	.....						
PEER TO PEER ENABLE	.....						
PEER TO PEER ADDRESSES								
1) 255	2) 255	3) 255	4) 255	5) 255				
6) 255	7) 255	8) 255	9) 255	10) 255				

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5. PORT 2

PORT 2 CONFIGURATION	
	<i>configuration</i>
PORT2 PROTOCOL.....	TERMNL
PORT2 ENABLE.....	NO
AB3418 ADDRESS.....	0
AB3418 GROUP ADDRESS.....	0
AB3418 RESPONSE DELAY.....	0
AB3418 SINGLE FLAG ENABLE.....	NO
AB3418 DROP-OUT TIME.....	0
AB3418 TOD SF SELECT.....	0
DTE / DCE SELECT.....	1200
DATA, PARITY, STOP.....	7,E,1

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6. PORT 3

PORT 3 CONFIGURATION	
	<u>configuration</u>
PORT 2 PROTOCOL.....	TELEM
PORT2 ENABLE.....	YES
TELEMETRY ADDRESS.....	2
SYSTEM DETECTOR 9 -16 ADDRESS.....	0
TELEMETRY RESPONSE DELAY.....	6000
AB3418 ADDRESS.....	0
AB3418 GROUP ADDRESS.....	0
AB3418 RESPONSE DELAY.....	0
AB3418 SINGLE FLAG ENABLE.....	NO
AB3418 DROP-OUT TIME.....	0
AB3418 TOD SF SELECT.....	0
DUPLEX - HALF OR FULL.....	FULL
MODEM DATA RATE (BPS).....	1200
DATA, PARITY, STOP.....	8,O,1
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7. ENABLE LOGGING

ENABLE EVENT LOGS	
	<u>configuration</u>
CRITICAL RFE'S (MMU/TF).....	X
NON-CRITICAL RFE'S (DET/TEST).....	X
DETECTOR ERRORS.....	X
MMU FLASH FAULTS.....	X
LOCAL FLASH FAULTS.....	X
PREEMPT.....	
POWER ON/OFF.....	
LOW BATTERY.....	
SPARE.....	
ALARM 1.....	
ALARM 2.....	
ALARM 3.....	
ALARM 4.....	
ALARM 5.....	
ALARM 6.....	
ALARM 7.....	
ALARM 8.....	
ALARM 9.....	
ALARM 10.....	
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8. OPTIONS

OPTIONS

configuration

SUPERVISOR ACCESS CODE..... 0000
 DATA CHANGE ACCESS CODE..... 0000
 KEY CLICK ENABLE..... YES
 BACKLIGHT ENABLE..... YES

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9. MMU PROGRAM

MMU PROGRAM

configuration

CAN SERVE WITH

PHASE	1 1 1 1 1 1 1														
	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2
1															
2						X		X			X				
3					X				X	X					
4					X		X		X	X					
5															
6						X		X							
7							X								
8					X		X								
9						X									
10					X										
11															
12															
13															
14															
15															

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1. TIMING DATA

controller

CONTROLLER TIMING DATA												
PHASE	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
MIN GRN		40		10		40		10				
BIKE GRN												
CS MGRN												
WALK		17		13		17		13				
PED CLR		23		22		23		22				
VEH EXT		5.0		5.0		5.0		5.0				
VEH EXT 2												
MAX EXT												
MAX1		40		35		40		35				
MAX2		40		35		40		35				
MAX3		40		35		40		35				
DET MAX												
YELLOW		4		4		4		4				
RED CLR		3		2		3		2				
RD RVT		2		2		2		2				
ACT B4												
SEC/ACT												
MAX INI												
TIME B4												
CARS WT												
TTREDUC												
MIN GAP	0	0	0	0	0	0	0	0	0	0	0	0

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2. PH OVLP ASSIGN

PHASE OVERLAP ASSIGNMENTS

OVERLAP CONSISTS OF PHASES controller

OVLP PHASE	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
1	X											
2		X										
3			X									
4				X								
5					X							
6						X						
7							X					
8								X				
9									X			
10										X		
11											X	
12												X

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3. PED CARRYOVER

PED TIMING CARRYOVER		controller
PHASE	CARRYOVER PHASE	
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	

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4. RECALL DATA

CONTROLLER RECALL DATA												
PHASE	controller											
	1...	2...	3...	4...	5...	6...	7...	8...	9...	10...	11...	12...
LOCKING MEMORY												
VEHICLE RECALL		X				X						
PED RECALL		X				X						
RECALL TO MAX												
SOFT RECALL												
DON'T REST HERE												
PED DARK N/CALL												

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5. OVERLAP DATA

OVERLAP A	controller											
	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD	X	X										
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG / LEAD GREEN TIMER	0.0											
LAG / LEAD YELLOW TIMER	0.0											
LAG / LEAD RED TIMER	0.0											
click here for main menu click here for sub-menu												

OVERLAP B	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG / LEAD GREEN TIMER	0.0											
LAG / LEAD YELLOW TIMER	0.0											
LAG / LEAD RED TIMER	0.0											
click here for main menu click here for sub-menu												

OVERLAP C	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG / LEAD GREEN TIMER	0.0											
LAG / LEAD YELLOW TIMER	0.0											
LAG / LEAD RED TIMER	0.0											
click here for main menu click here for sub-menu												

OVERLAP D	1	2	3	4	5	6	7	8	9	10	11	12
STANDARD												
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER	0.0											
LAG / LEAD GREEN TIMER	0.0											
LAG / LEAD YELLOW TIMER	0.0											
LAG / LEAD RED TIMER	0.0								controller			

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6. START / FLASH DATA

CONTROLLER START / FLASH DATA												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
POWER START		X				X						
EXTERNAL START		X				X						
ENTRY REM FLASH		X				X						
EXIT REM FLASH		X				X						
REM FLASH YELLOW												
FL TOGETHER PHASES		X		X		X		X				
FL TOGETHER OVERLAPS	A:		B:	X	C:		D:	X				
POWER START.....	YELLOW											
EXTERNAL START.....	YELLOW											
POWER START ALL RED TIME.....	0 SECONDS											
POWER START FLASH TIME	0 SECONDS											
OUT OF FLASH YELLOW.....												
OUT OF FLASH ALL RED.....												
MINIMUM RECALL.....												
SPARE.....												
FLASH THRU LOAD SWITCHES....												
CYCLE THROUGH PHASES.....												

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7. NO SERVE PHASES

controller

CAN NOT SERVE WITH

PHASE	12	11	10	9	8	7	6	5	4	3	2
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

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8. DIMMING

controller

	1	2	3	4	5	6	7	8
LOAD SWITCH								
DIM GRM / WLK								
DIM YEL / PC								
DIM RED / DW								

	9	10	11	12	13	14	15	16
LOAD SWITCH								
DIM GRM / WLK								
DIM YEL / PC								
DIM RED / DW								

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9. OPTION DATA

controller

CONTROLLER OPTION DATA												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
GUAR PASSAGE												
NONACTUATED 1		X				X						
NONACTUATED 2				X				X				
DUAL ENTRY		X		X		X		X				
COND SERVICE												
COND RESERVICE												
REST IN WALK		X				X						
FLASHING WALK												

FIVE SECTION LEFT TURN HEADS

5&2	7&4	1&6
3&8	11&10	9&12

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OPTION DATA CONTINUED

controller

DUAL ENTRY.....	ON
COND SERVICE ENABLE.....	OFF
COND SERVICE DET X SWITCHES..	OFF
PED CLR PROTECT.....	OFF
SPEC PREEMPT OVLP FLASH.....	OFF
LOCK DETECTORS IN RED ONLY....	OFF
RESERVED.....	OFF
RESERVED.....	OFF
BACKUP PROTECTION GROUP 1....	ON
BACKUP PROTECTION GROUP 2....	OFF
BACKUP PROTECTION GROUP 3....	OFF
SIMULTANEOUS GAP GROUP 1.....	OFF
SIMULTANEOUS GAP GROUP 2.....	OFF
SIMULTANEOUS GAP GROUP 3.....	OFF

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1. COORDINATOR OPTIONS

coordinator

SPLIT UNITS	SEC	ACT CRD PHASE	
OFFSET UNITS	SEC	ACT WALK/REST	
INTERCNT FMT	STD	INHIBIT MAX	X
INTERCNT SRC	TLM	MAX2 SELECT	
RESYNC COUNT	3	MULTISYNC	
TRANSITION	SMOOTH	FLOAT FORCE OFF	
DWELL PERIOD	0s		
FREE ALTERNATE SEQUENCE	A	B	C D E F

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2. COOR MANUAL AND SPLIT DEMAND

coordinator

MANUAL ENABLE	OFF	MANUAL PATTERN	0
		DEMAND 1	DEMAND 2
SPLIT DEMAND		0s	0
DEMAND CALL TIME		0s	0
DEMAND CYCLE COUNT			
DEMAND PHASE	1	2	3 4 5 6 7 8 9 10 11 12
DEMAND 1 PHASE			
DEMAND 2 PHASE			

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3. COORD AUTO PERM MIN GREEN

coordinator

PHASE	AUTO PERM MIN GRN
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0

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[click here for continuation of coordinator sub-menu Pattern Data](#)

4. PATTERN DATA

coordinator

STD FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		C/O/S	

PLAN FORMAT

COORD PATTERN		OFFSET	
CYCLE LENGTH		PLAN	

TS2 FORMAT

COORD PATTERN		TIMING PLAN						
CYCLE LENGTH		OFFSETS	1		2		3	

SPLITS												
PHASE 1		2		3		4						
PHASE 5		6		7		8						
PHASE 9		10		11		12						
VEH PERMISSIVE												
VEH PERM 2 DISP												
PHASE RESERVICE												
SPLIT EXTENSION RING												
SPL DMD PATTERN												
XARTERY PATTERN												
PHASE	1	2	3	4	5	6	7	8	9	10	11	12
COORD PHASE												
VEHICLE RECALL												
VEH MAX RECALL												
PED RECALL												
PHASE OMIT												
SPARE												
	A	B	C	D	E	F						
ALT SEQUENCE												
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1. PRIORITY PREEMPT 1

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

2. PRIORITY PREEMPT 2

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
click here for main menu click here for sub-menu preemptor												

3. PRIORITY PREEMPT 3

	1	2	3	4	5	6	7	8	9	10	11	12	
TERM PHASE OVLP													
TRK CLR PHASE													
HOLD PHASES		X				X							
EXIT PHASES				X				X					
EXIT CALLS													
SPARE													
TERM OVERLAP	A			B			C			D			
ACTIVE						PED DARK				NO			
PRIORITY						PED ACTIVE							
DET LOCK						ZERO PC TIME							
HOLD FLASH						PC THRU YELLOW							
TERM OVLP ASAP						TERM PHASES							
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD							
FLASH ALL OUTPUTS						NO CVM IN FLASH							
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD							
ENABLE MAX PREEMPT TIME						OUT OF FLASH				GREEN			
MAX TIME						0	DURATION TIME						
MIN HOLD TIME						10	DELAY TIME						
MIN PED CLEAR						7	INHIBIT TIME						
EXIT MAX						0	HLD DELAY TIME						
						GRN		YEL			RED		
MINIMUM						14	4			2			
TRACK CLEAR						0	0			0			
HOLD						0	0			0			
LINKED PREEMPTOR													
click here for main menu click here for sub-menu preemptor													

4. PRIORITY PREEMPT 4

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
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5. PRIORITY PREEMPT 5

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
<p align="center"> click here for main menu click here for sub-menu preemptor </p>												

6. PRIORITY PREEMPT 6

	1	2	3	4	5	6	7	8	9	10	11	12
TERM PHASE OVLP												
TRK CLR PHASE												
HOLD PHASES												
EXIT PHASES												
EXIT CALLS												
SPARE												
TERM OVERLAP	A			B			C			D		
ACTIVE						PED DARK						
PRIORITY						PED ACTIVE						
DET LOCK						ZERO PC TIME						
HOLD FLASH						PC THRU YELLOW						
TERM OVLP ASAP						TERM PHASES						
DON'T OVERRIDE FLASH						ACTIVE ONLY DURING HOLD						
FLASH ALL OUTPUTS						NO CVM IN FLASH						
YELLOW-RED GOES GREEN						FAST FLASH GREEN ON HOLD						
ENABLE MAX PREEMPT TIME						OUT OF FLASH						
MAX TIME						DURATION TIME						
MIN HOLD TIME						DELAY TIME						
MIN PED CLEAR						INHIBIT TIME						
EXIT MAX						HLD DELAY TIME						
					GRN			YEL			RED	
MINIMUM												
TRACK CLEAR												
HOLD												
LINKED PREEMPTOR												
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7. BUS PREEMPTORS

	BUS PREEMPTOR											
	1	2	3	4								
PREEMPTOR ACTIVE												
DETECTOR LOCK												
MAXIMUM TIME												
RESERVICE TIME												
DELAY TIME												
INHIBIT TIME												
ENTRANCE GREEN												
ENTRANCE PED CLEAR												
ENTRANCE YELLOW												
ENTRANCE RED												
MIN HOLD TIME												
	HOLD PHASE											
	1	2	3	4	5	6	7	8	9	10	11	12
PREEMPTOR 1												
PREEMPTOR 2												
PREEMPTOR 3												
PREEMPTOR 4												
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5.NIC/TOD SUBMENU

1. NIC/TOD CLOCK CALENDAR DATA

DATE SET:	YES
TIME SET:	YES
MANUAL NIC PROGRAM STEP	0
MANUAL TOD PROGRAM STEP	0
SYNC REFERENCE TIME	000
SYNC REFERENCE	TIME
WEEK 1 BEGINS ON 1ST SUNDAY	
DISABLE DAYLIGHT SAVINGS	
DST BEGINS LAST SUNDAY	

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2. NIC/TOD WEEKLY PROGRAMS

WEEK	SUN	MION	TUES	WED	THURS	FRI	SAT
1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1

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3. NIC/TOD YEARLY PROGRAMS

WEEK OF YEAR	1	2	3	4	5	6	7	8
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	9	10	11	12	13	14	15	16
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	17	18	19	20	21	22	23	24
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	25	26	27	28	29	30	31	32
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	33	34	35	36	37	38	39	40
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR	41	42	43	44	45	46	47	48
WEEKLY	1	1	1	1	1	1	1	1
WEEK OF YEAR				49	50	51	52	53
WEEKLY				1	1	1	1	1

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4. NIC/TOD HOLIDAY PROGRAM

HOLIDAY	FLOAT/ FIXED	MON/ MON/	DOW/ DOM	WOM/ YEAR	PROG
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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TOD PROGRAM STEP													
DAY PGM NUM													
STEP BEGINS													
FLASH													
RED REST													
SPARE 5													
SPARE 3													
TYPE 0 DELAY EN													
DET DIAG PLAN													
ALTERNATE SEQUENCE													
A B C D E F													
PHASE 1 2 3 4 5 6 7 8 9 10 11 12													
MAX2 ENABLE													
MAX3 ENABLE													
VEH RECALL													
VEH MAX RECALL													
PED RECALL													
COND SERVE INH													
PHASE OMIT													
SPECIAL FCTNS (1-8)													

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6.DETECTORS

1. DETECTORS TYPE / TIMERS

DET	TYPE	LOCK	EXTEND	DELAY	NO RESET	LOG ENABLE
1						
2						
3						
4	1			5		
5						
6						
7						
8	1			5		
9						
10						
11						
12						

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2. DETECTOR PHASE ASSIGNMENT

DETECTOR	PHASE ASSIGNMENT											
	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

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3. PED AND SYSTEM DETECTOR LOCAL ASSIGNMENT

DETECTOR INTERVAL				MINUTES		
LOCAL PED DET NUMBER	PHASE DETECTOR					
	1	2	3	4	5	6
	1	2	3	4	5	6
	7	8	9	10	11	12
NUMBER	7	8	9	10	11	12
LOCAL SYSTEM NUMBER						
LOCAL PED DET NUMBER	PHASE DETECTOR					
	1	2	3	4	5	6
	0	0	0	0	0	0
	7	8	9	10	11	12
NUMBER	0	0	0	0	0	0

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4. CROSS SWITCHING

DETECTOR	PHASES											
	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												

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5. SPEED DETECTORS

SPEED DET NUMBER	1	2	3	4	5	6	7	8
ONE DETECTOR SPEED								
LOCAL DET NUMBER	0	0	0	0	0	0	0	0
VEHICLE LENGTH	0	0	0	0	0	0	0	0
LOOP LENGTH	0	0	0	0	0	0	0	0
TWO DETECTOR SPEED	0	0	0	0	0	0	0	0
LOCAL DET NUMBER	0	0	0	0	0	0	0	0
SPEED TRAP LENGTH	0	0	0	0	0	0	0	0
ENABLE LOG								
UNITS								

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[click here for VEHICLE DETECTOR DIAGNOSTIC PLAN](#)

6. VEHICLE DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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7. PED DETECTOR DIAGNOSTIC PLAN

PLAN	DET NO	1	2	3	4	5	6	7	8	9	10	11	12
1	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
2	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
3	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
4	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
5	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
6	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
7	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1
8	DIAG NO	0	0	0	0	0	0	0	0	0	0	0	0
	SCALING	1	1	1	1	1	1	1	1	1	1	1	1

[click here for main menu](#)

[click here for sub-menu](#)

8. DETECTOR DIAGNOSTIC INTERVAL

DETECTOR DIAGNOSTIC INTERVAL

DIAGNOSTIC NUMBER	NO ACTIVITY	MAX PRES	ERRATIC COUNTS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			

[click here for main menu](#)

[click here for sub-menu](#)

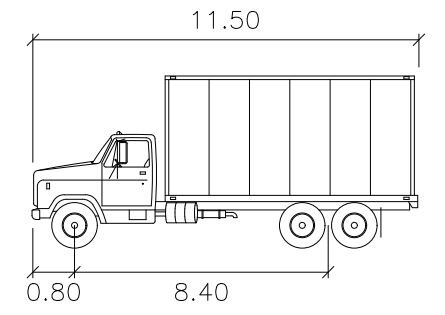
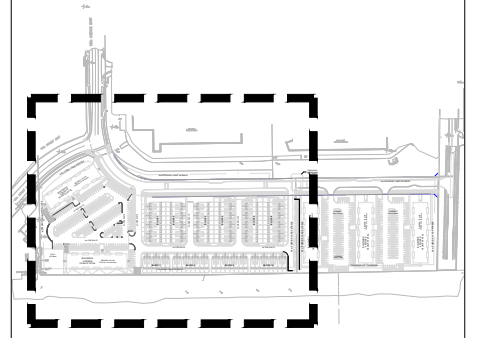
Appendix D

Turning Templates



Notes:

Key Map:



HSU
 meters
 Width : 2.60
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-19
REV: DESCRIPTION:		BY:	DATE:
STATUS:			

CGH Transportation
 628 Haines Road
 Newmarket, ON
 L3Y 6V5
 (905) 251-4070

CLIENT: SmartCentres
 ARCHITECT:

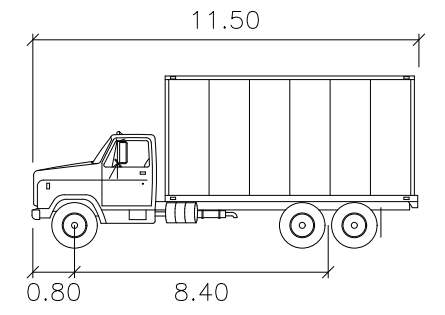
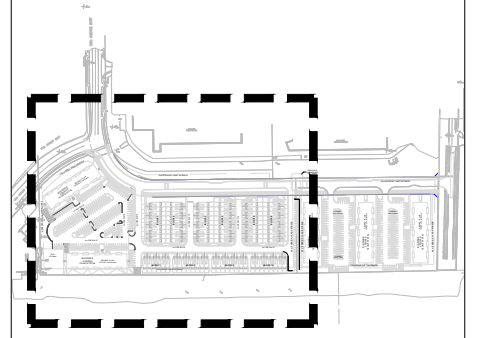
SITE:
 1555 18th Avenue East
 TITLE: Turning Movement Analysis
 HSU Inbound Movements

SCALE AT A3: 1:1000	DATE: 2023-01-30	DRAWN: AN	CHECKED: MC
PROJECT NO: 2022-032	DRAWING NO: 003	REVISION: 05	



Notes:

Key Map:



HSU
 meters
 Width : 2.60
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.0

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

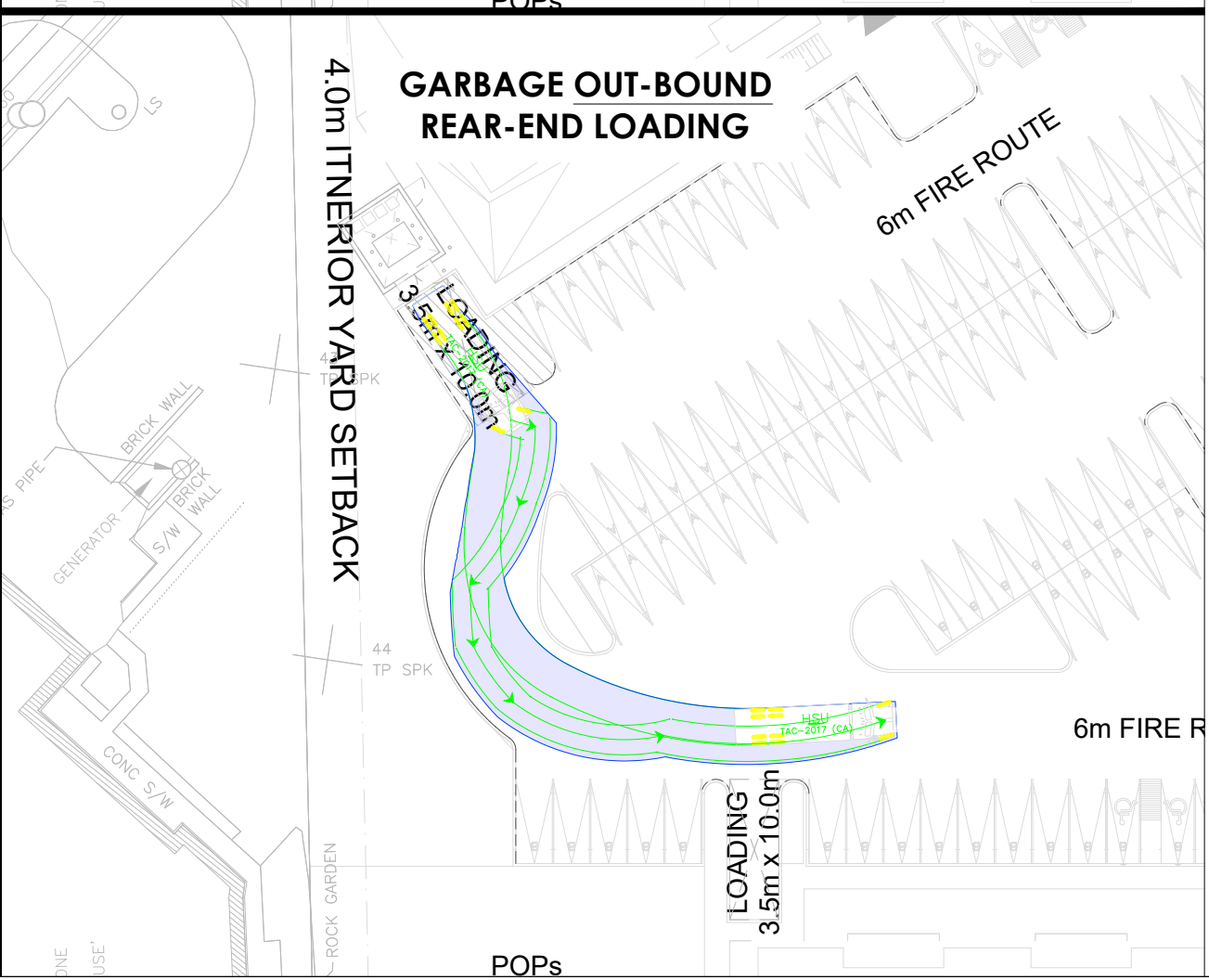
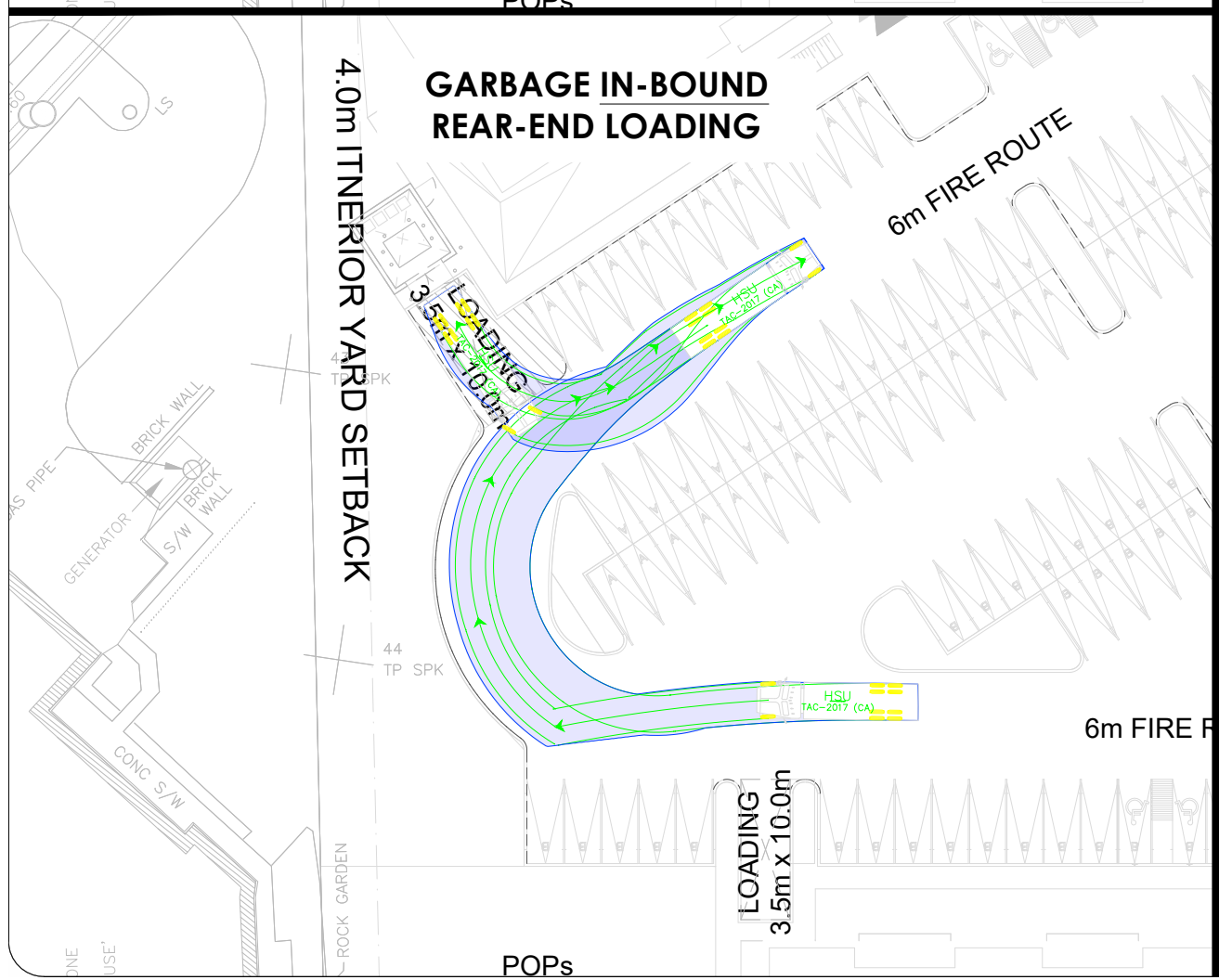
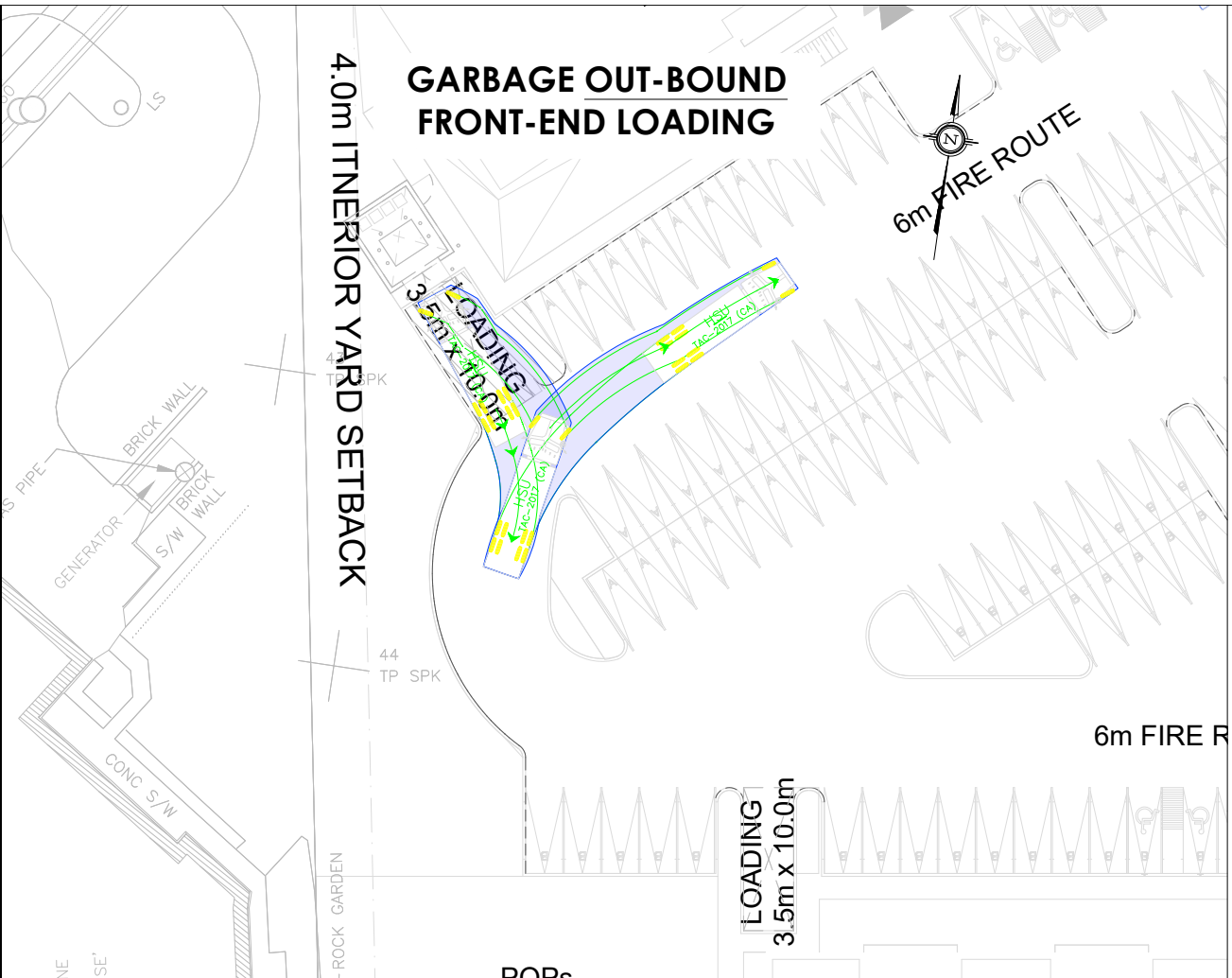
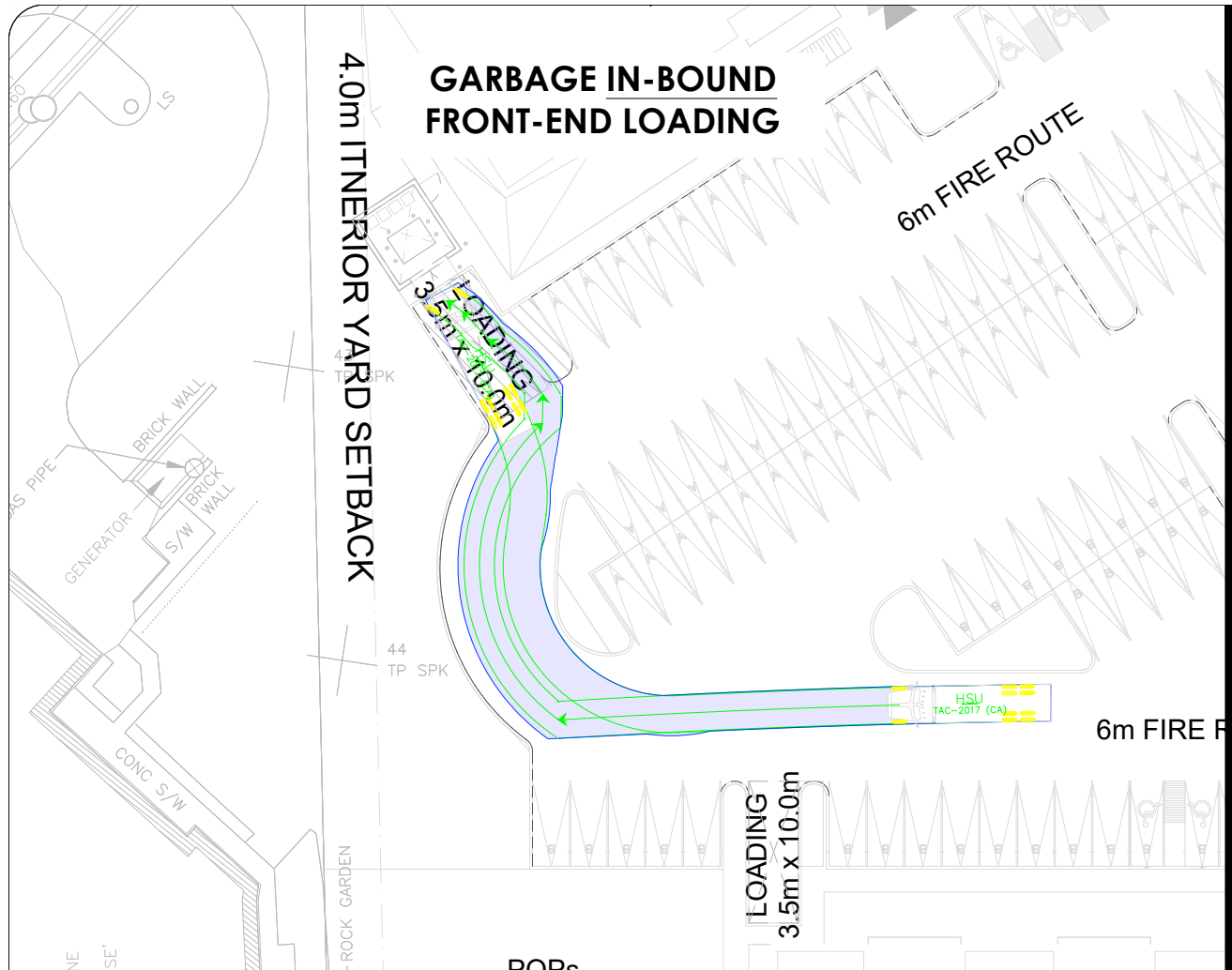
CGH Transportation
 628 Haines Road
 Newmarket, ON
 L3Y 6V5
 (905) 251-4070

CLIENT: SmartCentres
 ARCHITECT:

SITE: 1555 18th Avenue East

TITLE: Turning Movement Analysis
 HSU Outbound Movements

SCALE AT A3: 1:1000	DATE: 2023-01-30	DRAWN: AN	CHECKED: MC
PROJECT NO: 2022-032	DRAWING NO: 004	REVISION: 05	



Notes:

Key Map:

11.50

0.80 8.40

HSU

Width : 2.60 meters

Track : 2.60

Lock to Lock Time : 6.0

Steering Angle : 40.0

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: SmartCentres

ARCHITECT:

SITE: 1555 18th Avenue East

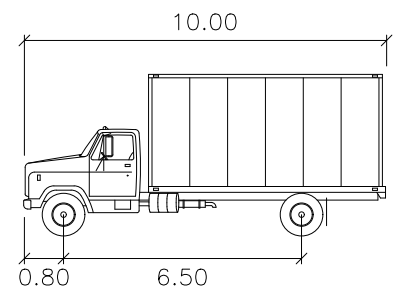
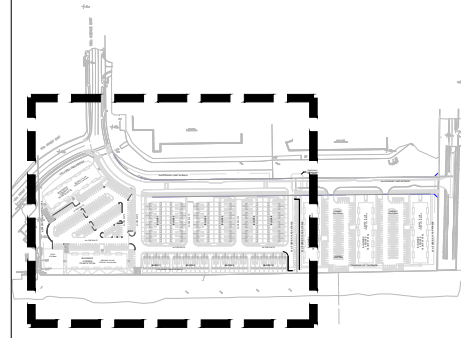
TITLE: Turning Movement Analysis
Garbage Turning Movements

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:500	2023-01-30	AN	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2022-032	005	05	



Notes:

Key Map:



MSU meters
 Width : 2.60
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.2

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-19
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
 628 Haines Road
 Newmarket, ON
 L3Y 6V5
 (905) 251-4070

CLIENT: SmartCentres

ARCHITECT:

SITE: 1555 18th Avenue East

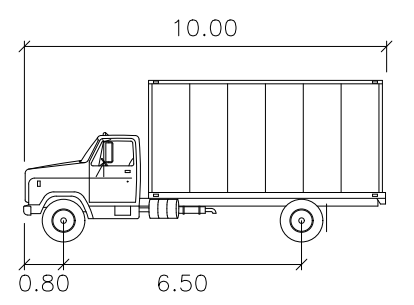
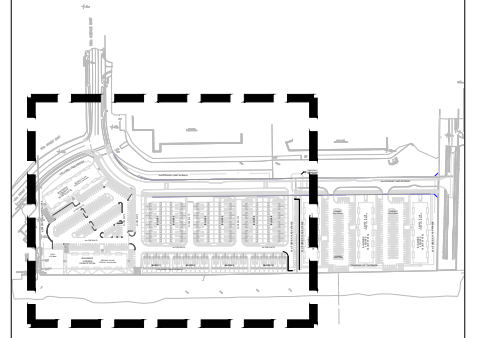
TITLE: Turning Movement Analysis
 MSU Inbound Movements

SCALE AT A3: 1:1000	DATE: 2023-01-30	DRAWN: AN	CHECKED: MC
PROJECT NO: 2022-032	DRAWING NO: 006	REVISION: 05	



Notes:

Key Map:



MSU meters
 Width : 2.60
 Track : 2.60
 Lock to Lock Time : 6.0
 Steering Angle : 40.2

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-19
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

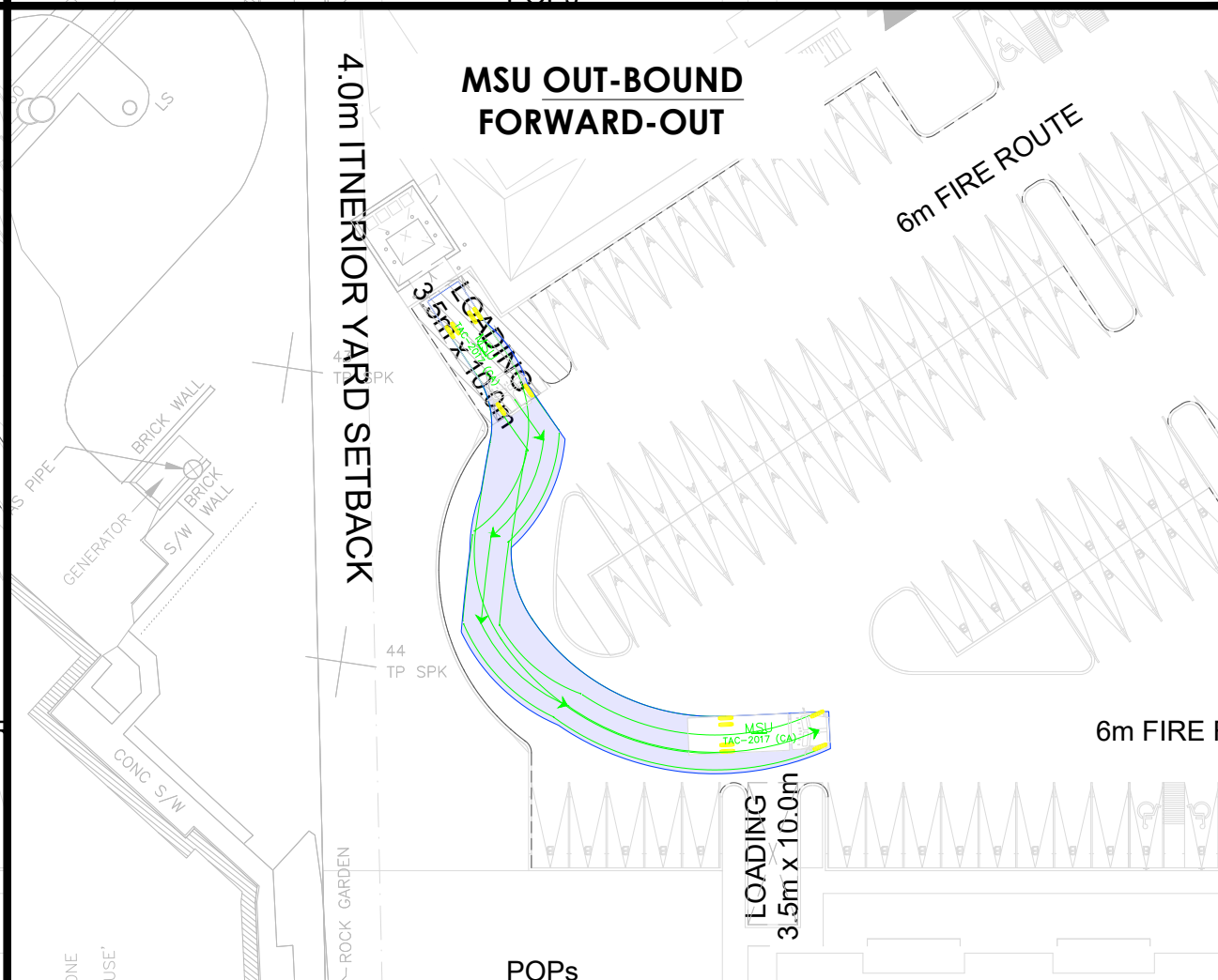
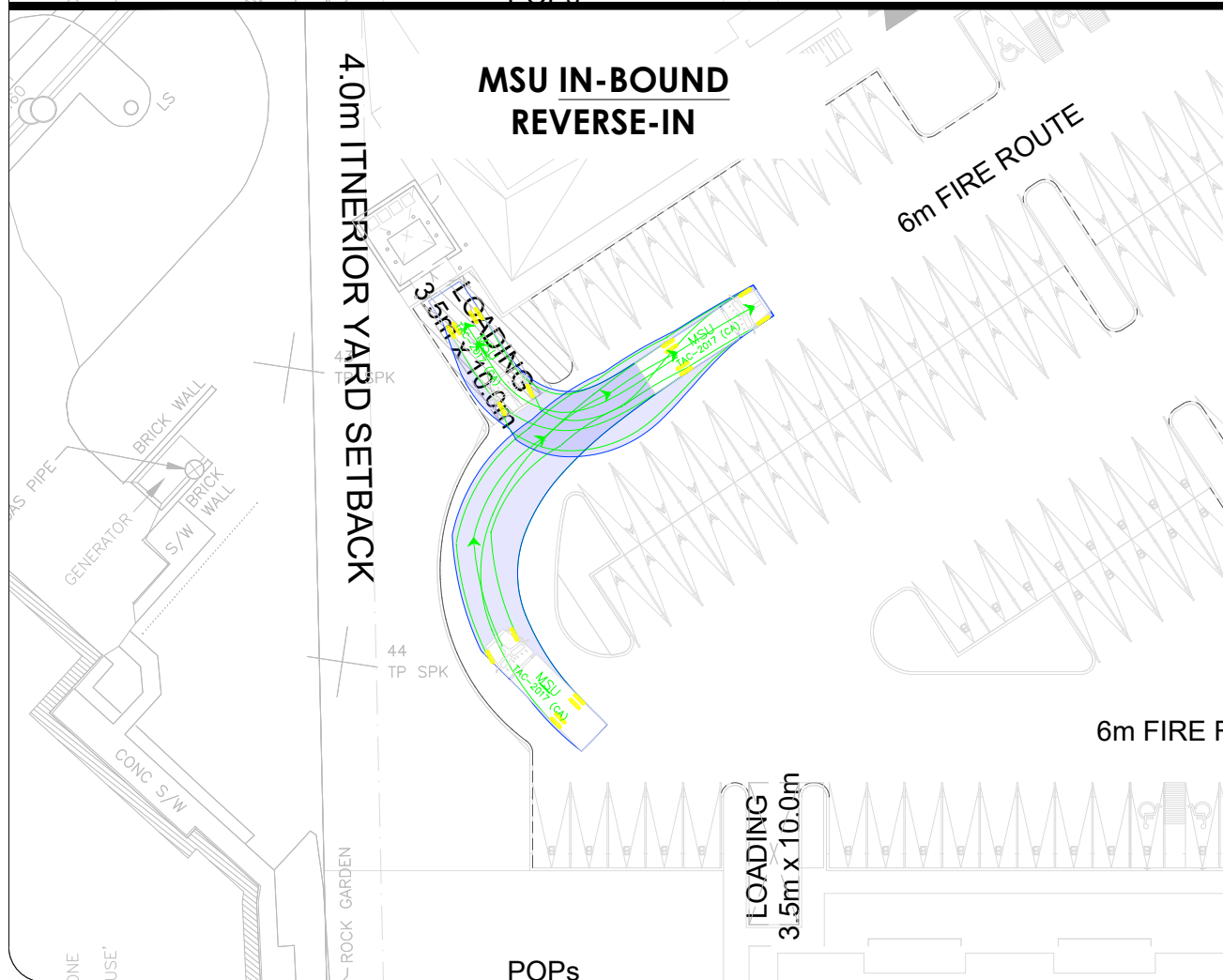
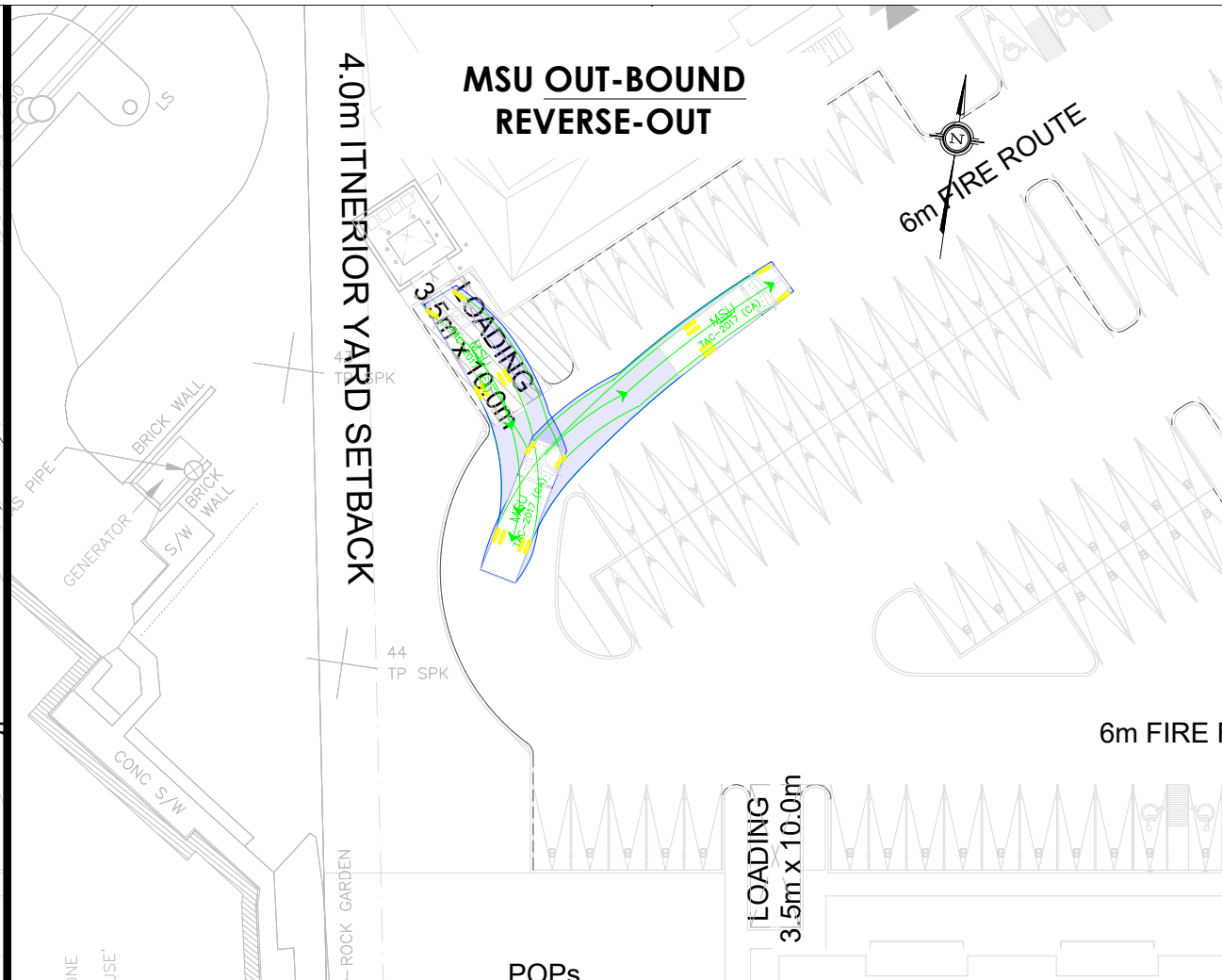
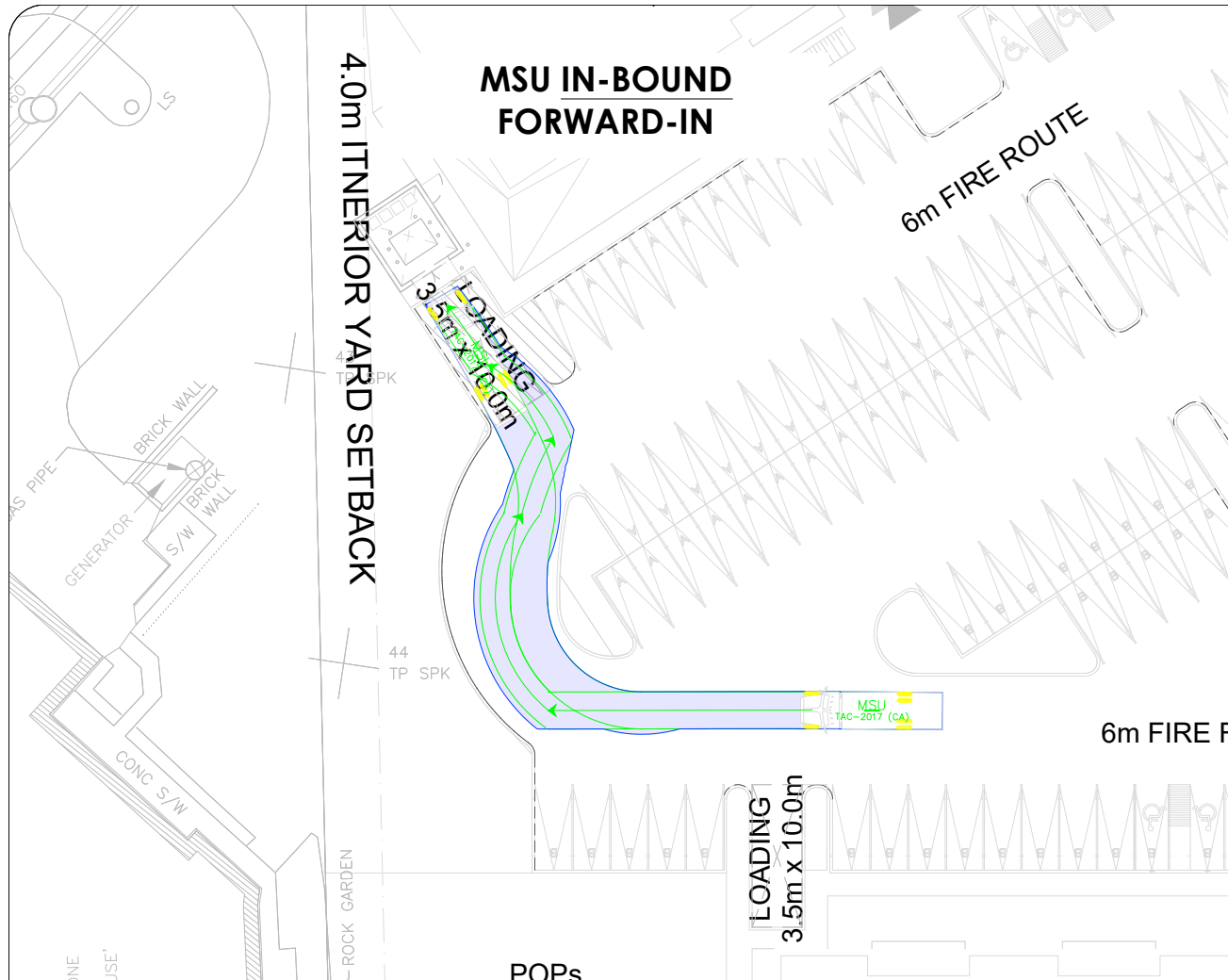
CGH Transportation
 628 Haines Road
 Newmarket, ON
 L3Y 6V5
 (905) 251-4070

CLIENT: SmartCentres
 ARCHITECT:

SITE: 1555 18th Avenue East

TITLE: Turning Movement Analysis
 MSU Outbound Movements

SCALE AT A3: 1:1000	DATE: 2023-01-30	DRAWN: AN	CHECKED: MC
PROJECT NO: 2022-032	DRAWING NO: 007	REVISION: 05	



Notes:

Key Map:

MSU

Width : 2.60 meters
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.2

05	Updated Site Plan	AN	2023-01-30
04	Updated Site Plan	AN	2023-01-25
03	Updated Site Plan	AN	2023-01-19
02	Updated Site Plan	AN	2023-01-11
01	Issued for Review	AN	2022-12-22
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: SmartCentres

ARCHITECT:

SITE: 1555 18th Avenue East

TITLE: Turning Movement Analysis
MSU Turning Movements

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:500	2023-01-30	AN	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2022-032	008	05	

Appendix E

Heavy Vehicle Percentages

[1] 10th Street East / 18th Avenue East												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume						9	4					
Total Volume						142	258					
HV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	6%	2%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume						6	3					
Total Volume						302	376					
HV%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	1%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

[2] 18th Avenue East / 16th Street East												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	6	0	2	4	2	1	0	11	5	1	10	2
Total Volume	106	32	62	23	19	15	15	163	97	27	212	18
HV%	6%	0%	3%	17%	11%	7%	0%	7%	5%	4%	5%	11%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	2	3	1	0	0	0	1	6	0	4	15	1
Total Volume	194	38	62	44	39	44	18	266	156	50	292	27
HV%	1%	8%	2%	0%	0%	0%	6%	2%	0%	8%	5%	4%

[3] 10th Street East / 16th Avenue East												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	1	8	4	0	14	1	6	1	2	6	1	1
Total Volume	26	168	93	18	139	70	127	148	59	53	59	9
HV%	4%	5%	4%	0%	10%	1%	5%	1%	3%	11%	2%	11%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	9	1	0	3	1	8	2	0	2	1	3
Total Volume	68	179	152	22	170	113	98	205	34	106	185	20
HV%	0%	5%	1%	0%	2%	1%	8%	1%	0%	2%	1%	15%

[4] 16th Street East / 16th Avenue East												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	2	5	1	1	8	6	1	15	1	2	15	0
Total Volume	105	106	70	11	68	62	44	193	68	63	258	10
HV%	2%	5%	1%	9%	12%	10%	2%	8%	1%	3%	6%	0%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	14	1	0	3	6	4	5	1	0	15	2
Total Volume	144	100	103	28	121	94	53	325	74	74	408	10
HV%	0%	14%	1%	0%	2%	6%	8%	2%	1%	0%	4%	20%

[5] 20th Avenue East / 16th Street East												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	2	0	1	0	0	0	0	14	3	2	11	0
Total Volume	70	0	28	0	0	0	0	166	82	67	188	0
HV%	3%	#DIV/0!	4%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	8%	4%	3%	6%	#DIV/0!
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	1	0	1	0	0	0	0	5	2	1	18	0
Total Volume	140	0	72	0	0	0	0	238	130	71	227	0
HV%	1%	#DIV/0!	1%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	1%	8%	#DIV/0!

Appendix F

2022 Existing Conditions Synchro Worksheets

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2022 Existing AM
 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	258	0	0	0	0	142
Future Volume (vph)	258	0	0	0	0	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1750	0	1842	0	0	1533
Flt Permitted	0.950					
Satd. Flow (perm)	1750	0	1842	0	0	1533
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	297	0	0	0	0	163
Shared Lane Traffic (%)						
Lane Group Flow (vph)	297	0	0	0	0	163
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.6%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2022 Existing AM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	258	0	0	0	0	142
Future Volume (Veh/h)	258	0	0	0	0	142
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	297	0	0	0	0	163
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	163	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	163	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	71	100	100	100	100	
cM capacity (veh/h)	1023	896	729	1085	1623	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	297	0	163			
Volume Left	297	0	0			
Volume Right	0	0	163			
cSH	1023	1700	1700			
Volume to Capacity	0.29	0.00	0.10			
Queue Length 95th (m)	9.2	0.0	0.0			
Control Delay (s)	10.0	0.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	10.0	0.0	0.0			
Approach LOS	A	A				
Intersection Summary						
Average Delay			6.4			
Intersection Capacity Utilization			17.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	163	97	27	212	18	106	32	62	23	19	15
Future Volume (vph)	15	163	97	27	212	18	106	32	62	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00		0.99	0.99		1.00	0.99	
Fr _t		0.944			0.989			0.901			0.935	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	3154	0	1716	3344	0	1684	3124	0	1526	3029	0
Fl _t Permitted	0.591			0.522			0.651			0.685		
Satd. Flow (perm)	1109	3154	0	941	3344	0	1146	3124	0	1099	3029	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		97			7			70			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Adj. Flow (vph)	17	185	110	31	241	20	120	36	70	26	22	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	295	0	31	261	0	120	106	0	26	39	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East

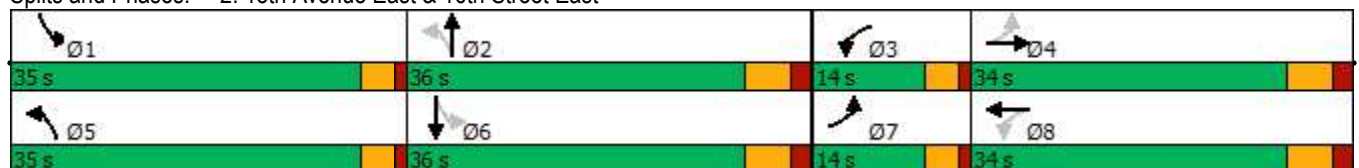


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			1			1			5	
Act Effct Green (s)	32.8	25.2		33.6	27.8		45.9	39.6		42.3	30.2	
Actuated g/C Ratio	0.36	0.28		0.37	0.31		0.51	0.44		0.47	0.34	
v/c Ratio	0.04	0.31		0.07	0.25		0.19	0.07		0.05	0.04	
Control Delay	16.5	19.0		16.9	24.8		13.4	9.1		12.9	15.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.5	19.0		16.9	24.8		13.4	9.1		12.9	15.5	
LOS	B	B		B	C		B	A		B	B	
Approach Delay		18.8			24.0			11.4			14.5	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	1.8	15.1		3.2	15.3		11.7	1.8		2.4	1.4	
Queue Length 95th (m)	5.6	25.7		8.5	30.1		20.8	7.7		6.5	5.1	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	480	1054		437	1129		783	1414		720	1028	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.28		0.07	0.23		0.15	0.07		0.04	0.04	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 90
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 18.3
 Intersection Capacity Utilization 53.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	15	163	97	27	212	18	106	32	62	23	19	15
Future Volume (vph)	15	163	97	27	212	18	106	32	62	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3155		1715	3343		1679	3125		1525	3030	
Flt Permitted	0.59	1.00		0.52	1.00		0.65	1.00		0.69	1.00	
Satd. Flow (perm)	1109	3155		943	3343		1150	3125		1099	3030	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	17	185	110	31	241	20	120	36	70	26	22	17
RTOR Reduction (vph)	0	70	0	0	5	0	0	41	0	0	11	0
Lane Group Flow (vph)	17	225	0	31	256	0	120	65	0	26	28	0
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.6	25.9		33.4	27.8		47.3	39.6		36.4	32.7	
Effective Green, g (s)	29.6	25.9		33.4	27.8		47.3	39.6		36.4	32.7	
Actuated g/C Ratio	0.31	0.27		0.35	0.29		0.50	0.42		0.38	0.34	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	372	861		377	980		632	1305		438	1045	
v/s Ratio Prot	0.00	0.07		c0.00	c0.08		c0.02	0.02		0.00	0.01	
v/s Ratio Perm	0.01			0.02			c0.07			0.02		
v/c Ratio	0.05	0.26		0.08	0.26		0.19	0.05		0.06	0.03	
Uniform Delay, d1	22.6	27.0		20.3	25.6		12.9	16.4		18.3	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.3		0.1	0.1		0.1	0.0	
Delay (s)	22.7	27.3		20.4	25.9		13.1	16.5		18.4	20.6	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		27.0			25.3			14.7			19.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2022 Existing AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	148	59	53	59	9	26	168	93	18	153	70
Future Volume (vph)	127	148	59	53	59	9	26	168	93	18	153	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.957			0.980			0.947			0.953	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1700	1760	0	1608	1781	0	1716	1685	0	1785	1660	0
Fl _t Permitted	0.709			0.612			0.608			0.586		
Satd. Flow (perm)	1268	1760	0	1035	1781	0	1097	1685	0	1097	1660	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			10			47			39	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Adj. Flow (vph)	138	161	64	58	64	10	28	183	101	20	166	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	225	0	58	74	0	28	284	0	20	242	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2022 Existing AM
1555 18th Avenue East



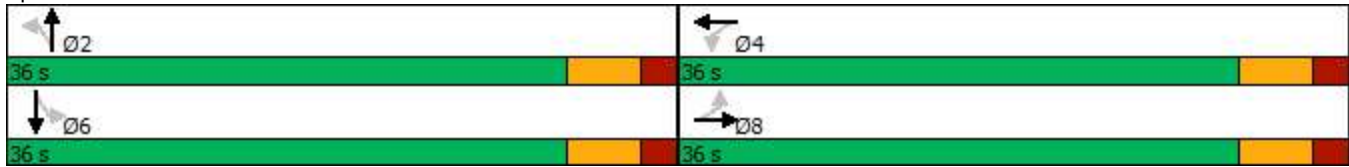
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	1	1		1	1		5	5		1		1
Act Effct Green (s)	15.5	15.5		15.5	15.5		31.1	31.1		31.1		31.1
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.53	0.53		0.53		0.53
v/c Ratio	0.41	0.46		0.21	0.16		0.05	0.31		0.03		0.27
Control Delay	20.7	17.5		17.4	14.1		9.8	9.2		9.9		9.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.7	17.5		17.4	14.1		9.8	9.2		9.9		9.0
LOS	C	B		B	B		A	A		A		A
Approach Delay		18.7			15.6			9.2				9.0
Approach LOS		B			B			A				A
Queue Length 50th (m)	11.8	16.3		4.7	5.1		1.2	11.1		0.8		9.3
Queue Length 95th (m)	23.5	30.5		11.5	12.2		6.6	38.7		5.3		33.1
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	655	926		535	925		580	914		580		897
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.21	0.24		0.11	0.08		0.05	0.31		0.03		0.27

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	58.7
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.46
Intersection Signal Delay:	13.2
Intersection LOS:	B

Intersection Capacity Utilization 60.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

2022 Existing AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	127	148	59	53	59	9	26	168	93	18	153	70
Future Volume (vph)	127	148	59	53	59	9	26	168	93	18	153	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1699	1760		1607	1780		1715	1685		1779	1660	
Flt Permitted	0.71	1.00		0.61	1.00		0.61	1.00		0.59	1.00	
Satd. Flow (perm)	1268	1760		1035	1780		1098	1685		1097	1660	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	161	64	58	64	10	28	183	101	20	166	76
RTOR Reduction (vph)	0	25	0	0	7	0	0	22	0	0	18	0
Lane Group Flow (vph)	138	200	0	58	67	0	28	262	0	20	224	0
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.5	15.5		15.5	15.5		31.1	31.1		31.1	31.1	
Effective Green, g (s)	15.5	15.5		15.5	15.5		31.1	31.1		31.1	31.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.53	0.53		0.53	0.53	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	335	465		273	470		582	894		582	880	
v/s Ratio Prot		c0.11			0.04			c0.16			0.13	
v/s Ratio Perm	0.11			0.06			0.03			0.02		
v/c Ratio	0.41	0.43		0.21	0.14		0.05	0.29		0.03	0.25	
Uniform Delay, d1	17.8	17.9		16.8	16.5		6.6	7.6		6.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.3		0.8	0.3		0.2	0.8		0.1	0.7	
Delay (s)	19.5	19.2		17.6	16.8		6.8	8.5		6.7	8.2	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		19.3			17.1			8.3			8.0	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	208	69	63	258	10	105	106	70	11	68	62
Future Volume (vph)	44	208	69	63	258	10	105	106	70	11	68	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99		1.00		
Fr _t		0.962			0.994			0.940				0.929
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3219	0	1733	3353	0	1750	3228	0	1638	2986	0
Fl _t Permitted	0.570			0.529			0.496			0.629		
Satd. Flow (perm)	1047	3219	0	962	3353	0	914	3228	0	1083	2986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			3			78			69	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Adj. Flow (vph)	49	231	77	70	287	11	117	118	78	12	76	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	308	0	70	298	0	117	196	0	12	145	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East

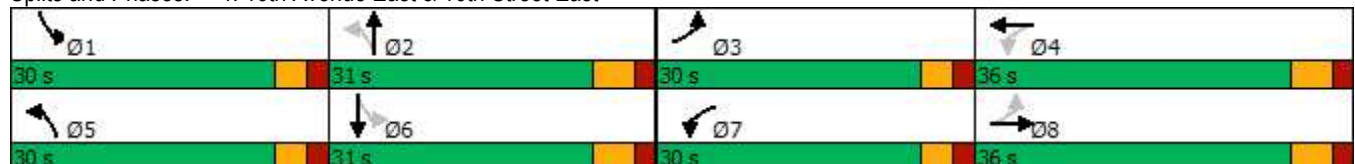


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		3			3			1			0	
Act Effct Green (s)	30.2	24.1		32.2	26.8		24.4	21.6		17.6	12.1	
Actuated g/C Ratio	0.44	0.35		0.46	0.39		0.35	0.31		0.25	0.17	
v/c Ratio	0.09	0.27		0.13	0.23		0.27	0.19		0.04	0.25	
Control Delay	12.0	18.6		12.1	18.6		17.2	12.3		15.3	17.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.0	18.6		12.1	18.6		17.2	12.3		15.3	17.2	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		17.7			17.4			14.1			17.0	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.2	14.3		4.6	15.2		10.6	5.5		1.0	4.8	
Queue Length 95th (m)	10.5	29.9		13.7	30.6		21.2	15.3		4.0	12.4	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	789	1476		772	1565		695	1279		660	1169	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.21		0.09	0.19		0.17	0.15		0.02	0.12	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	69.4
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.27
Intersection Signal Delay:	16.6
Intersection LOS:	B
Intersection Capacity Utilization:	55.8%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	208	69	63	258	10	105	106	70	11	68	62
Future Volume (vph)	44	208	69	63	258	10	105	106	70	11	68	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3222		1731	3354		1750	3230		1637	2985	
Flt Permitted	0.57	1.00		0.53	1.00		0.50	1.00		0.63	1.00	
Satd. Flow (perm)	1049	3222		963	3354		913	3230		1083	2985	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	49	231	77	70	287	11	117	118	78	12	76	69
RTOR Reduction (vph)	0	23	0	0	2	0	0	56	0	0	55	0
Lane Group Flow (vph)	49	285	0	70	296	0	117	140	0	12	90	0
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	29.0	25.1		32.4	26.8		27.7	21.6		16.2	15.1	
Effective Green, g (s)	29.0	25.1		32.4	26.8		27.7	21.6		16.2	15.1	
Actuated g/C Ratio	0.38	0.33		0.43	0.36		0.37	0.29		0.21	0.20	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	439	1072		470	1192		419	925		240	597	
v/s Ratio Prot	0.01	c0.09		c0.01	0.09		c0.03	0.04		0.00	0.03	
v/s Ratio Perm	0.04			0.05			c0.07			0.01		
v/c Ratio	0.11	0.27		0.15	0.25		0.28	0.15		0.05	0.15	
Uniform Delay, d1	14.7	18.4		12.8	17.2		16.4	20.1		23.4	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.2		0.4	0.2		0.1	0.2	
Delay (s)	14.8	18.7		12.9	17.4		16.7	20.2		23.5	25.1	
Level of Service	B	B		B	B		B	C		C	C	
Approach Delay (s)		18.2			16.6			18.9			25.0	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			18.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			75.4			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			55.8%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	166	82	67	188	70	28
Future Volume (vph)	166	82	67	188	70	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	45.0		0.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			85.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1740	1536	1733	1773	1733	1536
Flt Permitted			0.644		0.950	
Satd. Flow (perm)	1740	1536	1175	1773	1733	1536
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		89				30
Link Speed (k/h)	60			60	50	
Link Distance (m)	428.7			228.1	134.0	
Travel Time (s)	25.7			13.7	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	4%	3%	6%	3%	4%
Adj. Flow (vph)	180	89	73	204	76	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	89	73	204	76	30
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.0	2.0	10.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.0	2.0	0.6	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

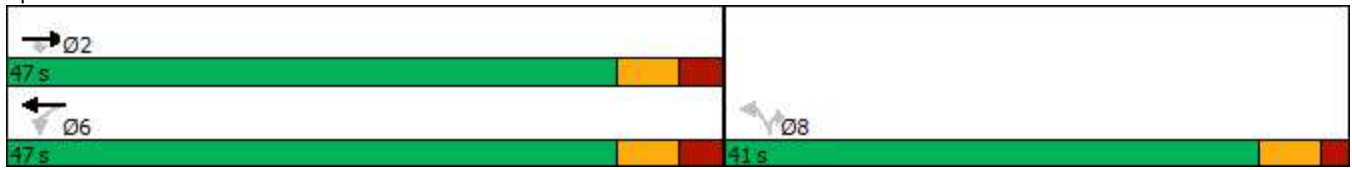
2022 Existing AM
1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		8	8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0	40.0	10.0	10.0
Minimum Split (s)	47.0	47.0	47.0	47.0	41.0	41.0
Total Split (s)	47.0	47.0	47.0	47.0	41.0	41.0
Total Split (%)	53.4%	53.4%	53.4%	53.4%	46.6%	46.6%
Maximum Green (s)	40.0	40.0	40.0	40.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	20.0	20.0	20.0	20.0	15.0	15.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	47.5	47.5	47.5	47.5	10.8	10.8
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.16	0.16
v/c Ratio	0.14	0.08	0.09	0.16	0.27	0.11
Control Delay	5.1	1.6	5.2	5.2	26.6	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	1.6	5.2	5.2	26.6	10.2
LOS	A	A	A	A	C	B
Approach Delay	4.0			5.2	22.0	
Approach LOS	A			A	C	
Queue Length 50th (m)	7.2	0.0	2.8	8.3	7.9	0.0
Queue Length 95th (m)	15.6	4.2	7.7	17.4	18.0	5.9
Internal Link Dist (m)	404.7			204.1	110.0	
Turn Bay Length (m)			45.0			
Base Capacity (vph)	1243	1123	840	1267	918	827
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.08	0.09	0.16	0.08	0.04

Intersection Summary	
Area Type:	Other
Cycle Length:	88
Actuated Cycle Length:	66.5
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.27
Intersection Signal Delay:	7.4
Intersection Capacity Utilization	78.3%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	D

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2022 Existing AM
1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (vph)	166	82	67	188	70	28
Future Volume (vph)	166	82	67	188	70	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1740	1536	1733	1773	1733	1536
Flt Permitted	1.00	1.00	0.64	1.00	0.95	1.00
Satd. Flow (perm)	1740	1536	1174	1773	1733	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	89	73	204	76	30
RTOR Reduction (vph)	0	28	0	0	0	26
Lane Group Flow (vph)	180	61	73	204	76	4
Heavy Vehicles (%)	8%	4%	3%	6%	3%	4%
Turn Type	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	46.1	46.1	46.1	46.1	8.7	8.7
Effective Green, g (s)	46.1	46.1	46.1	46.1	8.7	8.7
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.13	0.13
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1183	1044	798	1205	222	197
v/s Ratio Prot	0.10			c0.12		
v/s Ratio Perm		0.04	0.06		c0.04	0.00
v/c Ratio	0.15	0.06	0.09	0.17	0.34	0.02
Uniform Delay, d1	3.9	3.6	3.7	3.9	26.9	25.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.2	0.3	1.9	0.1
Delay (s)	4.1	3.7	3.9	4.2	28.9	25.9
Level of Service	A	A	A	A	C	C
Approach Delay (s)	4.0			4.1	28.0	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2022 Existing PM
 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	376	0	0	0	0	302
Future Volume (vph)	376	0	0	0	0	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1767	0	1842	0	0	1593
Flt Permitted	0.950					
Satd. Flow (perm)	1767	0	1842	0	0	1593
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%
Adj. Flow (vph)	404	0	0	0	0	325
Shared Lane Traffic (%)						
Lane Group Flow (vph)	404	0	0	0	0	325
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.2%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2022 Existing PM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	376	0	0	0	0	302
Future Volume (Veh/h)	376	0	0	0	0	302
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	404	0	0	0	0	325
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	325	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	325	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	61	100	100	100	100	
cM capacity (veh/h)	1026	896	593	1085	1623	
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	404	0	325			
Volume Left	404	0	0			
Volume Right	0	0	325			
cSH	1026	1700	1700			
Volume to Capacity	0.39	0.00	0.19			
Queue Length 95th (m)	14.5	0.0	0.0			
Control Delay (s)	10.8	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.8	0.0	0.0			
Approach LOS	B	A				
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			24.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	266	156	50	292	27	196	38	62	44	39	44
Future Volume (vph)	18	266	156	50	292	27	196	38	62	44	39	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	0.99		0.99	0.99	
Fr _t		0.945			0.987			0.907			0.920	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3316	0	1653	3353	0	1767	3069	0	1785	3259	0
Fl _t Permitted	0.547			0.350			0.619			0.685		
Satd. Flow (perm)	966	3316	0	609	3353	0	1150	3069	0	1279	3259	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		94			8			66			47	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Adj. Flow (vph)	19	283	166	53	311	29	209	40	66	47	41	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	449	0	53	340	0	209	106	0	47	88	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East

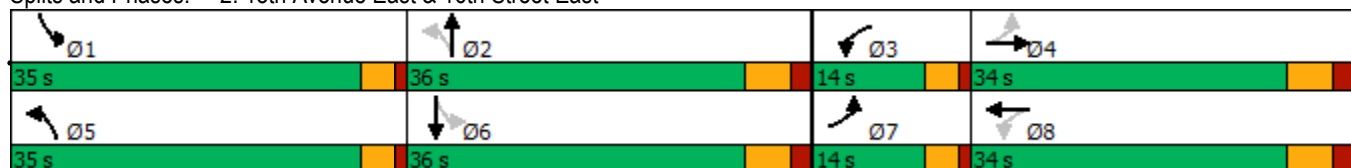


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			1			5			4	
Act Effct Green (s)	34.9	25.2		36.5	30.7		49.0	39.3		42.3	30.2	
Actuated g/C Ratio	0.37	0.26		0.38	0.32		0.51	0.41		0.44	0.32	
v/c Ratio	0.04	0.48		0.15	0.31		0.31	0.08		0.08	0.08	
Control Delay	18.2	26.0		19.2	26.6		14.8	9.9		13.2	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.2	26.0		19.2	26.6		14.8	9.9		13.2	13.9	
LOS	B	C		B	C		B	A		B	B	
Approach Delay		25.7			25.6			13.1			13.7	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.0	29.5		5.8	21.4		21.5	2.6		4.4	2.8	
Queue Length 95th (m)	6.8	47.0		14.0	42.3		34.8	8.1		9.9	8.7	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	429	1046		342	1148		796	1302		827	1064	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.43		0.15	0.30		0.26	0.08		0.06	0.08	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 95.4
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 21.4
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	18	266	156	50	292	27	196	38	62	44	39	44
Future Volume (vph)	18	266	156	50	292	27	196	38	62	44	39	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	3314		1653	3354		1766	3070		1779	3260	
Flt Permitted	0.55	1.00		0.35	1.00		0.62	1.00		0.69	1.00	
Satd. Flow (perm)	968	3314		609	3354		1151	3070		1283	3260	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	19	283	166	53	311	29	209	40	66	47	41	47
RTOR Reduction (vph)	0	69	0	0	6	0	0	40	0	0	32	0
Lane Group Flow (vph)	19	380	0	53	334	0	209	66	0	47	56	0
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.6	26.8		38.4	30.7		49.0	39.3		37.6	31.9	
Effective Green, g (s)	30.6	26.8		38.4	30.7		49.0	39.3		37.6	31.9	
Actuated g/C Ratio	0.31	0.27		0.39	0.31		0.49	0.39		0.38	0.32	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	324	892		315	1034		647	1212		513	1045	
v/s Ratio Prot	0.00	c0.11		c0.01	0.10		c0.04	0.02		0.01	0.02	
v/s Ratio Perm	0.02			0.05			c0.12			0.03		
v/c Ratio	0.06	0.43		0.17	0.32		0.32	0.05		0.09	0.05	
Uniform Delay, d1	24.1	30.0		19.8	26.4		14.6	18.6		19.8	23.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.3	0.2		0.3	0.1		0.1	0.1	
Delay (s)	24.2	30.3		20.1	26.6		14.9	18.7		19.9	23.5	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		30.1			25.7			16.2			22.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	99.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2022 Existing PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	205	34	106	185	20	68	179	152	22	170	113
Future Volume (vph)	98	205	34	106	185	20	68	179	152	22	170	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	1.00			0.99		1.00	0.99	
Frt		0.978			0.985			0.931			0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	1814	0	1750	1805	0	1785	1676	0	1785	1724	0
Flt Permitted	0.620			0.561			0.574			0.531		
Satd. Flow (perm)	1079	1814	0	1027	1805	0	1078	1676	0	995	1724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			9			73			57	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Adj. Flow (vph)	105	220	37	114	199	22	73	192	163	24	183	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	257	0	114	221	0	73	355	0	24	305	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
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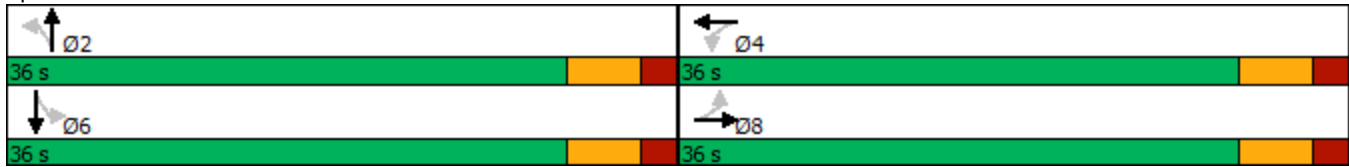


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	7	7		0	0		4	4		0		0
Act Effct Green (s)	16.3	16.3		16.3	16.3		30.4	30.4		30.4		30.4
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52		0.52
v/c Ratio	0.35	0.50		0.40	0.44		0.13	0.39		0.05		0.33
Control Delay	19.6	19.7		20.8	18.8		10.5	9.8		10.2		9.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	19.6	19.7		20.8	18.8		10.5	9.8		10.2		9.4
LOS	B	B		C	B		B	A		B		A
Approach Delay		19.6			19.5			10.0				9.5
Approach LOS		B			B			A				A
Queue Length 50th (m)	8.9	21.3		9.8	18.3		3.4	14.6		1.1		12.5
Queue Length 95th (m)	18.9	37.3		20.5	32.7		13.8	47.5		6.0		40.5
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	556	942		529	935		556	900		513		917
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.19	0.27		0.22	0.24		0.13	0.39		0.05		0.33

Intersection Summary	
Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	58.9
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	14.5
Intersection LOS:	B

Intersection Capacity Utilization 93.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

2022 Existing PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	98	205	34	106	185	20	68	179	152	22	170	113
Future Volume (vph)	98	205	34	106	185	20	68	179	152	22	170	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1815		1742	1805		1785	1677		1781	1724	
Flt Permitted	0.62	1.00		0.56	1.00		0.57	1.00		0.53	1.00	
Satd. Flow (perm)	1079	1815		1029	1805		1079	1677		996	1724	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	105	220	37	114	199	22	73	192	163	24	183	122
RTOR Reduction (vph)	0	10	0	0	7	0	0	35	0	0	27	0
Lane Group Flow (vph)	105	247	0	114	214	0	73	320	0	24	278	0
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	16.3	16.3		16.3	16.3		30.4	30.4		30.4	30.4	
Effective Green, g (s)	16.3	16.3		16.3	16.3		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	299	503		285	501		558	868		515	892	
v/s Ratio Prot		c0.14			0.12			c0.19			0.16	
v/s Ratio Perm	0.10			0.11			0.07			0.02		
v/c Ratio	0.35	0.49		0.40	0.43		0.13	0.37		0.05	0.31	
Uniform Delay, d1	17.0	17.7		17.2	17.4		7.3	8.4		7.0	8.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.6		1.9	1.2		0.5	1.2		0.2	0.9	
Delay (s)	18.5	19.3		19.1	18.6		7.8	9.6		7.2	9.0	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		19.1			18.8			9.3			8.9	
Approach LOS		B			B			A			A	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	325	74	74	408	10	144	100	103	28	121	94
Future Volume (vph)	53	325	74	74	408	10	144	100	103	28	121	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.972			0.996			0.924			0.934	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	3398	0	1785	3404	0	1785	3048	0	1785	3193	0
Fl _t Permitted	0.496			0.436			0.468			0.618		
Satd. Flow (perm)	860	3398	0	818	3404	0	877	3048	0	1159	3193	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			2			108			99	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Adj. Flow (vph)	56	342	78	78	429	11	152	105	108	29	127	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	420	0	78	440	0	152	213	0	29	226	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East

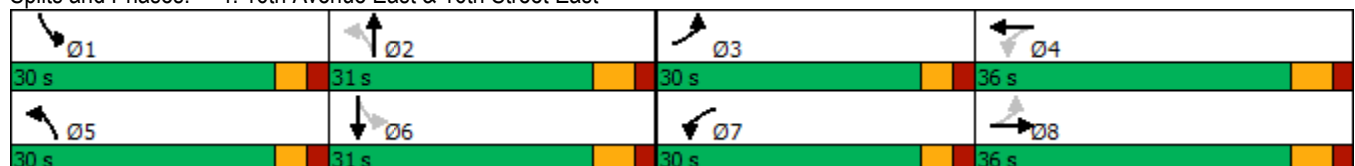


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			5			2			2	
Act Effct Green (s)	30.2	23.6		32.4	26.6		30.2	25.0		20.4	13.0	
Actuated g/C Ratio	0.40	0.31		0.43	0.35		0.40	0.33		0.27	0.17	
v/c Ratio	0.13	0.39		0.17	0.37		0.31	0.20		0.08	0.36	
Control Delay	14.2	23.0		14.2	22.0		17.1	11.3		15.4	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.2	23.0		14.2	22.0		17.1	11.3		15.4	17.9	
LOS	B	C		B	C		B	B		B	B	
Approach Delay		22.0			20.9			13.7			17.6	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	3.9	22.7		5.5	24.8		14.1	5.0		2.5	8.5	
Queue Length 95th (m)	13.4	48.2		17.4	51.4		26.6	14.7		7.2	18.7	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	670	1403		710	1442		667	1172		686	1155	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.30		0.11	0.31		0.23	0.18		0.04	0.20	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	75.2
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	19.1
Intersection LOS:	B
Intersection Capacity Utilization:	58.8%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	53	325	74	74	408	10	144	100	103	28	121	94
Future Volume (vph)	53	325	74	74	408	10	144	100	103	28	121	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3400		1784	3405		1784	3049		1783	3195	
Flt Permitted	0.50	1.00		0.44	1.00		0.47	1.00		0.62	1.00	
Satd. Flow (perm)	862	3400		819	3405		879	3049		1161	3195	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	342	78	78	429	11	152	105	108	29	127	99
RTOR Reduction (vph)	0	14	0	0	1	0	0	74	0	0	79	0
Lane Group Flow (vph)	56	406	0	78	439	0	152	139	0	29	147	0
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	29.0	24.7		32.8	26.6		32.5	25.0		18.9	16.4	
Effective Green, g (s)	29.0	24.7		32.8	26.6		32.5	25.0		18.9	16.4	
Actuated g/C Ratio	0.36	0.31		0.41	0.33		0.40	0.31		0.24	0.20	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	353	1044		408	1126		480	948		292	651	
v/s Ratio Prot	0.01	0.12		c0.01	c0.13		c0.04	0.05		0.00	0.05	
v/s Ratio Perm	0.05			0.06			c0.08			0.02		
v/c Ratio	0.16	0.39		0.19	0.39		0.32	0.15		0.10	0.23	
Uniform Delay, d1	17.0	21.9		14.8	20.7		15.8	20.0		23.9	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.2	0.5		0.4	0.1		0.1	0.4	
Delay (s)	17.2	22.4		15.1	21.1		16.2	20.1		24.1	27.1	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		21.8			20.2			18.5			26.7	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.3				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			80.4				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			58.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	238	132	71	227	140	72
Future Volume (vph)	238	132	71	227	140	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	45.0		0.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			85.0		15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				
Fr _t		0.850				0.850
Fl _t Protected			0.950		0.950	
Satd. Flow (prot)	1842	1566	1767	1740	1767	1581
Fl _t Permitted			0.608		0.950	
Satd. Flow (perm)	1842	1533	1131	1740	1767	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		135				73
Link Speed (k/h)	60			60	50	
Link Distance (m)	428.7			228.1	134.0	
Travel Time (s)	25.7			13.7	9.6	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	1%	8%	1%	1%
Adj. Flow (vph)	243	135	72	232	143	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	243	135	72	232	143	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.0	2.0	10.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.0	2.0	0.6	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



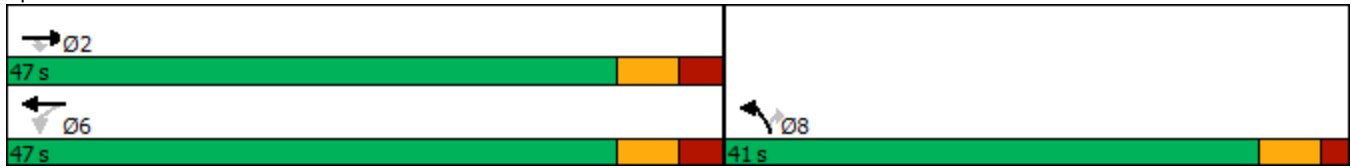
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0	40.0	10.0	10.0
Minimum Split (s)	47.0	47.0	47.0	47.0	41.0	41.0
Total Split (s)	47.0	47.0	47.0	47.0	41.0	41.0
Total Split (%)	53.4%	53.4%	53.4%	53.4%	46.6%	46.6%
Maximum Green (s)	40.0	40.0	40.0	40.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	20.0	20.0	20.0	20.0	15.0	15.0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	42.9	42.9	42.9	42.9	12.8	12.8
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.19	0.19
v/c Ratio	0.21	0.13	0.10	0.21	0.44	0.21
Control Delay	6.7	1.7	6.4	6.7	28.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	1.7	6.4	6.7	28.0	7.8
LOS	A	A	A	A	C	A
Approach Delay	4.9			6.7	21.2	
Approach LOS	A			A	C	
Queue Length 50th (m)	11.4	0.0	3.2	10.9	15.4	0.0
Queue Length 95th (m)	23.9	5.9	8.9	23.2	29.9	8.8
Internal Link Dist (m)	404.7			204.1	110.0	
Turn Bay Length (m)			45.0			
Base Capacity (vph)	1149	1007	705	1085	905	845
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.13	0.10	0.21	0.16	0.09

Intersection Summary

Area Type:	Other
Cycle Length:	88
Actuated Cycle Length:	68.7
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.44
Intersection Signal Delay:	9.4
Intersection Capacity Utilization	78.3%
Intersection LOS:	A
ICU Level of Service	D

Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2022 Existing PM
1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	238	132	71	227	140	72
Future Volume (vph)	238	132	71	227	140	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1842	1533	1767	1740	1767	1581
Flt Permitted	1.00	1.00	0.61	1.00	0.95	1.00
Satd. Flow (perm)	1842	1533	1131	1740	1767	1581
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	243	135	72	232	143	73
RTOR Reduction (vph)	0	51	0	0	0	59
Lane Group Flow (vph)	243	84	72	232	143	14
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	2%	2%	1%	8%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	42.8	42.8	42.8	42.8	12.8	12.8
Effective Green, g (s)	42.8	42.8	42.8	42.8	12.8	12.8
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.19	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1149	956	705	1085	329	294
v/s Ratio Prot	0.13			c0.13	c0.08	
v/s Ratio Perm		0.05	0.06			0.01
v/c Ratio	0.21	0.09	0.10	0.21	0.43	0.05
Uniform Delay, d1	5.6	5.1	5.2	5.6	24.7	22.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.3	0.5	1.9	0.1
Delay (s)	6.0	5.3	5.5	6.0	26.6	23.0
Level of Service	A	A	A	A	C	C
Approach Delay (s)	5.8			5.9	25.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix G

Signalization Warrants

8th Street East at 20th Avenue East
2027 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	304	42%	42%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	72	42%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	233	32%	25%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	19	25%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East at 18th Avenue East
2027 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	304	42%	42%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	188	111%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	179	25%	25%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	90	119%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

8th Street East at 20th Avenue East
2032 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	386	54%	54%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	116	68%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	270	38%	31%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	23	31%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East at 18th Avenue East
2032 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	332	46%	46%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	197	116%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	200	28%	28%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	100	133%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

8th Street East @ 20th Avenue East
 2027 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	304	42%	42%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	72	42%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	233	32%	25%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	19	25%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ 18th Avenue East
 2027 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	359	50%	50%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	290	170%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	166	23%	23%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	179	239%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ 20th Avenue East
 2027 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	88	12%	0%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	0	0%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	88	12%	0%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	0	0%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ Site Access #1
 2027 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	54	8%	8%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	36	21%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	30	4%	4%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	24	32%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

8th Street East @ 20th Avenue East
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	365	51%	51%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	107	63%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	259	36%	31%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	23	31%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ 20th Avenue East
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	140	19%	19%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	63	37%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	98	14%	14%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	38	50%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ 18th Avenue East
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	443	62%	62%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	355	209%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	207	29%	29%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	183	243%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ Site Access #1
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	148	20%	20%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	35	20%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	125	17%	17%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	22	29%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ Site Access #2
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	115	16%	8%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	13	8%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	107	15%	6%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	4	6%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ Site Access #3
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	112	16%	12%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	20	12%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	99	14%	14%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	11	14%		

Notes

1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

10th Street East @ Site Access #4
 2032 Future Total

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	96	13%	9%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	16	9%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	85	12%	12%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	9	12%		

Notes

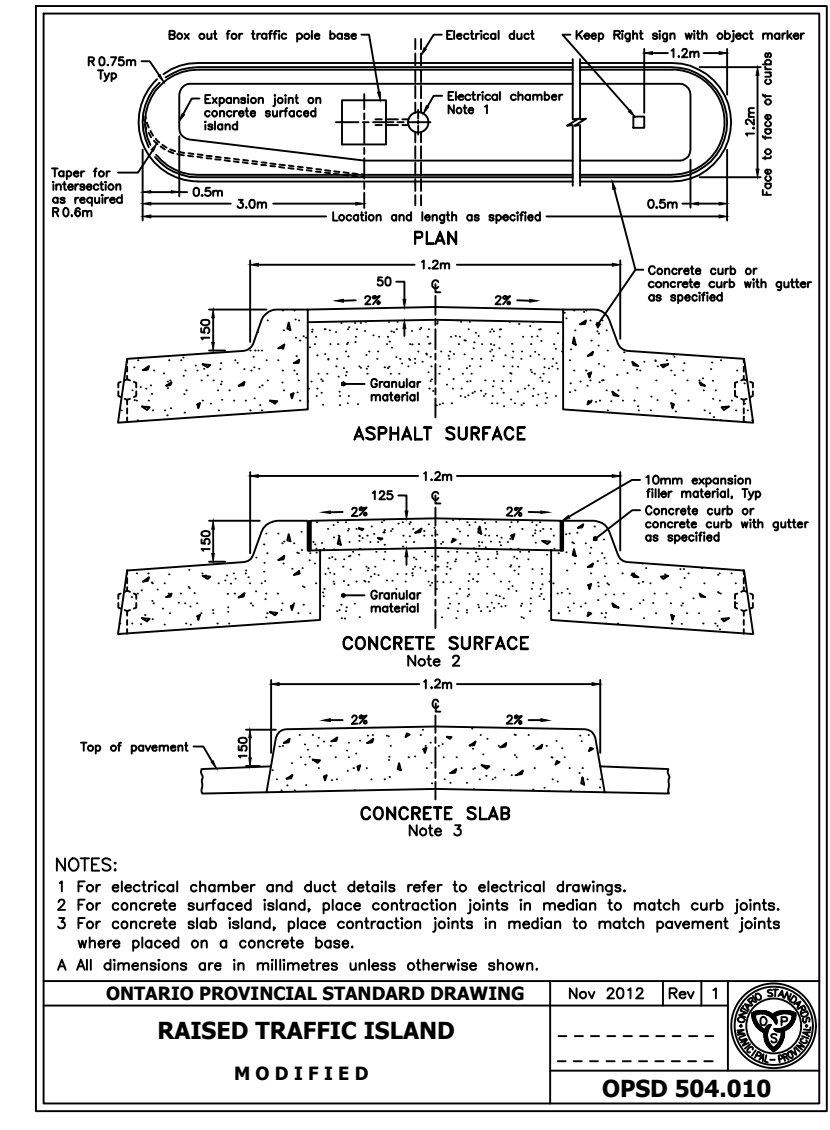
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$, including amplification factors
4. T-intersection factor corrected, applies only to 1B

Appendix H

16th Street East at 20th Avenue East Intersection Geometry

- GENERAL NOTES:**
1. LOCATION OF EXISTING UTILITIES SHALL BE CONFIRMED BY CONSULTING THE LOCAL MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF UTILITIES PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.
 2. THE CONTRACTOR SHALL REFER TO THE ONTARIO TRAFFIC MANUAL BOOK '7', "TEMPORARY CONDITIONS" & BOOK '11', "MARKINGS AND DELINEATION" FOR APPROPRIATE SIGNAGE AND PAVEMENT MARKINGS.
 3. THE CONSULTANT SHALL BE NOTIFIED 7 DAYS PRIOR TO COMMENCING CONSTRUCTION.
 4. ANY DAMAGE TO PROPERTY ADJACENT TO THE CONSTRUCTION SITE SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- PAVEMENT MARKING**
1. PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11.
 2. PAVEMENT MARKING MATERIAL SHALL BE IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS.

- SIGN INSTALLATION**
1. SIGNAGE SHALL BE IN ACCORDANCE WITH ONTARIO TRAFFIC MANUAL (OTM) BOOKS 5 AND 6.
 2. ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER NOT OBSTRUCTED BY LANDSCAPE.
 3. REFER TO SPECIFIC DETAILS AS SHOWN ON THE PLAN FOR SIGN MOUNTING, SIGN BLANK AND MESSAGE.
 4. TRAFFIC CONTROL SIGN MATERIAL SHALL BE TREATED FERROUS OR NON-FERROUS SIXTEEN GAUGE METAL.
 5. SPECIFIC REGULATORY TRAFFIC CONTROL SIGNS ARE REQUIRED TO HAVE HIGH INTENSITY GRADE REFLECTIVE SHEETING, REFER TO SECTION 1.4, TABLE 1, OTM BOOK 5.
 6. SIGN MOUNT POST SHALL BE 2-POST COMPONENT UNLESS OTHERWISE NOTED.
 7. ALL FASTENERS SUCH AS BOLTS, NUTS, WASHERS, EXPANSIONS, SHIELDS AND OTHER HARDWARE FOR ALL ERECTED SIGNS TO BE CAST ALUMINUM ALLOY, STAINLESS OR GALVANIZED STEEL.
 8. ALL SIGN POST LOCATIONS MUST BE PLACED SUCH THAT THE SIGN FACE OR EDGE OF SIGN WILL NOT PROJECT BEYOND THE CURB LINE.
 9. REGULATORY TRAFFIC CONTROL SIGNS MUST BE MOUNTED SUCH THAT THERE IS A MINIMUM 2.1 METRES CLEARANCE FROM THE BOTTOM OF SIGN TO THE SURFACE.



STOP SIGN (Ra-1)

KEEP RIGHT SIGN (Rb-25R)

SIGN (Wa-33L)

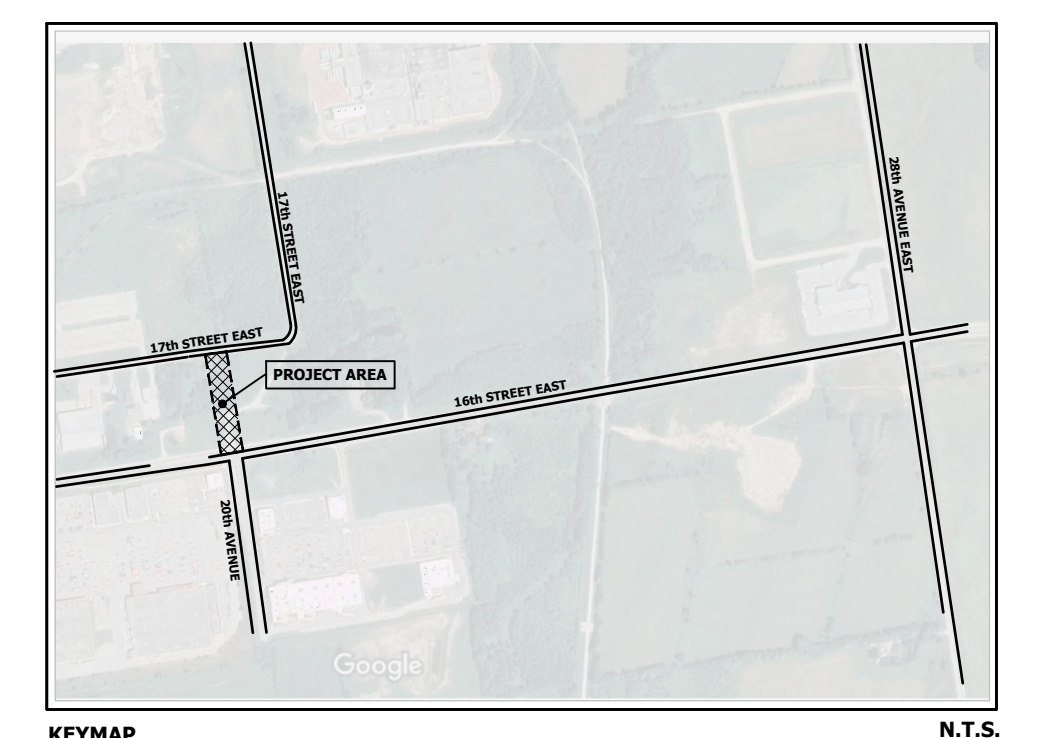
SIGN (Rb-02)

ENDS

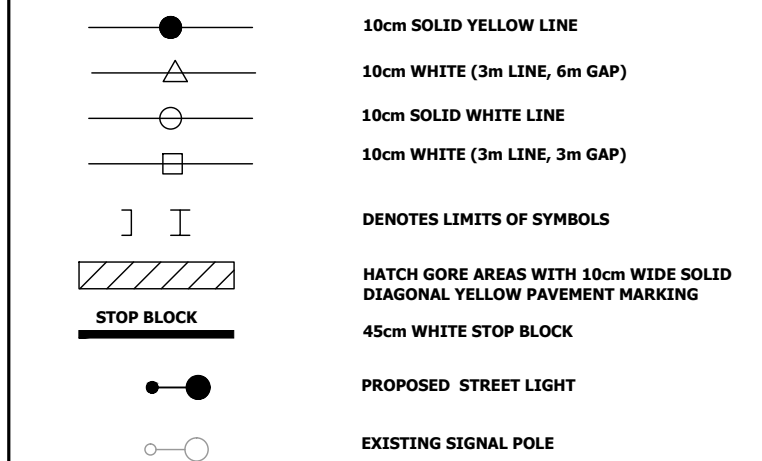
SIGN (Rb-1A)

SIGN (Wa-8R)

SIGN (Wa-8L)



PAVEMENT MARKING LEGEND



BEARING NOTE
 BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF PARTS 1 TO 6, PLAN 16R-8430, SHOWN TO BE N80°54'00"E, ON SAID PLAN. METRIC DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES
 ELEVATIONS SHOWN HEREON ARE IN METRES AND ARE BASED ON POST PROCESSED STATIC GPS OBSERVATIONS REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD28 HTV2.0). ELEVATIONS SHOWN WITH THE SURVEY MONUMENT DESCRIPTION WERE MEASURED TO THE TOP OF THE STEEL SURVEY MONUMENT.
 THE LOCAL BENCHMARK IS LOCATED ON THE TOP OF THE IRON BAR AT THE NORTHEASTERLY CORNER OF PART 3, PLAN 16R-1883 AND HAS AN ELEVATION OF 220.97 METRES, (CGVD28 HTV2.0). THE AREA OF THIS PROPERTY IS 1.112 HECTARES.

REVISION	BLOCK	DATE	APPR. BY

**SYDENHAM HEIGHTS CENTRE
 20th AVE ROAD CONSTRUCTION**

MUNICIPAL
 DESIGN APPROVED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO CITY OF OWEN SOUND STANDARDS AND SPECIFICATIONS.

SIGNED
 ENGINEERING & PUBLIC WORKS

DATE

DESIGNED BY:

APPROVED:

CONDELAND
 CONSULTING ENGINEERS & PROJECT MANAGERS

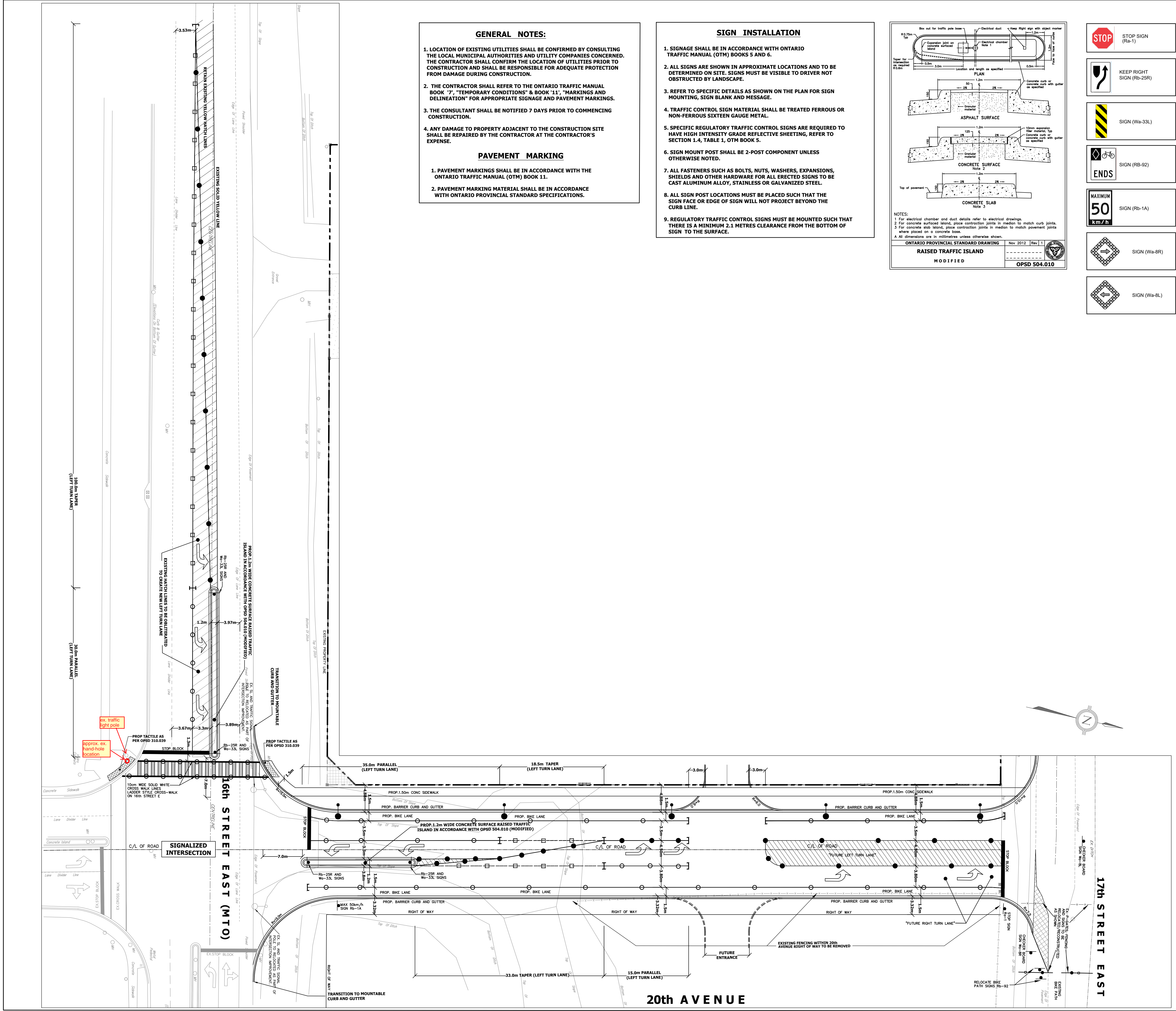
350 Creditstone Road, Unit 200 P: (905) 695-2096
 Concord, Ontario L4K 3Z2 F: (905) 695-2099

owen sound
 where you want to live

**16th STREET AND 20th AVENUE
 (OWEN SOUND) LP**

**PAVEMENT MARKING, SIGNAGE, AND TRAFFIC ISLAND
 CONSTRUCTION FOR 16th ST. E AND 20th AVE.**

DESIGNED BY: M.H.	DATE: AUGUST 2022	CHECKED BY: M.H.
DRAWN BY: G.M.	DRAWING NO. 22-017	CITY FILE:
SCALE 1:300	SHEET: 02 OF 3	

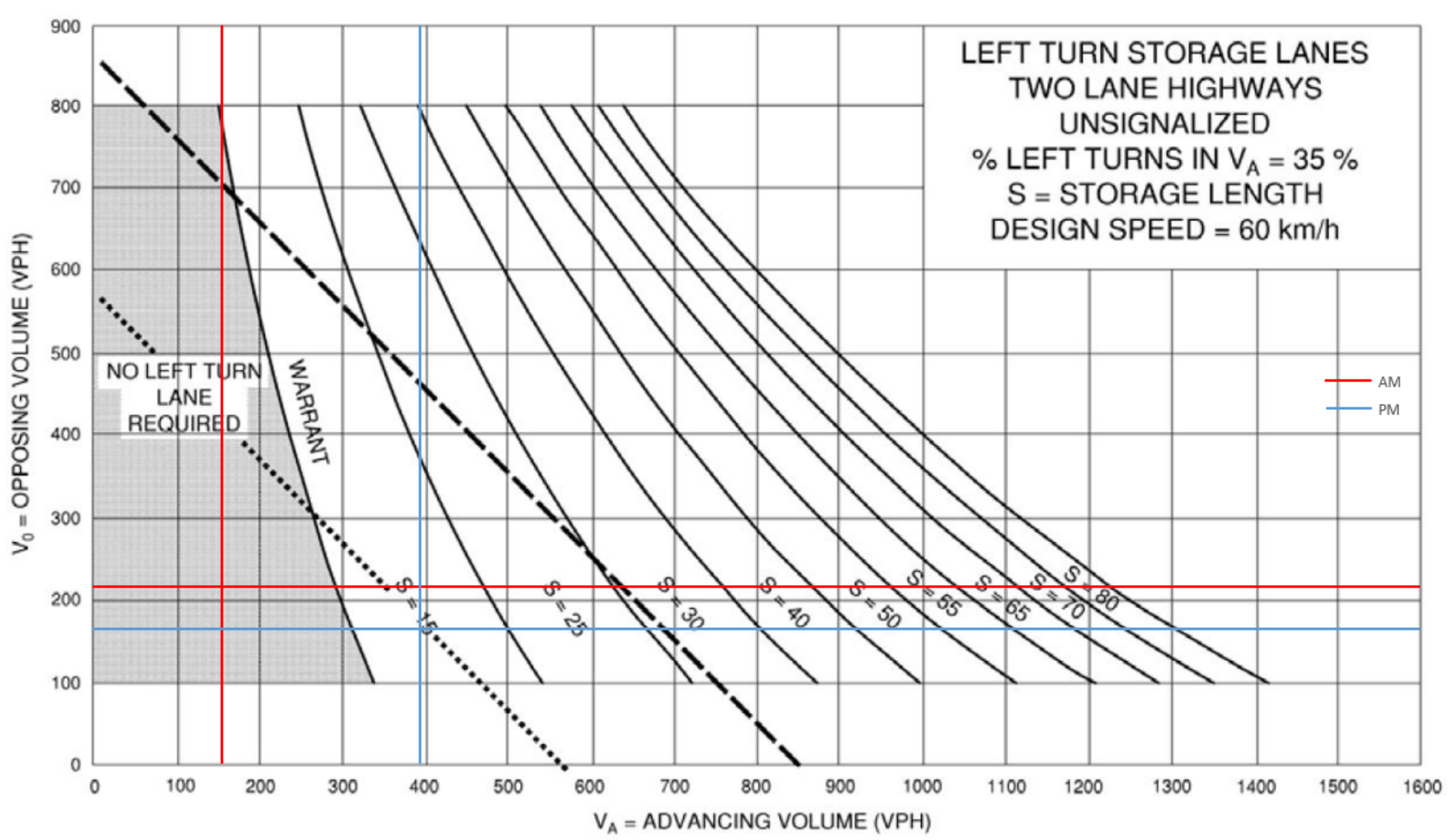


Appendix I

Left Turn Warrants

8th Street East and 20th Avenue East
 2027 Future Background

Design Speed 60 km/h	Eastbound Left	Yes												%Left Turn	Volume Advancing	Volume Opposing
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
	AM	21	122	12	6	200	10	28	10	22	5	6	26	13.5%	155	216
	PM	131	218	45	22	133	10	15	10	12	8	10	135	33.2%	394	165

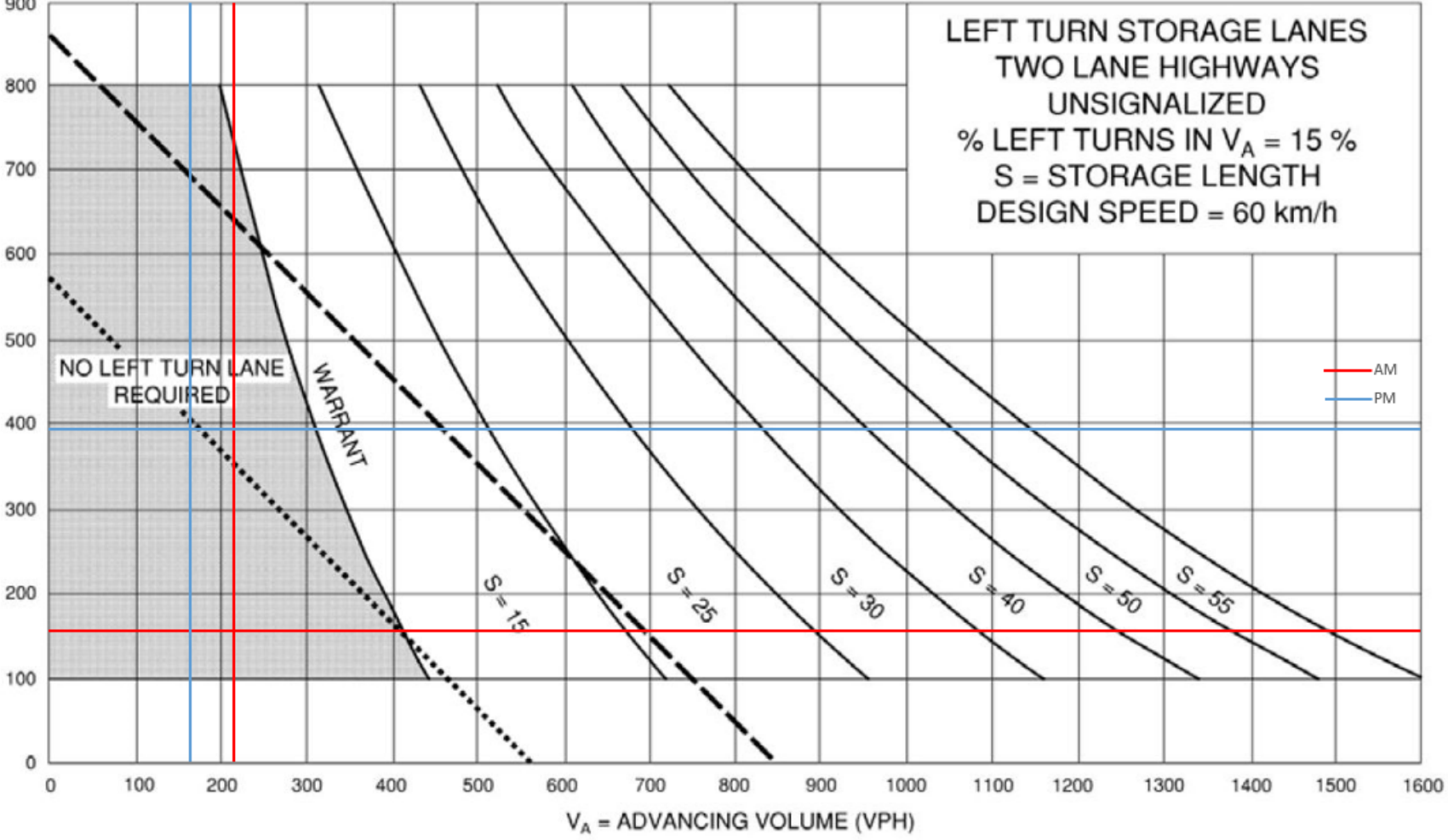


8th Street East and 20th Avenue East
 2027 Future Background

Design Speed 60 km/h	Westbound Left			Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR												
AM	21	122	12	6	200	10	28	10	22	5	6	26	2.8%	216	155
PM	131	218	45	22	133	10	15	10	12	8	10	135	13.3%	165	394

LEFT TURN STORAGE LANES
 TWO LANE HIGHWAYS
 UNSIGNALIZED
 % LEFT TURNS IN $V_A = 15\%$
 $S =$ STORAGE LENGTH
 DESIGN SPEED = 60 km/h

$V_0 =$ OPPOSING VOLUME (VPH)



AM
 PM

NO LEFT TURN LANE
 REQUIRED

WARRANT

$S = 15$

$S = 25$

$S = 30$

$S = 40$

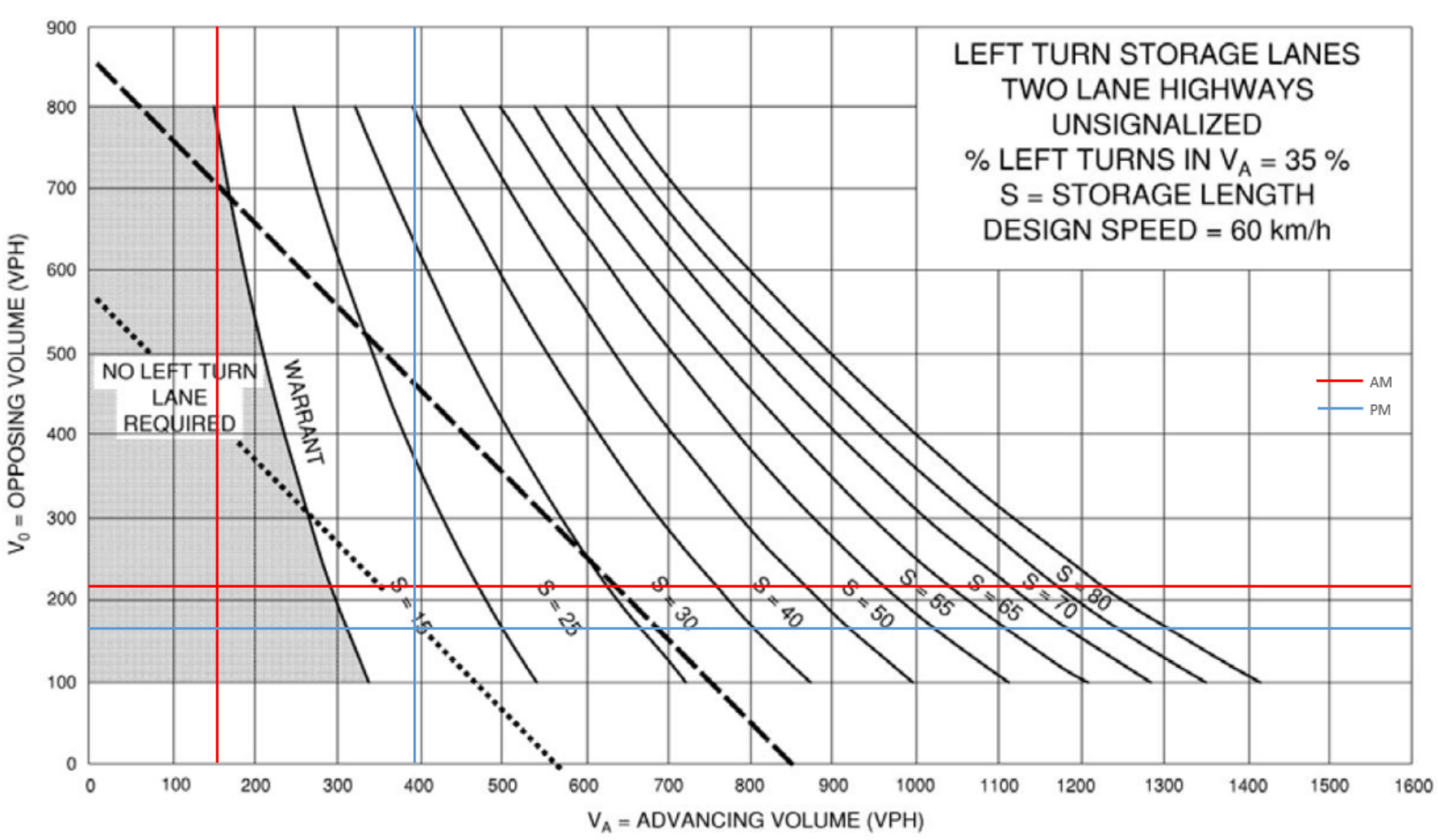
$S = 50$

$S = 55$

$V_A =$ ADVANCING VOLUME (VPH)

8th Street East at 20th Avenue East
 2027 Future Total

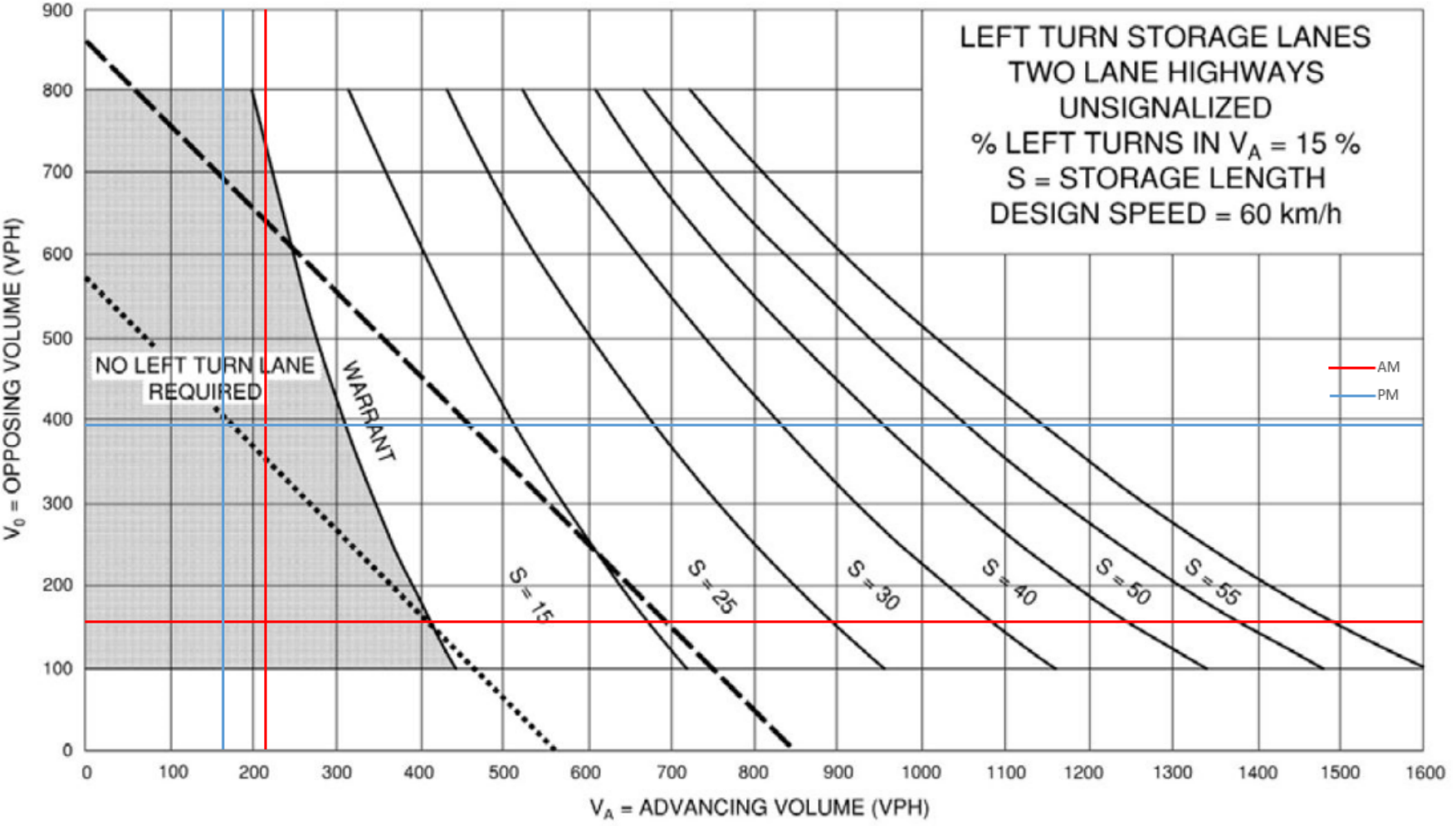
Design Speed	Eastbound Left	Yes															
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	21	122	12	6	200	10	28	10	22	5	6	26	13.5%	155	216	
	PM	131	218	45	22	133	10	15	10	12	8	10	135	33.2%	394	165	



8th Street East at 20th Avenue East
 2027 Future Total

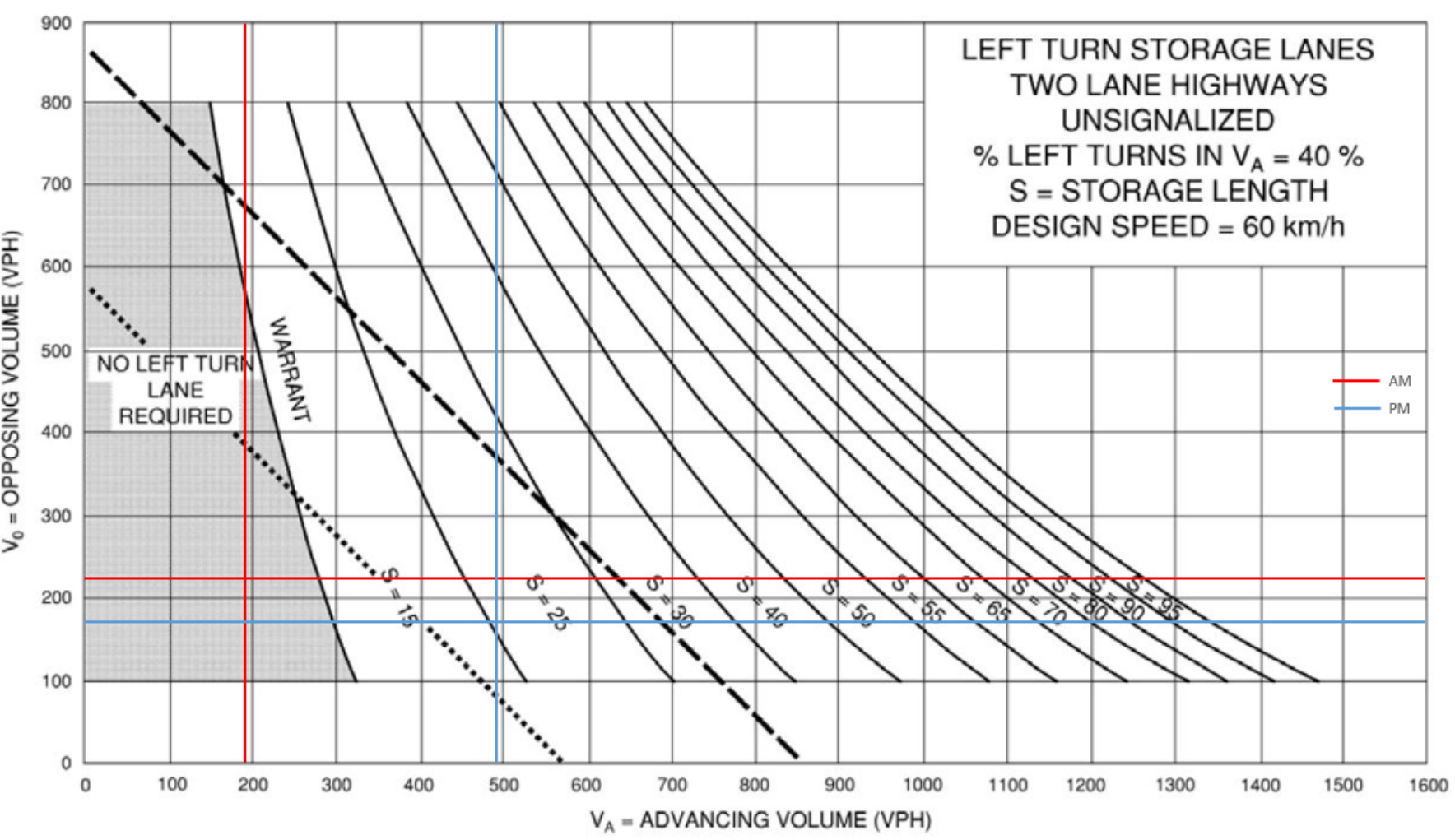
Design Speed 60 km/h	Westbound Left			Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR												
AM	21	122	12	6	200	10	28	10	22	5	6	26	2.8%	216	155
PM	131	218	45	22	133	10	15	10	12	8	10	135	13.3%	165	394

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN $V_A = 15\%$
 $S =$ STORAGE LENGTH
DESIGN SPEED = 60 km/h



8th Street East and 20th Avenue East
 2032 Future Background

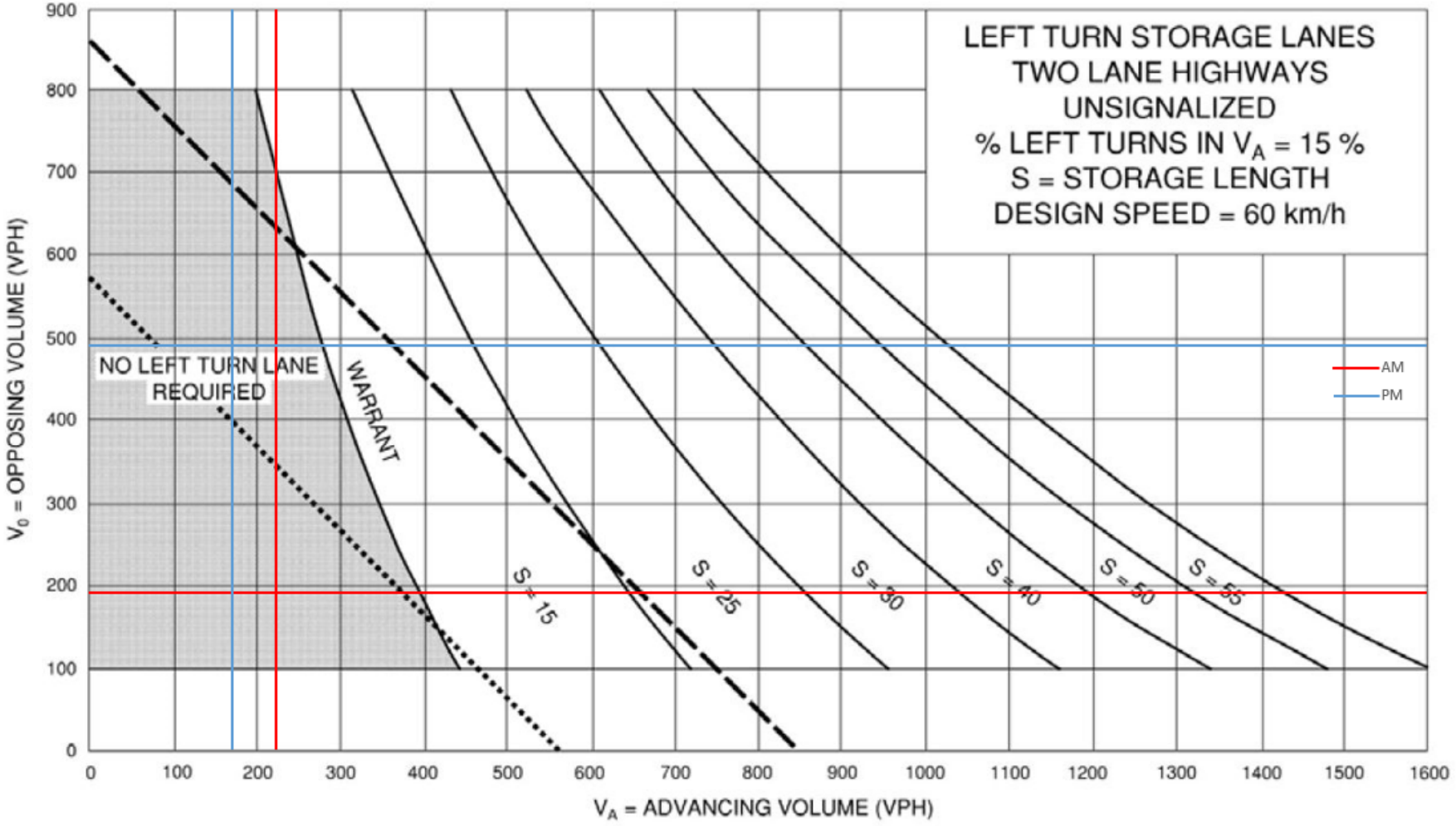
Design Speed 60 km/h	Eastbound Left	Yes												%Left Turn	Volume Advancing	Volume Opposing
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
	AM	57	122	12	6	202	17	28	10	22	7	6	116	29.8%	191	225
	PM	237	210	45	22	131	19	15	10	12	23	10	204	48.2%	492	172



8th Street East and 20th Avenue East
 2032 Future Background

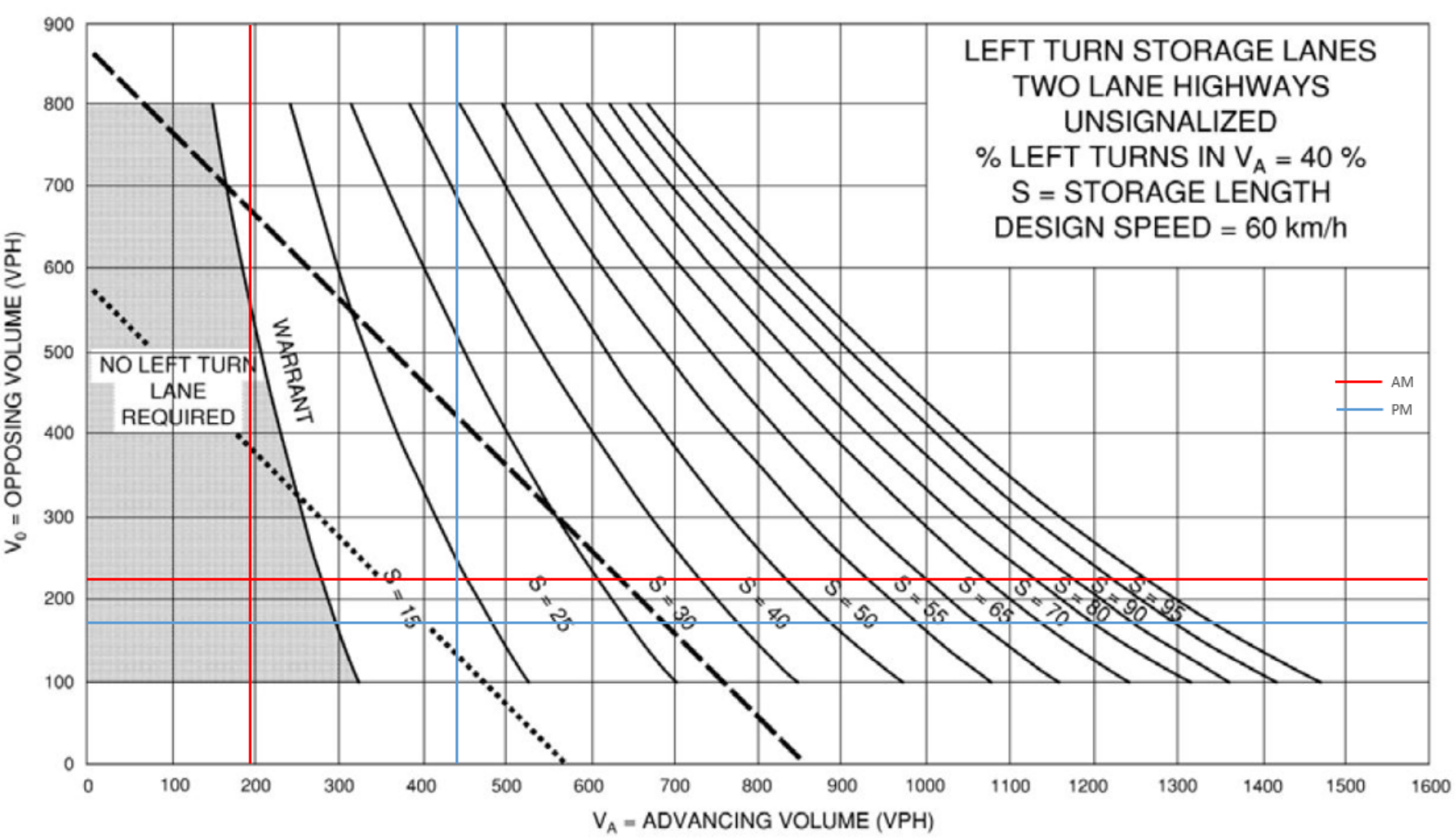
Design Speed 60 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	57	122	12	6	202	17	28	10	22	7	6	116	2.7%	225	191
PM	237	210	45	22	131	19	15	10	12	23	10	204	12.8%	172	492

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN $V_A = 15\%$
 $S =$ STORAGE LENGTH
DESIGN SPEED = 60 km/h



8th Street East at 20th Avenue East
 2032 Future Total

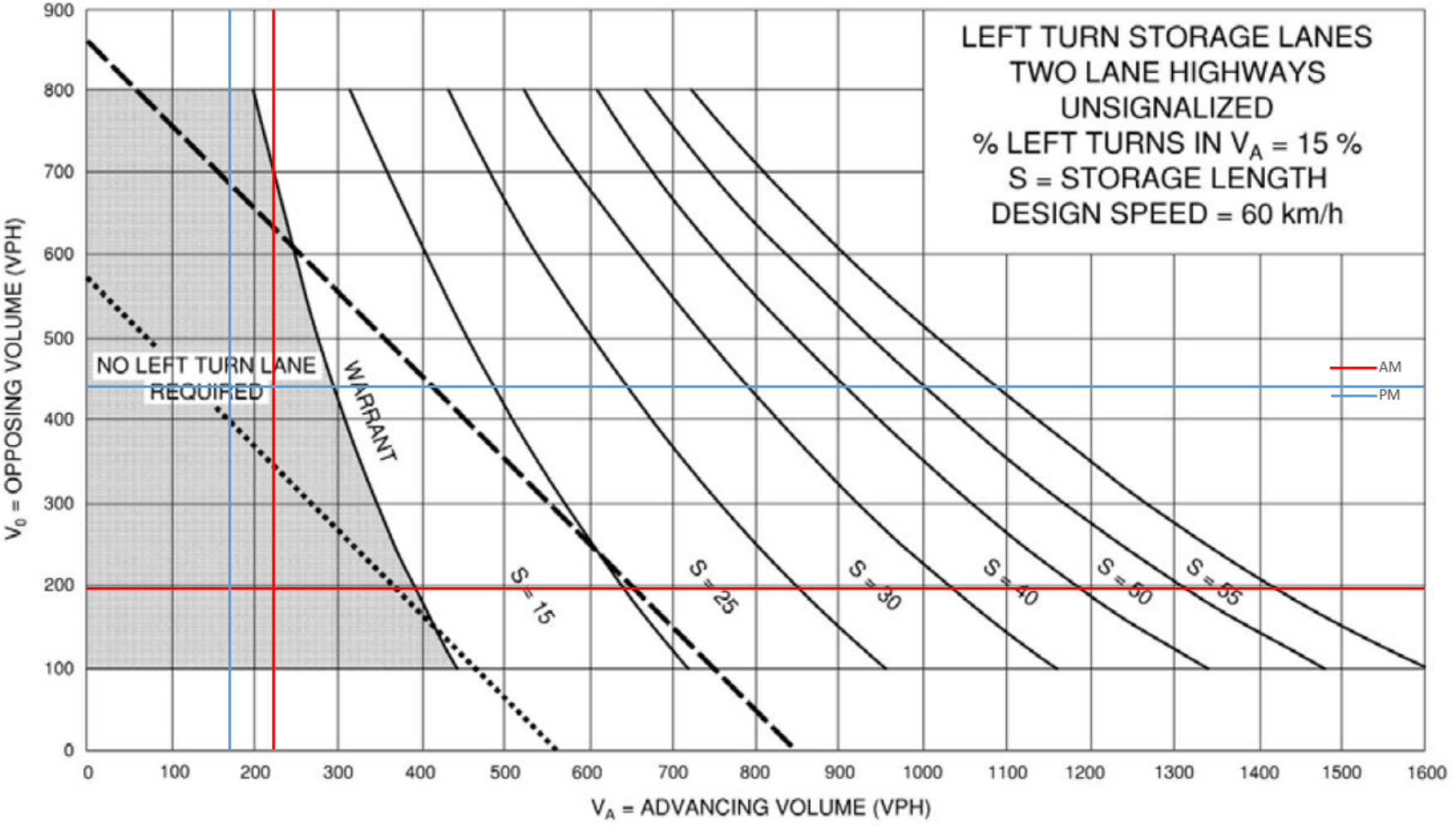
Design Speed	Eastbound Left	Yes															
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	61	122	12	6	202	17	28	10	22	7	6	127	31.3%	195	225	
	PM	187	210	45	22	131	19	15	10	12	23	10	156	42.3%	442	172	



8th Street East at 20th Avenue East
 2032 Future Total

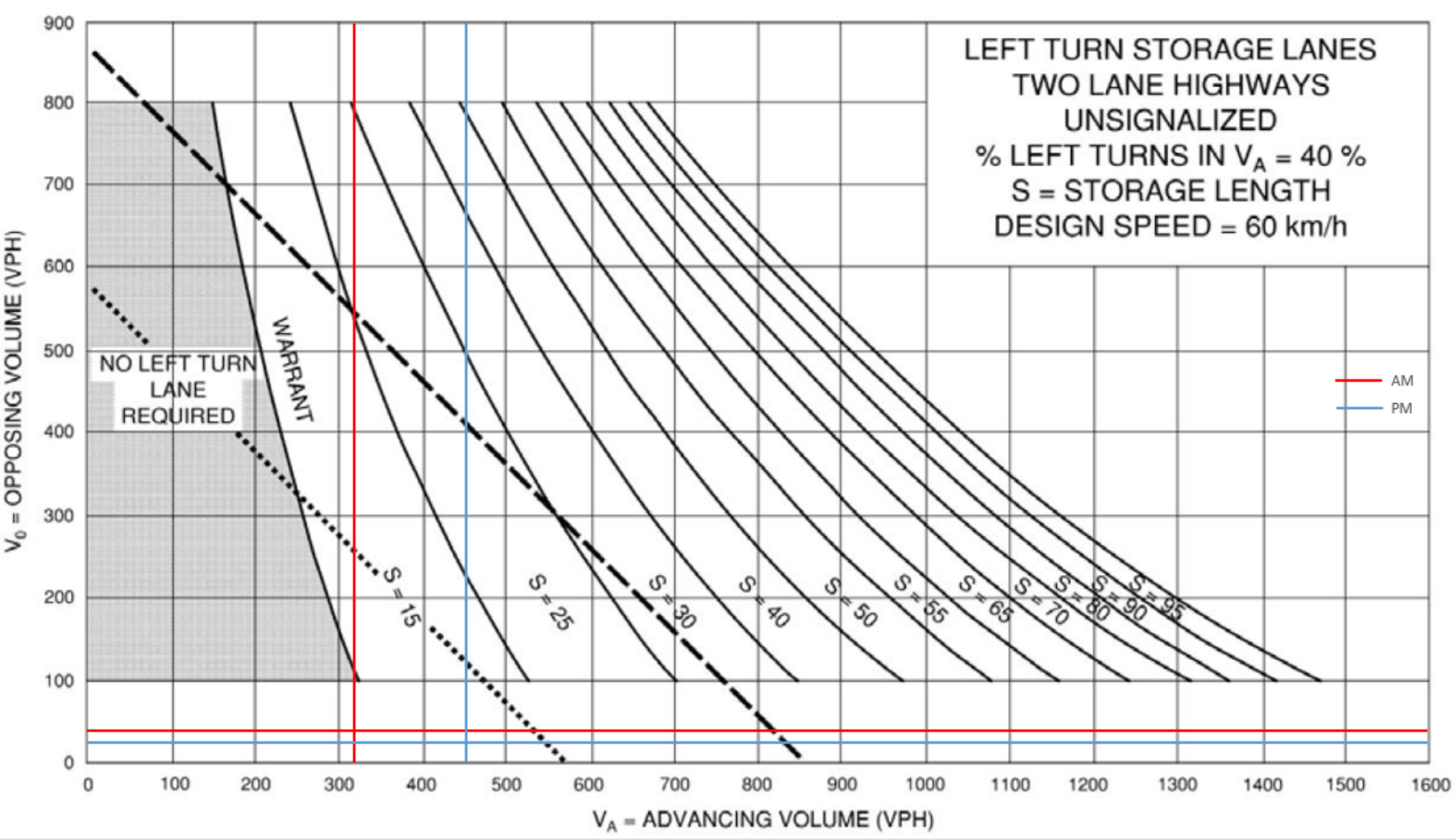
Design Speed 60 km/h	Westbound Left			Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR												
AM	61	122	12	6	202	17	28	10	22	7	6	127	2.7%	225	195
PM	187	210	45	22	131	19	15	10	12	23	10	156	12.8%	172	442

LEFT TURN STORAGE LANES
 TWO LANE HIGHWAYS
 UNSIGNALIZED
 % LEFT TURNS IN $V_A = 15\%$
 $S =$ STORAGE LENGTH
 DESIGN SPEED = 60 km/h



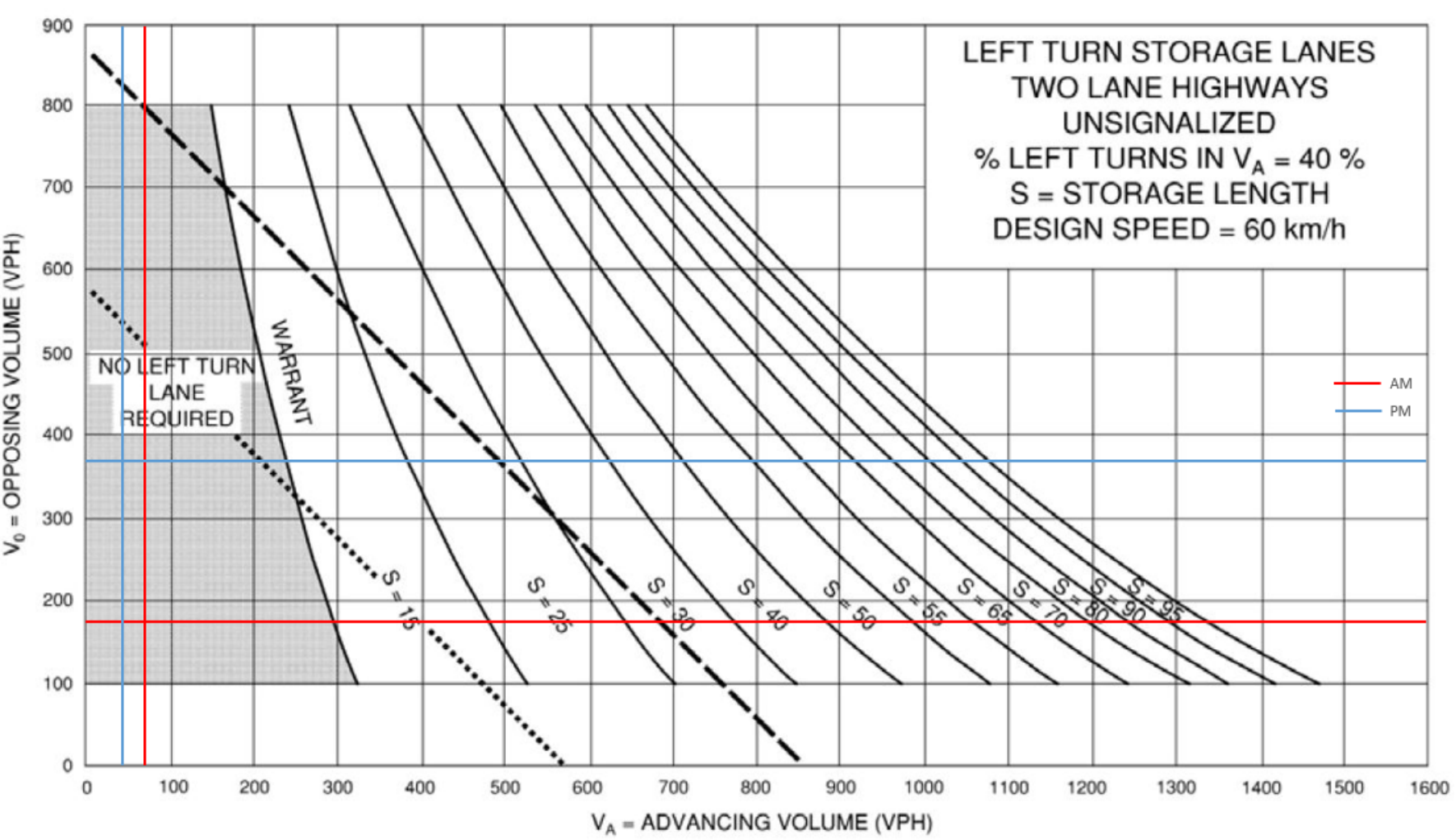
10th Street East at 18th Avenue East
 2027 Future Total

Design Speed	Eastbound Left	Yes																	
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing			
	AM	298	0	21	39	0	0	0	0	32	0	0	18	158	93.4%	319	39		
	PM	418	0	35	24	0	0	0	0	20	0	0	28	343	92.3%	453	24		



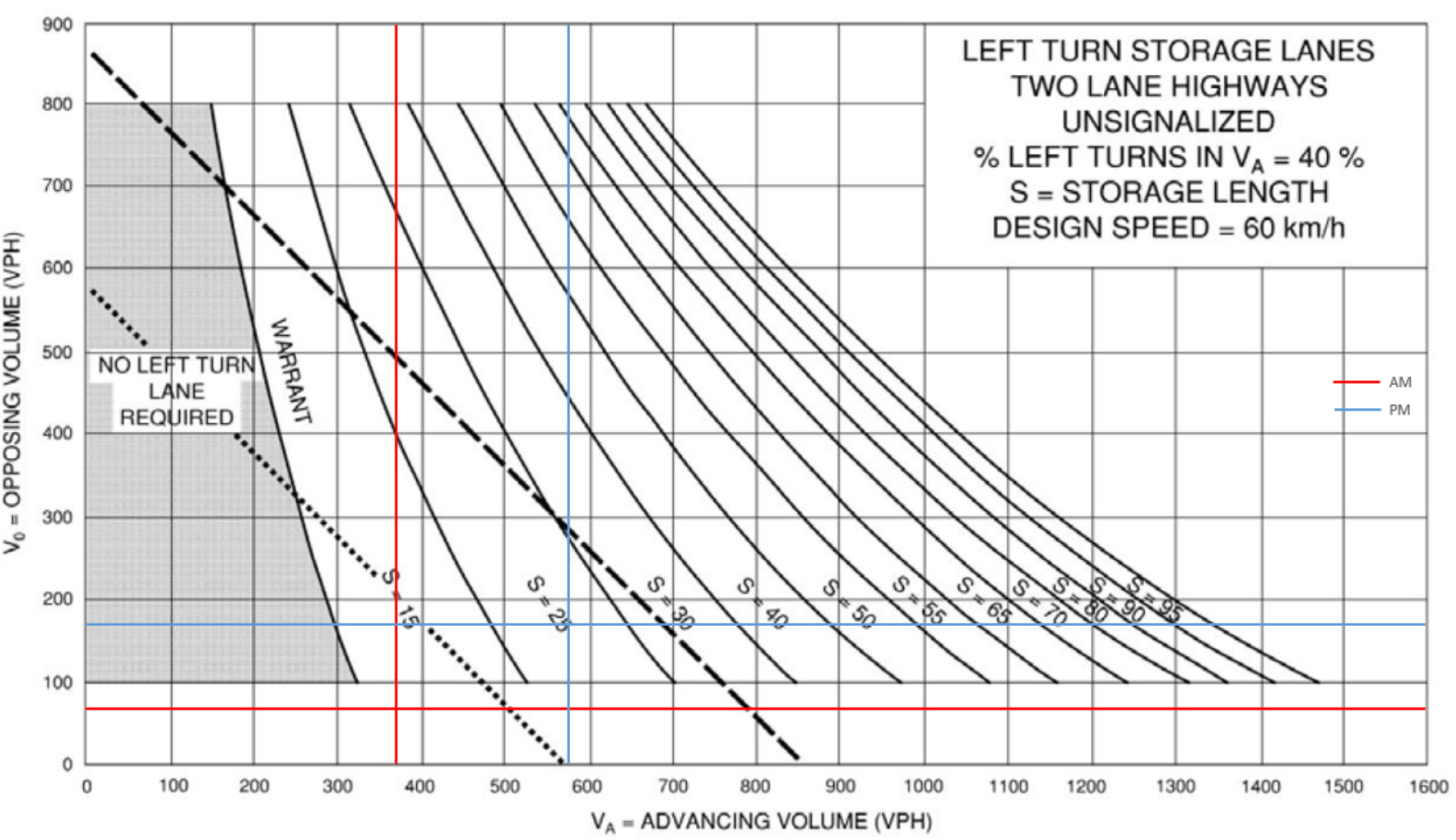
10th Street East at 18th Avenue East
 2027 Future Total

Design Speed 60 km/h	Northbound Left										Yes				%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
AM	298	0	21	0	0	0	39	32	0	0	18	158	54.9%	71	176		
PM	418	0	35	0	0	0	24	20	0	0	28	343	54.5%	44	371		



10th Street East at 18th Avenue East
 2032 Future Total

Design Speed	Eastbound Left	Yes															
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	340	0	31	68	0	0	0	50	0	0	21	166	91.6%	371	68	
	PM	390	0	186	170	0	0	0	27	0	0	42	293	67.7%	576	170	

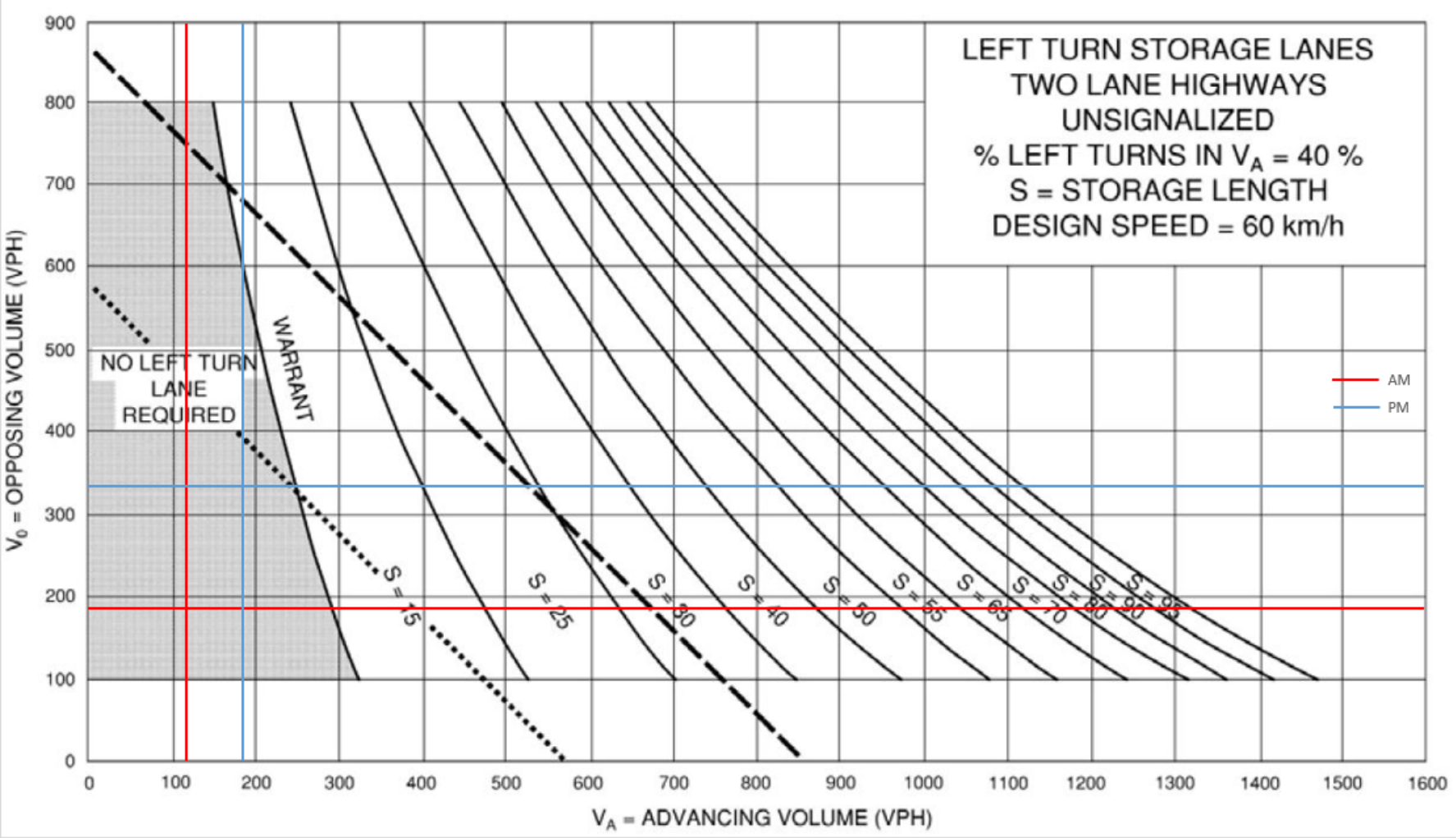


10th Street East at 18th Avenue East
 2032 Future Total

Design Speed 60 km/h	Northbound Left							Yes							%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
AM	340	0	31	0	0	0	68	50	0	0	21	166	57.6%	118	187		
PM	390	0	186	0	0	0	159	27	0	0	42	293	85.5%	186	335		

LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN $V_A = 40\%$
 $S =$ STORAGE LENGTH
DESIGN SPEED = 60 km/h

$V_0 =$ OPPOSING VOLUME (VPH)

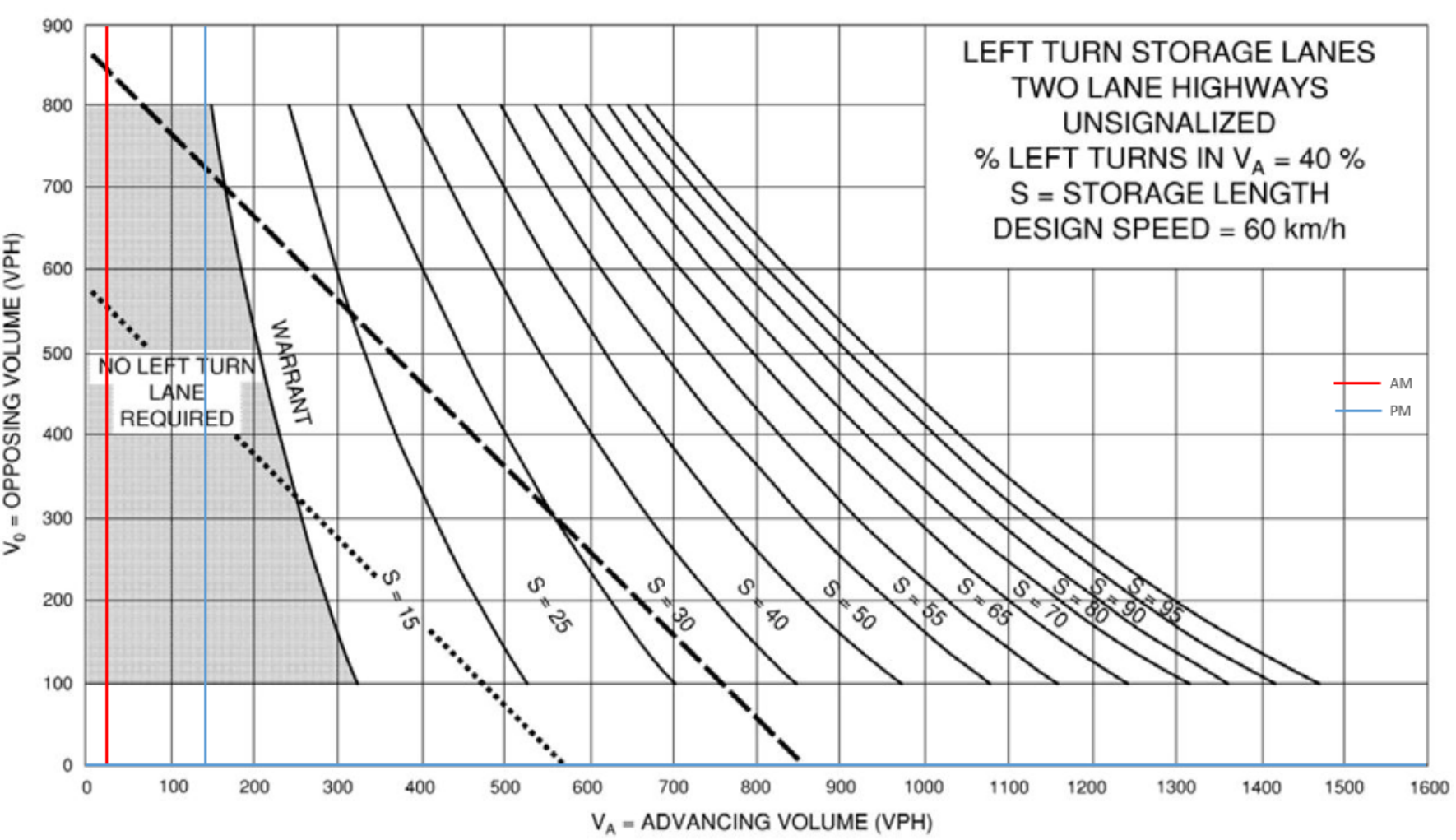


AM
PM

$V_A =$ ADVANCING VOLUME (VPH)

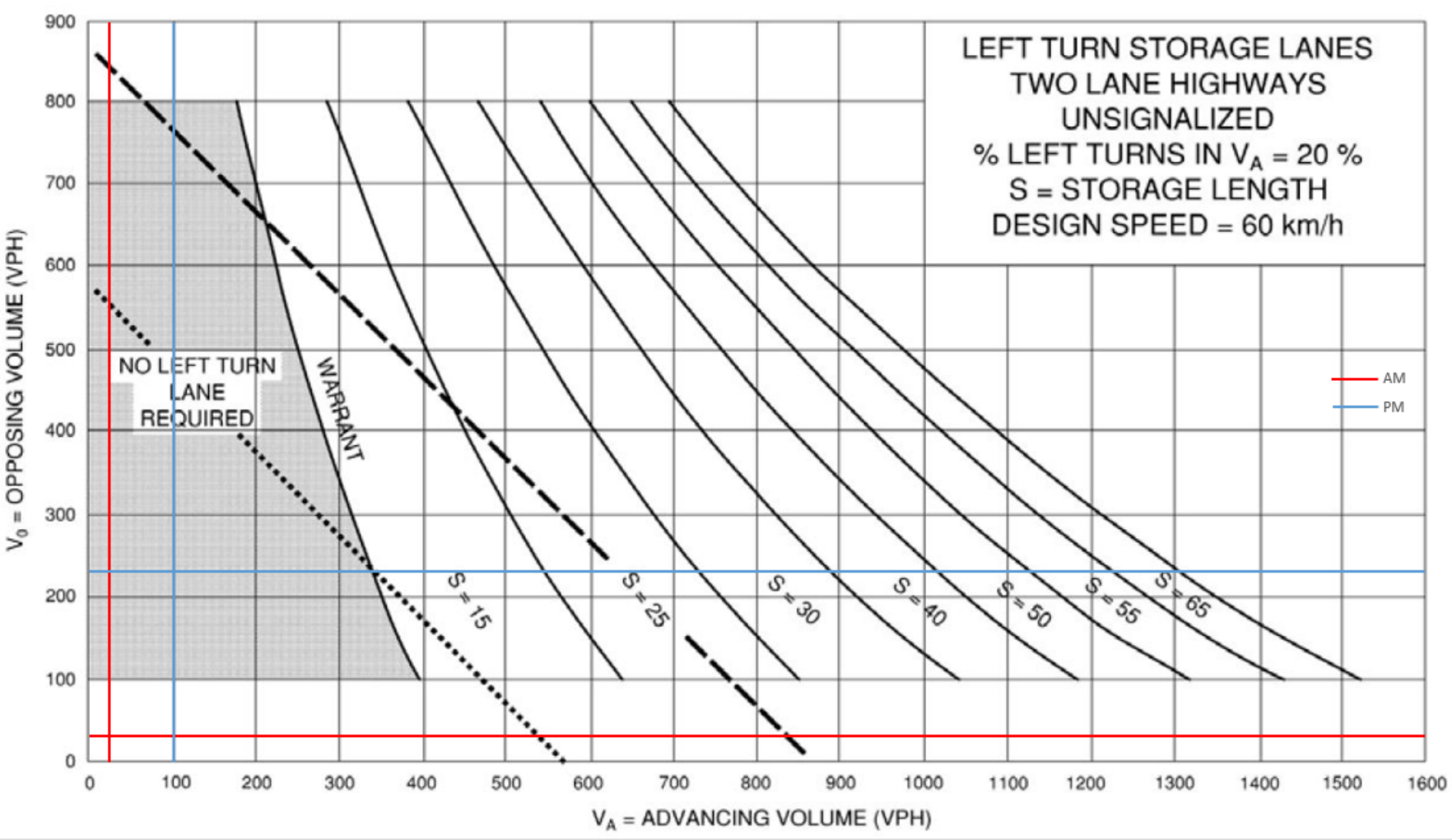
10th Street East at 20th Avenue East
 2032 Future Total

Design Speed 60 km/h	Eastbound Left	Yes												%Left Turn	Volume Advancing	Volume Opposing
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
	AM	14	0	11	0	0	0	4	21	0	0	26	6	56.0%	25	0
	PM	137	0	6	0	0	0	9	92	0	0	99	133	95.8%	143	0



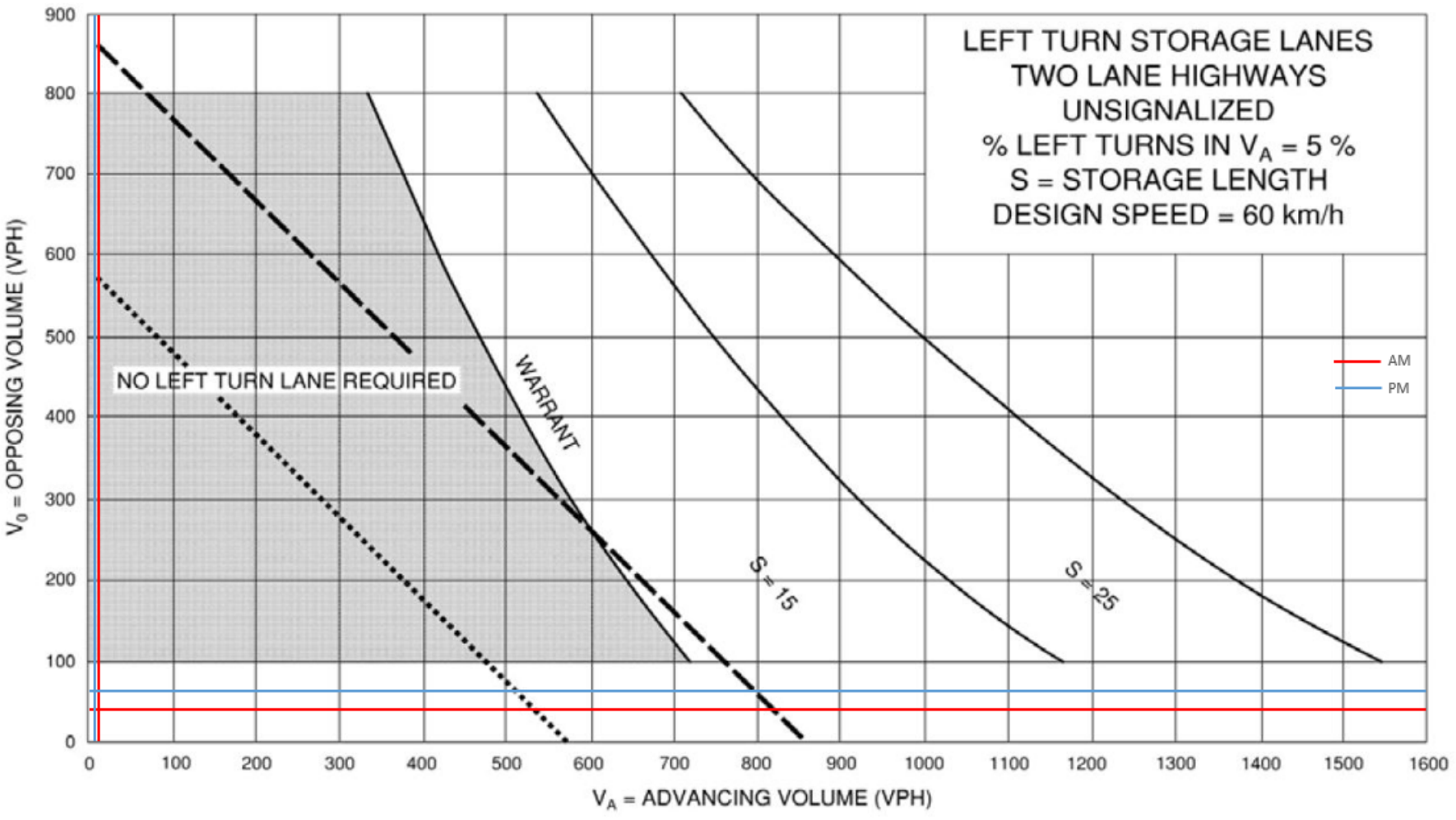
10th Street East at 20th Avenue East
 2032 Future Total

Design Speed 60 km/h	Northbound Left							Yes							%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
AM	14	0	11	0	0	0	0	4	21	0	0	26	6	16.0%	25	32	
PM	137	0	6	0	0	0	0	9	92	0	0	99	133	8.9%	101	232	



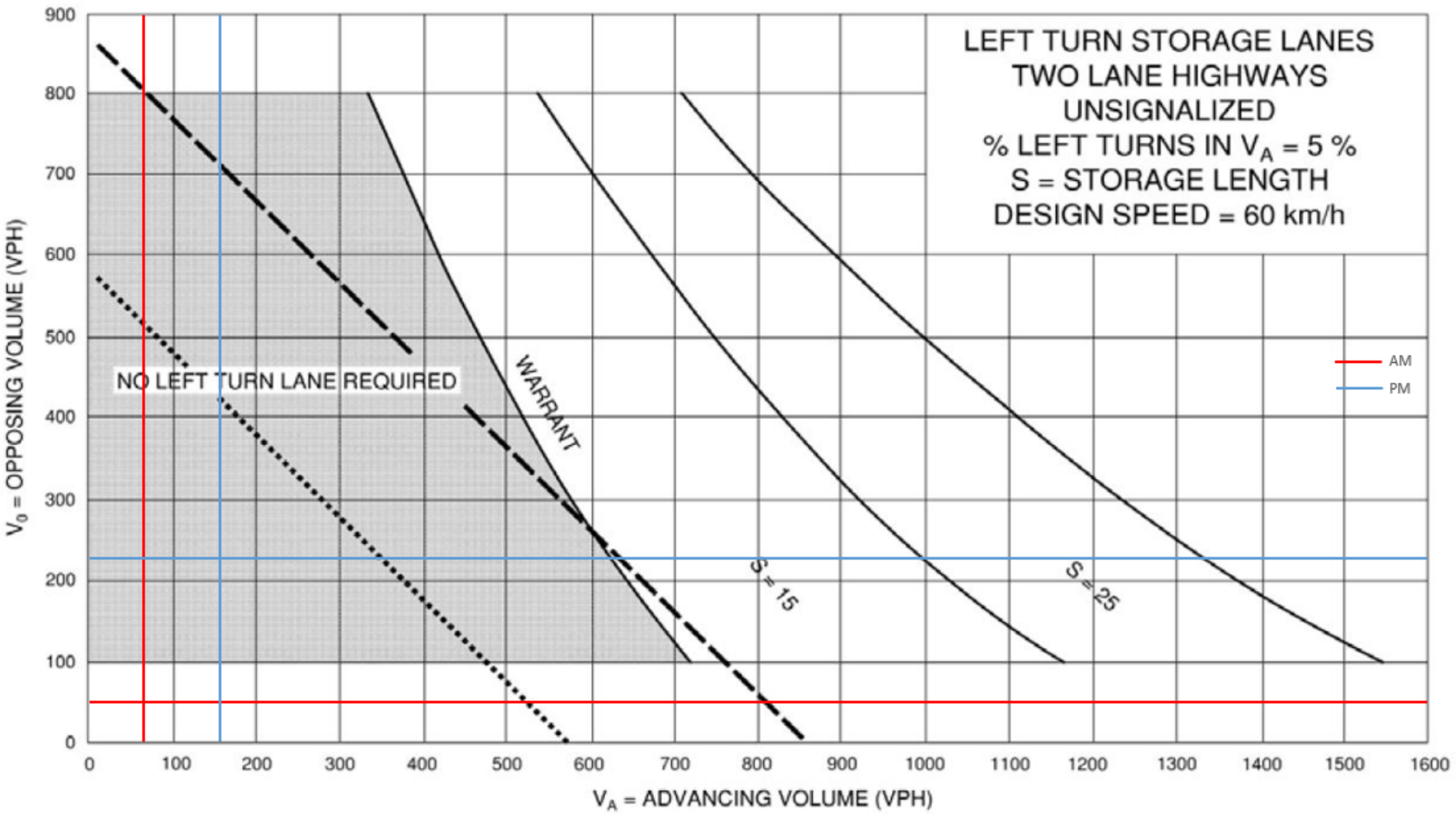
10th Street East at Site Access 1
 2027 Future Total

Design Speed 60 km/h	Westbound Left			Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR												
AM	0	6	33	0	11	0	60	0	0	0	0	0	0.0%	11	39
PM	0	9	54	0	7	0	37	0	0	0	0	0	0.0%	7	63



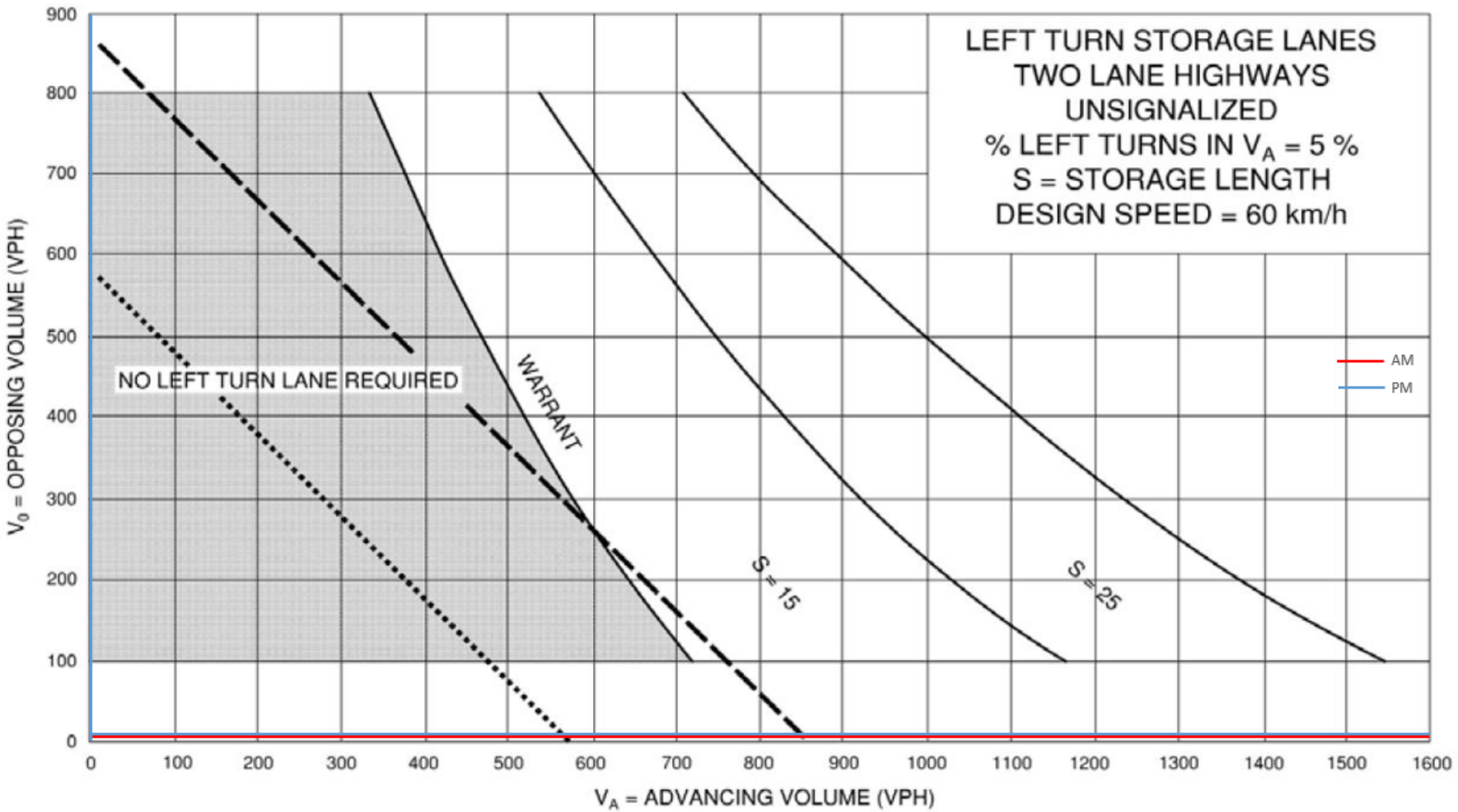
10th Street East at Site Access 1
 2032 Future Total

Design Speed 60 km/h	Westbound Left												%Left Turn	Volume Advancing	Volume Opposing	
		EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT				SBR
	AM	0	21	29	2	63	0	53	0	4	0	0	0	3.1%	65	50
	PM	0	180	47	3	153	0	33	0	2	0	0	0	1.9%	156	227



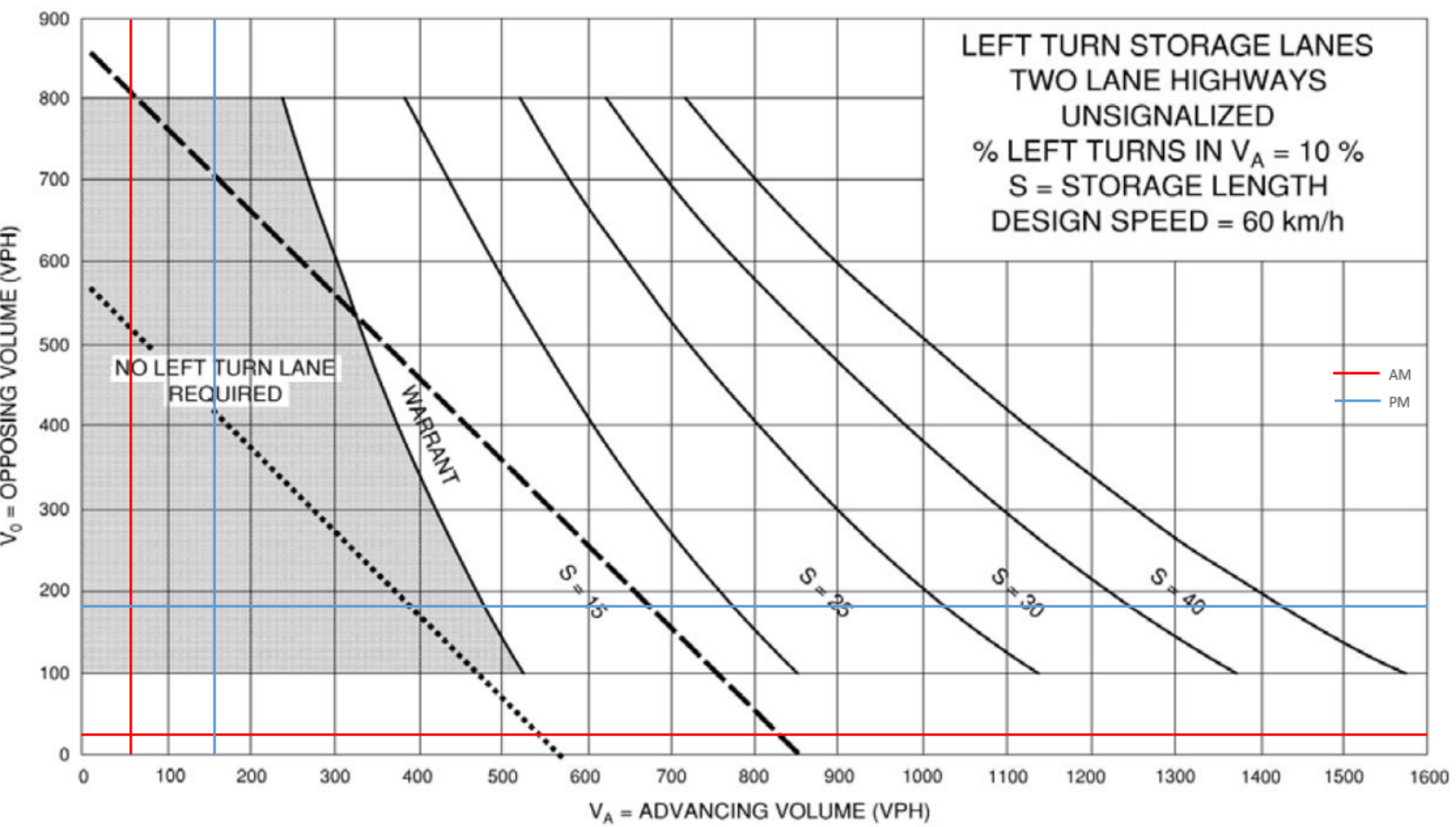
10th Street East at Site Access 2
 2027 Future Total

Design Speed 60 km/h	Westbound Left	EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	0	0	6	0	0	0	11	0	0	0	0	0	#DIV/0!	0	6
PM	0	0	0	9	0	0	0	7	0	0	0	0	0	#DIV/0!	0	9



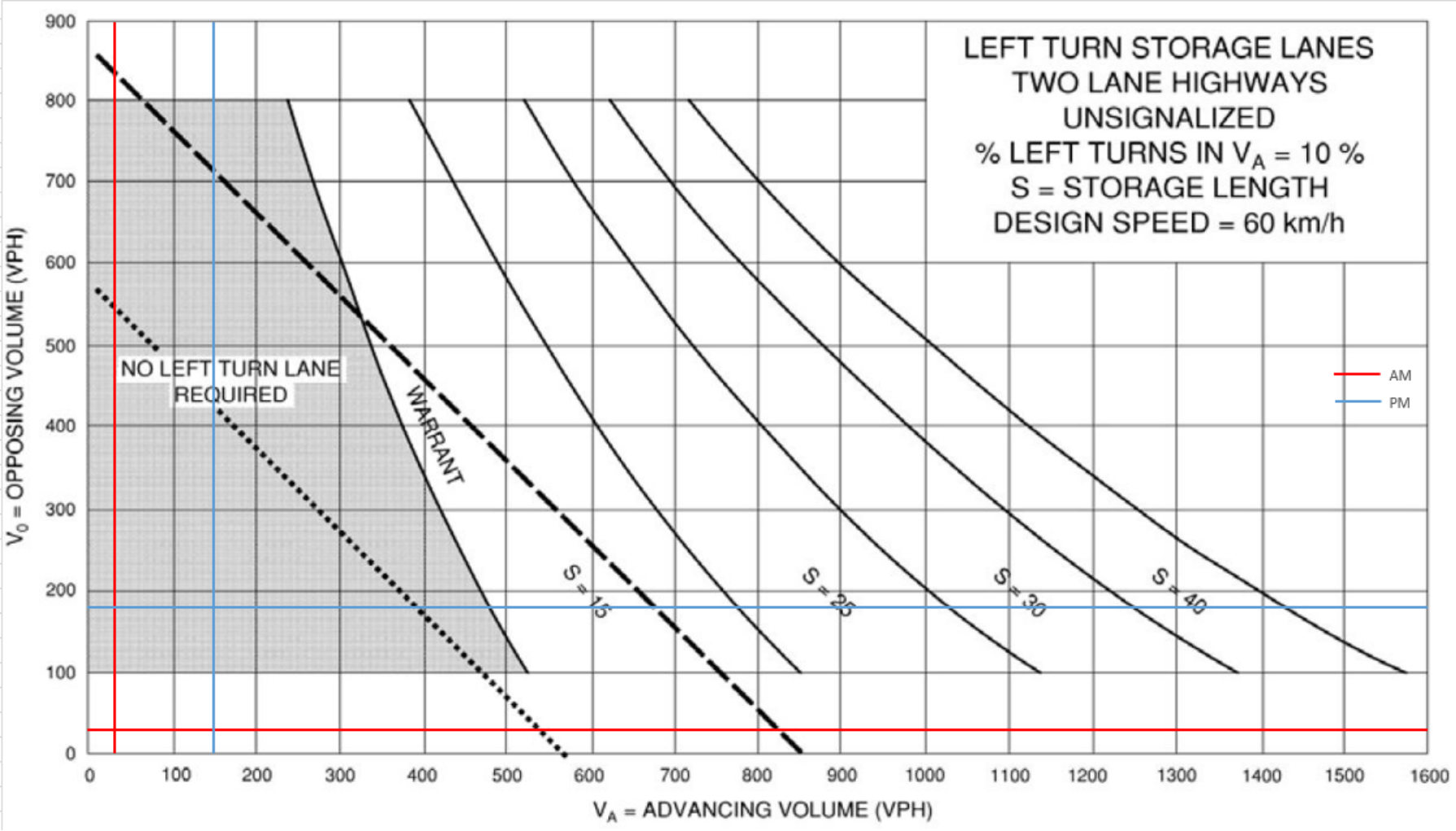
10th Street East at Site Access 1
 2032 Future Total

Design Speed 60 km/h	Westbound Left	EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	20	5	5	55	0	11	0	11	0	0	0	0	8.3%	60	25
PM	0	173	9	9	150	0	6	0	6	0	0	0	0	5.7%	159	182



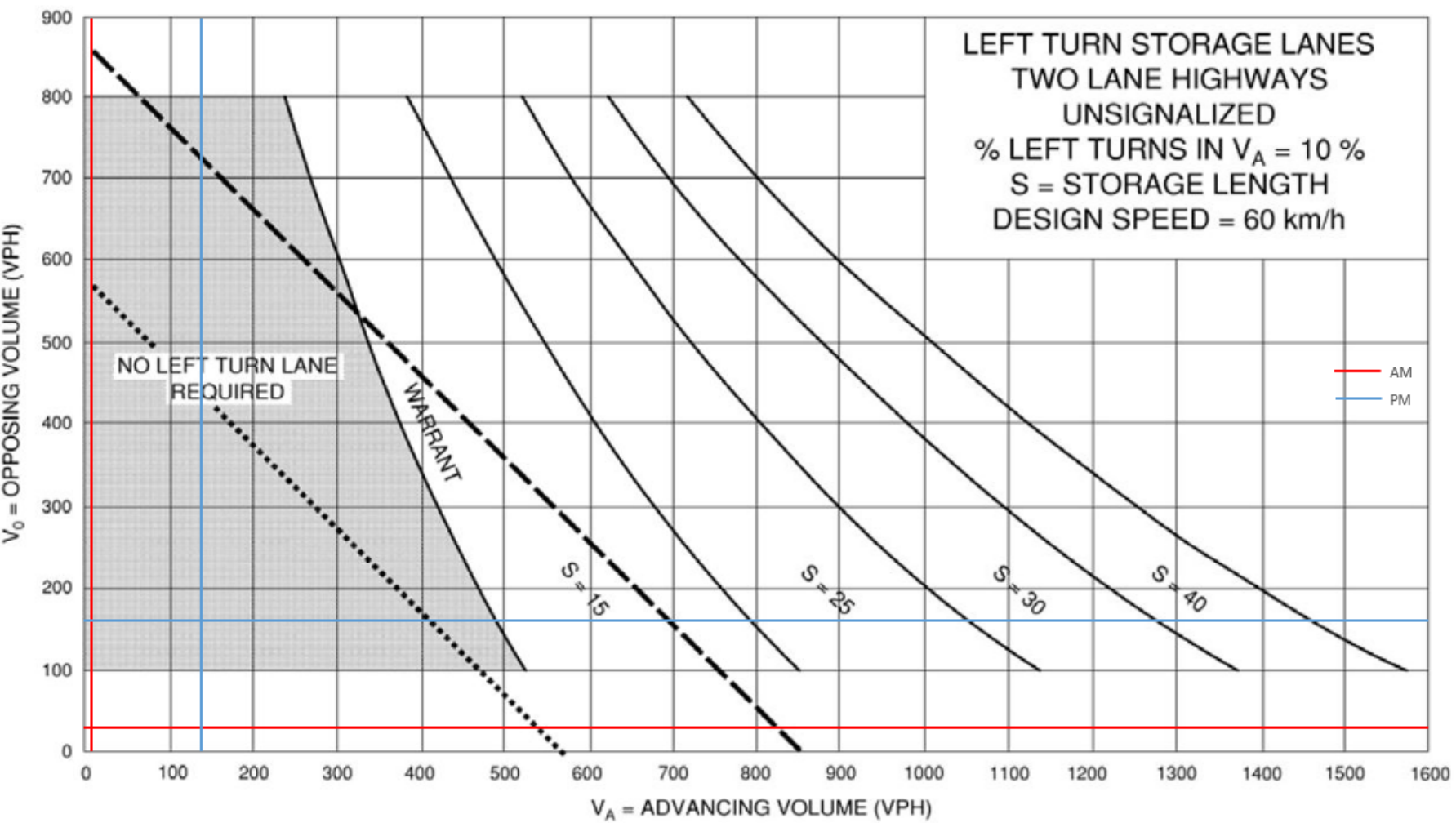
10th Street East at Site Access 1
 2032 Future Total

Design Speed 60 km/h	Westbound Left	EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	22	8	2	32	0	28	0	7	0	0	0	5.9%	34	30
PM	0	158	22	6	145	0	14	0	4	0	0	0	4.0%	151	180	



10th Street East at Site Access 1
 2032 Future Total

Design Speed 60 km/h	Westbound Left	EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
		AM	0	22	7	1	9	0	25	0	4	0	0	0	10.0%	10	29
PM	0	141	20	3	138	0	12	0	2	0	0	0	2.1%	141	161	



Appendix J

2027 Future Background Synchro Worksheets

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2027 FB AM
 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	298	0	0	0	0	158
Future Volume (vph)	298	0	0	0	0	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1750	0	1842	0	0	1533
Flt Permitted	0.950					
Satd. Flow (perm)	1750	0	1842	0	0	1533
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	343	0	0	0	0	182
Shared Lane Traffic (%)						
Lane Group Flow (vph)	343	0	0	0	0	182
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.8%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2027 FB AM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	298	0	0	0	0	158
Future Volume (Veh/h)	298	0	0	0	0	158
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	343	0	0	0	0	182
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	182	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	182	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	66	100	100	100	100	
cM capacity (veh/h)	1023	896	712	1085	1623	
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	343	0	182			
Volume Left	343	0	0			
Volume Right	0	0	182			
cSH	1023	1700	1700			
Volume to Capacity	0.34	0.00	0.11			
Queue Length 95th (m)	11.3	0.0	0.0			
Control Delay (s)	10.3	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.3	0.0	0.0			
Approach LOS	B	A				
Intersection Summary						
Average Delay			6.7			
Intersection Capacity Utilization			19.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2027 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	208	102	35	262	23	111	41	85	30	22	16
Future Volume (vph)	16	208	102	35	262	23	111	41	85	30	22	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99	0.99		1.00	0.99	
Fr _t		0.951			0.988			0.899			0.937	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	3177	0	1716	3340	0	1684	3116	0	1526	3034	0
Fl _t Permitted	0.556			0.468			0.646			0.661		
Satd. Flow (perm)	1044	3177	0	844	3340	0	1137	3116	0	1060	3034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			7			97			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Adj. Flow (vph)	18	236	116	40	298	26	126	47	97	34	25	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	352	0	40	324	0	126	144	0	34	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2027 FB AM
1555 18th Avenue East

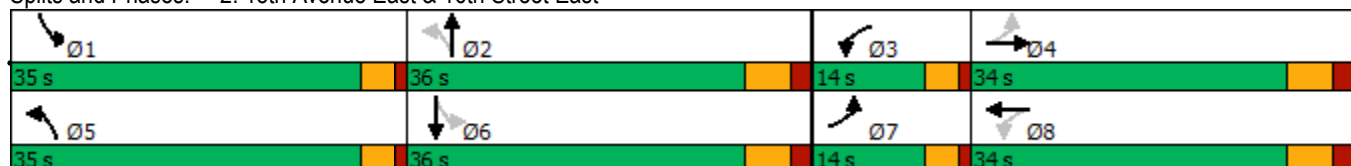


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			1			1			5	
Act Effct Green (s)	32.8	25.2		33.6	27.8		45.2	37.0		42.3	30.2	
Actuated g/C Ratio	0.36	0.28		0.37	0.31		0.50	0.41		0.47	0.34	
v/c Ratio	0.04	0.38		0.10	0.31		0.20	0.11		0.06	0.04	
Control Delay	16.6	23.4		17.3	25.6		13.5	9.0		12.9	15.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	23.4		17.3	25.6		13.5	9.0		12.9	15.8	
LOS	B	C		B	C		B	A		B	B	
Approach Delay		23.1			24.7			11.1			14.5	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	1.9	22.3		4.2	19.4		12.4	3.1		3.2	1.6	
Queue Length 95th (m)	5.8	34.8		10.3	37.2		21.7	9.2		7.8	5.4	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	463	1041		412	1128		782	1338		713	1030	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.34		0.10	0.29		0.16	0.11		0.05	0.04	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 90
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.38
 Intersection Signal Delay: 20.0
 Intersection Capacity Utilization 64.0%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
 2: 18th Avenue East & 16th Street East

2027 FB AM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	16	208	102	35	262	23	111	41	85	30	22	16
Future Volume (vph)	16	208	102	35	262	23	111	41	85	30	22	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3176		1715	3340		1679	3117		1525	3037	
Flt Permitted	0.56	1.00		0.47	1.00		0.65	1.00		0.66	1.00	
Satd. Flow (perm)	1044	3176		846	3340		1142	3117		1060	3037	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	18	236	116	40	298	26	126	47	97	34	25	18
RTOR Reduction (vph)	0	49	0	0	5	0	0	59	0	0	12	0
Lane Group Flow (vph)	18	303	0	40	319	0	126	85	0	34	31	0
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.6	25.9		33.4	27.8		46.6	37.0		37.5	31.9	
Effective Green, g (s)	29.6	25.9		33.4	27.8		46.6	37.0		37.5	31.9	
Actuated g/C Ratio	0.31	0.28		0.35	0.30		0.50	0.39		0.40	0.34	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	357	874		351	986		626	1225		450	1029	
v/s Ratio Prot	0.00	c0.10		c0.01	0.10		c0.02	0.03		0.00	0.01	
v/s Ratio Perm	0.01			0.03			c0.08			0.03		
v/c Ratio	0.05	0.35		0.11	0.32		0.20	0.07		0.08	0.03	
Uniform Delay, d1	22.3	27.3		20.1	25.8		13.1	17.8		17.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.1	0.4		0.2	0.1		0.1	0.1	
Delay (s)	22.4	27.8		20.3	26.2		13.2	17.9		17.5	20.8	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		27.6			25.6			15.7			19.3	
Approach LOS		C			C			B			B	

Intersection Summary		
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.26	C
Actuated Cycle Length (s)	94.1	Sum of lost time (s)
Intersection Capacity Utilization	64.0%	20.0
Analysis Period (min)	15	ICU Level of Service
		C
c Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2027 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	162	67	61	66	9	32	237	120	19	182	76
Future Volume (vph)	136	162	67	61	66	9	32	237	120	19	182	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.956			0.982			0.950			0.956	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1700	1757	0	1608	1787	0	1716	1691	0	1785	1663	0
Fl _t Permitted	0.704			0.574			0.587			0.503		
Satd. Flow (perm)	1259	1757	0	971	1787	0	1060	1691	0	942	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			10			43			36	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Adj. Flow (vph)	148	176	73	66	72	10	35	258	130	21	198	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	249	0	66	82	0	35	388	0	21	281	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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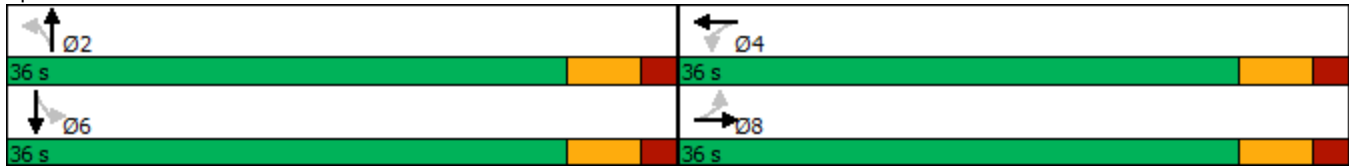
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	1	1		1	1		5	5		1		1
Act Effct Green (s)	15.9	15.9		15.9	15.9		30.4	30.4		30.4		30.4
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.52	0.52		0.52		0.52
v/c Ratio	0.43	0.49		0.25	0.17		0.06	0.43		0.04		0.32
Control Delay	20.9	18.0		18.0	14.3		10.0	11.1		10.2		9.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.9	18.0		18.0	14.3		10.0	11.1		10.2		9.8
LOS	C	B		B	B		B	B		B		A
Approach Delay		19.1			16.0			11.0				9.9
Approach LOS		B			B			B				A
Queue Length 50th (m)	12.8	18.4		5.4	5.7		1.5	18.1		0.9		12.0
Queue Length 95th (m)	25.1	34.0		12.9	13.2		7.8	57.2		5.5		39.6
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	654	930		504	933		551	900		490		882
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.23	0.27		0.13	0.09		0.06	0.43		0.04		0.32

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	58.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	13.8
Intersection LOS:	B

Intersection Capacity Utilization 63.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

2027 FB AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	136	162	67	61	66	9	32	237	120	19	182	76
Future Volume (vph)	136	162	67	61	66	9	32	237	120	19	182	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1699	1757		1607	1786		1715	1691		1780	1662	
Flt Permitted	0.70	1.00		0.57	1.00		0.59	1.00		0.50	1.00	
Satd. Flow (perm)	1259	1757		971	1786		1060	1691		943	1662	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	176	73	66	72	10	35	258	130	21	198	83
RTOR Reduction (vph)	0	26	0	0	7	0	0	21	0	0	17	0
Lane Group Flow (vph)	148	223	0	66	75	0	35	367	0	21	264	0
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9		30.4	30.4		30.4	30.4	
Effective Green, g (s)	15.9	15.9		15.9	15.9		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	343	479		264	487		552	881		491	866	
v/s Ratio Prot		c0.13			0.04			c0.22				0.16
v/s Ratio Perm	0.12			0.07			0.03			0.02		
v/c Ratio	0.43	0.47		0.25	0.15		0.06	0.42		0.04	0.30	
Uniform Delay, d1	17.5	17.7		16.5	16.1		6.9	8.5		6.8	7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.5		1.0	0.3		0.2	1.5		0.2	0.9	
Delay (s)	19.3	19.2		17.6	16.4		7.1	10.0		7.0	8.8	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		19.2			16.9			9.7			8.7	
Approach LOS		B			B			A			A	

Intersection Summary		
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.43	B
Actuated Cycle Length (s)	58.3	Sum of lost time (s)
Intersection Capacity Utilization	63.0%	12.0
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2027 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	46	246	81	72	303	12	135	139	83	14	80	65
Future Volume (vph)	46	246	81	72	303	12	135	139	83	14	80	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99		1.00		
Fr _t		0.963			0.994			0.944			0.933	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3222	0	1733	3353	0	1750	3239	0	1638	2998	0
Fl _t Permitted	0.542			0.482			0.495			0.599		
Satd. Flow (perm)	996	3222	0	877	3353	0	912	3239	0	1031	2998	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			3			88			72	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Adj. Flow (vph)	51	273	90	80	337	13	150	154	92	16	89	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	363	0	80	350	0	150	246	0	16	161	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

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1555 18th Avenue East

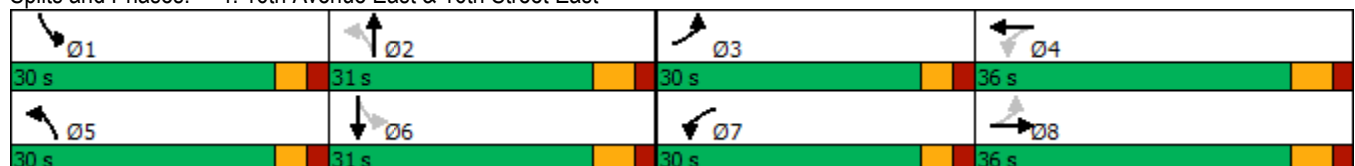


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		3			3			1			0	
Act Effct Green (s)	29.8	23.4		32.3	26.5		28.8	25.8		18.8	11.7	
Actuated g/C Ratio	0.41	0.32		0.44	0.36		0.39	0.35		0.26	0.16	
v/c Ratio	0.11	0.35		0.17	0.29		0.31	0.21		0.05	0.30	
Control Delay	12.5	20.4		12.8	19.7		17.5	12.5		15.6	18.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.5	20.4		12.8	19.7		17.5	12.5		15.6	18.5	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		19.4			18.4			14.4			18.2	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.5	18.3		5.6	18.9		14.0	7.6		1.4	5.8	
Queue Length 95th (m)	10.8	36.0		15.3	35.7		26.7	19.2		4.9	14.3	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	732	1361		711	1444		653	1225		621	1087	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.27		0.11	0.24		0.23	0.20		0.03	0.15	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	73.4
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.35
Intersection Signal Delay:	17.6
Intersection LOS:	B
Intersection Capacity Utilization:	57.5%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2027 FB AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗		
Traffic Volume (vph)	46	246	81	72	303	12	135	139	83	14	80	65	
Future Volume (vph)	46	246	81	72	303	12	135	139	83	14	80	65	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.93		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1748	3222		1732	3354		1750	3240		1637	2998		
Flt Permitted	0.54	1.00		0.48	1.00		0.50	1.00		0.60	1.00		
Satd. Flow (perm)	997	3222		878	3354		912	3240		1032	2998		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	51	273	90	80	337	13	150	154	92	16	89	72	
RTOR Reduction (vph)	0	23	0	0	2	0	0	59	0	0	58	0	
Lane Group Flow (vph)	51	340	0	80	348	0	150	187	0	16	103	0	
Confl. Peds. (#/hr)	3		3	3		3			1	1			
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA		
Protected Phases	3	8		7	4		5	2		1	6		
Permitted Phases	8			4			2			6			
Actuated Green, G (s)	28.5	24.4		32.7	26.5		31.9	25.8		17.1	16.0		
Effective Green, g (s)	28.5	24.4		32.7	26.5		31.9	25.8		17.1	16.0		
Actuated g/C Ratio	0.36	0.31		0.41	0.33		0.40	0.32		0.22	0.20		
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0		
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0		
Lane Grp Cap (vph)	396	988		427	1118		480	1051		230	603		
v/s Ratio Prot	0.01	c0.11		c0.01	0.10		c0.04	0.06		0.00	0.03		
v/s Ratio Perm	0.04			0.06			c0.08			0.01			
v/c Ratio	0.13	0.34		0.19	0.31		0.31	0.18		0.07	0.17		
Uniform Delay, d1	16.9	21.4		14.5	19.7		15.8	19.2		24.7	26.3		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.1	0.4		0.2	0.3		0.4	0.2		0.1	0.3		
Delay (s)	17.0	21.8		14.7	20.0		16.1	19.4		24.9	26.6		
Level of Service	B	C		B	C		B	B		C	C		
Approach Delay (s)		21.2			19.1			18.2			26.4		
Approach LOS		C			B			B			C		
Intersection Summary													
HCM 2000 Control Delay			20.4									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.33										
Actuated Cycle Length (s)			79.5									Sum of lost time (s)	22.0
Intersection Capacity Utilization			57.5%									ICU Level of Service	B
Analysis Period (min)			15										

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	185	101	81	199	33	89	5	35	38	5	73
Future Volume (vph)	82	185	101	81	199	33	89	5	35	38	5	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.947			0.979			0.867			0.859	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3172	0	1733	1745	0	1733	1570	0	1750	1582	0
Flt Permitted	0.603			0.563			0.702			0.729		
Satd. Flow (perm)	1111	3172	0	1027	1745	0	1281	1570	0	1343	1582	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		110			12			38			79	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Adj. Flow (vph)	89	201	110	88	216	36	97	5	38	41	5	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	311	0	88	252	0	97	43	0	41	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

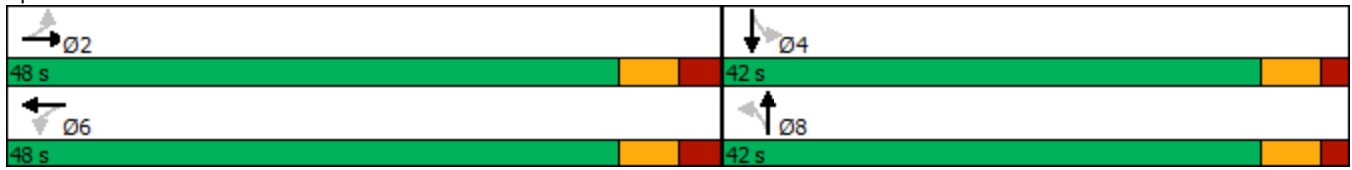
2027 FB AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	45.7	45.7		45.7	45.7		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.19	0.19		0.19	0.19	
v/c Ratio	0.12	0.14		0.12	0.21		0.40	0.13		0.16	0.23	
Control Delay	6.5	3.8		6.6	6.1		29.0	10.2		23.9	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.5	3.8		6.6	6.1		29.0	10.2		23.9	8.5	
LOS	A	A		A	A		C	B		C	A	
Approach Delay		4.4			6.2			23.2			13.6	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	3.9	4.5		3.9	11.2		10.6	0.5		4.3	0.5	
Queue Length 95th (m)	10.7	10.4		10.7	24.4		22.9	7.4		11.4	10.2	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	765	2218		707	1205		696	870		729	895	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.14		0.12	0.21		0.14	0.05		0.06	0.09	

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	66.4
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	8.8
Intersection LOS:	A
Intersection Capacity Utilization:	90.6%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

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1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	82	185	101	81	199	33	89	5	35	38	5	73
Future Volume (vph)	82	185	101	81	199	33	89	5	35	38	5	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.87		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3172		1733	1744		1733	1571		1750	1582	
Flt Permitted	0.60	1.00		0.56	1.00		0.70	1.00		0.73	1.00	
Satd. Flow (perm)	1111	3172		1027	1744		1281	1571		1343	1582	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	201	110	88	216	36	97	5	38	41	5	79
RTOR Reduction (vph)	0	38	0	0	4	0	0	32	0	0	67	0
Lane Group Flow (vph)	89	273	0	88	248	0	97	11	0	41	17	0
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.2	44.2		44.2	44.2		10.4	10.4		10.4	10.4	
Effective Green, g (s)	44.2	44.2		44.2	44.2		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.15	0.15		0.15	0.15	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	726	2074		671	1140		197	241		206	243	
v/s Ratio Prot		0.09			c0.14			0.01			0.01	
v/s Ratio Perm	0.08			0.09			c0.08			0.03		
v/c Ratio	0.12	0.13		0.13	0.22		0.49	0.05		0.20	0.07	
Uniform Delay, d1	4.4	4.4		4.4	4.7		26.2	24.4		25.0	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.4	0.4		4.0	0.2		0.5	0.1	
Delay (s)	4.7	4.6		4.8	5.2		30.2	24.5		25.4	24.6	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		4.6			5.1			28.5			24.9	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	122	12	6	200	10	28	10	22	5	6	26
Future Volume (vph)	21	122	12	6	200	10	28	10	22	5	6	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.987			0.993			0.950			0.905	
Fl _t Protected	0.950			0.950				0.977			0.994	
Satd. Flow (prot)	1750	1818	0	1750	1829	0	0	1710	0	0	1657	0
Fl _t Permitted	0.950			0.950				0.977			0.994	
Satd. Flow (perm)	1750	1818	0	1750	1829	0	0	1710	0	0	1657	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			593.3	
Travel Time (s)		15.3			13.4			5.2			42.7	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	133	13	7	217	11	30	11	24	5	7	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	146	0	7	228	0	0	65	0	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2027 FB AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	122	12	6	200	10	28	10	22	5	6	26
Future Volume (Veh/h)	21	122	12	6	200	10	28	10	22	5	6	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	133	13	7	217	11	30	11	24	5	7	28
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	253			171			498	478	190	495	478	272
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			171			498	478	190	495	478	272
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	98	97	99	98	96
cM capacity (veh/h)	1280			1372			413	453	811	416	452	729
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	23	146	7	228	65	40						
Volume Left	23	0	7	0	30	5						
Volume Right	0	13	0	11	24	28						
cSH	1280	1700	1372	1700	514	607						
Volume to Capacity	0.02	0.09	0.01	0.13	0.13	0.07						
Queue Length 95th (m)	0.4	0.0	0.1	0.0	3.3	1.6						
Control Delay (s)	7.9	0.0	7.6	0.0	13.0	11.3						
Lane LOS	A		A		B	B						
Approach Delay (s)	1.1		0.2		13.0	11.3						
Approach LOS					B	B						
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			35.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

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 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	418	0	0	0	0	343
Future Volume (vph)	418	0	0	0	0	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1767	0	1842	0	0	1593
Flt Permitted	0.950					
Satd. Flow (perm)	1767	0	1842	0	0	1593
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%
Adj. Flow (vph)	449	0	0	0	0	369
Shared Lane Traffic (%)						
Lane Group Flow (vph)	449	0	0	0	0	369
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.5%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2027 FB PM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	418	0	0	0	0	343
Future Volume (Veh/h)	418	0	0	0	0	343
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	449	0	0	0	0	369
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	369	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	369	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	56	100	100	100	100	
cM capacity (veh/h)	1026	896	560	1085	1623	
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	449	0	369			
Volume Left	449	0	0			
Volume Right	0	0	369			
cSH	1026	1700	1700			
Volume to Capacity	0.44	0.00	0.22			
Queue Length 95th (m)	17.2	0.0	0.0			
Control Delay (s)	11.2	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.2	0.0	0.0			
Approach LOS	B	A				
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			26.5%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	382	164	70	378	33	206	45	83	53	50	46
Future Volume (vph)	19	382	164	70	378	33	206	45	83	53	50	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	0.99		0.99	0.99	
Fr _t		0.955			0.988			0.903			0.928	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3349	0	1653	3357	0	1767	3058	0	1785	3290	0
Fl _t Permitted	0.498			0.257			0.610			0.666		
Satd. Flow (perm)	880	3349	0	447	3357	0	1133	3058	0	1244	3290	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			7			88			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Adj. Flow (vph)	20	406	174	74	402	35	219	48	88	56	53	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	580	0	74	437	0	219	136	0	56	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

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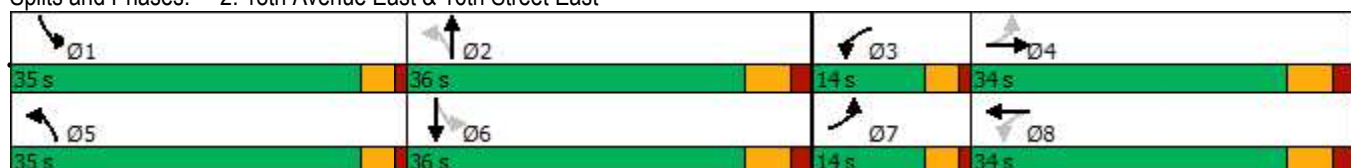


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			1			5			4	
Act Effct Green (s)	35.5	25.7		37.0	31.3		48.9	36.9		42.4	30.3	
Actuated g/C Ratio	0.37	0.27		0.38	0.33		0.51	0.38		0.44	0.31	
v/c Ratio	0.05	0.62		0.25	0.40		0.33	0.11		0.09	0.10	
Control Delay	18.4	32.5		20.6	27.9		15.3	9.5		13.8	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.4	32.5		20.6	27.9		15.3	9.5		13.8	15.3	
LOS	B	C		C	C		B	A		B	B	
Approach Delay		32.0			26.8			13.1			14.7	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.2	46.9		8.3	28.9		22.7	3.2		5.3	3.6	
Queue Length 95th (m)	7.1	69.3		18.3	55.1		38.5	9.6		11.9	10.5	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	408	1019		298	1141		790	1225		817	1067	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.57		0.25	0.38		0.28	0.11		0.07	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 96.3
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 24.6
 Intersection Capacity Utilization 78.1%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

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1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	19	382	164	70	378	33	206	45	83	53	50	46
Future Volume (vph)	19	382	164	70	378	33	206	45	83	53	50	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1682	3349		1653	3357		1766	3060		1779	3291	
Flt Permitted	0.50	1.00		0.26	1.00		0.61	1.00		0.67	1.00	
Satd. Flow (perm)	882	3349		447	3357		1133	3060		1247	3291	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	20	406	174	74	402	35	219	48	88	56	53	49
RTOR Reduction (vph)	0	38	0	0	5	0	0	55	0	0	34	0
Lane Group Flow (vph)	20	542	0	74	432	0	219	81	0	56	68	0
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	27.3		39.0	31.3		48.6	36.9		38.9	31.2	
Effective Green, g (s)	31.0	27.3		39.0	31.3		48.6	36.9		38.9	31.2	
Actuated g/C Ratio	0.31	0.27		0.39	0.31		0.49	0.37		0.39	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	304	917		268	1054		638	1133		528	1030	
v/s Ratio Prot	0.00	c0.16		c0.02	0.13		c0.05	0.03		0.01	0.02	
v/s Ratio Perm	0.02			0.09			c0.12			0.03		
v/c Ratio	0.07	0.59		0.28	0.41		0.34	0.07		0.11	0.07	
Uniform Delay, d1	23.9	31.3		20.2	26.9		15.0	20.3		19.1	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.0		0.6	0.3		0.3	0.1		0.1	0.1	
Delay (s)	24.0	32.3		20.8	27.1		15.3	20.4		19.2	24.1	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		32.1			26.2			17.3			22.4	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.44	C
Actuated Cycle Length (s)	99.6	Sum of lost time (s)
Intersection Capacity Utilization	78.1%	20.0
Analysis Period (min)	15	ICU Level of Service
		D
c Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	222	45	132	199	21	79	222	176	23	226	121
Future Volume (vph)	106	222	45	132	199	21	79	222	176	23	226	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	1.00			0.99		1.00	0.99	
Fr _t		0.975			0.985			0.934			0.948	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	1808	0	1750	1806	0	1785	1681	0	1785	1739	0
Fl _t Permitted	0.596			0.514			0.512			0.462		
Satd. Flow (perm)	1037	1808	0	942	1806	0	962	1681	0	866	1739	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			68			46	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Adj. Flow (vph)	114	239	48	142	214	23	85	239	189	25	243	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	287	0	142	237	0	85	428	0	25	373	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
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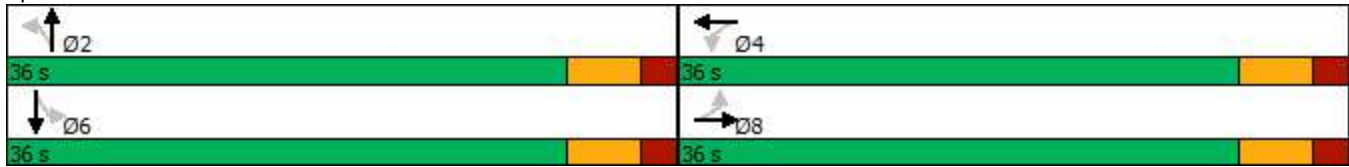
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	7	7		0	0		4	4		0		0
Act Effct Green (s)	17.0	17.0		17.0	17.0		30.3	30.3		30.3		30.3
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.51	0.51		0.51		0.51
v/c Ratio	0.39	0.54		0.53	0.45		0.17	0.48		0.06		0.41
Control Delay	20.2	20.3		24.8	19.0		11.4	11.6		10.6		11.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.2	20.3		24.8	19.0		11.4	11.6		10.6		11.1
LOS	C	C		C	B		B	B		B		B
Approach Delay		20.2			21.1			11.6				11.0
Approach LOS		C			C			B				B
Queue Length 50th (m)	9.8	24.2		12.7	19.9		4.2	20.6		1.2		18.1
Queue Length 95th (m)	20.5	41.7		26.3	34.9		16.1	61.9		6.2		53.5
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	528	930		480	924		490	890		441		909
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.22	0.31		0.30	0.26		0.17	0.48		0.06		0.41

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 59.5
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 15.6
 Intersection LOS: B

Intersection Capacity Utilization 95.1% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	222	45	132	199	21	79	222	176	23	226	121
Future Volume (vph)	106	222	45	132	199	21	79	222	176	23	226	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1808		1742	1807		1785	1682		1781	1739	
Flt Permitted	0.60	1.00		0.51	1.00		0.51	1.00		0.46	1.00	
Satd. Flow (perm)	1037	1808		942	1807		961	1682		866	1739	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	114	239	48	142	214	23	85	239	189	25	243	130
RTOR Reduction (vph)	0	12	0	0	6	0	0	33	0	0	22	0
Lane Group Flow (vph)	114	275	0	142	231	0	85	395	0	25	351	0
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		30.4	30.4		30.4	30.4	
Effective Green, g (s)	17.0	17.0		17.0	17.0		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.51	0.51		0.51	0.51	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	296	517		269	517		491	860		443	889	
v/s Ratio Prot		c0.15			0.13			c0.23			0.20	
v/s Ratio Perm	0.11			0.15			0.09			0.03		
v/c Ratio	0.39	0.53		0.53	0.45		0.17	0.46		0.06	0.39	
Uniform Delay, d1	17.0	17.8		17.8	17.3		7.8	9.3		7.3	8.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.9		3.5	1.3		0.8	1.8		0.2	1.3	
Delay (s)	18.7	19.8		21.4	18.6		8.5	11.0		7.5	10.2	
Level of Service	B	B		C	B		A	B		A	B	
Approach Delay (s)		19.5			19.7			10.6			10.0	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	431	93	85	492	12	166	116	119	31	154	99
Future Volume (vph)	56	431	93	85	492	12	166	116	119	31	154	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.973			0.996			0.924			0.941	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	3402	0	1785	3404	0	1785	3047	0	1785	3225	0
Fl _t Permitted	0.393			0.344			0.447			0.599		
Satd. Flow (perm)	682	3402	0	646	3404	0	838	3047	0	1123	3225	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			2			125			102	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Adj. Flow (vph)	59	454	98	89	518	13	175	122	125	33	162	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	552	0	89	531	0	175	247	0	33	266	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
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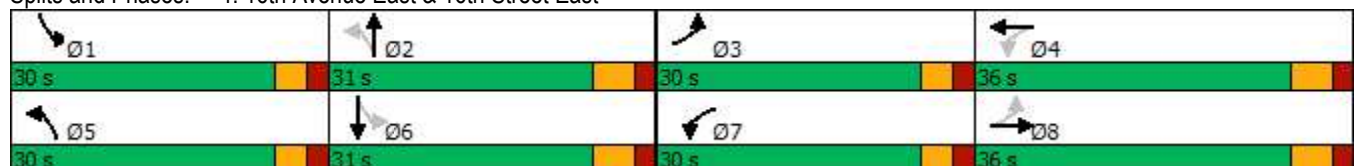


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			5			2			2	
Act Effct Green (s)	31.6	24.8		33.3	25.7		32.2	24.5		21.2	13.5	
Actuated g/C Ratio	0.40	0.31		0.42	0.33		0.41	0.31		0.27	0.17	
v/c Ratio	0.16	0.51		0.23	0.48		0.36	0.24		0.09	0.42	
Control Delay	14.8	25.5		15.1	25.0		18.4	12.7		16.7	20.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	25.5		15.1	25.0		18.4	12.7		16.7	20.7	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		24.4			23.6			15.0			20.3	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	4.3	33.3		6.6	32.3		16.8	7.5		2.9	11.3	
Queue Length 95th (m)	14.2	65.8		19.6	63.4		34.4	18.1		8.9	25.2	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	635	1353		674	1351		655	1143		678	1128	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.41		0.13	0.39		0.27	0.22		0.05	0.24	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	78.8
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	21.5
Intersection LOS:	C
Intersection Capacity Utilization:	60.5%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2027 FB PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	56	431	93	85	492	12	166	116	119	31	154	99
Future Volume (vph)	56	431	93	85	492	12	166	116	119	31	154	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.92		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3404		1784	3406		1784	3049		1784	3227	
Flt Permitted	0.39	1.00		0.34	1.00		0.45	1.00		0.60	1.00	
Satd. Flow (perm)	682	3404		646	3406		840	3049		1124	3227	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	454	98	89	518	13	175	122	125	33	162	104
RTOR Reduction (vph)	0	13	0	0	1	0	0	88	0	0	82	0
Lane Group Flow (vph)	59	539	0	89	530	0	175	159	0	33	184	0
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.5	24.8		32.3	25.7		33.3	24.5		19.7	15.9	
Effective Green, g (s)	30.5	24.8		32.3	25.7		33.3	24.5		19.7	15.9	
Actuated g/C Ratio	0.37	0.30		0.40	0.31		0.41	0.30		0.24	0.19	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	322	1033		347	1071		485	914		301	628	
v/s Ratio Prot	0.01	c0.16		c0.02	0.16		c0.05	0.05		0.01	0.06	
v/s Ratio Perm	0.06			0.08			c0.09			0.02		
v/c Ratio	0.18	0.52		0.26	0.49		0.36	0.17		0.11	0.29	
Uniform Delay, d1	16.7	23.5		16.0	22.7		16.1	21.1		24.0	28.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.9		0.4	0.8		0.5	0.2		0.2	0.5	
Delay (s)	17.0	24.4		16.3	23.5		16.5	21.3		24.1	28.6	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		23.7			22.5			19.3			28.1	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.44	
Actuated Cycle Length (s)	81.7	Sum of lost time (s) 22.0
Intersection Capacity Utilization	60.5%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	275	186	99	191	41	237	5	98	47	5	91
Future Volume (vph)	102	275	186	99	191	41	237	5	98	47	5	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Fr _t		0.939			0.973			0.857				0.858
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3259	0	1767	1703	0	1767	1594	0	1750	1580	0
Fl _t Permitted	0.611			0.482			0.694			0.689		
Satd. Flow (perm)	1125	3259	0	897	1703	0	1291	1594	0	1269	1580	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		190			16			100				93
Link Speed (k/h)		60			60			50				50
Link Distance (m)		428.7			228.1			260.8				75.9
Travel Time (s)		25.7			13.7			18.8				5.5
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Adj. Flow (vph)	104	281	190	101	195	42	242	5	100	48	5	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	471	0	101	237	0	242	105	0	48	98	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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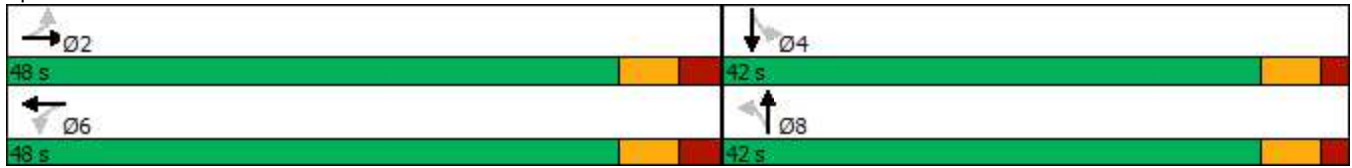
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4		4
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0		10.0
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0		41.0
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0		42.0
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%		46.7%
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0		36.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None		None		None
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0		13.0
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0		22.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0		0
Act Effct Green (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8		20.8
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.28	0.28		0.28		0.28
v/c Ratio	0.17	0.25		0.21	0.25		0.68	0.20		0.14		0.19
Control Delay	11.1	6.3		11.9	10.4		34.0	5.9		20.3		6.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	11.1	6.3		11.9	10.4		34.0	5.9		20.3		6.0
LOS	B	A		B	B		C	A		C		A
Approach Delay		7.1			10.9			25.5				10.7
Approach LOS		A			B			C				B
Queue Length 50th (m)	6.7	9.3		6.6	14.8		30.2	0.5		5.1		0.5
Queue Length 95th (m)	18.6	21.6		19.1	35.0		52.2	10.1		12.2		9.8
Internal Link Dist (m)		404.7			204.1			236.8				51.9
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	617	1875		492	942		622	820		611		809
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.17	0.25		0.21	0.25		0.39	0.13		0.08		0.12

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.2
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	12.9
Intersection Capacity Utilization	103.1%
Intersection LOS:	B
ICU Level of Service	G

Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	102	275	186	99	191	41	237	5	98	47	5	91
Future Volume (vph)	102	275	186	99	191	41	237	5	98	47	5	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3261		1767	1704		1767	1594		1750	1580	
Flt Permitted	0.61	1.00		0.48	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	1126	3261		897	1704		1290	1594		1270	1580	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	104	281	190	101	195	42	242	5	100	48	5	93
RTOR Reduction (vph)	0	86	0	0	7	0	0	72	0	0	67	0
Lane Group Flow (vph)	104	385	0	101	230	0	242	33	0	48	31	0
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8	20.8	
Effective Green, g (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8	20.8	
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.28	0.28		0.28	0.28	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	619	1793		493	937		357	441		351	437	
v/s Ratio Prot		0.12			c0.13			0.02			0.02	
v/s Ratio Perm	0.09			0.11			c0.19			0.04		
v/c Ratio	0.17	0.21		0.20	0.25		0.68	0.07		0.14	0.07	
Uniform Delay, d1	8.4	8.6		8.6	8.8		24.2	20.0		20.4	20.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.3		0.9	0.6		6.5	0.2		0.2	0.1	
Delay (s)	9.0	8.9		9.5	9.4		30.7	20.2		20.6	20.1	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.9			9.4			27.5			20.3	
Approach LOS		A			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.39	B
Actuated Cycle Length (s)	75.1	Sum of lost time (s)
Intersection Capacity Utilization	103.1%	13.0
Analysis Period (min)	15	ICU Level of Service
		G

c Critical Lane Group

Lanes, Volumes, Timings
 7: 20th Avenue East /20th Avenue East & 8th Street East

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 1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	218	45	22	133	10	15	10	12	5	6	142
Future Volume (vph)	131	218	45	22	133	10	15	10	12	5	6	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.974			0.990			0.956				0.875
Fl _t Protected	0.950			0.950				0.980				0.998
Satd. Flow (prot)	1750	1794	0	1750	1824	0	0	1726	0	0	1609	0
Fl _t Permitted	0.950			0.950				0.980				0.998
Satd. Flow (perm)	1750	1794	0	1750	1824	0	0	1726	0	0	1609	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		161.5			209.6			72.0				597.5
Travel Time (s)		11.6			15.1			5.2				43.0
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	134	222	46	22	136	10	15	10	12	5	6	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	268	0	22	146	0	0	37	0	0	156	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop				Stop

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 40.8% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
 7: 20th Avenue East /20th Avenue East & 8th Street East

2027 FB PM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	218	45	22	133	10	15	10	12	5	6	142
Future Volume (Veh/h)	131	218	45	22	133	10	15	10	12	5	6	142
Sign Control	Free		Free		Free		Stop		Stop		Stop	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	134	222	46	22	136	10	15	10	12	5	6	145
Pedestrians	25		25		25		25		25		25	
Lane Width (m)	3.5		3.5		3.5		3.5		3.5		3.5	
Walking Speed (m/s)	1.0		1.0		1.0		1.0		1.0		1.0	
Percent Blockage	2		2		2		2		2		2	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	171			293			891	753	295	742	771	191
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171			293			891	753	295	742	771	191
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			98			92	97	98	98	98	82
cM capacity (veh/h)	1372			1238			178	286	709	266	279	810
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	134	268	22	146	37	156						
Volume Left	134	0	22	0	15	5						
Volume Right	0	46	0	10	12	145						
cSH	1372	1700	1238	1700	272	711						
Volume to Capacity	0.10	0.16	0.02	0.09	0.14	0.22						
Queue Length 95th (m)	2.5	0.0	0.4	0.0	3.5	6.3						
Control Delay (s)	7.9	0.0	8.0	0.0	20.3	11.5						
Lane LOS	A		A		C	B						
Approach Delay (s)	2.6		1.0		20.3	11.5						
Approach LOS					C	B						
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			40.8%		ICU Level of Service		A					
Analysis Period (min)			15									

Appendix K

2032 Future Background Synchro Worksheets

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FB AM
 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	340	0	0	0	0	166
Future Volume (vph)	340	0	0	0	0	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1750	0	1842	0	0	1533
Flt Permitted	0.950					
Satd. Flow (perm)	1750	0	1842	0	0	1533
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	391	0	0	0	0	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	391	0	0	0	0	191
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2032 FB AM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	340	0	0	0	0	166
Future Volume (Veh/h)	340	0	0	0	0	166
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	391	0	0	0	0	191
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	191	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	191	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	62	100	100	100	100	
cM capacity (veh/h)	1023	896	704	1085	1623	
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	391	0	191			
Volume Left	391	0	0			
Volume Right	0	0	191			
cSH	1023	1700	1700			
Volume to Capacity	0.38	0.00	0.11			
Queue Length 95th (m)	13.8	0.0	0.0			
Control Delay (s)	10.7	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	0.0	0.0			
Approach LOS	B	A				
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			22.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	217	107	37	273	24	117	52	106	31	23	17
Future Volume (vph)	17	217	107	37	273	24	117	52	106	31	23	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99	0.99		1.00	0.99	
Fr _t		0.950			0.988			0.899			0.937	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	3174	0	1716	3340	0	1684	3116	0	1526	3034	0
Fl _t Permitted	0.549			0.452			0.645			0.639		
Satd. Flow (perm)	1031	3174	0	815	3340	0	1136	3116	0	1025	3034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			7			120			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Adj. Flow (vph)	19	247	122	42	310	27	133	59	120	35	26	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	369	0	42	337	0	133	179	0	35	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FB AM
1555 18th Avenue East

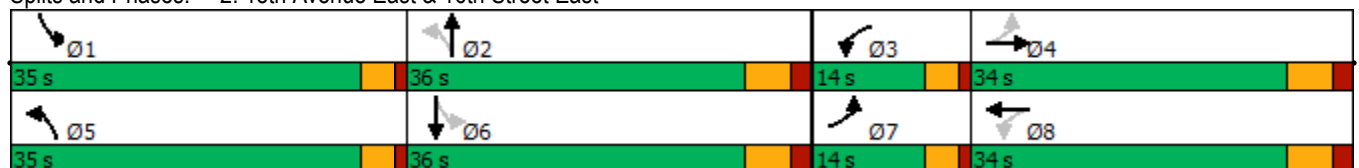


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			1			1			5	
Act Effct Green (s)	32.8	25.2		33.6	27.8		45.5	37.2		42.3	30.2	
Actuated g/C Ratio	0.36	0.28		0.37	0.31		0.50	0.41		0.47	0.33	
v/c Ratio	0.04	0.40		0.10	0.33		0.21	0.13		0.07	0.04	
Control Delay	16.8	24.0		17.5	25.8		13.5	8.7		12.9	15.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.8	24.0		17.5	25.8		13.5	8.7		12.9	15.8	
LOS	B	C		B	C		B	A		B	B	
Approach Delay		23.6			24.9			10.8			14.5	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.0	23.7		4.4	20.3		13.1	3.9		3.3	1.7	
Queue Length 95th (m)	6.1	37.1		10.7	38.8		22.7	10.6		8.0	5.6	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	459	1038		403	1126		782	1355		708	1029	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.36		0.10	0.30		0.17	0.13		0.05	0.04	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 90.2
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 20.0
 Intersection Capacity Utilization 66.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
 2: 18th Avenue East & 16th Street East

2032 FB AM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	17	217	107	37	273	24	117	52	106	31	23	17
Future Volume (vph)	17	217	107	37	273	24	117	52	106	31	23	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3176		1715	3340		1679	3119		1525	3035	
Flt Permitted	0.55	1.00		0.45	1.00		0.65	1.00		0.64	1.00	
Satd. Flow (perm)	1031	3176		817	3340		1141	3119		1025	3035	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	19	247	122	42	310	27	133	59	120	35	26	19
RTOR Reduction (vph)	0	49	0	0	5	0	0	73	0	0	13	0
Lane Group Flow (vph)	19	320	0	42	332	0	133	106	0	35	32	0
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.6	25.9		33.4	27.8		46.8	37.2		37.6	32.0	
Effective Green, g (s)	29.6	25.9		33.4	27.8		46.8	37.2		37.6	32.0	
Actuated g/C Ratio	0.31	0.27		0.35	0.29		0.50	0.39		0.40	0.34	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	353	872		342	984		627	1230		438	1029	
v/s Ratio Prot	0.00	c0.10		c0.01	0.10		c0.02	0.03		0.00	0.01	
v/s Ratio Perm	0.01			0.04			c0.08			0.03		
v/c Ratio	0.05	0.37		0.12	0.34		0.21	0.09		0.08	0.03	
Uniform Delay, d1	22.4	27.6		20.3	26.0		13.1	17.9		17.4	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.2	0.4		0.2	0.1		0.1	0.1	
Delay (s)	22.5	28.1		20.4	26.5		13.3	18.0		17.5	20.9	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		27.9			25.8			16.0			19.4	
Approach LOS		C			C			B			B	

Intersection Summary		
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.27	C
Actuated Cycle Length (s)	94.3	Sum of lost time (s)
Intersection Capacity Utilization	66.5%	20.0
Analysis Period (min)	15	ICU Level of Service
		C
c Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2032 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	169	70	64	69	10	42	298	153	20	190	79
Future Volume (vph)	143	169	70	64	69	10	42	298	153	20	190	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.956			0.981			0.949			0.956	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1700	1757	0	1608	1784	0	1716	1689	0	1785	1663	0
Fl _t Permitted	0.701			0.556			0.581			0.411		
Satd. Flow (perm)	1254	1757	0	940	1784	0	1049	1689	0	770	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			11			44			36	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Adj. Flow (vph)	155	184	76	70	75	11	46	324	166	22	207	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	260	0	70	86	0	46	490	0	22	293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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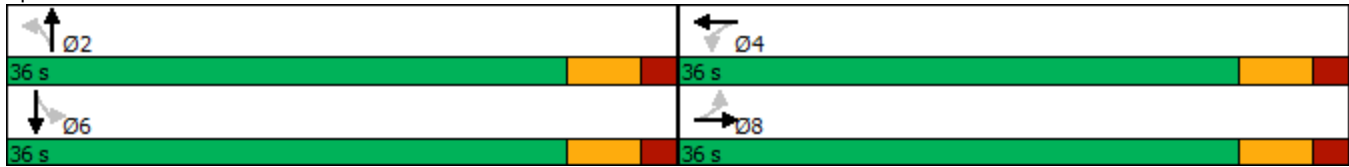
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	1	1		1	1		5	5		1		1
Act Effct Green (s)	16.4	16.4		16.4	16.4		30.4	30.4		30.4		30.4
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52		0.52
v/c Ratio	0.45	0.51		0.27	0.17		0.09	0.55		0.06		0.34
Control Delay	21.0	18.3		18.3	14.2		10.3	13.3		10.6		10.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	21.0	18.3		18.3	14.2		10.3	13.3		10.6		10.2
LOS	C	B		B	B		B	B		B		B
Approach Delay		19.3			16.0			13.1				10.2
Approach LOS		B			B			B				B
Queue Length 50th (m)	13.5	19.7		5.7	6.0		2.2	27.2		1.0		13.6
Queue Length 95th (m)	26.2	35.7		13.6	13.7		9.6	78.5		5.8		41.6
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	646	923		484	925		541	892		397		874
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.24	0.28		0.14	0.09		0.09	0.55		0.06		0.34

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 58.9
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 14.6
 Intersection LOS: B

Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	169	70	64	69	10	42	298	153	20	190	79
Future Volume (vph)	143	169	70	64	69	10	42	298	153	20	190	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1699	1758		1607	1783		1715	1690		1781	1663	
Flt Permitted	0.70	1.00		0.56	1.00		0.58	1.00		0.41	1.00	
Satd. Flow (perm)	1254	1758		941	1783		1048	1690		770	1663	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	184	76	70	75	11	46	324	166	22	207	86
RTOR Reduction (vph)	0	25	0	0	8	0	0	21	0	0	17	0
Lane Group Flow (vph)	155	235	0	70	78	0	46	469	0	22	276	0
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	16.4	16.4		16.4	16.4		30.4	30.4		30.4	30.4	
Effective Green, g (s)	16.4	16.4		16.4	16.4		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	349	490		262	497		541	873		398	859	
v/s Ratio Prot		c0.13			0.04			c0.28			0.17	
v/s Ratio Perm	0.12			0.07			0.04			0.03		
v/c Ratio	0.44	0.48		0.27	0.16		0.09	0.54		0.06	0.32	
Uniform Delay, d1	17.4	17.6		16.5	16.0		7.2	9.5		7.1	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	1.5		1.1	0.3		0.3	2.4		0.3	1.0	
Delay (s)	19.3	19.2		17.7	16.3		7.5	11.9		7.3	9.2	
Level of Service	B	B		B	B		A	B		A	A	
Approach Delay (s)		19.2			16.9			11.5			9.1	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2032 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	257	84	76	317	12	166	172	86	14	84	68
Future Volume (vph)	49	257	84	76	317	12	166	172	86	14	84	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			1.00		1.00		
Fr _t		0.963			0.995			0.950				0.933
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3221	0	1733	3356	0	1750	3257	0	1638	2998	0
Fl _t Permitted	0.534			0.463			0.488			0.576		
Satd. Flow (perm)	981	3221	0	842	3356	0	899	3257	0	992	2998	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			3			62				76
Link Speed (k/h)		50			50			50				50
Link Distance (m)		131.3			262.3			433.8				156.6
Travel Time (s)		9.5			18.9			31.2				11.3
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Adj. Flow (vph)	54	286	93	84	352	13	184	191	96	16	93	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	379	0	84	365	0	184	287	0	16	169	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
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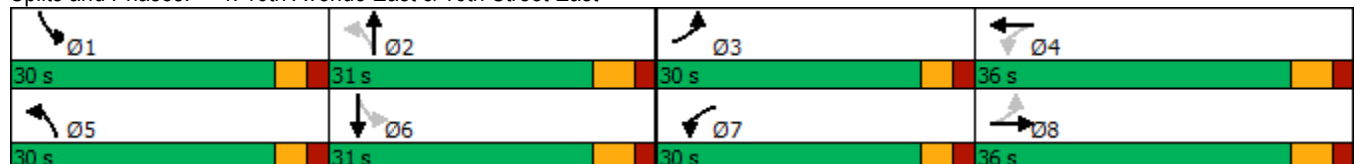


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		3			3			1			0	
Act Effct Green (s)	29.9	23.4		32.6	26.7		30.0	26.9		18.5	11.4	
Actuated g/C Ratio	0.40	0.31		0.44	0.36		0.40	0.36		0.25	0.15	
v/c Ratio	0.12	0.37		0.18	0.30		0.37	0.24		0.05	0.32	
Control Delay	13.0	21.4		13.3	20.5		18.1	15.1		15.9	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.0	21.4		13.3	20.5		18.1	15.1		15.9	19.3	
LOS	B	C		B	C		B	B		B	B	
Approach Delay		20.3			19.1			16.3			19.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	3.9	20.1		6.2	20.6		17.6	11.2		1.4	6.3	
Queue Length 95th (m)	11.3	37.9		15.9	37.4		32.4	25.1		4.9	15.3	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	719	1335		695	1420		653	1233		620	1070	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.28		0.12	0.26		0.28	0.23		0.03	0.16	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	74.8
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.37
Intersection Signal Delay:	18.6
Intersection LOS:	B
Intersection Capacity Utilization:	59.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
 4: 16th Avenue East & 16th Street East

2032 FB AM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	49	257	84	76	317	12	166	172	86	14	84	68
Future Volume (vph)	49	257	84	76	317	12	166	172	86	14	84	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3223		1732	3355		1750	3257		1637	2996	
Flt Permitted	0.53	1.00		0.46	1.00		0.49	1.00		0.58	1.00	
Satd. Flow (perm)	983	3223		844	3355		900	3257		992	2996	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	54	286	93	84	352	13	184	191	96	16	93	76
RTOR Reduction (vph)	0	23	0	0	2	0	0	41	0	0	61	0
Lane Group Flow (vph)	54	356	0	84	363	0	184	246	0	16	108	0
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	28.6	24.4		33.0	26.6		33.1	26.9		16.8	15.6	
Effective Green, g (s)	28.6	24.4		33.0	26.6		33.1	26.9		16.8	15.6	
Actuated g/C Ratio	0.35	0.30		0.41	0.33		0.41	0.33		0.21	0.19	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	387	972		414	1103		499	1082		215	577	
v/s Ratio Prot	0.01	c0.11		c0.02	0.11		c0.06	0.08		0.00	0.04	
v/s Ratio Perm	0.04			0.07			c0.09			0.01		
v/c Ratio	0.14	0.37		0.20	0.33		0.37	0.23		0.07	0.19	
Uniform Delay, d1	17.4	22.2		15.0	20.4		16.0	19.5		25.6	27.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.2	0.4		0.5	0.2		0.1	0.3	
Delay (s)	17.6	22.7		15.2	20.8		16.4	19.7		25.8	27.7	
Level of Service	B	C		B	C		B	B		C	C	
Approach Delay (s)		22.0			19.8			18.4			27.5	
Approach LOS		C			B			B			C	

Intersection Summary		
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.37	
Actuated Cycle Length (s)	80.9	Sum of lost time (s) 22.0
Intersection Capacity Utilization	59.2%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2032 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	194	106	85	209	33	92	5	37	38	5	73
Future Volume (vph)	82	194	106	85	209	33	92	5	37	38	5	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.947			0.979			0.867			0.859	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3172	0	1733	1744	0	1733	1570	0	1750	1582	0
Flt Permitted	0.597			0.555			0.702			0.728		
Satd. Flow (perm)	1100	3172	0	1012	1744	0	1281	1570	0	1341	1582	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		115			12			40			79	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Adj. Flow (vph)	89	211	115	92	227	36	100	5	40	41	5	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	326	0	92	263	0	100	45	0	41	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (m)	0.0	0.0		0.0	0.0		2.0	0.6		2.0	0.6	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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1555 18th Avenue East

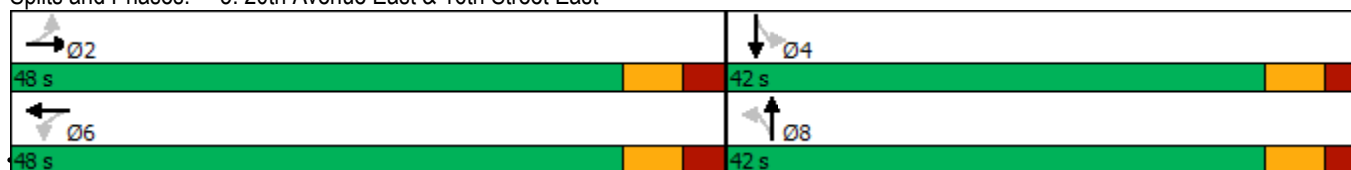


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	45.7	45.7		45.7	45.7		12.6	12.6		12.6	12.6	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.19	0.19		0.19	0.19	
v/c Ratio	0.12	0.15		0.13	0.22		0.41	0.14		0.16	0.23	
Control Delay	6.6	3.9		6.7	6.2		29.1	10.0		23.8	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	3.9		6.7	6.2		29.1	10.0		23.8	8.5	
LOS	A	A		A	A		C	B		C	A	
Approach Delay		4.4			6.4			23.2			13.5	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	3.9	4.8		4.1	11.9		11.0	0.5		4.3	0.5	
Queue Length 95th (m)	10.8	11.0		11.3	25.7		23.3	7.7		11.4	10.2	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	756	2216		695	1202		694	869		727	893	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.15		0.13	0.22		0.14	0.05		0.06	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 66.5
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 8.8
 Intersection LOS: A
 Intersection Capacity Utilization 93.2%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2032 FB AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	82	194	106	85	209	33	92	5	37	38	5	73
Future Volume (vph)	82	194	106	85	209	33	92	5	37	38	5	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.87		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3172		1733	1745		1733	1569		1750	1582	
Flt Permitted	0.60	1.00		0.55	1.00		0.70	1.00		0.73	1.00	
Satd. Flow (perm)	1099	3172		1012	1745		1281	1569		1340	1582	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	211	115	92	227	36	100	5	40	41	5	79
RTOR Reduction (vph)	0	40	0	0	4	0	0	34	0	0	67	0
Lane Group Flow (vph)	89	286	0	92	259	0	100	11	0	41	17	0
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.2	44.2		44.2	44.2		10.5	10.5		10.5	10.5	
Effective Green, g (s)	44.2	44.2		44.2	44.2		10.5	10.5		10.5	10.5	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.16	0.16		0.16	0.16	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	717	2070		660	1139		198	243		207	245	
v/s Ratio Prot		0.09			c0.15			0.01			0.01	
v/s Ratio Perm	0.08			0.09			c0.08			0.03		
v/c Ratio	0.12	0.14		0.14	0.23		0.51	0.05		0.20	0.07	
Uniform Delay, d1	4.4	4.5		4.5	4.8		26.2	24.3		24.9	24.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.4	0.5		4.2	0.2		0.5	0.1	
Delay (s)	4.8	4.6		4.9	5.3		30.4	24.5		25.4	24.6	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		4.7			5.2			28.6			24.8	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	67.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

2032 FB AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	122	12	6	202	17	28	10	22	7	6	116
Future Volume (vph)	57	122	12	6	202	17	28	10	22	7	6	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.987			0.989			0.950			0.879	
Fl _t Protected	0.950			0.950				0.977			0.997	
Satd. Flow (prot)	1750	1818	0	1750	1822	0	0	1710	0	0	1614	0
Fl _t Permitted	0.950			0.950				0.977			0.997	
Satd. Flow (perm)	1750	1818	0	1750	1822	0	0	1710	0	0	1614	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			593.3	
Travel Time (s)		15.3			13.4			5.2			42.7	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	133	13	7	220	18	30	11	24	8	7	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	146	0	7	238	0	0	65	0	0	141	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 41.2% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2032 FB AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	122	12	6	202	17	28	10	22	7	6	116
Future Volume (Veh/h)	57	122	12	6	202	17	28	10	22	7	6	116
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	133	13	7	220	18	30	11	24	8	7	126
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	263			171			677	566	190	580	563	279
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			171			677	566	190	580	563	279
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			89	97	97	98	98	83
cM capacity (veh/h)	1270			1372			263	391	811	356	392	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	62	146	7	238	65	141						
Volume Left	62	0	7	0	30	8						
Volume Right	0	13	0	18	24	126						
cSH	1270	1700	1372	1700	378	657						
Volume to Capacity	0.05	0.09	0.01	0.14	0.17	0.21						
Queue Length 95th (m)	1.2	0.0	0.1	0.0	4.7	6.1						
Control Delay (s)	8.0	0.0	7.6	0.0	16.5	12.0						
Lane LOS	A		A		C	B						
Approach Delay (s)	2.4		0.2		16.5	12.0						
Approach LOS					C	B						
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			41.2%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FB PM
 1555 18th Avenue East



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	460	0	0	0	0	360
Future Volume (vph)	460	0	0	0	0	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected	0.950					
Satd. Flow (prot)	1767	0	1842	0	0	1593
Flt Permitted	0.950					
Satd. Flow (perm)	1767	0	1842	0	0	1593
Link Speed (k/h)	40		40	50		
Link Distance (m)	321.6		38.6	74.7		
Travel Time (s)	28.9		3.5	5.4		
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%
Adj. Flow (vph)	495	0	0	0	0	387
Shared Lane Traffic (%)						
Lane Group Flow (vph)	495	0	0	0	0	387
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	7.0		7.0	0.0		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	3.0		3.0	3.0		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25			15	25	15
Sign Control	Stop		Stop	Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.8%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2032 FB PM
 1555 18th Avenue East



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	460	0	0	0	0	360
Future Volume (Veh/h)	460	0	0	0	0	360
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	495	0	0	0	0	387
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0	387	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	387	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	52	100	100	100	100	
cM capacity (veh/h)	1026	896	547	1085	1623	
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	495	0	387			
Volume Left	495	0	0			
Volume Right	0	0	387			
cSH	1026	1700	1700			
Volume to Capacity	0.48	0.00	0.23			
Queue Length 95th (m)	20.4	0.0	0.0			
Control Delay (s)	11.7	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.7	0.0	0.0			
Approach LOS	B	A				
Intersection Summary						
Average Delay			6.6			
Intersection Capacity Utilization			28.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FB PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	20	396	172	72	394	35	217	56	99	56	52	49
Future Volume (vph)	20	396	172	72	394	35	217	56	99	56	52	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	0.99		0.99	0.99	
Fr _t		0.955			0.988			0.905			0.927	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3349	0	1653	3357	0	1767	3064	0	1785	3286	0
Fl _t Permitted	0.479			0.239			0.607			0.648		
Satd. Flow (perm)	847	3349	0	416	3357	0	1128	3064	0	1211	3286	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			7			105			52	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Adj. Flow (vph)	21	421	183	77	419	37	231	60	105	60	55	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	604	0	77	456	0	231	165	0	60	107	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

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1555 18th Avenue East

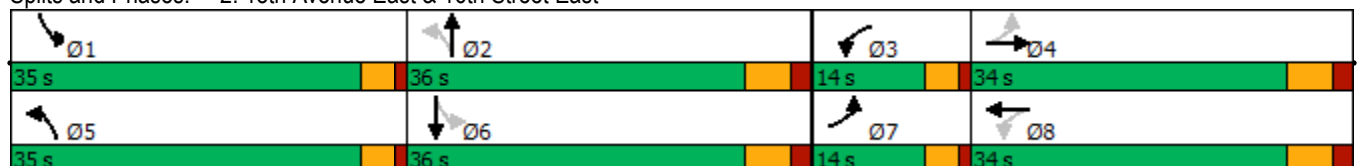


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			1			5			4	
Act Effct Green (s)	35.5	25.8		37.1	31.4		49.6	37.4		42.4	30.3	
Actuated g/C Ratio	0.37	0.27		0.38	0.32		0.51	0.39		0.44	0.31	
v/c Ratio	0.05	0.65		0.27	0.42		0.35	0.13		0.10	0.10	
Control Delay	18.8	33.5		21.3	28.4		15.4	9.4		13.9	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.8	33.5		21.3	28.4		15.4	9.4		13.9	15.3	
LOS	B	C		C	C		B	A		B	B	
Approach Delay		33.0			27.4			12.9			14.8	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.3	49.7		8.7	30.7		24.1	4.0		5.7	3.8	
Queue Length 95th (m)	7.4	73.4		19.2	58.1		40.6	11.1		12.6	11.0	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	397	1015		288	1135		791	1248		813	1062	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.60		0.27	0.40		0.29	0.13		0.07	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 96.9
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 24.9
 Intersection LOS: C
 Intersection Capacity Utilization 78.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2032 FB PM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	20	396	172	72	394	35	217	56	99	56	52	49
Future Volume (vph)	20	396	172	72	394	35	217	56	99	56	52	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1682	3348		1653	3356		1766	3064		1780	3287	
Flt Permitted	0.48	1.00		0.24	1.00		0.61	1.00		0.65	1.00	
Satd. Flow (perm)	847	3348		416	3356		1128	3064		1213	3287	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	421	183	77	419	37	231	60	105	60	55	52
RTOR Reduction (vph)	0	39	0	0	5	0	0	66	0	0	36	0
Lane Group Flow (vph)	21	565	0	77	451	0	231	99	0	60	71	0
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	27.3		39.0	31.3		49.1	37.4		38.9	31.2	
Effective Green, g (s)	31.0	27.3		39.0	31.3		49.1	37.4		38.9	31.2	
Actuated g/C Ratio	0.31	0.27		0.39	0.31		0.49	0.37		0.39	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	913		257	1049		641	1144		515	1024	
v/s Ratio Prot	0.00	c0.17		c0.02	0.13		c0.05	0.03		0.01	0.02	
v/s Ratio Perm	0.02			0.09			c0.13			0.04		
v/c Ratio	0.07	0.62		0.30	0.43		0.36	0.09		0.12	0.07	
Uniform Delay, d1	24.2	31.8		20.6	27.3		15.0	20.3		19.4	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.3		0.7	0.3		0.3	0.1		0.1	0.1	
Delay (s)	24.3	33.1		21.3	27.6		15.4	20.4		19.5	24.4	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		32.8			26.7			17.5			22.6	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.46	C
Actuated Cycle Length (s)	100.1	Sum of lost time (s)
Intersection Capacity Utilization	78.7%	20.0
Analysis Period (min)	15	ICU Level of Service
		D
c Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	233	47	138	209	22	94	260	206	24	235	127
Future Volume (vph)	111	233	47	138	209	22	94	260	206	24	235	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	1.00			0.99		1.00	0.99	
Frt		0.975			0.986			0.934			0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	1808	0	1750	1808	0	1785	1681	0	1785	1738	0
Flt Permitted	0.578			0.494			0.493			0.392		
Satd. Flow (perm)	1006	1808	0	905	1808	0	926	1681	0	735	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			68				46
Link Speed (k/h)		40			40			50				50
Link Distance (m)		172.7			321.6			117.8				433.8
Travel Time (s)		15.5			28.9			8.5				31.2
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Adj. Flow (vph)	119	251	51	148	225	24	101	280	222	26	253	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	302	0	148	249	0	101	502	0	26	390	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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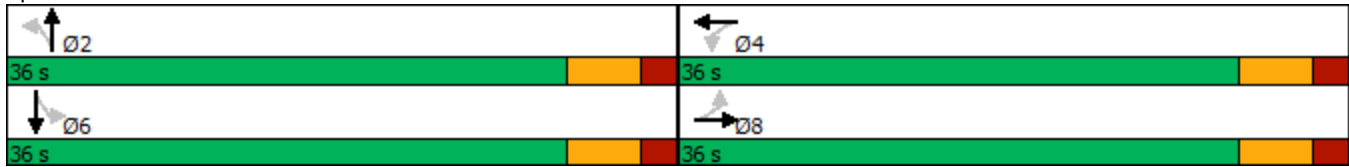
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	7	7		0	0		4	4		0		0
Act Effct Green (s)	17.7	17.7		17.7	17.7		30.3	30.3		30.3		30.3
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.50	0.50		0.50		0.50
v/c Ratio	0.40	0.56		0.56	0.46		0.22	0.57		0.07		0.43
Control Delay	20.6	20.4		25.9	19.0		12.2	13.6		11.1		11.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.6	20.4		25.9	19.0		12.2	13.6		11.1		11.7
LOS	C	C		C	B		B	B		B		B
Approach Delay		20.5			21.5			13.4				11.6
Approach LOS		C			C			B				B
Queue Length 50th (m)	10.3	25.8		13.5	21.1		5.5	28.8		1.3		20.7
Queue Length 95th (m)	21.5	44.1		27.9	36.8		18.9	78.2		6.5		56.5
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	507	919		456	915		466	881		370		899
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.23	0.33		0.32	0.27		0.22	0.57		0.07		0.43

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	60.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	16.4
Intersection LOS:	B

Intersection Capacity Utilization 97.1% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

2032 FB PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	233	47	138	209	22	94	260	206	24	235	127
Future Volume (vph)	111	233	47	138	209	22	94	260	206	24	235	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1808		1742	1807		1785	1681		1782	1738	
Flt Permitted	0.58	1.00		0.49	1.00		0.49	1.00		0.39	1.00	
Satd. Flow (perm)	1005	1808		905	1807		925	1681		736	1738	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	119	251	51	148	225	24	101	280	222	26	253	137
RTOR Reduction (vph)	0	12	0	0	6	0	0	34	0	0	23	0
Lane Group Flow (vph)	119	290	0	148	243	0	101	468	0	26	367	0
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7		30.3	30.3		30.3	30.3	
Effective Green, g (s)	17.7	17.7		17.7	17.7		30.3	30.3		30.3	30.3	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.51	0.51		0.51	0.51	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	296	533		266	533		467	848		371	877	
v/s Ratio Prot		0.16			0.13			c0.28			0.21	
v/s Ratio Perm	0.12			c0.16			0.11			0.04		
v/c Ratio	0.40	0.54		0.56	0.46		0.22	0.55		0.07	0.42	
Uniform Delay, d1	16.9	17.8		17.8	17.2		8.3	10.2		7.6	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	2.0		4.2	1.3		1.1	2.6		0.4	1.5	
Delay (s)	18.8	19.8		22.1	18.5		9.3	12.8		8.0	10.8	
Level of Service	B	B		C	B		A	B		A	B	
Approach Delay (s)		19.5			19.8			12.2			10.6	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	448	97	89	514	12	190	133	125	33	161	104
Future Volume (vph)	59	448	97	89	514	12	190	133	125	33	161	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.973			0.996			0.927			0.941	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	3402	0	1785	3405	0	1785	3051	0	1785	3224	0
Fl _t Permitted	0.368			0.322			0.444			0.584		
Satd. Flow (perm)	638	3402	0	604	3405	0	833	3051	0	1095	3224	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			2			132			104	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Adj. Flow (vph)	62	472	102	94	541	13	200	140	132	35	169	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	574	0	94	554	0	200	272	0	35	278	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

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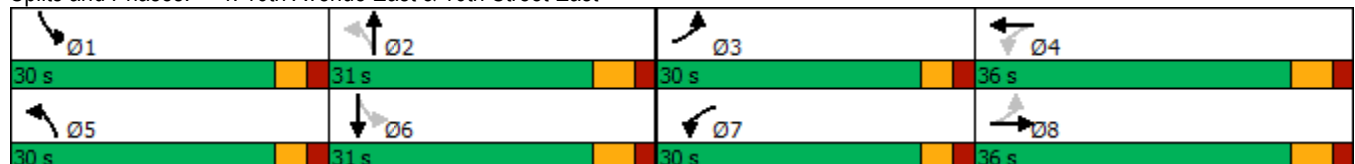


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			5			2			2	
Act Effct Green (s)	31.9	25.0		33.7	25.9		33.8	26.1		21.5	13.8	
Actuated g/C Ratio	0.39	0.31		0.42	0.32		0.42	0.32		0.27	0.17	
v/c Ratio	0.18	0.54		0.25	0.51		0.39	0.25		0.10	0.44	
Control Delay	15.7	26.9		16.1	26.3		18.7	12.9		16.9	21.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.7	26.9		16.1	26.3		18.7	12.9		16.9	21.9	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		25.8			24.9			15.4			21.3	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	4.8	36.4		7.4	35.3		19.6	8.7		3.1	12.3	
Queue Length 95th (m)	15.2	71.0		21.1	68.5		39.4	20.2		9.4	27.3	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	617	1323		655	1323		654	1149		679	1106	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.43		0.14	0.42		0.31	0.24		0.05	0.25	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	80.8
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	22.5
Intersection LOS:	C
Intersection Capacity Utilization:	62.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

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1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	59	448	97	89	514	12	190	133	125	33	161	104
Future Volume (vph)	59	448	97	89	514	12	190	133	125	33	161	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3404		1785	3407		1784	3053		1784	3226	
Flt Permitted	0.37	1.00		0.32	1.00		0.44	1.00		0.58	1.00	
Satd. Flow (perm)	640	3404		605	3407		834	3053		1097	3226	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	472	102	94	541	13	200	140	132	35	169	109
RTOR Reduction (vph)	0	13	0	0	1	0	0	91	0	0	84	0
Lane Group Flow (vph)	62	561	0	94	553	0	200	181	0	35	194	0
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	0%	2%	6%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.9	25.0		32.7	25.9		35.0	26.1		20.1	16.2	
Effective Green, g (s)	30.9	25.0		32.7	25.9		35.0	26.1		20.1	16.2	
Actuated g/C Ratio	0.37	0.30		0.39	0.31		0.42	0.31		0.24	0.19	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	307	1015		331	1052		504	950		295	623	
v/s Ratio Prot	0.01	c0.16		c0.02	0.16		c0.07	0.06		0.01	0.06	
v/s Ratio Perm	0.06			0.09			c0.10			0.02		
v/c Ratio	0.20	0.55		0.28	0.53		0.40	0.19		0.12	0.31	
Uniform Delay, d1	17.5	24.7		16.8	23.9		16.2	21.1		24.7	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.1		0.5	0.9		0.5	0.2		0.2	0.6	
Delay (s)	17.8	25.8		17.2	24.8		16.7	21.3		24.9	29.6	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		25.0			23.7			19.4			29.1	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			23.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			83.8				Sum of lost time (s)		22.0			
Intersection Capacity Utilization			62.1%				ICU Level of Service		B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	288	193	102	203	41	245	5	102	47	5	91
Future Volume (vph)	102	288	193	102	203	41	245	5	102	47	5	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.940			0.975			0.857				0.858
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3262	0	1767	1706	0	1767	1594	0	1750	1580	0
Flt Permitted	0.605			0.473			0.694			0.687		
Satd. Flow (perm)	1114	3262	0	880	1706	0	1291	1594	0	1265	1580	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		197			15			104			93	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			260.8			75.9	
Travel Time (s)		25.7			13.7			18.8			5.5	
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Adj. Flow (vph)	104	294	197	104	207	42	250	5	104	48	5	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	491	0	104	249	0	250	109	0	48	98	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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1555 18th Avenue East



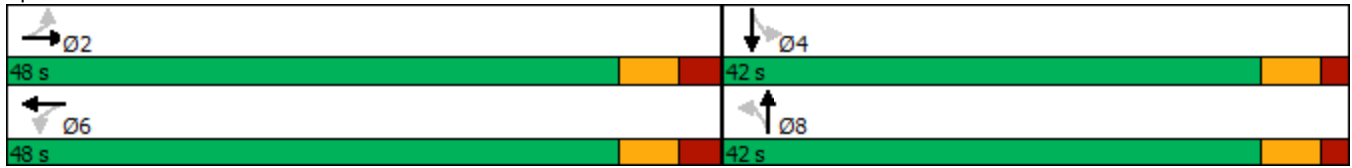
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	41.3	41.3		41.3	41.3		21.5	21.5		21.5	21.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.28	0.28		0.28	0.28	
v/c Ratio	0.17	0.26		0.22	0.27		0.68	0.21		0.13	0.19	
Control Delay	11.6	6.5		12.5	11.0		33.9	5.7		20.1	5.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.6	6.5		12.5	11.0		33.9	5.7		20.1	5.9	
LOS	B	A		B	B		C	A		C	A	
Approach Delay		7.4			11.4			25.4			10.5	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	6.8	10.1		7.0	16.0		31.4	0.5		5.1	0.5	
Queue Length 95th (m)	19.0	23.0		20.2	37.6		53.8	10.2		12.2	9.7	
Internal Link Dist (m)		404.7			204.1			236.8			51.9	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	606	1864		478	934		616	816		604	803	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.26		0.22	0.27		0.41	0.13		0.08	0.12	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.9
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	13.1
Intersection Capacity Utilization	103.6%
Intersection LOS:	B
ICU Level of Service	G

Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2032 FB PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	102	288	193	102	203	41	245	5	102	47	5	91
Future Volume (vph)	102	288	193	102	203	41	245	5	102	47	5	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3262		1767	1706		1767	1593		1750	1580	
Flt Permitted	0.60	1.00		0.47	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	1114	3262		879	1706		1290	1593		1265	1580	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	104	294	197	104	207	42	250	5	104	48	5	93
RTOR Reduction (vph)	0	90	0	0	7	0	0	75	0	0	67	0
Lane Group Flow (vph)	104	401	0	104	242	0	250	34	0	48	31	0
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.3	41.3		41.3	41.3		21.5	21.5		21.5	21.5	
Effective Green, g (s)	41.3	41.3		41.3	41.3		21.5	21.5		21.5	21.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.28	0.28		0.28	0.28	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	606	1777		478	929		365	451		358	448	
v/s Ratio Prot		0.12			c0.14			0.02			0.02	
v/s Ratio Perm	0.09			0.12			c0.19			0.04		
v/c Ratio	0.17	0.23		0.22	0.26		0.68	0.08		0.13	0.07	
Uniform Delay, d1	8.7	9.0		8.9	9.2		24.1	19.9		20.2	19.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.3		1.0	0.7		6.7	0.2		0.2	0.1	
Delay (s)	9.3	9.2		10.0	9.8		30.9	20.0		20.4	19.9	
Level of Service	A	A		A	A		C	C		C	B	
Approach Delay (s)		9.3			9.9			27.6			20.1	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	13.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 7: 20th Avenue East /20th Avenue East & 8th Street East

2032 FB PM
 1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	210	45	22	131	19	15	10	12	23	10	204
Future Volume (vph)	237	210	45	22	131	19	15	10	12	23	10	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.973			0.981			0.956			0.883	
Fl _t Protected	0.950			0.950				0.980			0.995	
Satd. Flow (prot)	1750	1792	0	1750	1807	0	0	1726	0	0	1618	0
Fl _t Permitted	0.950			0.950				0.980			0.995	
Satd. Flow (perm)	1750	1792	0	1750	1807	0	0	1726	0	0	1618	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		161.5			209.6			72.0			597.5	
Travel Time (s)		11.6			15.1			5.2			43.0	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	242	214	46	22	134	19	15	10	12	23	10	208
Shared Lane Traffic (%)												
Lane Group Flow (vph)	242	260	0	22	153	0	0	37	0	0	241	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 51.1% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
 7: 20th Avenue East /20th Avenue East & 8th Street East

2032 FB PM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	210	45	22	131	19	15	10	12	23	10	204
Future Volume (Veh/h)	237	210	45	22	131	19	15	10	12	23	10	204
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	242	214	46	22	134	19	15	10	12	23	10	208
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178			285			1162	968	287	952	982	194
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178			285			1162	968	287	952	982	194
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			98			84	95	98	87	95	74
cM capacity (veh/h)	1364			1246			96	195	716	177	192	807
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	242	260	22	153	37	241						
Volume Left	242	0	22	0	15	23						
Volume Right	0	46	0	19	12	208						
cSH	1364	1700	1246	1700	165	548						
Volume to Capacity	0.18	0.15	0.02	0.09	0.22	0.44						
Queue Length 95th (m)	4.9	0.0	0.4	0.0	6.3	16.9						
Control Delay (s)	8.2	0.0	7.9	0.0	33.0	16.6						
Lane LOS	A		A		D	C						
Approach Delay (s)	4.0		1.0		33.0	16.6						
Approach LOS					D	C						
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			51.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Appendix L

All-way Stop-control Warrants

2032 FT	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	68	50	0	0	0	0	0	21	166	340	0	31
AM Sum	118			0			187			371		
PM	159	27	0	0	0	0	0	42	293	390	0	186
PM Sum	186			0			335			576		
EB/WB AM	371	55%	NB/SB AM	305	45%							
EB/WB PM	576	53%	NB/SB PM	521	47%							

2027 FT	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	39	32	0	0	0	0	0	18	158	298	0	21
AM Sum	71			0			176			319		
PM	24	20	0	0	0	0	0	28	343	418	0	35
PM Sum	44			0			371			453		
EB/WB AM	319	56%	NB/SB AM	247	44%							
EB/WB PM	453	52%	NB/SB PM	415	48%							

Appendix M

2027 Future Total Synchro Worksheets

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2027 FT AM
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	298	21	39	32	18	158
Future Volume (vph)	298	21	39	32	18	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.991			0.879		
Flt Protected	0.955			0.973		
Satd. Flow (prot)	1743	0	0	1792	1564	0
Flt Permitted	0.955			0.973		
Satd. Flow (perm)	1743	0	0	1792	1564	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)			25			25
Confl. Bikes (#/hr)	5					5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	343	24	45	37	21	182
Shared Lane Traffic (%)						
Lane Group Flow (vph)	367	0	0	82	203	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2027 FT AM
 1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	298	21	39	32	18	158
Future Volume (Veh/h)	298	21	39	32	18	158
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	343	24	45	37	21	182
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						262
pX, platoon unblocked						
vC, conflicting volume	264	137	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	137	228			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	97	97			
cM capacity (veh/h)	683	889	1308			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	367	82	203			
Volume Left	343	45	0			
Volume Right	24	0	182			
cSH	694	1308	1700			
Volume to Capacity	0.53	0.03	0.12			
Queue Length 95th (m)	23.8	0.8	0.0			
Control Delay (s)	15.9	4.4	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.9	4.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			9.5			
Intersection Capacity Utilization			44.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	208	112	39	262	23	129	48	92	30	26	16
Future Volume (vph)	16	208	112	39	262	23	129	48	92	30	26	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00		0.99	0.99		1.00	0.99	
Fr _t		0.948			0.988			0.902			0.944	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	3167	0	1716	3340	0	1684	3128	0	1526	3055	0
Fl _t Permitted	0.556			0.457			0.644			0.651		
Satd. Flow (perm)	1044	3167	0	824	3340	0	1134	3128	0	1044	3055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			7			105			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Adj. Flow (vph)	18	236	127	44	298	26	147	55	105	34	30	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	363	0	44	324	0	147	160	0	34	48	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East

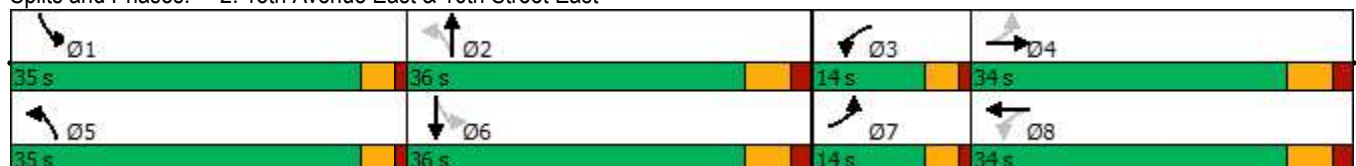


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			1			1			5	
Act Effct Green (s)	32.8	25.2		33.6	27.8		46.2	37.5		42.3	30.2	
Actuated g/C Ratio	0.36	0.28		0.37	0.31		0.51	0.41		0.47	0.33	
v/c Ratio	0.04	0.39		0.11	0.31		0.23	0.12		0.06	0.05	
Control Delay	17.0	23.1		17.8	25.9		13.6	9.0		12.9	16.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.0	23.1		17.8	25.9		13.6	9.0		12.9	16.7	
LOS	B	C		B	C		B	A		B	B	
Approach Delay		22.8			25.0			11.2			15.1	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	1.9	22.3		4.6	19.5		14.6	3.6		3.2	2.0	
Queue Length 95th (m)	6.0	35.6		11.3	37.8		24.8	10.1		7.8	6.1	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	460	1041		404	1123		783	1358		713	1032	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.35		0.11	0.29		0.19	0.12		0.05	0.05	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 90.5
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 19.8
 Intersection Capacity Utilization 67.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	16	208	112	39	262	23	129	48	92	30	26	16
Future Volume (vph)	16	208	112	39	262	23	129	48	92	30	26	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3166		1715	3340		1679	3128		1525	3056	
Flt Permitted	0.56	1.00		0.46	1.00		0.64	1.00		0.65	1.00	
Satd. Flow (perm)	1044	3166		826	3340		1137	3128		1044	3056	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	18	236	127	44	298	26	147	55	105	34	30	18
RTOR Reduction (vph)	0	57	0	0	5	0	0	63	0	0	12	0
Lane Group Flow (vph)	18	306	0	44	319	0	147	97	0	34	36	0
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.7	26.0		33.5	27.9		47.1	37.5		37.6	32.0	
Effective Green, g (s)	29.7	26.0		33.5	27.9		47.1	37.5		37.6	32.0	
Actuated g/C Ratio	0.31	0.27		0.35	0.29		0.50	0.40		0.40	0.34	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	356	869		344	984		629	1238		442	1032	
v/s Ratio Prot	0.00	c0.10		c0.01	0.10		c0.03	0.03		0.00	0.01	
v/s Ratio Perm	0.01			0.04			c0.09			0.03		
v/c Ratio	0.05	0.35		0.13	0.32		0.23	0.08		0.08	0.03	
Uniform Delay, d1	22.5	27.6		20.4	26.0		13.2	17.8		17.6	21.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.2	0.4		0.2	0.1		0.1	0.1	
Delay (s)	22.6	28.1		20.6	26.5		13.4	17.9		17.7	21.1	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		27.8			25.7			15.8			19.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	94.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	174	67	79	87	9	32	237	130	19	182	76
Future Volume (vph)	136	174	67	79	87	9	32	237	130	19	182	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.958			0.986			0.947			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1700	1762	0	1608	1799	0	1716	1685	0	1785	1663	0
Flt Permitted	0.689			0.553			0.587			0.491		
Satd. Flow (perm)	1232	1762	0	935	1799	0	1060	1685	0	920	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			9			47			36	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Adj. Flow (vph)	148	189	73	86	95	10	35	258	141	21	198	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	262	0	86	105	0	35	399	0	21	281	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	1	1		1	1		5	5		1		1
Act Effct Green (s)	16.5	16.5		16.5	16.5		30.4	30.4		30.4		30.4
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52		0.52
v/c Ratio	0.43	0.51		0.33	0.21		0.06	0.45		0.04		0.32
Control Delay	20.8	18.5		19.6	15.1		10.2	11.5		10.4		10.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.8	18.5		19.6	15.1		10.2	11.5		10.4		10.1
LOS	C	B		B	B		B	B		B		B
Approach Delay		19.3			17.1			11.4				10.1
Approach LOS		B			B			B				B
Queue Length 50th (m)	12.8	20.0		7.2	7.7		1.6	20.0		1.0		12.9
Queue Length 95th (m)	25.2	36.2		16.4	16.5		7.8	58.9		5.5		39.6
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	634	923		481	930		545	890		473		873
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.23	0.28		0.18	0.11		0.06	0.45		0.04		0.32

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	59
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	14.3
Intersection LOS:	B

Intersection Capacity Utilization 63.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

2027 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↘		↗	↘		↗	↘		↗	↘	
Traffic Volume (vph)	136	174	67	79	87	9	32	237	130	19	182	76
Future Volume (vph)	136	174	67	79	87	9	32	237	130	19	182	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1699	1762		1607	1798		1715	1685		1780	1662	
Flt Permitted	0.69	1.00		0.55	1.00		0.59	1.00		0.49	1.00	
Satd. Flow (perm)	1233	1762		935	1798		1060	1685		920	1662	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	189	73	86	95	10	35	258	141	21	198	83
RTOR Reduction (vph)	0	24	0	0	6	0	0	23	0	0	17	0
Lane Group Flow (vph)	148	238	0	86	99	0	35	376	0	21	264	0
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	16.4	16.4		16.4	16.4		30.4	30.4		30.4	30.4	
Effective Green, g (s)	16.4	16.4		16.4	16.4		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	343	491		260	501		548	871		475	859	
v/s Ratio Prot		c0.14			0.05			c0.22				0.16
v/s Ratio Perm	0.12			0.09			0.03			0.02		
v/c Ratio	0.43	0.49		0.33	0.20		0.06	0.43		0.04	0.31	
Uniform Delay, d1	17.4	17.7		16.8	16.2		7.1	8.8		7.0	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	1.6		1.6	0.4		0.2	1.6		0.2	0.9	
Delay (s)	19.2	19.3		18.4	16.6		7.3	10.4		7.2	9.1	
Level of Service	B	B		B	B		A	B		A	A	
Approach Delay (s)		19.2			17.4			10.1			8.9	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	254	81	72	317	16	135	139	83	16	80	65
Future Volume (vph)	46	254	81	72	317	16	135	139	83	16	80	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			0.99		1.00		
Fr _t		0.964			0.993			0.944			0.933	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3224	0	1733	3351	0	1750	3239	0	1638	2998	0
Fl _t Permitted	0.532			0.474			0.495			0.599		
Satd. Flow (perm)	977	3224	0	862	3351	0	912	3239	0	1031	2998	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			4			88			72	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Adj. Flow (vph)	51	282	90	80	352	18	150	154	92	18	89	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	372	0	80	370	0	150	246	0	18	161	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East

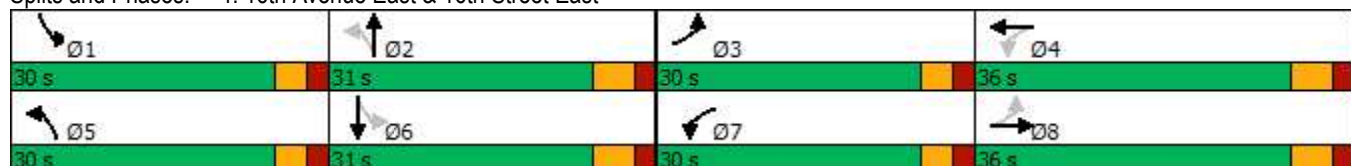


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		3			3			1			0	
Act Effct Green (s)	29.8	23.4		32.3	26.5		28.8	25.8		18.9	11.7	
Actuated g/C Ratio	0.41	0.32		0.44	0.36		0.39	0.35		0.26	0.16	
v/c Ratio	0.11	0.35		0.17	0.31		0.31	0.21		0.06	0.30	
Control Delay	12.6	20.6		12.8	19.9		17.5	12.6		15.7	18.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	20.6		12.8	19.9		17.5	12.6		15.7	18.5	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		19.7			18.6			14.4			18.2	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.5	18.9		5.6	20.1		14.0	7.6		1.6	5.8	
Queue Length 95th (m)	10.8	37.1		15.4	37.8		26.8	19.3		5.4	14.4	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	729	1360		709	1443		653	1224		621	1086	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.27		0.11	0.26		0.23	0.20		0.03	0.15	

Intersection Summary

Area Type: Other
 Cycle Length: 127
 Actuated Cycle Length: 73.4
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 17.7
 Intersection Capacity Utilization 57.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
 4: 16th Avenue East & 16th Street East

2027 FT AM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	46	254	81	72	317	16	135	139	83	16	80	65
Future Volume (vph)	46	254	81	72	317	16	135	139	83	16	80	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3224		1732	3350		1750	3240		1637	2998	
Flt Permitted	0.53	1.00		0.47	1.00		0.50	1.00		0.60	1.00	
Satd. Flow (perm)	978	3224		864	3350		912	3240		1032	2998	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	282	90	80	352	18	150	154	92	18	89	72
RTOR Reduction (vph)	0	22	0	0	3	0	0	59	0	0	58	0
Lane Group Flow (vph)	51	350	0	80	367	0	150	187	0	18	103	0
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	28.5	24.4		32.7	26.5		32.0	25.8		17.2	16.0	
Effective Green, g (s)	28.5	24.4		32.7	26.5		32.0	25.8		17.2	16.0	
Actuated g/C Ratio	0.36	0.31		0.41	0.33		0.40	0.32		0.22	0.20	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	389	988		422	1115		482	1050		232	602	
v/s Ratio Prot	0.01	0.11		c0.01	c0.11		c0.04	0.06		0.00	0.03	
v/s Ratio Perm	0.04			0.06			c0.08			0.02		
v/c Ratio	0.13	0.35		0.19	0.33		0.31	0.18		0.08	0.17	
Uniform Delay, d1	16.9	21.5		14.5	19.9		15.7	19.3		24.7	26.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.2	0.4		0.4	0.2		0.1	0.3	
Delay (s)	17.0	21.9		14.8	20.3		16.1	19.5		24.9	26.6	
Level of Service	B	C		B	C		B	B		C	C	
Approach Delay (s)		21.3			19.3			18.2			26.4	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			20.5	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			79.6	Sum of lost time (s)				22.0				
Intersection Capacity Utilization			57.5%	ICU Level of Service				B				
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	189	101	81	201	33	89	5	35	38	5	75
Future Volume (vph)	86	189	101	81	201	33	89	5	35	38	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948			0.979			0.867			0.859	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3175	0	1733	1745	0	1733	1570	0	1750	1582	0
Flt Permitted	0.602			0.561			0.701			0.729		
Satd. Flow (perm)	1109	3175	0	1023	1745	0	1279	1570	0	1343	1582	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		110			12			38			82	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Adj. Flow (vph)	93	205	110	88	218	36	97	5	38	41	5	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	315	0	88	254	0	97	43	0	41	87	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (m)	0.0	0.0		0.0	0.0		2.0	0.6		2.0	0.6	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East

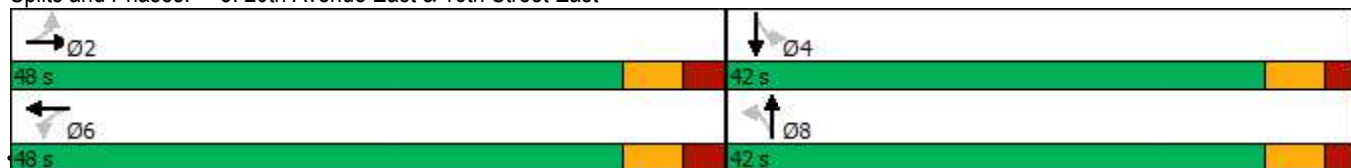


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	45.7	45.7		45.7	45.7		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.19	0.19		0.19	0.19	
v/c Ratio	0.12	0.14		0.12	0.21		0.40	0.13		0.16	0.24	
Control Delay	6.5	3.8		6.6	6.1		29.0	10.2		23.9	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.5	3.8		6.6	6.1		29.0	10.2		23.9	8.5	
LOS	A	A		A	A		C	B		C	A	
Approach Delay		4.5			6.2			23.2			13.4	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.1	4.6		3.9	11.3		10.6	0.5		4.3	0.5	
Queue Length 95th (m)	11.0	10.6		10.7	24.6		22.9	7.4		11.4	10.3	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	763	2220		704	1205		694	870		729	896	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.14		0.13	0.21		0.14	0.05		0.06	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 66.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 8.8
 Intersection LOS: A
 Intersection Capacity Utilization 93.9%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2027 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	189	101	81	201	33	89	5	35	38	5	75
Future Volume (vph)	86	189	101	81	201	33	89	5	35	38	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.87		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3173		1733	1744		1733	1571		1750	1582	
Flt Permitted	0.60	1.00		0.56	1.00		0.70	1.00		0.73	1.00	
Satd. Flow (perm)	1109	3173		1023	1744		1278	1571		1343	1582	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	205	110	88	218	36	97	5	38	41	5	82
RTOR Reduction (vph)	0	38	0	0	4	0	0	32	0	0	69	0
Lane Group Flow (vph)	93	277	0	88	250	0	97	11	0	41	18	0
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.2	44.2		44.2	44.2		10.4	10.4		10.4	10.4	
Effective Green, g (s)	44.2	44.2		44.2	44.2		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.15	0.15		0.15	0.15	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	725	2074		668	1140		196	241		206	243	
v/s Ratio Prot		0.09			c0.14			0.01				0.01
v/s Ratio Perm	0.08			0.09			c0.08			0.03		
v/c Ratio	0.13	0.13		0.13	0.22		0.49	0.05		0.20	0.07	
Uniform Delay, d1	4.4	4.4		4.4	4.7		26.2	24.4		25.0	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.4	0.4		4.1	0.2		0.5	0.1	
Delay (s)	4.8	4.6		4.8	5.2		30.3	24.5		25.4	24.6	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		4.6			5.1			28.5			24.9	
Approach LOS		A			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.27	B
Actuated Cycle Length (s)	67.6	Sum of lost time (s)
Intersection Capacity Utilization	93.9%	13.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		F

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

2027 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	122	12	6	200	10	28	10	22	5	6	26
Future Volume (vph)	21	122	12	6	200	10	28	10	22	5	6	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.987			0.993			0.950			0.905	
Fl _t Protected	0.950			0.950				0.977			0.994	
Satd. Flow (prot)	1750	1818	0	1750	1829	0	0	1710	0	0	1657	0
Fl _t Permitted	0.950			0.950				0.977			0.994	
Satd. Flow (perm)	1750	1818	0	1750	1829	0	0	1710	0	0	1657	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			593.3	
Travel Time (s)		15.3			13.4			5.2			42.7	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	133	13	7	217	11	30	11	24	5	7	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	146	0	7	228	0	0	65	0	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2027 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	122	12	6	200	10	28	10	22	5	6	26
Future Volume (Veh/h)	21	122	12	6	200	10	28	10	22	5	6	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	133	13	7	217	11	30	11	24	5	7	28
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	253			171			498	478	190	495	478	272
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			171			498	478	190	495	478	272
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	98	97	99	98	96
cM capacity (veh/h)	1280			1372			413	453	811	416	452	729
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	23	146	7	228	65	40						
Volume Left	23	0	7	0	30	5						
Volume Right	0	13	0	11	24	28						
cSH	1280	1700	1372	1700	514	607						
Volume to Capacity	0.02	0.09	0.01	0.13	0.13	0.07						
Queue Length 95th (m)	0.4	0.0	0.1	0.0	3.3	1.6						
Control Delay (s)	7.9	0.0	7.6	0.0	13.0	11.3						
Lane LOS	A		A		B	B						
Approach Delay (s)	1.1		0.2		13.0	11.3						
Approach LOS					B	B						
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			35.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 8: Site Access #1 & 10th Street East

2027 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	6	33	0	11	60	0
Future Volume (vph)	6	33	0	11	60	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.886					
Flt Protected					0.950	
Satd. Flow (prot)	1632	0	0	1842	1750	0
Flt Permitted					0.950	
Satd. Flow (perm)	1632	0	0	1842	1750	0
Link Speed (k/h)	50		50		40	
Link Distance (m)	79.7		134.3		72.4	
Travel Time (s)	5.7		9.7		6.5	
Confl. Peds. (#/hr)	25		25			
Confl. Bikes (#/hr)	5				5	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	7	38	0	13	69	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	0	13	69	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.5	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 8: Site Access #1 & 10th Street East

2027 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	6	33	0	11	60	0
Future Volume (Veh/h)	6	33	0	11	60	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	38	0	13	69	0
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	342					
pX, platoon unblocked						
vC, conflicting volume			70		64	51
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			70		64	51
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		92	100
cM capacity (veh/h)			1493		919	992
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	45	13	69			
Volume Left	0	0	69			
Volume Right	38	0	0			
cSH	1700	1493	919			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.0	0.0	1.8			
Control Delay (s)	0.0	0.0	9.2			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			19.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 9: Site Access #2 & 10th Street East

2027 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	6	0	0	11	0
Future Volume (vph)	0	6	0	0	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected					0.950	
Satd. Flow (prot)	1593	0	0	1842	1750	0
Flt Permitted					0.950	
Satd. Flow (perm)	1593	0	0	1842	1750	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	134.3			49.2	71.8	
Travel Time (s)	9.7			3.5	6.5	
Confl. Peds. (#/hr)	25		25			
Confl. Bikes (#/hr)	5				5	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	7	0	0	13	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	0	0	0	13	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	15		25		25	
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 9: Site Access #2 & 10th Street East

2027 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	0	6	0	0	11	0
Future Volume (Veh/h)	0	6	0	0	11	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	7	0	0	13	0
Pedestrians					25	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			32		28	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			32		28	28
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1542		962	1021
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	7	0	13			
Volume Left	0	0	13			
Volume Right	7	0	0			
cSH	1700	1700	962			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	8.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			5.7			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2027 FT AM AWSC
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	298	21	39	32	18	158
Future Volume (vph)	298	21	39	32	18	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	15.0		15.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.879	
Flt Protected	0.950			0.973		
Satd. Flow (prot)	1750	1566	0	1792	1564	0
Flt Permitted	0.950			0.973		
Satd. Flow (perm)	1750	1566	0	1792	1564	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)	25	25	25			25
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	343	24	45	37	21	182
Shared Lane Traffic (%)						
Lane Group Flow (vph)	343	24	0	82	203	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.5%
	ICU Level of Service A
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷		↶	↷	
Traffic Vol, veh/h	298	21	39	32	18	158
Future Vol, veh/h	298	21	39	32	18	158
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	6
Mvmt Flow	343	24	45	37	21	182
Number of Lanes	1	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.5	9.1	9.2
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	55%	100%	0%	0%
Vol Thru, %	45%	0%	0%	10%
Vol Right, %	0%	0%	100%	90%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	298	21	176
LT Vol	39	298	0	0
Through Vol	32	0	0	18
RT Vol	0	0	21	158
Lane Flow Rate	82	343	24	202
Geometry Grp	2	7	7	2
Degree of Util (X)	0.121	0.541	0.03	0.256
Departure Headway (Hd)	5.343	5.685	4.479	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	668	630	792	785
Service Time	3.404	3.456	2.249	2.602
HCM Lane V/C Ratio	0.123	0.544	0.03	0.257
HCM Control Delay	9.1	15	7.4	9.2
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	3.2	0.1	1

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2027 FT PM
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	418	35	24	20	28	343
Future Volume (vph)	418	35	24	20	28	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.989					0.875
Flt Protected	0.956					0.974
Satd. Flow (prot)	1742	0	0	1794	1612	0
Flt Permitted	0.956					0.974
Satd. Flow (perm)	1742	0	0	1794	1612	0
Link Speed (k/h)	40					50
Link Distance (m)	321.6					79.7
Travel Time (s)	28.9					5.4
Confl. Peds. (#/hr)			25			
Confl. Bikes (#/hr)	5					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	449	38	26	22	30	369
Shared Lane Traffic (%)						
Lane Group Flow (vph)	487	0	0	48	399	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	3.0					3.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.8%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2027 FT PM
 1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	418	35	24	20	28	343
Future Volume (Veh/h)	418	35	24	20	28	343
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	449	38	26	22	30	369
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						262
pX, platoon unblocked						
vC, conflicting volume	314	240	424			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	314	240	424			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	31	95	98			
cM capacity (veh/h)	647	780	1108			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	487	48	399			
Volume Left	449	26	0			
Volume Right	38	0	369			
cSH	656	1108	1700			
Volume to Capacity	0.74	0.02	0.23			
Queue Length 95th (m)	50.1	0.5	0.0			
Control Delay (s)	24.6	4.6	0.0			
Lane LOS	C	A				
Approach Delay (s)	24.6	4.6	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			13.1			
Intersection Capacity Utilization			56.8%	ICU Level of Service	B	
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2027 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	19	382	180	76	378	33	217	49	87	53	56	46
Future Volume (vph)	19	382	180	76	378	33	217	49	87	53	56	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	0.99		0.99	0.99	
Frt		0.952			0.988			0.904				0.933
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3339	0	1653	3357	0	1767	3061	0	1785	3309	0
Flt Permitted	0.497			0.246			0.606			0.660		
Satd. Flow (perm)	879	3339	0	428	3357	0	1126	3061	0	1233	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61			7			93			49	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Adj. Flow (vph)	20	406	191	81	402	35	231	52	93	56	60	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	597	0	81	437	0	231	145	0	56	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

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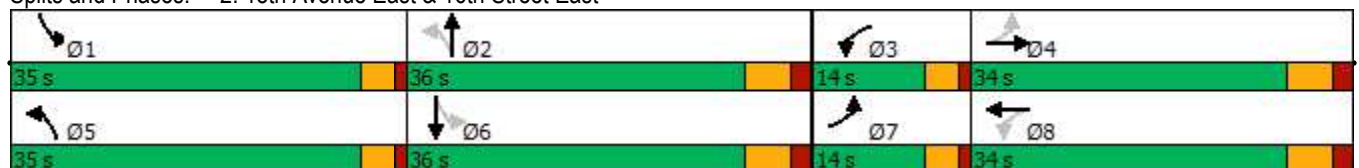


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			1			5			4	
Act Effct Green (s)	35.9	26.2		37.5	31.8		49.8	37.5		42.4	30.3	
Actuated g/C Ratio	0.37	0.27		0.39	0.33		0.51	0.39		0.44	0.31	
v/c Ratio	0.05	0.63		0.28	0.40		0.35	0.12		0.09	0.10	
Control Delay	18.6	32.6		21.3	28.0		15.6	9.5		14.0	16.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.6	32.6		21.3	28.0		15.6	9.5		14.0	16.2	
LOS	B	C		C	C		B	A		B	B	
Approach Delay		32.2			27.0			13.2			15.5	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.2	48.6		9.3	29.4		24.1	3.4		5.3	4.2	
Queue Length 95th (m)	7.2	71.6		20.1	55.6		40.6	10.1		11.8	11.4	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	407	1012		291	1130		787	1237		814	1062	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.59		0.28	0.39		0.29	0.12		0.07	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 97.4
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 24.7
 Intersection LOS: C
 Intersection Capacity Utilization 78.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	19	382	180	76	378	33	217	49	87	53	56	46
Future Volume (vph)	19	382	180	76	378	33	217	49	87	53	56	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1682	3339		1653	3357		1766	3062		1779	3308	
Flt Permitted	0.50	1.00		0.25	1.00		0.61	1.00		0.66	1.00	
Satd. Flow (perm)	879	3339		429	3357		1126	3062		1236	3308	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	20	406	191	81	402	35	231	52	93	56	60	49
RTOR Reduction (vph)	0	44	0	0	5	0	0	58	0	0	34	0
Lane Group Flow (vph)	20	553	0	81	432	0	231	87	0	56	75	0
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.5	27.8		39.5	31.8		49.2	37.5		38.9	31.2	
Effective Green, g (s)	31.5	27.8		39.5	31.8		49.2	37.5		38.9	31.2	
Actuated g/C Ratio	0.31	0.28		0.39	0.32		0.49	0.37		0.39	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	304	921		261	1060		639	1140		518	1024	
v/s Ratio Prot	0.00	c0.17		c0.02	0.13		c0.05	0.03		0.01	0.02	
v/s Ratio Perm	0.02			0.10			c0.13			0.03		
v/c Ratio	0.07	0.60		0.31	0.41		0.36	0.08		0.11	0.07	
Uniform Delay, d1	24.1	31.6		20.6	27.1		15.2	20.4		19.6	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.6		0.7	0.5		0.4	0.1		0.1	0.1	
Delay (s)	24.2	33.3		21.2	27.6		15.6	20.5		19.7	24.7	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		33.0			26.6			17.5			23.0	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.46	C
Actuated Cycle Length (s)	100.7	Sum of lost time (s)
Intersection Capacity Utilization	78.7%	20.0
Analysis Period (min)	15	ICU Level of Service
		D
c Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	241	45	143	212	21	79	222	192	23	226	121
Future Volume (vph)	106	241	45	143	212	21	79	222	192	23	226	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	1.00			0.99		1.00	0.99	
Frt		0.977			0.986			0.931			0.948	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	1812	0	1750	1809	0	1785	1676	0	1785	1739	0
Flt Permitted	0.575			0.487			0.507			0.441		
Satd. Flow (perm)	1000	1812	0	892	1809	0	953	1676	0	827	1739	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			9			74			46	
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		172.7			321.6			117.8			433.8	
Travel Time (s)		15.5			28.9			8.5			31.2	
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Adj. Flow (vph)	114	259	48	154	228	23	85	239	206	25	243	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	307	0	154	251	0	85	445	0	25	373	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	7	7		0	0		4	4		0		0
Act Effct Green (s)	18.0	18.0		18.0	18.0		30.3	30.3		30.3		30.3
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.50	0.50		0.50		0.50
v/c Ratio	0.38	0.56		0.58	0.46		0.18	0.51		0.06		0.42
Control Delay	20.1	20.5		26.9	18.9		11.8	12.2		11.0		11.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	20.1	20.5		26.9	18.9		11.8	12.2		11.0		11.5
LOS	C	C		C	B		B	B		B		B
Approach Delay		20.4			21.9			12.2				11.5
Approach LOS		C			C			B				B
Queue Length 50th (m)	9.8	26.4		14.2	21.3		4.6	23.4		1.3		19.7
Queue Length 95th (m)	20.7	45.0		29.2	37.1		16.1	64.6		6.3		53.5
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	501	917		447	912		478	877		414		895
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.23	0.33		0.34	0.28		0.18	0.51		0.06		0.42

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 60.4
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 16.2
 Intersection LOS: B

Intersection Capacity Utilization 95.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
3: 16th Avenue East & 10th Street East

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1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↘		↗	↘		↗	↘		↗	↘	
Traffic Volume (vph)	106	241	45	143	212	21	79	222	192	23	226	121
Future Volume (vph)	106	241	45	143	212	21	79	222	192	23	226	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1811		1742	1810		1785	1676		1781	1739	
Flt Permitted	0.57	1.00		0.49	1.00		0.51	1.00		0.44	1.00	
Satd. Flow (perm)	1000	1811		894	1810		952	1676		827	1739	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	114	259	48	154	228	23	85	239	206	25	243	130
RTOR Reduction (vph)	0	11	0	0	6	0	0	37	0	0	23	0
Lane Group Flow (vph)	114	296	0	154	245	0	85	408	0	25	350	0
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0		30.3	30.3		30.3	30.3	
Effective Green, g (s)	18.0	18.0		18.0	18.0		30.3	30.3		30.3	30.3	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.50	0.50		0.50	0.50	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	298	540		266	540		478	842		415	873	
v/s Ratio Prot		0.16			0.14			c0.24			0.20	
v/s Ratio Perm	0.11			c0.17			0.09			0.03		
v/c Ratio	0.38	0.55		0.58	0.45		0.18	0.48		0.06	0.40	
Uniform Delay, d1	16.7	17.7		17.9	17.2		8.2	9.9		7.7	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	2.0		4.8	1.3		0.8	2.0		0.3	1.4	
Delay (s)	18.5	19.7		22.7	18.4		9.0	11.9		8.0	10.7	
Level of Service	B	B		C	B		A	B		A	B	
Approach Delay (s)		19.4			20.1			11.4			10.5	
Approach LOS		B			C			B			B	

Intersection Summary

HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2027 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	444	93	85	501	14	166	116	119	34	154	99
Future Volume (vph)	56	444	93	85	501	14	166	116	119	34	154	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.974			0.996			0.924			0.941	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	3406	0	1785	3402	0	1785	3047	0	1638	3225	0
Fl _t Permitted	0.384			0.335			0.448			0.599		
Satd. Flow (perm)	666	3406	0	629	3402	0	840	3047	0	1030	3225	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			125			102	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	9%	2%	6%
Adj. Flow (vph)	59	467	98	89	527	15	175	122	125	36	162	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	565	0	89	542	0	175	247	0	36	266	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

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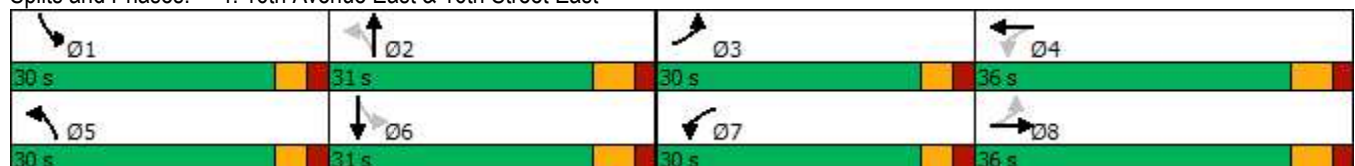


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			5			2			2	
Act Effct Green (s)	31.7	24.9		33.5	25.8		32.2	24.4		21.4	13.6	
Actuated g/C Ratio	0.40	0.32		0.42	0.33		0.41	0.31		0.27	0.17	
v/c Ratio	0.17	0.52		0.23	0.49		0.36	0.24		0.11	0.42	
Control Delay	14.8	25.7		15.1	25.1		18.5	12.8		17.0	20.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	25.7		15.1	25.1		18.5	12.8		17.0	20.8	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		24.7			23.7			15.2			20.3	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	4.3	34.5		6.6	33.1		16.8	7.5		3.2	11.3	
Queue Length 95th (m)	14.2	67.6		19.5	64.7		34.7	18.3		9.7	25.3	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	633	1352		671	1351		654	1141		621	1126	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.42		0.13	0.40		0.27	0.22		0.06	0.24	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	79
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	21.7
Intersection LOS:	C
Intersection Capacity Utilization:	60.5%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	56	444	93	85	501	14	166	116	119	34	154	99
Future Volume (vph)	56	444	93	85	501	14	166	116	119	34	154	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.92		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3406		1784	3402		1784	3049		1636	3227	
Flt Permitted	0.38	1.00		0.33	1.00		0.45	1.00		0.60	1.00	
Satd. Flow (perm)	667	3406		628	3402		841	3049		1031	3227	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	467	98	89	527	15	175	122	125	36	162	104
RTOR Reduction (vph)	0	13	0	0	1	0	0	88	0	0	82	0
Lane Group Flow (vph)	59	552	0	89	541	0	175	159	0	36	184	0
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	9%	2%	6%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.6	24.9		32.4	25.8		33.4	24.4		20.0	16.0	
Effective Green, g (s)	30.6	24.9		32.4	25.8		33.4	24.4		20.0	16.0	
Actuated g/C Ratio	0.37	0.30		0.40	0.32		0.41	0.30		0.24	0.20	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	317	1035		341	1071		485	908		281	630	
v/s Ratio Prot	0.01	c0.16		c0.02	0.16		c0.05	0.05		0.01	0.06	
v/s Ratio Perm	0.06			0.08			c0.09			0.03		
v/c Ratio	0.19	0.53		0.26	0.50		0.36	0.18		0.13	0.29	
Uniform Delay, d1	16.8	23.7		16.0	22.8		16.1	21.3		23.9	28.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.0		0.4	0.8		0.5	0.2		0.2	0.5	
Delay (s)	17.0	24.6		16.4	23.6		16.6	21.5		24.1	28.7	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		23.9			22.6			19.4			28.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	277	186	99	194	41	237	5	98	47	5	94
Future Volume (vph)	104	277	186	99	194	41	237	5	98	47	5	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98				0.99					0.98	0.95	
Fr _t		0.940			0.974			0.857			0.857	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3290	0	1767	1696	0	1767	1594	0	1750	1495	0
Fl _t Permitted	0.610			0.481			0.692			0.689		
Satd. Flow (perm)	1101	3290	0	895	1696	0	1287	1594	0	1248	1495	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		190			16			100			96	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Confl. Peds. (#/hr)	25					25				25		25
Confl. Bikes (#/hr)						5						5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Adj. Flow (vph)	106	283	190	101	198	42	242	5	100	48	5	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	473	0	101	240	0	242	105	0	48	101	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

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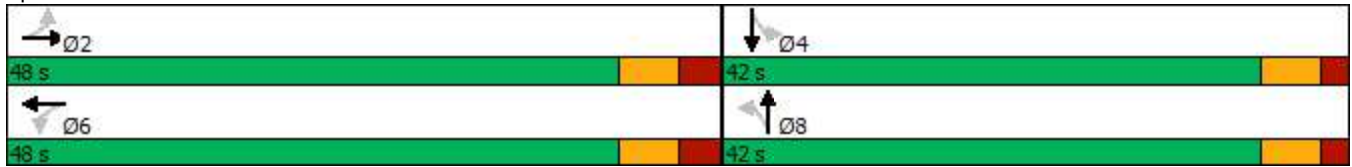
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8	20.8	
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.28	0.28		0.28	0.28	
v/c Ratio	0.18	0.25		0.21	0.26		0.68	0.20		0.14	0.21	
Control Delay	11.2	6.3		11.9	10.5		34.1	5.9		20.4	6.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.2	6.3		11.9	10.5		34.1	5.9		20.4	6.1	
LOS	B	A		B	B		C	A		C	A	
Approach Delay		7.2			10.9			25.5			10.7	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	6.8	9.4		6.6	15.0		30.2	0.5		5.1	0.5	
Queue Length 95th (m)	19.0	21.7		19.2	35.5		52.0	10.1		12.2	10.0	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	604	1891		491	938		620	819		601	770	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.25		0.21	0.26		0.39	0.13		0.08	0.13	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75.2
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	12.9
Intersection LOS:	B

Intersection Capacity Utilization 103.9% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2027 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	104	277	186	99	194	41	237	5	98	47	5	94
Future Volume (vph)	104	277	186	99	194	41	237	5	98	47	5	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.95	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.86		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1721	3289		1767	1697		1767	1594		1726	1500	
Flt Permitted	0.61	1.00		0.48	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	1104	3289		895	1697		1287	1594		1252	1500	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	106	283	190	101	198	42	242	5	100	48	5	96
RTOR Reduction (vph)	0	86	0	0	7	0	0	72	0	0	69	0
Lane Group Flow (vph)	106	387	0	101	233	0	242	33	0	48	32	0
Confl. Peds. (#/hr)	25					25				25		25
Confl. Bikes (#/hr)						5						5
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8	20.8	
Effective Green, g (s)	41.3	41.3		41.3	41.3		20.8	20.8		20.8	20.8	
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.28	0.28		0.28	0.28	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	607	1808		492	933		356	441		346	415	
v/s Ratio Prot		0.12			c0.14			0.02			0.02	
v/s Ratio Perm	0.10			0.11			c0.19			0.04		
v/c Ratio	0.17	0.21		0.21	0.25		0.68	0.07		0.14	0.08	
Uniform Delay, d1	8.4	8.6		8.6	8.8		24.2	20.0		20.4	20.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.3		0.9	0.6		6.6	0.2		0.2	0.1	
Delay (s)	9.0	8.9		9.5	9.5		30.8	20.2		20.6	20.1	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.9			9.5			27.6			20.3	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	75.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

2027 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	218	45	22	133	10	15	10	12	5	6	142
Future Volume (vph)	131	218	45	22	133	10	15	10	12	5	6	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.974			0.990			0.956			0.875	
Fl _t Protected	0.950			0.950				0.980			0.998	
Satd. Flow (prot)	1750	1794	0	1750	1824	0	0	1726	0	0	1609	0
Fl _t Permitted	0.950			0.950				0.980			0.998	
Satd. Flow (perm)	1750	1794	0	1750	1824	0	0	1726	0	0	1609	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			593.3	
Travel Time (s)		15.3			13.4			5.2			42.7	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	134	222	46	22	136	10	15	10	12	5	6	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	268	0	22	146	0	0	37	0	0	156	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 40.8% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2027 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	218	45	22	133	10	15	10	12	5	6	142
Future Volume (Veh/h)	131	218	45	22	133	10	15	10	12	5	6	142
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	134	222	46	22	136	10	15	10	12	5	6	145
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	171			293			891	753	295	742	771	191
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171			293			891	753	295	742	771	191
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			98			92	97	98	98	98	82
cM capacity (veh/h)	1372			1238			178	286	709	266	279	810
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	134	268	22	146	37	156						
Volume Left	134	0	22	0	15	5						
Volume Right	0	46	0	10	12	145						
cSH	1372	1700	1238	1700	272	711						
Volume to Capacity	0.10	0.16	0.02	0.09	0.14	0.22						
Queue Length 95th (m)	2.5	0.0	0.4	0.0	3.5	6.3						
Control Delay (s)	7.9	0.0	8.0	0.0	20.3	11.5						
Lane LOS	A		A		C	B						
Approach Delay (s)	2.6		1.0		20.3	11.5						
Approach LOS					C	B						
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			40.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 8: Site Access #1 & 10th Street East

2027 FT PM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	9	54	0	7	37	0
Future Volume (vph)	9	54	0	7	37	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.885					
Flt Protected					0.950	
Satd. Flow (prot)	1630	0	0	1842	1750	0
Flt Permitted					0.950	
Satd. Flow (perm)	1630	0	0	1842	1750	0
Link Speed (k/h)	50		50		40	
Link Distance (m)	79.7		134.3		72.4	
Travel Time (s)	5.7		9.7		6.5	
Confl. Peds. (#/hr)	25		25			
Confl. Bikes (#/hr)	5				5	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	10	58	0	8	40	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	0	0	8	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0		0.0		3.5	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	15		25		25	
Sign Control	Free		Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 8: Site Access #1 & 10th Street East

2027 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	9	54	0	7	37	0
Future Volume (Veh/h)	9	54	0	7	37	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	10	58	0	8	40	0
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	342					
pX, platoon unblocked						
vC, conflicting volume			93		72	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			93		72	64
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1465		909	976
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	68	8	40			
Volume Left	0	0	40			
Volume Right	58	0	0			
cSH	1700	1465	909			
Volume to Capacity	0.04	0.00	0.04			
Queue Length 95th (m)	0.0	0.0	1.0			
Control Delay (s)	0.0	0.0	9.1			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			20.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 9: Site Access #2 & 10th Street East

2027 FT PM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	9	0	0	7	0
Future Volume (vph)	0	9	0	0	7	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected					0.950	
Satd. Flow (prot)	1593	0	0	1842	1750	0
Flt Permitted					0.950	
Satd. Flow (perm)	1593	0	0	1842	1750	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	134.3			49.2	71.8	
Travel Time (s)	9.7			3.5	6.5	
Confl. Peds. (#/hr)	25		25			
Confl. Bikes (#/hr)	5				5	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	10	0	0	8	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	15		25		25	
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 9: Site Access #2 & 10th Street East

2027 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	0	9	0	0	7	0
Future Volume (Veh/h)	0	9	0	0	7	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	10	0	0	8	0
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			35		30	30
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			35		30	30
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1538		960	1019
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	0	8			
Volume Left	0	0	8			
Volume Right	10	0	0			
cSH	1700	1700	960			
Volume to Capacity	0.01	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	0.0	0.0	8.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2027 FT PM AWSC
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	418	35	24	20	28	343
Future Volume (vph)	418	35	24	20	28	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	15.0		15.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.875	
Flt Protected	0.950			0.974		
Satd. Flow (prot)	1750	1566	0	1794	1612	0
Flt Permitted	0.950			0.974		
Satd. Flow (perm)	1750	1566	0	1794	1612	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)	25	25	25			25
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	449	38	26	22	30	369
Shared Lane Traffic (%)						
Lane Group Flow (vph)	449	38	0	48	399	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.7%
Analysis Period (min)	15
	ICU Level of Service A

Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷		↶	↷	
Traffic Vol, veh/h	418	35	24	20	28	343
Future Vol, veh/h	418	35	24	20	28	343
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	449	38	26	22	30	369
Number of Lanes	1	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	26	9.8	14.1
HCM LOS	D	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	55%	100%	0%	0%
Vol Thru, %	45%	0%	0%	8%
Vol Right, %	0%	0%	100%	92%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	418	35	371
LT Vol	24	418	0	0
Through Vol	20	0	0	28
RT Vol	0	0	35	343
Lane Flow Rate	47	449	38	399
Geometry Grp	2	7	7	2
Degree of Util (X)	0.081	0.778	0.052	0.555
Departure Headway (Hd)	6.187	6.229	5.017	5.006
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	577	584	714	726
Service Time	4.245	3.957	2.745	3.006
HCM Lane V/C Ratio	0.081	0.769	0.053	0.55
HCM Control Delay	9.8	27.5	8	14.1
HCM Lane LOS	A	D	A	B
HCM 95th-tile Q	0.3	7.2	0.2	3.4

Appendix N

2032 Future Total Synchro Worksheets

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FT AM AWSC
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	340	31	68	50	21	166
Future Volume (vph)	340	31	68	50	21	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	15.0		15.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.880	
Flt Protected	0.950			0.972		
Satd. Flow (prot)	1750	1566	0	1790	1566	0
Flt Permitted	0.950			0.972		
Satd. Flow (perm)	1750	1566	0	1790	1566	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)	25	25	25			25
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	391	36	78	57	24	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	391	36	0	135	215	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.7%
ICU Level of Service	A
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷		↶	↷	
Traffic Vol, veh/h	340	31	68	50	21	166
Future Vol, veh/h	340	31	68	50	21	166
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	6
Mvmt Flow	391	36	78	57	24	191
Number of Lanes	1	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	18.1	10.2	9.9
HCM LOS	C	B	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	58%	100%	0%	0%
Vol Thru, %	42%	0%	0%	11%
Vol Right, %	0%	0%	100%	89%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	118	340	31	187
LT Vol	68	340	0	0
Through Vol	50	0	0	21
RT Vol	0	0	31	166
Lane Flow Rate	136	391	36	215
Geometry Grp	2	7	7	2
Degree of Util (X)	0.214	0.648	0.047	0.288
Departure Headway (Hd)	5.672	5.972	4.763	4.932
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	636	610	755	733
Service Time	3.672	3.681	2.472	2.932
HCM Lane V/C Ratio	0.214	0.641	0.048	0.293
HCM Control Delay	10.2	19	7.7	9.9
HCM Lane LOS	B	C	A	A
HCM 95th-tile Q	0.8	4.7	0.1	1.2

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FT AM
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	340	31	68	50	21	166
Future Volume (vph)	340	31	68	50	21	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.989			0.880		
Flt Protected	0.956			0.972		
Satd. Flow (prot)	1742	0	0	1790	1566	0
Flt Permitted	0.956			0.972		
Satd. Flow (perm)	1742	0	0	1790	1566	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)			25			25
Confl. Bikes (#/hr)	5					5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	2%	2%	6%
Adj. Flow (vph)	391	36	78	57	24	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	427	0	0	135	215	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	50.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2032 FT AM
 1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	340	31	68	50	21	166
Future Volume (Veh/h)	340	31	68	50	21	166
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	391	36	78	57	24	191
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						262
pX, platoon unblocked						
vC, conflicting volume	358	144	240			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	144	240			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	33	96	94			
cM capacity (veh/h)	588	881	1294			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	427	135	215			
Volume Left	391	78	0			
Volume Right	36	0	191			
cSH	605	1294	1700			
Volume to Capacity	0.71	0.06	0.13			
Queue Length 95th (m)	43.6	1.5	0.0			
Control Delay (s)	24.0	4.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	24.0	4.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			14.0			
Intersection Capacity Utilization			50.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	17	217	122	37	273	24	135	66	124	31	29	17
Future Volume (vph)	17	217	122	37	273	24	135	66	124	31	29	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00		0.99	0.99		1.00	0.99	
Fr _t		0.946			0.988			0.902			0.945	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1785	3161	0	1716	3340	0	1684	3129	0	1526	3057	0
Fl _t Permitted	0.549			0.436			0.641			0.617		
Satd. Flow (perm)	1031	3161	0	787	3340	0	1129	3129	0	990	3057	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		86			7			141			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Adj. Flow (vph)	19	247	139	42	310	27	153	75	141	35	33	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	386	0	42	337	0	153	216	0	35	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East

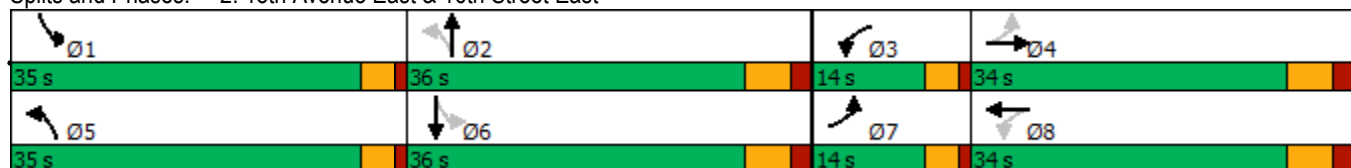


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			1			1			5	
Act Effct Green (s)	32.8	25.2		33.6	27.9		46.6	37.8		42.4	30.3	
Actuated g/C Ratio	0.36	0.28		0.37	0.31		0.51	0.42		0.47	0.33	
v/c Ratio	0.04	0.41		0.11	0.33		0.24	0.16		0.07	0.05	
Control Delay	17.2	23.3		17.9	26.2		13.6	8.6		12.9	16.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.2	23.3		17.9	26.2		13.6	8.6		12.9	16.9	
LOS	B	C		B	C		B	A		B	B	
Approach Delay		23.0			25.3			10.7			15.3	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.0	23.8		4.4	20.4		15.3	5.0		3.3	2.2	
Queue Length 95th (m)	6.3	37.7		10.9	39.5		25.8	12.3		8.0	6.4	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	456	1042		394	1120		783	1384		703	1031	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.37		0.11	0.30		0.20	0.16		0.05	0.05	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 90.8
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 19.5
 Intersection Capacity Utilization 66.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	17	217	122	37	273	24	135	66	124	31	29	17
Future Volume (vph)	17	217	122	37	273	24	135	66	124	31	29	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3161		1715	3340		1679	3130		1525	3060	
Flt Permitted	0.55	1.00		0.44	1.00		0.64	1.00		0.62	1.00	
Satd. Flow (perm)	1031	3161		787	3340		1133	3130		990	3060	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	19	247	139	42	310	27	153	75	141	35	33	19
RTOR Reduction (vph)	0	62	0	0	5	0	0	85	0	0	13	0
Lane Group Flow (vph)	19	324	0	42	332	0	153	131	0	35	39	0
Confl. Peds. (#/hr)	1		2	2		1	5		1	1		5
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	7%	5%	4%	5%	11%	6%	0%	3%	17%	11%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.7	26.0		33.5	27.9		47.4	37.8		37.7	32.1	
Effective Green, g (s)	29.7	26.0		33.5	27.9		47.4	37.8		37.7	32.1	
Actuated g/C Ratio	0.31	0.27		0.35	0.29		0.50	0.40		0.40	0.34	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	351	865		332	980		630	1245		424	1033	
v/s Ratio Prot	0.00	c0.10		c0.01	0.10		c0.03	0.04		0.00	0.01	
v/s Ratio Perm	0.01			0.04			c0.09			0.03		
v/c Ratio	0.05	0.37		0.13	0.34		0.24	0.11		0.08	0.04	
Uniform Delay, d1	22.7	27.9		20.5	26.3		13.2	18.0		17.7	21.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.2	0.4		0.2	0.2		0.1	0.1	
Delay (s)	22.7	28.5		20.7	26.7		13.4	18.1		17.8	21.2	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		28.2			26.1			16.2			19.8	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	187	70	89	111	10	42	298	164	20	190	79
Future Volume (vph)	143	187	70	89	111	10	42	298	164	20	190	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.959			0.987			0.947			0.956	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1700	1764	0	1608	1803	0	1716	1685	0	1785	1663	0
Fl _t Permitted	0.673			0.526			0.581			0.398		
Satd. Flow (perm)	1204	1764	0	890	1803	0	1049	1685	0	746	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			8			47				36
Link Speed (k/h)		40			40			50				50
Link Distance (m)		172.7			321.6			117.8				433.8
Travel Time (s)		15.5			28.9			8.5				31.2
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Adj. Flow (vph)	155	203	76	97	121	11	46	324	178	22	207	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	279	0	97	132	0	46	502	0	22	293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2032 FT AM
1555 18th Avenue East



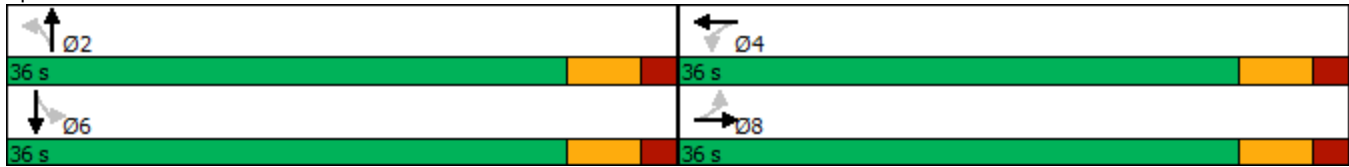
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	1	1		1	1		5	5		1		1
Act Effct Green (s)	16.9	16.9		16.9	16.9		30.4	30.4		30.4		30.4
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.51	0.51		0.51		0.51
v/c Ratio	0.45	0.53		0.38	0.26		0.09	0.57		0.06		0.34
Control Delay	21.2	19.0		20.9	15.7		10.5	13.8		10.8		10.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	21.2	19.0		20.9	15.7		10.5	13.8		10.8		10.4
LOS	C	B		C	B		B	B		B		B
Approach Delay		19.8			17.9			13.5				10.4
Approach LOS		B			B			B				B
Queue Length 50th (m)	13.5	21.8		8.3	10.1		2.2	29.2		1.1		14.1
Queue Length 95th (m)	26.5	38.9		18.5	20.2		9.6	81.2		5.8		41.6
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	615	917		455	926		536	884		381		868
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.25	0.30		0.21	0.14		0.09	0.57		0.06		0.34

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 59.4
 Natural Cycle: 75
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 15.3
 Intersection LOS: B

Intersection Capacity Utilization 72.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
 3: 16th Avenue East & 10th Street East

2032 FT AM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	143	187	70	89	111	10	42	298	164	20	190	79
Future Volume (vph)	143	187	70	89	111	10	42	298	164	20	190	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1699	1765		1607	1804		1715	1685		1781	1663	
Flt Permitted	0.67	1.00		0.53	1.00		0.58	1.00		0.40	1.00	
Satd. Flow (perm)	1203	1765		890	1804		1048	1685		745	1663	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	203	76	97	121	11	46	324	178	22	207	86
RTOR Reduction (vph)	0	23	0	0	6	0	0	23	0	0	18	0
Lane Group Flow (vph)	155	256	0	97	126	0	46	479	0	22	275	0
Confl. Peds. (#/hr)	1		1	1		1	1		5	5		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	1%	3%	11%	2%	11%	4%	5%	4%	0%	10%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	16.9	16.9		16.9	16.9		30.4	30.4		30.4	30.4	
Effective Green, g (s)	16.9	16.9		16.9	16.9		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.51	0.51		0.51	0.51	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	342	503		253	514		537	863		381	852	
v/s Ratio Prot		c0.15			0.07			c0.28				0.17
v/s Ratio Perm	0.13			0.11			0.04			0.03		
v/c Ratio	0.45	0.51		0.38	0.25		0.09	0.56		0.06	0.32	
Uniform Delay, d1	17.4	17.7		17.0	16.3		7.4	9.8		7.3	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.7		2.0	0.5		0.3	2.6		0.3	1.0	
Delay (s)	19.4	19.4		19.0	16.8		7.7	12.4		7.5	9.4	
Level of Service	B	B		B	B		A	B		A	A	
Approach Delay (s)		19.4			17.8			12.0			9.3	
Approach LOS		B			B			B			A	

Intersection Summary

HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	269	84	76	345	20	166	172	86	17	84	68
Future Volume (vph)	49	269	84	76	345	20	166	172	86	17	84	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00			1.00		1.00		
Fr _t		0.964			0.992			0.950			0.933	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3223	0	1733	3348	0	1750	3257	0	1638	2998	0
Fl _t Permitted	0.514			0.452			0.488			0.576		
Satd. Flow (perm)	945	3223	0	822	3348	0	899	3257	0	992	2998	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			4			62				76
Link Speed (k/h)		50			50			50				50
Link Distance (m)		131.3			262.3			433.8				156.6
Travel Time (s)		9.5			18.9			31.2				11.3
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Adj. Flow (vph)	54	299	93	84	383	22	184	191	96	19	93	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	392	0	84	405	0	184	287	0	19	169	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East

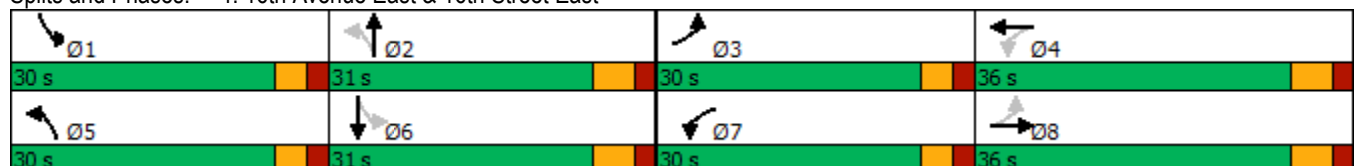


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		3			3			1			0	
Act Effct Green (s)	29.9	23.4		32.6	26.7		30.0	26.9		18.6	11.4	
Actuated g/C Ratio	0.40	0.31		0.44	0.36		0.40	0.36		0.25	0.15	
v/c Ratio	0.12	0.38		0.19	0.34		0.37	0.24		0.06	0.32	
Control Delay	13.0	21.7		13.4	20.8		18.1	15.2		16.0	19.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.0	21.7		13.4	20.8		18.1	15.2		16.0	19.4	
LOS	B	C		B	C		B	B		B	B	
Approach Delay		20.7			19.5			16.3			19.0	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	3.9	21.1		6.2	23.2		17.6	11.2		1.7	6.3	
Queue Length 95th (m)	11.3	39.6		16.0	41.5		32.4	25.2		5.6	15.4	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	714	1334		693	1416		653	1232		620	1070	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.29		0.12	0.29		0.28	0.23		0.03	0.16	

Intersection Summary





















Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	74.8
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.38
Intersection Signal Delay:	18.8
Intersection LOS:	B
Intersection Capacity Utilization:	59.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	269	84	76	345	20	166	172	86	17	84	68
Future Volume (vph)	49	269	84	76	345	20	166	172	86	17	84	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3226		1732	3348		1750	3257		1637	2996	
Flt Permitted	0.51	1.00		0.45	1.00		0.49	1.00		0.58	1.00	
Satd. Flow (perm)	946	3226		824	3348		900	3257		992	2996	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	54	299	93	84	383	22	184	191	96	19	93	76
RTOR Reduction (vph)	0	22	0	0	3	0	0	41	0	0	61	0
Lane Group Flow (vph)	54	370	0	84	402	0	184	246	0	19	108	0
Confl. Peds. (#/hr)	3		3	3		3			1	1		
Heavy Vehicles (%)	2%	8%	1%	3%	6%	0%	2%	5%	1%	9%	12%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	28.7	24.5		33.1	26.7		33.1	26.9		16.8	15.6	
Effective Green, g (s)	28.7	24.5		33.1	26.7		33.1	26.9		16.8	15.6	
Actuated g/C Ratio	0.35	0.30		0.41	0.33		0.41	0.33		0.21	0.19	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	376	975		408	1103		498	1081		215	577	
v/s Ratio Prot	0.01	0.11		c0.02	c0.12		c0.06	0.08		0.00	0.04	
v/s Ratio Perm	0.04			0.07			c0.09			0.02		
v/c Ratio	0.14	0.38		0.21	0.36		0.37	0.23		0.09	0.19	
Uniform Delay, d1	17.4	22.3		15.0	20.7		16.0	19.5		25.7	27.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.3	0.4		0.5	0.2		0.2	0.3	
Delay (s)	17.6	22.8		15.2	21.1		16.5	19.8		25.9	27.7	
Level of Service	B	C		B	C		B	B		C	C	
Approach Delay (s)		22.2			20.1			18.5			27.5	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			81.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			59.2%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	194	106	88	209	33	92	13	45	38	8	73
Future Volume (vph)	82	194	106	88	209	33	92	13	45	38	8	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.947			0.979			0.883			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3172	0	1733	1744	0	1733	1602	0	1750	1593	0
Flt Permitted	0.597			0.555			0.700			0.716		
Satd. Flow (perm)	1100	3172	0	1012	1744	0	1277	1602	0	1319	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		115			12			49			79	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Adj. Flow (vph)	89	211	115	96	227	36	100	14	49	41	9	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	326	0	96	263	0	100	63	0	41	88	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (m)	0.0	0.0		0.0	0.0		2.0	0.6		2.0	0.6	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East

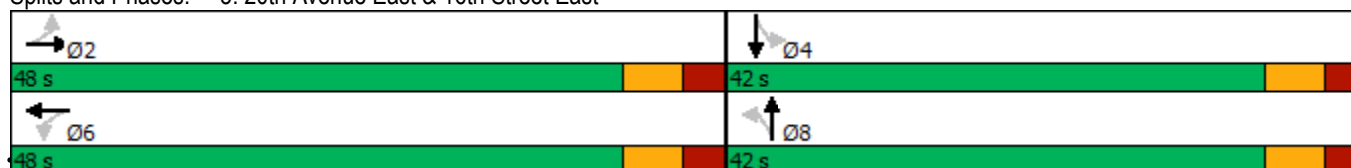


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	45.7	45.7		45.7	45.7		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.19	0.19		0.19	0.19	
v/c Ratio	0.12	0.15		0.14	0.22		0.41	0.18		0.16	0.24	
Control Delay	6.6	3.9		6.8	6.3		29.1	11.0		23.9	9.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	3.9		6.8	6.3		29.1	11.0		23.9	9.0	
LOS	A	A		A	A		C	B		C	A	
Approach Delay		4.5			6.4			22.1			13.8	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	4.0	4.8		4.3	12.0		11.0	1.4		4.3	0.9	
Queue Length 95th (m)	10.9	11.0		11.8	25.8		23.3	9.8		11.5	10.7	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	756	2215		695	1202		692	890		714	899	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.15		0.14	0.22		0.14	0.07		0.06	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 66.5
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 8.9
 Intersection LOS: A
 Intersection Capacity Utilization 95.1%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2032 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	82	194	106	88	209	33	92	13	45	38	8	73
Future Volume (vph)	82	194	106	88	209	33	92	13	45	38	8	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.88		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3172		1733	1745		1733	1603		1750	1594	
Flt Permitted	0.60	1.00		0.55	1.00		0.70	1.00		0.72	1.00	
Satd. Flow (perm)	1099	3172		1012	1745		1277	1603		1319	1594	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	211	115	96	227	36	100	14	49	41	9	79
RTOR Reduction (vph)	0	40	0	0	4	0	0	41	0	0	67	0
Lane Group Flow (vph)	89	286	0	96	259	0	100	22	0	41	21	0
Heavy Vehicles (%)	2%	8%	4%	3%	6%	2%	3%	2%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.2	44.2		44.2	44.2		10.6	10.6		10.6	10.6	
Effective Green, g (s)	44.2	44.2		44.2	44.2		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.16	0.16		0.16	0.16	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	716	2067		659	1137		199	250		206	249	
v/s Ratio Prot		0.09			c0.15			0.01			0.01	
v/s Ratio Perm	0.08			0.09			c0.08			0.03		
v/c Ratio	0.12	0.14		0.15	0.23		0.50	0.09		0.20	0.09	
Uniform Delay, d1	4.5	4.5		4.5	4.8		26.2	24.5		24.9	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.5	0.5		4.1	0.3		0.5	0.1	
Delay (s)	4.8	4.7		5.0	5.3		30.3	24.8		25.4	24.6	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		4.7			5.2			28.2			24.9	
Approach LOS		A			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.28	B
Actuated Cycle Length (s)	67.8	Sum of lost time (s)
Intersection Capacity Utilization	95.1%	13.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		F

Lanes, Volumes, Timings
6: 20th Avenue East & 10th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	11	4	21	26	6
Future Volume (vph)	14	11	4	21	26	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.940			0.973		
Flt Protected	0.973			0.993		
Satd. Flow (prot)	1685	0	0	1829	1792	0
Flt Permitted	0.973			0.993		
Satd. Flow (perm)	1685	0	0	1829	1792	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	80.6			530.3	63.1	
Travel Time (s)	5.8			38.2	4.5	
Confl. Peds. (#/hr)				25		25
Confl. Bikes (#/hr)	5					5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	12	4	23	28	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	0	27	35	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
6: 20th Avenue East & 10th Street East

2032 FT AM
1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	11	4	21	26	6
Future Volume (Veh/h)	14	11	4	21	26	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	12	4	23	28	7
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						322
pX, platoon unblocked						
vC, conflicting volume	88	56	60			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	56	60			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	889	985	1506			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	27	27	35			
Volume Left	15	4	0			
Volume Right	12	0	7			
cSH	929	1506	1700			
Volume to Capacity	0.03	0.00	0.02			
Queue Length 95th (m)	0.7	0.1	0.0			
Control Delay (s)	9.0	1.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.0	1.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

2032 FT AM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	122	12	6	202	17	28	10	22	7	6	127
Future Volume (vph)	61	122	12	6	202	17	28	10	22	7	6	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.987			0.989			0.950			0.878	
Fl _t Protected	0.950			0.950				0.977			0.997	
Satd. Flow (prot)	1750	1818	0	1750	1822	0	0	1710	0	0	1612	0
Fl _t Permitted	0.950			0.950				0.977			0.997	
Satd. Flow (perm)	1750	1818	0	1750	1822	0	0	1710	0	0	1612	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			530.3	
Travel Time (s)		15.3			13.4			5.2			38.2	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	133	13	7	220	18	30	11	24	8	7	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	146	0	7	238	0	0	65	0	0	153	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2032 FT AM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	122	12	6	202	17	28	10	22	7	6	127
Future Volume (Veh/h)	61	122	12	6	202	17	28	10	22	7	6	127
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	133	13	7	220	18	30	11	24	8	7	138
Pedestrians		25			25			25			25	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	263			171			697	574	190	588	571	279
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			171			697	574	190	588	571	279
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			88	97	97	98	98	81
cM capacity (veh/h)	1270			1372			249	386	811	351	387	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	66	146	7	238	65	153						
Volume Left	66	0	7	0	30	8						
Volume Right	0	13	0	18	24	138						
cSH	1270	1700	1372	1700	364	660						
Volume to Capacity	0.05	0.09	0.01	0.14	0.18	0.23						
Queue Length 95th (m)	1.2	0.0	0.1	0.0	4.9	6.8						
Control Delay (s)	8.0	0.0	7.6	0.0	17.0	12.1						
Lane LOS	A		A		C	B						
Approach Delay (s)	2.5		0.2		17.0	12.1						
Approach LOS					C	B						
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			41.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
 8: Site Access #1 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	21	29	2	63	53	4
Future Volume (vph)	21	29	2	63	53	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.922				0.990	
Flt Protected				0.999	0.956	
Satd. Flow (prot)	1698	0	0	1840	1743	0
Flt Permitted				0.999	0.956	
Satd. Flow (perm)	1698	0	0	1840	1743	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	79.7			134.3	72.4	
Travel Time (s)	5.7			9.7	6.5	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	24	33	2	72	61	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	0	0	74	66	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.4% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 8: Site Access #1 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	21	29	2	63	53	4
Future Volume (Veh/h)	21	29	2	63	53	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	24	33	2	72	61	5
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	342					
pX, platoon unblocked						
vC, conflicting volume			82	142		66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			82	142		66
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			100	93		99
cM capacity (veh/h)			1479	830		974
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	57	74	66			
Volume Left	0	2	61			
Volume Right	33	0	5			
cSH	1700	1479	839			
Volume to Capacity	0.03	0.00	0.08			
Queue Length 95th (m)	0.0	0.0	1.9			
Control Delay (s)	0.0	0.2	9.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.2	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			19.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 9: Site Access #2 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	5	5	55	11	11
Future Volume (vph)	20	5	5	55	11	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.972				0.932	
Flt Protected				0.996	0.976	
Satd. Flow (prot)	1790	0	0	1835	1676	0
Flt Permitted				0.996	0.976	
Satd. Flow (perm)	1790	0	0	1835	1676	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	134.3			89.9	71.8	
Travel Time (s)	9.7			6.5	6.5	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	23	6	6	63	13	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	29	0	0	69	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 9: Site Access #2 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	20	5	5	55	11	11
Future Volume (Veh/h)	20	5	5	55	11	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	23	6	6	63	13	13
Pedestrians					25	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		126	51
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		126	51
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1514		844	992
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	29	69	26			
Volume Left	0	6	13			
Volume Right	6	0	13			
cSH	1700	1514	912			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (m)	0.0	0.1	0.7			
Control Delay (s)	0.0	0.7	9.1			
Lane LOS			A			
Approach Delay (s)	0.0	0.7	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 10: Site Access #3 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	22	8	2	32	28	7
Future Volume (vph)	22	8	2	32	28	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.964					0.973
Flt Protected				0.997	0.962	
Satd. Flow (prot)	1776	0	0	1837	1724	0
Flt Permitted				0.997	0.962	
Satd. Flow (perm)	1776	0	0	1837	1724	0
Link Speed (k/h)	50					40
Link Distance (m)	89.9					79.7
Travel Time (s)	6.5					7.2
Confl. Peds. (#/hr)	25		25			
Confl. Bikes (#/hr)	5			5		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	25	9	2	37	32	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	0	39	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0					3.5
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	3.0					3.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	15		25	25		15
Sign Control	Free				Free	Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 10: Site Access #3 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	22	8	2	32	28	7
Future Volume (Veh/h)	22	8	2	32	28	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	25	9	2	37	32	8
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			59		96	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			59		96	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	99
cM capacity (veh/h)			1507		881	988
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	34	39	40			
Volume Left	0	2	32			
Volume Right	9	0	8			
cSH	1700	1507	900			
Volume to Capacity	0.02	0.00	0.04			
Queue Length 95th (m)	0.0	0.0	1.1			
Control Delay (s)	0.0	0.4	9.2			
Lane LOS			A			
Approach Delay (s)	0.0	0.4	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 11: Site Access #4 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (vph)	22	7	1	9	25	4
Future Volume (vph)	22	7	1	9	25	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.967				0.980	
Flt Protected				0.995	0.959	
Satd. Flow (prot)	1781	0	0	1833	1731	0
Flt Permitted				0.995	0.959	
Satd. Flow (perm)	1781	0	0	1833	1731	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	66.9			80.6	88.8	
Travel Time (s)	4.8			5.8	8.0	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	25	8	1	10	29	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	33	0	0	11	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Site Access #4 & 10th Street East

2032 FT AM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	22	7	1	9	25	4
Future Volume (Veh/h)	22	7	1	9	25	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	25	8	1	10	29	5
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			58		66	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		66	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1509		916	989
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	33	11	34			
Volume Left	0	1	29			
Volume Right	8	0	5			
cSH	1700	1509	926			
Volume to Capacity	0.02	0.00	0.04			
Queue Length 95th (m)	0.0	0.0	0.9			
Control Delay (s)	0.0	0.7	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.7	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FT PM
 12-01-2022



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	390	186	159	27	42	293
Future Volume (vph)	390	186	159	27	42	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0			0.0
Storage Lanes	1	1	0			0
Taper Length (m)	15.0		15.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.882	
Flt Protected	0.950			0.959		
Satd. Flow (prot)	1750	1566	0	1767	1625	0
Flt Permitted	0.950			0.959		
Satd. Flow (perm)	1750	1566	0	1767	1625	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)	25	25	25			25
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	419	200	171	29	45	315
Shared Lane Traffic (%)						
Lane Group Flow (vph)	419	200	0	200	360	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	64.2%
ICU Level of Service	C
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷		↶	↷	
Traffic Vol, veh/h	390	186	159	27	42	293
Future Vol, veh/h	390	186	159	27	42	293
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	419	200	171	29	45	315
Number of Lanes	1	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	22.6	12.8	14.7
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1
Vol Left, %	85%	100%	0%	0%
Vol Thru, %	15%	0%	0%	13%
Vol Right, %	0%	0%	100%	87%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	186	390	186	335
LT Vol	159	390	0	0
Through Vol	27	0	0	42
RT Vol	0	0	186	293
Lane Flow Rate	200	419	200	360
Geometry Grp	2	7	7	2
Degree of Util (X)	0.352	0.771	0.3	0.542
Departure Headway (Hd)	6.344	6.623	5.407	5.412
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	566	545	664	663
Service Time	4.403	4.365	3.149	3.463
HCM Lane V/C Ratio	0.353	0.769	0.301	0.543
HCM Control Delay	12.8	28.3	10.5	14.7
HCM Lane LOS	B	D	B	B
HCM 95th-tile Q	1.6	7	1.3	3.3

Lanes, Volumes, Timings
 1: 10th Street East & 18th Avenue East

2032 FT PM
 1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	390	186	159	27	42	293
Future Volume (vph)	390	186	159	27	42	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.956			0.882		
Flt Protected	0.967			0.959		
Satd. Flow (prot)	1703	0	0	1767	1625	0
Flt Permitted	0.967			0.959		
Satd. Flow (perm)	1703	0	0	1767	1625	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	321.6			79.7	74.7	
Travel Time (s)	28.9			5.7	5.4	
Confl. Peds. (#/hr)			25			25
Confl. Bikes (#/hr)	5					5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	419	200	171	29	45	315
Shared Lane Traffic (%)						
Lane Group Flow (vph)	619	0	0	200	360	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	75.5%
ICU Level of Service	D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 1: 10th Street East & 18th Avenue East

2032 FT PM
 1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	390	186	159	27	42	293
Future Volume (Veh/h)	390	186	159	27	42	293
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	419	200	171	29	45	315
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						262
pX, platoon unblocked						
vC, conflicting volume	598	228	385			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	598	228	385			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	75	85			
cM capacity (veh/h)	386	792	1145			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	619	200	360			
Volume Left	419	171	0			
Volume Right	200	0	315			
cSH	462	1145	1700			
Volume to Capacity	1.34	0.15	0.21			
Queue Length 95th (m)	212.0	4.0	0.0			
Control Delay (s)	191.4	7.6	0.0			
Lane LOS	F	A				
Approach Delay (s)	191.4	7.6	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			101.8			
Intersection Capacity Utilization			75.5%	ICU Level of Service	D	
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↕		↘	↕		↘	↕		↘	↕	
Traffic Volume (vph)	20	396	202	72	394	35	226	64	110	56	64	49
Future Volume (vph)	20	396	202	72	394	35	226	64	110	56	64	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	30.0		25.0	40.0		0.0	25.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	15.0			90.0			30.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	0.99		0.99	0.99	
Fr _t		0.949			0.988			0.905			0.935	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3329	0	1653	3357	0	1767	3063	0	1785	3317	0
Fl _t Permitted	0.477			0.221			0.599			0.635		
Satd. Flow (perm)	843	3329	0	384	3357	0	1113	3063	0	1187	3317	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			7			117			52	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		262.3			428.7			187.8			159.1	
Travel Time (s)		18.9			30.9			13.5			11.5	
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Adj. Flow (vph)	21	421	215	77	419	37	240	68	117	60	68	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	636	0	77	456	0	240	185	0	60	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane		Yes										
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
2: 18th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East

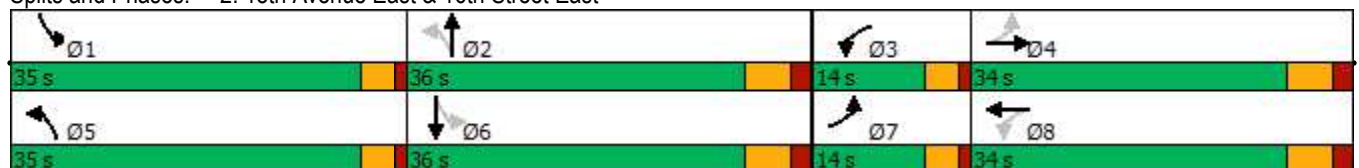


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	14.0	32.0		14.0	32.0		14.5	32.0		14.5	32.0	
Total Split (s)	14.0	34.0		14.0	34.0		35.0	36.0		35.0	36.0	
Total Split (%)	11.8%	28.6%		11.8%	28.6%		29.4%	30.3%		29.4%	30.3%	
Maximum Green (s)	10.0	28.0		10.0	28.0		31.0	30.0		31.0	30.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		15.0			15.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		0			1			5			4	
Act Effct Green (s)	36.1	26.4		37.7	32.0		50.3	38.0		42.4	30.3	
Actuated g/C Ratio	0.37	0.27		0.38	0.33		0.51	0.39		0.43	0.31	
v/c Ratio	0.05	0.67		0.28	0.41		0.36	0.15		0.10	0.11	
Control Delay	18.9	33.3		21.6	28.5		15.8	9.5		14.2	16.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9	33.3		21.6	28.5		15.8	9.5		14.2	16.7	
LOS	B	C		C	C		B	A		B	B	
Approach Delay		32.9			27.5			13.1			15.9	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	2.4	52.3		8.9	31.2		25.5	4.5		5.7	4.8	
Queue Length 95th (m)	7.4	77.0		19.4	58.7		42.1	12.1		12.5	12.6	
Internal Link Dist (m)		238.3			404.7			163.8			135.1	
Turn Bay Length (m)	35.0			30.0			40.0			25.0		
Base Capacity (vph)	397	1010		278	1126		785	1257		805	1061	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.63		0.28	0.40		0.31	0.15		0.07	0.11	

Intersection Summary

Area Type: Other
 Cycle Length: 119
 Actuated Cycle Length: 98
 Natural Cycle: 95
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 24.9
 Intersection Capacity Utilization 79.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: 18th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
2: 18th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	20	396	202	72	394	35	226	64	110	56	64	49
Future Volume (vph)	20	396	202	72	394	35	226	64	110	56	64	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.91		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1682	3330		1653	3356		1766	3066		1780	3318	
Flt Permitted	0.48	1.00		0.22	1.00		0.60	1.00		0.64	1.00	
Satd. Flow (perm)	845	3330		384	3356		1114	3066		1190	3318	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	421	215	77	419	37	240	68	117	60	68	52
RTOR Reduction (vph)	0	51	0	0	5	0	0	73	0	0	36	0
Lane Group Flow (vph)	21	585	0	77	451	0	240	112	0	60	84	0
Confl. Peds. (#/hr)	4					4	1		5	5		1
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	2%	0%	8%	5%	4%	1%	8%	2%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.7	28.0		39.7	32.0		49.7	38.0		39.0	31.3	
Effective Green, g (s)	31.7	28.0		39.7	32.0		49.7	38.0		39.0	31.3	
Actuated g/C Ratio	0.31	0.28		0.39	0.32		0.49	0.37		0.38	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	294	919		246	1059		638	1148		502	1024	
v/s Ratio Prot	0.00	c0.18		c0.02	0.13		c0.05	0.04		0.01	0.03	
v/s Ratio Perm	0.02			0.10			c0.13			0.04		
v/c Ratio	0.07	0.64		0.31	0.43		0.38	0.10		0.12	0.08	
Uniform Delay, d1	24.3	32.2		20.9	27.4		15.3	20.6		19.9	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.0		0.7	0.6		0.4	0.2		0.1	0.2	
Delay (s)	24.4	34.2		21.6	28.0		15.7	20.7		20.0	25.0	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		33.9			27.1			17.9			23.3	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	101.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c	Critical Lane Group		

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	328	47	152	287	22	94	260	227	24	235	127
Future Volume (vph)	111	328	47	152	287	22	94	260	227	24	235	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		0.0	35.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	40.0			25.0			35.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00			0.99		1.00	0.99	
Frt		0.981			0.989			0.930			0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	1821	0	1750	1820	0	1785	1675	0	1785	1738	0
Flt Permitted	0.465			0.371			0.475			0.351		
Satd. Flow (perm)	809	1821	0	680	1820	0	892	1675	0	658	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			7			75				46
Link Speed (k/h)		40			40			50				50
Link Distance (m)		172.7			321.6			117.8				433.8
Travel Time (s)		15.5			28.9			8.5				31.2
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Adj. Flow (vph)	119	353	51	163	309	24	101	280	244	26	253	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	404	0	163	333	0	101	524	0	26	390	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	2	2		2	2		0	0		0	0	
Detector Template												
Leading Detector (m)	12.0	12.0		12.0	12.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	2.0		2.0	2.0		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	10.0	10.0		10.0	10.0							
Detector 2 Size(m)	2.0	2.0		2.0	2.0							
Detector 2 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex							
Detector 2 Channel												

Lanes, Volumes, Timings
3: 16th Avenue East & 10th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0	0.0		0.0	0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2				6
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		30.0	30.0		30.0		30.0
Minimum Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0		36.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0		30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Recall Mode	None	None		None	None		Max	Max		Max		Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0		10.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0		20.0
Pedestrian Calls (#/hr)	7	7		0	0		4	4		0		0
Act Effct Green (s)	21.3	21.3		21.3	21.3		30.3	30.3		30.3		30.3
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.48	0.48		0.48		0.48
v/c Ratio	0.44	0.65		0.72	0.54		0.24	0.63		0.08		0.46
Control Delay	21.6	22.6		36.9	19.9		14.0	16.1		12.5		13.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	21.6	22.6		36.9	19.9		14.0	16.1		12.5		13.3
LOS	C	C		D	B		B	B		B		B
Approach Delay		22.4			25.5			15.8				13.3
Approach LOS		C			C			B				B
Queue Length 50th (m)	10.6	38.1		16.3	30.3		6.5	35.6		1.6		24.4
Queue Length 95th (m)	23.1	62.3		36.4	50.2		19.1	82.5		6.6		56.5
Internal Link Dist (m)		148.7			297.6			93.8				409.8
Turn Bay Length (m)	40.0			35.0			30.0					
Base Capacity (vph)	384	872		323	869		423	835		312		850
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.31	0.46		0.50	0.38		0.24	0.63		0.08		0.46

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 63.7

Natural Cycle: 75

Control Type: Semi Act-Uncoord

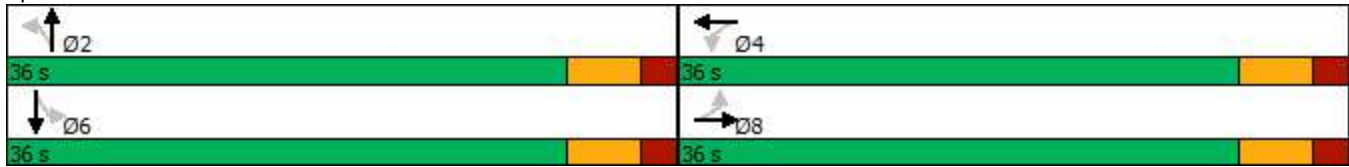
Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.3

Intersection LOS: B

Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 3: 16th Avenue East & 10th Street East



HCM Signalized Intersection Capacity Analysis
 3: 16th Avenue East & 10th Street East

2032 FT PM
 1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	328	47	152	287	22	94	260	227	24	235	127
Future Volume (vph)	111	328	47	152	287	22	94	260	227	24	235	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1821		1743	1820		1785	1675		1782	1738	
Flt Permitted	0.47	1.00		0.37	1.00		0.48	1.00		0.35	1.00	
Satd. Flow (perm)	809	1821		681	1820		893	1675		658	1738	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	119	353	51	163	309	24	101	280	244	26	253	137
RTOR Reduction (vph)	0	8	0	0	5	0	0	39	0	0	24	0
Lane Group Flow (vph)	119	396	0	163	328	0	101	485	0	26	366	0
Confl. Peds. (#/hr)			7	7					4	4		
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	8%	1%	0%	2%	1%	15%	0%	5%	1%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.3	21.3		21.3	21.3		30.3	30.3		30.3	30.3	
Effective Green, g (s)	21.3	21.3		21.3	21.3		30.3	30.3		30.3	30.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	270	609		228	609		425	797		313	828	
v/s Ratio Prot		0.22			0.18			c0.29			0.21	
v/s Ratio Perm	0.15			c0.24			0.11			0.04		
v/c Ratio	0.44	0.65		0.71	0.54		0.24	0.61		0.08	0.44	
Uniform Delay, d1	16.5	18.0		18.5	17.2		9.8	12.3		9.1	11.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	3.3		12.5	1.7		1.3	3.4		0.5	1.7	
Delay (s)	18.9	21.3		30.9	18.8		11.1	15.7		9.6	12.8	
Level of Service	B	C		C	B		B	B		A	B	
Approach Delay (s)		20.8			22.8			15.0			12.6	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	472	97	89	530	16	190	133	125	39	161	104
Future Volume (vph)	59	472	97	89	530	16	190	133	125	39	161	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	40.0		0.0	40.0		0.0	30.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	35.0			15.0			15.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Fr _t		0.974			0.996			0.927			0.941	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1653	3406	0	1785	3401	0	1785	3051	0	1638	3224	0
Fl _t Permitted	0.353			0.305			0.444			0.584		
Satd. Flow (perm)	613	3406	0	572	3401	0	833	3051	0	1005	3224	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			132			104	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.3			262.3			433.8			156.6	
Travel Time (s)		9.5			18.9			31.2			11.3	
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	9%	2%	6%
Adj. Flow (vph)	62	497	102	94	558	17	200	140	132	41	169	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	599	0	94	575	0	200	272	0	41	278	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	0	0		0	0		0	0		0	0	
Detector Template												
Leading Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	23.0		5.0	23.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	32.0		10.0	32.0	
Total Split (s)	30.0	36.0		30.0	36.0		30.0	31.0		30.0	31.0	
Total Split (%)	23.6%	28.3%		23.6%	28.3%		23.6%	24.4%		23.6%	24.4%	
Maximum Green (s)	25.0	30.0		25.0	30.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	

Lanes, Volumes, Timings
4: 16th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East

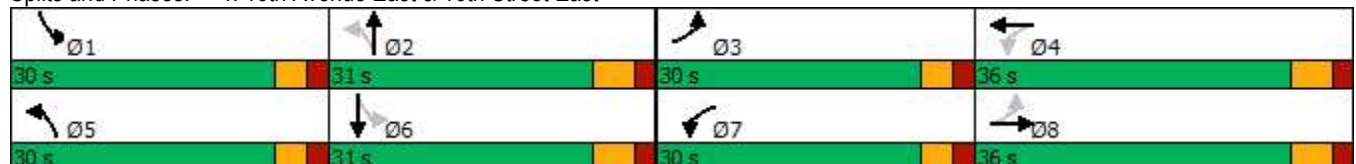


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)		13.0			13.0			15.0			15.0	
Flash Dont Walk (s)		10.0			10.0			10.0			10.0	
Pedestrian Calls (#/hr)		2			5			2			2	
Act Effct Green (s)	32.0	25.1		33.9	26.1		33.8	25.9		21.8	13.8	
Actuated g/C Ratio	0.40	0.31		0.42	0.32		0.42	0.32		0.27	0.17	
v/c Ratio	0.18	0.56		0.26	0.52		0.39	0.26		0.13	0.44	
Control Delay	15.8	27.4		16.1	26.6		18.8	13.1		17.3	22.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	27.4		16.1	26.6		18.8	13.1		17.3	22.0	
LOS	B	C		B	C		B	B		B	C	
Approach Delay		26.3			25.1			15.5			21.4	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	4.8	38.7		7.4	37.1		19.7	8.8		3.7	12.4	
Queue Length 95th (m)	15.2	74.4		21.1	71.3		39.6	20.4		10.6	27.2	
Internal Link Dist (m)		107.3			238.3			409.8			132.6	
Turn Bay Length (m)	25.0			40.0			40.0			30.0		
Base Capacity (vph)	613	1320		650	1319		652	1144		622	1103	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.45		0.14	0.44		0.31	0.24		0.07	0.25	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	81
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	22.8
Intersection LOS:	C
Intersection Capacity Utilization:	62.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: 16th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
4: 16th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	59	472	97	89	530	16	190	133	125	39	161	104
Future Volume (vph)	59	472	97	89	530	16	190	133	125	39	161	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3408		1785	3400		1784	3053		1636	3226	
Flt Permitted	0.35	1.00		0.31	1.00		0.44	1.00		0.58	1.00	
Satd. Flow (perm)	613	3408		573	3400		834	3053		1006	3226	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	497	102	94	558	17	200	140	132	41	169	109
RTOR Reduction (vph)	0	13	0	0	1	0	0	91	0	0	84	0
Lane Group Flow (vph)	62	586	0	94	574	0	200	181	0	41	194	0
Confl. Peds. (#/hr)	5		2	2		5	2		2	2		2
Heavy Vehicles (%)	8%	2%	1%	0%	4%	20%	0%	14%	1%	9%	2%	6%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	31.1	25.2		32.9	26.1		35.0	25.9		20.3	16.2	
Effective Green, g (s)	31.1	25.2		32.9	26.1		35.0	25.9		20.3	16.2	
Actuated g/C Ratio	0.37	0.30		0.39	0.31		0.42	0.31		0.24	0.19	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	299	1022		322	1056		503	941		273	622	
v/s Ratio Prot	0.01	c0.17		c0.02	0.17		c0.07	0.06		0.01	0.06	
v/s Ratio Perm	0.06			0.09			c0.10			0.03		
v/c Ratio	0.21	0.57		0.29	0.54		0.40	0.19		0.15	0.31	
Uniform Delay, d1	17.5	24.9		16.8	24.0		16.3	21.4		24.8	29.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.2		0.5	1.0		0.5	0.2		0.3	0.6	
Delay (s)	17.8	26.1		17.3	25.0		16.8	21.6		25.0	29.7	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		25.3			23.9			19.5			29.1	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.2				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			84.0			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			62.1%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	288	193	108	203	41	245	9	106	47	11	91
Future Volume (vph)	102	288	193	108	203	41	245	9	106	47	11	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	45.0		0.0	0.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	100.0			85.0			15.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98				0.99					0.98	0.95	
Fr _t		0.940			0.975			0.862			0.866	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1750	3290	0	1767	1697	0	1767	1602	0	1750	1515	0
Fl _t Permitted	0.605			0.473			0.690			0.682		
Satd. Flow (perm)	1093	3290	0	880	1697	0	1284	1602	0	1236	1515	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		197			15			108			93	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		428.7			228.1			258.8			125.4	
Travel Time (s)		25.7			13.7			18.6			9.0	
Confl. Peds. (#/hr)	25					25				25		25
Confl. Bikes (#/hr)						5						5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Adj. Flow (vph)	104	294	197	110	207	42	250	9	108	48	11	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	491	0	110	249	0	250	117	0	48	104	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
5: 20th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



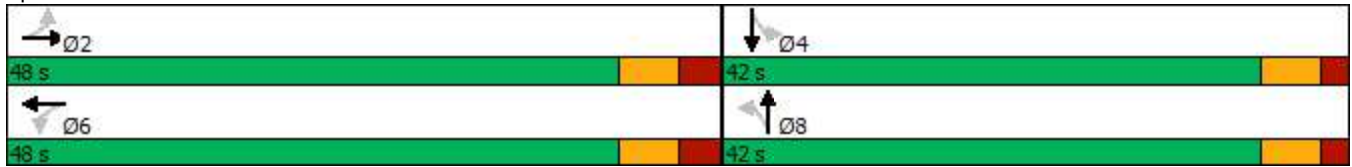
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	40.0	40.0		40.0	40.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	47.0	47.0		47.0	47.0		41.0	41.0		41.0	41.0	
Total Split (s)	48.0	48.0		48.0	48.0		42.0	42.0		42.0	42.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	41.0	41.0		41.0	41.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	17.0	17.0		17.0	17.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0		22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	41.3	41.3		41.3	41.3		21.7	21.7		21.7	21.7	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.29	0.29		0.29	0.29	
v/c Ratio	0.18	0.26		0.23	0.27		0.68	0.22		0.14	0.21	
Control Delay	11.7	6.6		12.7	11.1		33.9	5.9		20.1	6.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.7	6.6		12.7	11.1		33.9	5.9		20.1	6.6	
LOS	B	A		B	B		C	A		C	A	
Approach Delay		7.5			11.6			25.0			10.8	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	6.8	10.1		7.5	16.2		31.5	0.9		5.1	1.1	
Queue Length 95th (m)	19.1	23.1		21.3	37.9		54.0	10.9		12.2	10.6	
Internal Link Dist (m)		404.7			204.1			234.8			101.4	
Turn Bay Length (m)	30.0			45.0						35.0		
Base Capacity (vph)	593	1875		477	928		611	820		588	770	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.26		0.23	0.27		0.41	0.14		0.08	0.14	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 76.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 13.2
 Intersection LOS: B

Intersection Capacity Utilization 103.9% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 5: 20th Avenue East & 16th Street East



HCM Signalized Intersection Capacity Analysis
5: 20th Avenue East & 16th Street East

2032 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	102	288	193	108	203	41	245	9	106	47	11	91
Future Volume (vph)	102	288	193	108	203	41	245	9	106	47	11	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.95	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1721	3289		1767	1698		1767	1601		1726	1520	
Flt Permitted	0.60	1.00		0.47	1.00		0.69	1.00		0.68	1.00	
Satd. Flow (perm)	1095	3289		879	1698		1283	1601		1238	1520	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	104	294	197	110	207	42	250	9	108	48	11	93
RTOR Reduction (vph)	0	90	0	0	7	0	0	77	0	0	66	0
Lane Group Flow (vph)	104	401	0	110	242	0	250	40	0	48	38	0
Confl. Peds. (#/hr)	25					25				25		25
Confl. Bikes (#/hr)						5						5
Heavy Vehicles (%)	2%	2%	2%	1%	8%	2%	1%	2%	1%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.3	41.3		41.3	41.3		21.7	21.7		21.7	21.7	
Effective Green, g (s)	41.3	41.3		41.3	41.3		21.7	21.7		21.7	21.7	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.29	0.29		0.29	0.29	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	595	1787		477	922		366	457		353	434	
v/s Ratio Prot		0.12			c0.14			0.02				0.02
v/s Ratio Perm	0.09			0.13			c0.19			0.04		
v/c Ratio	0.17	0.22		0.23	0.26		0.68	0.09		0.14	0.09	
Uniform Delay, d1	8.8	9.0		9.1	9.2		24.1	19.9		20.2	19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.3		1.1	0.7		6.6	0.2		0.2	0.1	
Delay (s)	9.4	9.3		10.2	9.9		30.7	20.1		20.4	20.0	
Level of Service	A	A		B	A		C	C		C	B	
Approach Delay (s)		9.3			10.0			27.3			20.1	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: 20th Avenue East & 10th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	137	6	9	92	99	133
Future Volume (vph)	137	6	9	92	99	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.994				0.923	
Flt Protected	0.954			0.996		
Satd. Flow (prot)	1747	0	0	1835	1700	0
Flt Permitted	0.954			0.996		
Satd. Flow (perm)	1747	0	0	1835	1700	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	83.7			530.8	62.6	
Travel Time (s)	6.0			38.2	4.5	
Confl. Peds. (#/hr)			25			25
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	140	6	9	94	101	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	146	0	0	103	237	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
6: 20th Avenue East & 10th Street East

2032 FT PM
1555 18th Avenue East



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	137	6	9	92	99	133
Future Volume (Veh/h)	137	6	9	92	99	133
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	140	6	9	94	101	136
Pedestrians	25					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						321
pX, platoon unblocked						
vC, conflicting volume	306	194	262			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306	194	262			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	99	99			
cM capacity (veh/h)	665	827	1271			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	146	103	237			
Volume Left	140	9	0			
Volume Right	6	0	136			
cSH	670	1271	1700			
Volume to Capacity	0.22	0.01	0.14			
Queue Length 95th (m)	6.3	0.2	0.0			
Control Delay (s)	11.9	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.9	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			29.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: 20th Avenue East & 8th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	210	45	22	131	19	15	10	12	23	10	156
Future Volume (vph)	187	210	45	22	131	19	15	10	12	23	10	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	15.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.973			0.981			0.956			0.888	
Fl _t Protected	0.950			0.950				0.980			0.994	
Satd. Flow (prot)	1750	1792	0	1750	1807	0	0	1726	0	0	1626	0
Fl _t Permitted	0.950			0.950				0.980			0.994	
Satd. Flow (perm)	1750	1792	0	1750	1807	0	0	1726	0	0	1626	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		212.1			186.6			72.7			530.8	
Travel Time (s)		15.3			13.4			5.2			38.2	
Confl. Peds. (#/hr)	25		25	25		25	25		25	25		25
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	214	46	22	134	19	15	10	12	23	10	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	260	0	22	153	0	0	37	0	0	192	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 45.3% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
7: 20th Avenue East & 8th Street East

2032 FT PM
1555 18th Avenue East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	187	210	45	22	131	19	15	10	12	23	10	156	
Future Volume (Veh/h)	187	210	45	22	131	19	15	10	12	23	10	156	
Sign Control	Free		Free		Free		Stop		Stop		Stop		
Grade	0%		0%		0%		0%		0%		0%		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Hourly flow rate (vph)	191	214	46	22	134	19	15	10	12	23	10	159	
Pedestrians	25		25		25		25		25		25		
Lane Width (m)	3.5		3.5		3.5		3.5		3.5		3.5		
Walking Speed (m/s)	1.0		1.0		1.0		1.0		1.0		1.0		
Percent Blockage	2		2		2		2		2		2		
Right turn flare (veh)													
Median type	None				None								
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	178			285			1011	866	287	850	880	194	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	178			285			1011	866	287	850	880	194	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	86			98			89	96	98	89	96	80	
cM capacity (veh/h)	1364			1246			137	234	716	216	230	807	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	191	260	22	153	37	192							
Volume Left	191	0	22	0	15	23							
Volume Right	0	46	0	19	12	159							
cSH	1364	1700	1246	1700	219	553							
Volume to Capacity	0.14	0.15	0.02	0.09	0.17	0.35							
Queue Length 95th (m)	3.7	0.0	0.4	0.0	4.5	11.7							
Control Delay (s)	8.1	0.0	7.9	0.0	24.7	14.9							
Lane LOS	A		A		C	B							
Approach Delay (s)	3.4		1.0		24.7	14.9							
Approach LOS					C	B							
Intersection Summary													
Average Delay			6.4										
Intersection Capacity Utilization			45.3%		ICU Level of Service			A					
Analysis Period (min)			15										

Lanes, Volumes, Timings
8: Site Access #1 & 10th Street East

2032 FT PM
1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	180	47	3	153	33	2
Future Volume (vph)	180	47	3	153	33	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.972				0.993	
Flt Protected				0.999	0.955	
Satd. Flow (prot)	1790	0	0	1840	1747	0
Flt Permitted				0.999	0.955	
Satd. Flow (perm)	1790	0	0	1840	1747	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	79.7			134.3	72.4	
Travel Time (s)	5.7			9.7	6.5	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	194	51	3	165	35	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	168	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 8: Site Access #1 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	180	47	3	153	33	2
Future Volume (Veh/h)	180	47	3	153	33	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	194	51	3	165	35	2
Pedestrians						25
Lane Width (m)						3.5
Walking Speed (m/s)						1.0
Percent Blockage						2
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	342					
pX, platoon unblocked						
vC, conflicting volume			270	416		244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			270	416		244
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			100	94		100
cM capacity (veh/h)			1262	578		775
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	245	168	37			
Volume Left	0	3	35			
Volume Right	51	0	2			
cSH	1700	1262	586			
Volume to Capacity	0.14	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.2	11.6			
Lane LOS			A			B
Approach Delay (s)	0.0	0.2	11.6			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			23.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 9: Site Access #2 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (vph)	173	9	9	150	6	6
Future Volume (vph)	173	9	9	150	6	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993				0.932	
Flt Protected				0.997	0.976	
Satd. Flow (prot)	1829	0	0	1837	1676	0
Flt Permitted				0.997	0.976	
Satd. Flow (perm)	1829	0	0	1837	1676	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	134.3			89.9	71.8	
Travel Time (s)	9.7			6.5	6.5	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	186	10	10	161	6	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	196	0	0	171	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 9: Site Access #2 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Traffic Volume (veh/h)	173	9	9	150	6	6
Future Volume (Veh/h)	173	9	9	150	6	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	186	10	10	161	6	6
Pedestrians					25	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			221		397	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			221		397	216
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1315		589	804
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	196	171	12			
Volume Left	0	10	6			
Volume Right	10	0	6			
cSH	1700	1315	680			
Volume to Capacity	0.12	0.01	0.02			
Queue Length 95th (m)	0.0	0.2	0.4			
Control Delay (s)	0.0	0.5	10.4			
Lane LOS			A			B
Approach Delay (s)	0.0	0.5	10.4			
Approach LOS				B		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			25.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 10: Site Access #3 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (vph)	158	22	6	145	14	4
Future Volume (vph)	158	22	6	145	14	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983				0.972	
Flt Protected				0.998	0.962	
Satd. Flow (prot)	1811	0	0	1838	1722	0
Flt Permitted				0.998	0.962	
Satd. Flow (perm)	1811	0	0	1838	1722	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	89.9			66.9	80.5	
Travel Time (s)	6.5			4.8	7.2	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	170	24	6	156	15	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	0	0	162	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.5%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 10: Site Access #3 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Traffic Volume (veh/h)	158	22	6	145	14	4
Future Volume (Veh/h)	158	22	6	145	14	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	170	24	6	156	15	4
Pedestrians					25	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			219		375	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			219		375	207
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1318		608	813
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	194	162	19			
Volume Left	0	6	15			
Volume Right	24	0	4			
cSH	1700	1318	642			
Volume to Capacity	0.11	0.00	0.03			
Queue Length 95th (m)	0.0	0.1	0.7			
Control Delay (s)	0.0	0.3	10.8			
Lane LOS			A			B
Approach Delay (s)	0.0	0.3	10.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			22.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
 11: Site Access #4 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	141	20	3	138	12	2
Future Volume (vph)	141	20	3	138	12	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.983				0.982	
Flt Protected				0.999	0.958	
Satd. Flow (prot)	1811	0	0	1840	1733	0
Flt Permitted				0.999	0.958	
Satd. Flow (perm)	1811	0	0	1840	1733	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	66.9			83.7	80.5	
Travel Time (s)	4.8			6.0	7.2	
Confl. Peds. (#/hr)		25	25			
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	152	22	3	148	13	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	174	0	0	151	15	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: Site Access #4 & 10th Street East

2032 FT PM
 1555 18th Avenue East



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Traffic Volume (veh/h)	141	20	3	138	12	2
Future Volume (Veh/h)	141	20	3	138	12	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	152	22	3	148	13	2
Pedestrians					25	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			199		342	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			199		342	188
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1340		637	833
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	174	151	15			
Volume Left	0	3	13			
Volume Right	22	0	2			
cSH	1700	1340	657			
Volume to Capacity	0.10	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.5			
Control Delay (s)	0.0	0.2	10.6			
Lane LOS			A			B
Approach Delay (s)	0.0	0.2	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			21.4%	ICU Level of Service	A	
Analysis Period (min)			15			