

159TH & LAGRANGE RETAIL

Traffic Impact Study

Orland Park, Illinois
November 2025

Kimley»Horn

Table of Contents

Executive Summary 1

1. Introduction 2

2. Existing Conditions 4

3. Development Characteristics 15

4. Future Conditions (2033)..... 23

5. Future Conditions (2050)..... 40

6. Recommendations & Conclusions 53

Appendix..... 55

LIST OF TABLES

Table 2.1 Level of Service Grading Descriptions	8
Table 2.2 Level of Service Grading Criteria	8
Table 2.3 Existing (2025) Levels of Service	10
Table 2.4 Existing (2025) 95 th Percentile Queue Lengths	12
Table 3.1 ITE Trip Generation Data	16
Table 3.2 Site-Generated Traffic Projections.....	16
Table 3.3. Directional Distribution	17
Table 4.1 CMAP Projected Growth Rates	23
Table 4.2. Future (2033) No-Build Signal Warrant Summary – LaGrange Road / 161 st Street	28
Table 4.3. Future (2033) Build Signal Warrant Summary – LaGrange Road / 161 st Street	29
Table 4.4. Future (2033) No-Build Levels of Service	31
Table 4.5 No-Build (2033) 95 th Percentile Queue Lengths	33
Table 4.6. Future (2033) Build Levels of Service	35
Table 4.7 Build (2033) 95 th Percentile Queue Lengths	37
Table 5.1. Future (2050) No-Build Levels of Service	44
Table 5.2 No-Build (2050) 95 th Percentile Queue Lengths	46
Table 5.3. Future (2050) Build Levels of Service	48
Table 5.4 Build (2050) 95 th Percentile Queue Lengths	50

LIST OF EXHIBITS

Exhibit 1. Site Location Map	3
Exhibit 2. Existing (2025) Traffic Volumes	7
Exhibit 3. Site Trip Assignment – Primary (Site).....	18
Exhibit 4. Site Trip Assignment – Pass-by (Site).....	19
Exhibit 5. Site Trip Assignment – Primary (Outlots)	20
Exhibit 6. Site Trip Assignment – Pass-by (Outlots).....	21
Exhibit 7. Site Trip Assignment – Total	22
Exhibit 8. Future (2033) No-Build Traffic Projections	24
Exhibit 9. Future (2033) Build Traffic Projections	25
Exhibit 10. Future (2050) No-Build Traffic Projections	41
Exhibit 11. Future (2050) Build Traffic Projections	42

EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc. (Kimley-Horn) prepared a traffic impact study for a retail development proposed on the southwest quadrant of the intersection of 159th Street (US 6)/LaGrange Road (US 45) in Orland Park, Illinois. The development would include a 230,667 square-foot retail building and 45,000 square feet of retail/restaurant outlots.

Access to the site would be provided via driveways to 159th Street, LaGrange Road, and 161st Street. Per coordination with the Village of Orland Park, Ravinia Avenue will be extended east to connect to 161st Street. One right-in/right-out (RIRO) driveway to 159th Street (Access A) would primarily facilitate truck traffic outside the peak hours. One RIRO driveway to 159th Street (Access B) would align with an existing commercial driveway on the north side of 159th Street. One RIRO driveway to LaGrange Road (Access C) and three full-movement driveways to 161st Street (Access D-Access F) will also be provided.

As part of this study, the existing roadway network was analyzed to determine the current operations at the study intersections. In order to assess the potential impact on the area roadway network, site-generated trips were established and added to future background volumes. The development is anticipated to be operational in 2028, and so for purposes of this analysis traffic conditions were evaluated for Build 2033 (build-plus-five years), per Illinois Department of Transportation (IDOT) guidelines. Additionally, per input from the Village of Orland Park, Year 2050 was analyzed to assess future potential impacts.

Based on a review of future traffic conditions, IDOT *Bureau of Design and Environment (BDE) Manual* criteria for turn lanes, and *Manual on Uniform Traffic Control Devices* (MUTCD) traffic signal warrant criteria, the following improvements were included in the analysis of future conditions.

All study access driveways should include one inbound and one outbound lane and operate under minor-leg stop control. An eastbound right-turn should be provided on 159th Street at Access B. A southbound right-turn lane should be provided on LaGrange Road at Access C. A westbound right-turn lane should be provided on 161st Street at Access D.

With the Ravinia Avenue extension, dual northbound left-turn lanes and an eastbound right-turn lane should be installed at the 159th Street/Ravinia Avenue intersection. Additionally, at the intersection of LaGrange Road/161st Street, a traffic signal should be provided and is currently under design based on coordination with the Village of Orland Park. Dual northbound left-turn lanes should be installed and be incorporated in the ongoing signal design.

Additional discussion of the analysis and recommendations is presented in *Section 4 Future Conditions* of this report.

1. INTRODUCTION

Kimley-Horn prepared a traffic impact study for a retail development proposed on the southwest quadrant of the intersection of 159th Street (US 6)/LaGrange Road (US 45) in Orland Park, Illinois. The subject site is highlighted in **Exhibit 1**.

The development would include a 230,667 square-foot retail building and 45,000 square feet of retail/restaurant outlots. To accommodate the development, the existing vacant commercial building at the northeast corner of the site would be removed. Two existing right-in/right-out (RIRO) driveways would be removed: 1) 159th Street, located approximately 175 feet west of LaGrange Road (measured centerline-to-centerline); and 2) LaGrange Road, located approximately 290 feet south of 159th Street. Access to the site would be provided as summarized below. To accommodate site access, 161st Street would be extended west across the south property frontage.

- Access A – RIRO driveway located on the south side of 159th Street approximately 900 feet west of LaGrange Road to primarily facilitate trucks.
 - This access was not included in the capacity analysis as truck trips are anticipated to occur outside of the analyzed peak hours.
- Access B – RIRO driveway located on the south side of 159th Street approximately 550 feet west of LaGrange Road, aligned with the existing commercial driveway on the north side of 159th Street (North Private Drive).
- Access C – RIRO driveway located on the west side of LaGrange Road approximately 610 feet south of 159th Street.
- Access D – Full-movement driveway located on the north side of 161st Street approximately 345 feet west of LaGrange Road, aligned with the existing driveway for the mixed-use development on the south side of 161st Street (West Access).
- Access E – Full-movement driveway located on the north side of 161st Street extension, approximately 335 feet west of Access D.
- Access F – Full-movement driveway located on the north side of 161st Street extension, located approximately 435 feet west of Access E.

This report presents and documents the study methodology, summarizes data collection and development traffic characteristics, highlights the evaluation of traffic conditions on the study intersections and roadways, and identifies recommendations to address operational impacts and integrate the proposed development into the surrounding transportation system.



2. EXISTING CONDITIONS

Kimley-Horn reviewed the subject site and surrounding area to collect relevant information pertaining to site context, surrounding land uses, the adjacent street system, current traffic volumes and operating conditions, lane configurations and traffic control at nearby intersections, and other key transportation characteristics. This section of the report details information on the existing conditions.

Area Land Uses & Connectivity

Located at the southwest quadrant of the intersection of 159th Street (US 6)/LaGrange Road (US 45) in Orland Park, Illinois, the subject site is currently a mix of undeveloped land and a vacant building at the northeast corner, zoned for mixed use (COR). The immediate surrounding area includes residential and commercial development. The site is bounded by 159th Street (US 6) to the north, 161st Street to the south, LaGrange Road (US 45) to the east, and vacant land to the west.

In the site vicinity, local north-south access is provided via LaGrange Road (US 45), located immediately east of the site, with Ravinia Avenue serving as an alternative, located northwest of the site. Local east-west access is facilitated via 159th Street (US 6), located immediately north of the site. Interstate 80 (I-80), located approximately 3.5 miles south of the site, provides regional east-west access through Illinois. LaGrange Road provides a full interchange with I-80.

Existing Roadway Characteristics

159th Street (US 6) is an east-west divided roadway along the northern boundary of the site. Through the study area, two travel lanes are provided in each direction with a landscaped center median. IDOT classifies 159th Street as a Strategic Regional Arterial (SRA). The SRA system was established by IDOT to promote mobility on key routes throughout the Chicago area by applying various strategies, such as access control and limited signalization. 159th Street is under IDOT jurisdiction. At its signalized intersection with Ravinia Avenue, 159th Street provides one dedicated left-turn lane, one through lane, and one shared through/right-turn lane on the west leg; on the east leg, 159th Street provides dual left-turn lanes, two through lanes, and one dedicated right-turn lane. A striped crosswalk with pedestrian signals is provided on both legs of 159th Street at Ravinia Avenue. At its unsignalized T-intersection with North Private Drive, 159th Street provides one dedicated left-turn lane and two through lanes on the west leg, and two through lanes and one dedicated right-turn lane on the east leg. At its signalized intersection with LaGrange Road, 159th Street provides dual left-turn lanes, two through lanes and one dedicated right-turn lane on each leg. A striped crosswalk with pedestrian signals is provided on each leg of 159th Street at LaGrange Road. 159th Street has a posted speed limit of 40 miles per hour (mph).

LaGrange Road (US 45) is a north-south divided roadway along the eastern boundary of the site. Through the study area, three travel lanes are provided in each direction with a landscaped center median. IDOT classifies LaGrange Road as an SRA roadway and is under IDOT jurisdiction. At its signalized intersection with 159th Street, LaGrange Road provides dual left-turn lanes, three through lanes, and one dedicated right-turn lane on each leg. Striped crosswalks with pedestrian signals are provided on the north and south legs of LaGrange Road at 159th Street. At its unsignalized intersection with 161st Street, LaGrange Road provides one dedicated left-turn lane, two through lanes and one shared through/right-turn lane on each leg. LaGrange Road has a posted speed limit of 40 mph north of 161st Street and 45 mph south of 161st Street.

Ravinia Avenue is a north-south divided road located approximately 525 feet west of the site. Through the study area, two travel lanes are provided in each direction with a landscaped center median provided along the segment south of 159th Street; north of 159th Street, the landscaped center median is limited. IDOT classifies Ravinia Avenue as a Local Road under the jurisdiction of Orland Park. The roadway terminates approximately 1,400 feet south of 159th Street and will be extended as part of the Ravinia Avenue/161st Street extension project. At its signalized intersection with 159th Street, Ravinia Avenue provides one dedicated left-turn lane, one through lane, and one dedicated right-turn lane on each leg. Ravinia Avenue has a posted speed limit of 30 mph.

161st Street is an east-west divided roadway along the southern boundary of the site. Through the study area, two travel lanes are provided in each direction. IDOT does not provide classification for 161st Street, and as such is assumed as a Local Road under private jurisdiction. The roadway currently terminates approximately 315 feet west of LaGrange Road and will be extended as part of the Ravinia Avenue/161st Street extension project. At its unsignalized intersection with LaGrange Road, 161st Street provides one left-turn lane and one shared through/right-turn lane on the east leg, and one dedicated left-turn lane, one through lane and one dedicated right-turn lane on the west leg. There is no posted speed limit, and for purposes of the analysis, a speed limit of 30 mph was assumed.

North Private Drive is a north-south driveway providing access to a commercial development on the north side of 159th Street. At its unsignalized T-intersection with 159th Street, North Private Drive operates under minor-leg stop control and provides two inbound lanes and two outbound lanes. For purposes of the analysis, a speed limit of 25 mph was assumed.

East Access is a north-south access driveway providing access to mixed-use development on the south side of 161st Street. At its unsignalized intersection with 161st Street, East Access provides a single inbound lane and a single outbound lane. A stop sign is not currently posted; however, for purposes of this analysis East Access was assumed to operate under minor-leg stop control. For purposes of the analysis, a speed limit of 25 mph was assumed.

West Access is a north-south access driveway providing access to mixed-use development on the south side of 161st Street. At its unsignalized intersection with 161st Street, West Access operates under minor-leg stop control and provides a single inbound lane and a single outbound lane. For purposes of the analysis, a speed limit of 25 mph was assumed.

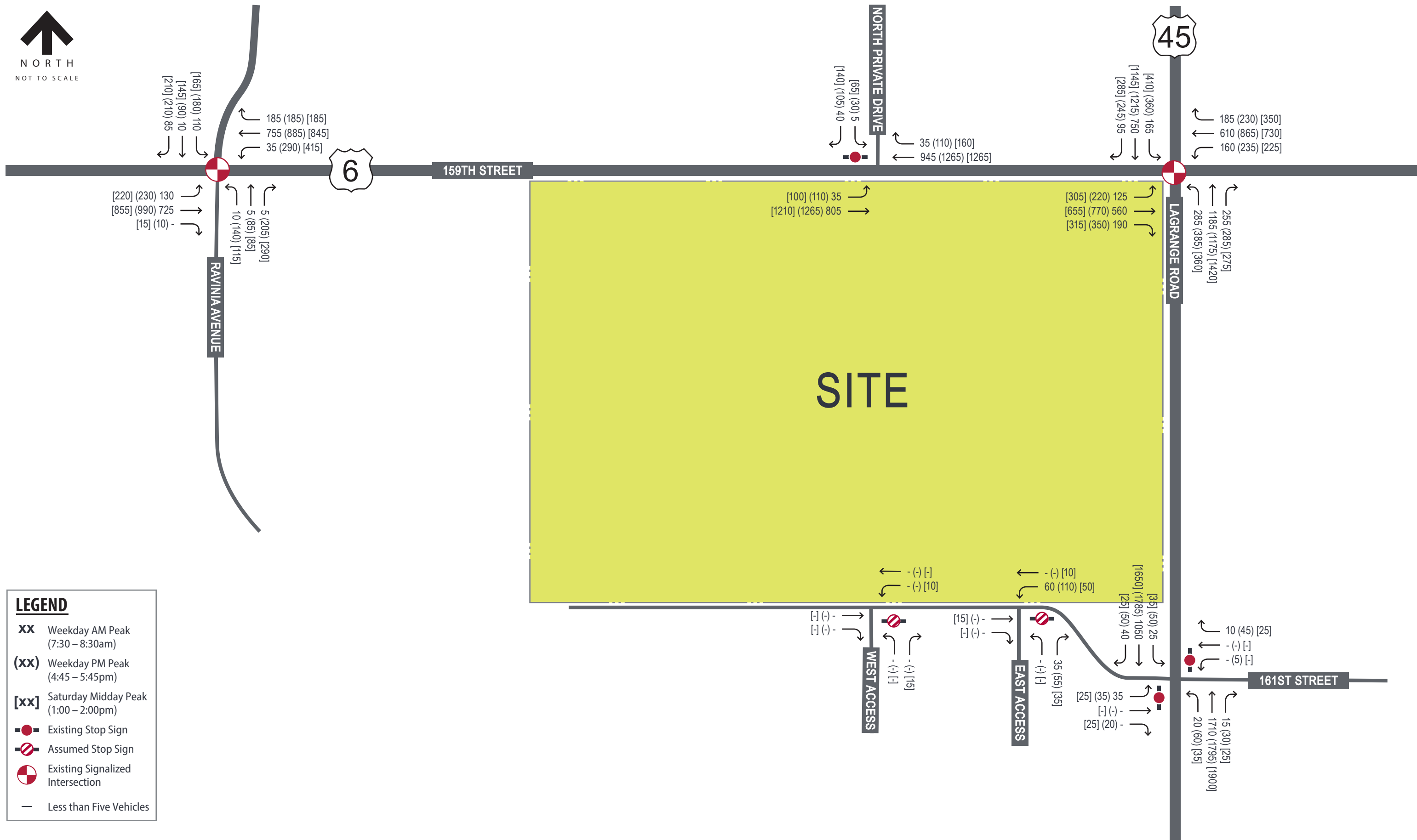
Traffic Count Data

Weekday turning movement count data was collected in April 2025 at the study intersections listed below. These counts were conducted during the weekday morning (6:00 to 9:00 AM), weekday evening (3:00 to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak periods. These count periods were selected in order to capture the peak travel periods in the area. Additionally, at the intersection of LaGrange Road/161st Street, traffic counts were collected from 6:00 AM-7:00 PM for purposes of signal warrant analysis.

- LaGrange Road / 159th Street
- 159th Street / Ravinia Avenue
- 159th Street / North Private Drive
- LaGrange Road / 161st Street
- 161st Street / West Access
- 161st Street / East Access

Note that turning movement counts were not conducted at the driveways for the existing development (159th Street and LaGrange Road) on the northeast corner of the site as the building is currently vacant.

The traffic count data indicates that peak hour traffic volumes occur within the study area from 7:30 to 8:30 AM and 4:45 to 5:45 PM during a typical weekday, and 1:00 to 2:00 PM during a typical Saturday. For purposes of the analysis, the peak hour traffic volumes were rounded to the nearest multiple of five and balanced between intersections, with two exceptions. Traffic volumes were not balanced between the following intersections due to the presence of other intersections and commercial driveways: 159th Street/Ravinia Avenue and 159th Street/North Private Drive (westbound); 159th Street/North Private Drive and LaGrange Road/159th Street (westbound); and LaGrange Road/159th Street and LaGrange Road/161st Street (northbound). A summary of existing traffic volumes is depicted in **Exhibit 2**. The traffic count data is included in the appendix.



LEGEND

- xx** Weekday AM Peak (7:30 – 8:30am)
- (xx)** Weekday PM Peak (4:45 – 5:45pm)
- [xx]** Saturday Midday Peak (1:00 – 2:00pm)
- Existing Stop Sign
- ⊘ Assumed Stop Sign
- ⊕ Existing Signalized Intersection
- Less than Five Vehicles

Existing Capacity Analysis

Synchro capacity software was used to evaluate the existing operational conditions at the study intersections during the weekday AM, weekday PM, and Saturday peak hours. The capacity of an intersection quantifies its ability to accommodate traffic volumes and is expressed in terms of level of service (LOS), measured in average delay per vehicle. LOS grades range from A to F, with LOS A as the highest (best traffic flow and least delay), LOS E as saturated or at-capacity conditions, and LOS F as the lowest (oversaturated conditions). The lowest LOS grade typically accepted by jurisdictional transportation agencies in Northeastern Illinois is LOS D, and a minimum LOS C is required for through movements on SRA routes such as 159th Street and LaGrange Road.

The LOS grades shown below, which are provided in the Transportation Research Board's Highway Capacity Manual (HCM) quantify and categorize the driver's discomfort, frustration, fuel consumption, and travel times experienced as a result of intersection control and the resulting traffic queuing. A detailed description of each LOS rating can be found in **Table 2.1**.

Table 2.1 Level of Service Grading Descriptions¹

Level of Service	Description
A	Minimal control delay; traffic operates at primarily free-flow conditions; unimpeded movement within traffic stream.
B	Minor control delay; traffic operates at a fairly unimpeded level with slightly restricted movement within traffic stream.
C	Moderate control delay; movement within traffic stream more restricted than at LOS B; formation of queues contributes to lower average travel speeds.
D	Considerable control delay that may be substantially increased by small increases in flow; average travel speeds continue to decrease.
E	High control delay; average travel speed no more than 33 percent of free flow speed.
F	Extremely high control delay; extensive queuing and high volumes create exceedingly restricted traffic flow.

¹Highway Capacity Manual, 7th Edition.

The range of control delay for each rating (as detailed in the HCM) is shown in **Table 2.2**. Because signalized intersections are expected to carry a larger volume of vehicles and stopping is required during red time, note that higher delays are tolerated for the corresponding LOS ratings.

Table 2.2 Level of Service Grading Criteria¹

Level of Service	Average Control Delay (s/veh) at:	
	Unsignalized Intersections	Signalized Intersections
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F ²	> 50	> 80

¹Highway Capacity Manual, 7th Edition

²All movements with a Volume to Capacity (v/C) ratio greater than 1 receive a rating of LOS F.

For purposes of the analysis, signal timing data was obtained from IDOT. Per IDOT standards, right-turn-on-red (RTOR) movements were not included in the analysis despite being observed in the field.

Based on these standards, capacity results were identified for the study intersections under existing conditions. The results of the capacity analysis are summarized in **Table 2.3**. In this table, the operation for each approach is quantified according to the average delay per vehicle and the corresponding LOS. Overall intersection level of service is not reported for minor-leg stop-controlled intersections, since the majority of vehicles are able to move through the intersection with little to no delay.

The 95th percentile queueing results are provided in **Table 2.4**. In this table, the storage and taper provided for each dedicated turn lane is shown, along with the projected queue length for each movement during the peak hour evaluations. Anticipated queue spillback is noted when the projected queues exceed the provided turn lane lengths. Queue lengths presented assume a vehicle length of 25 feet.

The results are based on Synchro's HCM 7th Edition reports. Copies of the capacity analysis reports are provided in the appendix.

Table 2.3 Existing (2025) Levels of Service

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
159th Street / Ravinia Avenue ★						
Eastbound	18	B ¹	45	D ²	43	D ²
Westbound	14	B ¹	33	C ¹	54	D ¹
Northbound	56	E	42	D	39	D
Southbound	48	D	39	D	37	D
<i>Intersection</i>	20-	B	39	D	46	D
159th Street / North Private Drive △						
Eastbound (Left)	11	B	14	B	14	B
Southbound	16	C	106	F	>120	F
LaGrange Road / 159th Street ★						
Eastbound	49	D ¹	57	E	56	E ²
Westbound	48	D ¹	66	E	52	D ³
Northbound	27	C ¹	45	D ²	44	D ¹
Southbound	28	C ¹	39	D ¹	40	D ¹
<i>Intersection</i>	36	D	50	D	47	D
LaGrange Road / 161st Street △						
Eastbound	>120	F	>120	F	>120	F
Westbound	69	F	>120	F	>120	F
Northbound (Left)	19	C	53	F	34	D
Southbound (Left)	33	D	47	E	48	E
161st Street / East Access △						
Westbound (Left)	7	A	7	A	7	A
Northbound	9	A	9	A	9	A
161st Street / West Access △						
Westbound (Left)	7	A	7	A	7	A
Northbound	8	A	8	A	8	A

★ -Signalized Intersection

△ -Minor-Leg Stop-Controlled Intersection

¹Left-turn movement operates at LOS E.

²Left-turn movement operates at LOS F.

³Left-turn and through movement operate at LOS E.

Under existing conditions the study network experiences operational challenges, primarily due to the high traffic volumes on the SRA routes. Per IDOT standards, through movements along SRA routes (159th Street and LaGrange Road) are expected to operate at LOS C or better. Under existing conditions, this standard is not met for most of the through movements on either SRA route. A summary of intersections, approaches, and movements estimated to operate at LOS E or LOS F are outlined below.

At the intersection of 159th Street/Ravinia Avenue, the eastbound and westbound approaches operate acceptably; however, the left-turn movements operate at LOS E or LOS F during the peak hours. The delay estimated for the left-turn movements is attributable to the relatively limited green time allocated to the protected left-turn phases. The northbound approach also operates at LOS E in the weekday morning peak hour. This delay is attributable to the signal cycle length (130 seconds weekday morning and Saturday midday peak hours; 120 seconds weekday evening peak hour) and priority given to east-west through traffic on 159th Street. As a result, relatively limited green time is allocated to the protected left-turn phases and minor-leg approaches.

At the intersection of 159th Street/North Private Drive, the southbound approach operates at LOS F during the weekday evening and Saturday midday peak hours. This delay is not uncommon for stop-controlled minor-leg streets intersecting with heavily traveled SRA routes, such as 159th Street

At the intersection of LaGrange Road/159th Street, the left-turn movements operate at LOS E in the weekday morning peak hour. During the weekday evening peak hour, the eastbound and westbound approaches operate at LOS E, while the northbound and southbound left-turn movements operate at LOS F and LOS E, respectively. During the Saturday midday peak hour, the eastbound approach operates at LOS E and the eastbound left-turn movement operates at LOS F, while the westbound, northbound and southbound left-turn movements and the westbound through movement operate at LOS E.

At the intersection of LaGrange Road/161st Street, the eastbound and westbound approaches operate at LOS F during the peak hours. This delay is common for stop-controlled minor-leg roadways intersecting with heavily traveled SRA routes, such as LaGrange Road. The northbound and southbound left-turn movements operate at LOS E or LOS F during the weekday evening peak hour; the southbound left-turn movement operates at LOS E during the Saturday midday peak hour.

Table 2.4 Existing (2025) 95th Percentile Queue Lengths¹

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
159th Street / Ravinia Avenue ★					
Eastbound Left	270	420	213	435 ³	355 ²
Eastbound Through	--	--	178	413	422
Eastbound Through/Right	--	--	185	428	438
Westbound Left	400	670	30	215	330
Westbound Through	--	--	230	368	528
Westbound Right	200	415	115	163	263 ²
Northbound Left	295	375	15	168	143
Northbound Through	--	--	8	113	113
Northbound Right	--	--	8	242	325
Southbound Left	165	240	158	208 ²	198 ²
Southbound Through	--	--	15	115	195
Southbound Right	165	240	113	233 ²	230 ²
159th Street / North Private Drive △					
Eastbound Left	180	350	5	23	20
Westbound Right	175	275	--	--	--
Southbound Left	--	--	5	93	198
Southbound Right	90	180	8	29	43
LaGrange Road / 159th Street ★					
Eastbound Left	160	390	93	190 ²	268 ²
Eastbound Through	--	--	338	508	422
Eastbound Right	400	625	205	380	350
Westbound Left	185	435	118	188 ²	178
Westbound Through	--	--	360	618	468
Westbound Right	460	605	208	240	365
Northbound Left	300	600	210	343 ²	273
Northbound Through	--	--	305	393	518
Northbound Right	170	320	181 ²	255 ²	260 ²
Southbound Left	185	400	120	300 ²	300 ²
Southbound Through	--	--	208	403	390
Southbound Right	135	265	68	220 ²	255 ²

Table 2.5 Existing (2025) 95th Percentile Queue Lengths (continued)

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
LaGrange Road / 161 st Street △					
Eastbound Left	75	75	80 ²	158 ³	118 ²
Eastbound Through	--	--	8	15	15
Eastbound Right	100	100	0	8	10
Westbound Left	50	50	3	35	10
Westbound Through/ Right	50	50	13	133 ³	68 ²
Northbound Left	190	390	5	53	20
Southbound Left	265	425	15	40	30
161 st Street / East Access △					
Westbound Left	--	--	3	5	3
Northbound	--	--	3	5	3
161 st Street / West Access △					
Westbound Left	--	--	0	0	0
Northbound	--	--	0	0	0

★ -Signalized Intersection △-Minor-Leg Stop-Controlled Intersection

¹Queue length in feet based on an assumed 25' vehicle.

²Exceeds storage lane length.

³Exceeds storage lane and taper length.

Under existing conditions, the study network experiences high queues along multiple movements primarily due to the high traffic volumes on the SRA notes as previously noted. A summary of turning movements with queue estimates longer than the available storage length are outlined below.

At the intersection of 159th Street/Ravinia Avenue during the weekday evening and Saturday midday peak hour, the eastbound left, southbound left, and southbound right-turn queue projections are anticipated to exceed the storage length provided. The overall turn lane length (inclusive of storage and taper) is exceeded for the eastbound left-turn movement during the weekday evening peak hour. During the Saturday midday peak hour, the westbound right-turn queue projection is anticipated to exceed the storage length provided. With the exception of the eastbound left-turn queues during the weekday evening peak hour, queues associated with the movements identified are generally accommodated within the taper.

At the intersection of LaGrange Road/159th Street during the weekday morning peak hour, the northbound right queue projection is anticipated to exceed the storage length provided. In addition to the northbound right-turn spillback noted during the weekday morning peak hour, the eastbound left, southbound left, and southbound right-turn queue projections are anticipated to exceed the storage length provided during the Saturday midday peak hour. Finally, during the weekday evening peak hour, all turning movements previously noted in addition to the northbound left-turn queue projections are anticipated to exceed the storage length. For the turning movements identified with queue spillback through the provided storage, the projected queues are generally accommodated within the taper.

At the intersection of LaGrange Road/161st Street eastbound left-turn queue is projected to spillback past the provided storage and taper during all peak hours, while the westbound through/right-turn queue is projected to spillback during the weekday evening and Saturday midday peak hours.

3. DEVELOPMENT CHARACTERISTICS

This section of the report outlines the proposed site plan and summarizes site-specific traffic characteristics.

Development Characteristics

The development includes an approximately 230,667 square-foot retail building and 45,000 square-feet of retail/restaurant outlot buildings. To accommodate the development, the existing vacant commercial building at the northeast corner of the site would be removed. In addition, two existing site driveways would be removed: 1) 159th Street, located approximately 175 feet west of LaGrange Road (measured centerline-to-centerline); and 2) LaGrange Road, located approximately 290 feet south of 159th Street. To accommodate access to the development, 161st Street would be extended west across the south property frontage. Access to the site would be provided as summarized below.

- Access A – RIRO driveway located on the south side of 159th Street approximately 900 feet west of LaGrange Road to primarily facilitate trucks.
 - This access was not included in the capacity analysis as truck trips are anticipated to occur outside of the analyzed peak hours.
- Access B – RIRO driveway located on the south side of 159th Street approximately 550 feet west of LaGrange Road, aligned with the existing commercial driveway on the north side of 159th Street (North Private Drive).
- Access C – RIRO driveway located on the west side of LaGrange Road approximately 610 feet south of 159th Street.
- Access D – Full-movement driveway located on the north side of 161st Street approximately 345 feet west of LaGrange Road, aligned with the existing driveway for a mixed-use development on the south side of 161st Street (West Access).
- Access E – Full-movement driveway located on the north side of 161st Street approximately 300 feet west of Access D.
- Access F – Full-movement driveway located on the north side of 161st Street extension, located approximately 435 feet west of Access E.

Trip Generation

In order to calculate trips generated by the proposed site, data was referenced from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition. The trip generation data for the ITE Land Use Code (LUC) corresponding to the proposed land uses are shown in **Table 3.1**. The proposed retail store is expected to sell a wide range of goods; and therefore, LUC 815, Free-Standing Discount Store, was selected as most closely representative of the proposed retail use. For the outlots, retail and restaurant uses are anticipated; and therefore, LUC 821, Shopping Plaza (40-150k) was selected to represent a mix of tenants. Where available, the ITE fitted curve equation was referenced otherwise the average rate was used. A copy of the ITE data is provided in the appendix.

Table 3.1 ITE Trip Generation Data

ITE Land Use	Daily	Weekday		Saturday
		AM Peak Hour	PM Peak Hour	Midday Peak Hour
Free-Standing Discount Store (Site) (LUC 815)	$\text{Ln}(T) = 0.77\text{Ln}(X) + 5.05$ 50% in/50% out	$\text{Ln}(T) = 0.84\text{Ln}(X) + 0.74$ 70% in/30% out	$\text{Ln}(T) = 0.84\text{Ln}(X) + 2.30$ 50% in/50% out	$T = 7.04X$ 51% in/49% out
Shopping Plaza (40-150k) (Outlots) (LUC 821)	$T = 67.52X$ 50% in/50% out	$T = 1.73X$ 62% in/38% out	$T = 5.19X$ 49% in/51% out	$T = 7.75X - 98.93$ 52% in/48% out

T = Trips; X = Square Feet

For the purpose of this study, site generated trips are expected to exhibit multiple routing patterns when traveling to and from the subject site, as described below.

- Primary Trips** - Vehicles that travel to the subject development and then return directly to their place of origin are called “primary trips”. Primary trips reflect new traffic volumes generated by the proposed development that would approach and depart on the same route. Trips to/from the site that are not pass-by trips are expected to be primary trips.
- Pass-By** - Pass-by traffic reflects the travel patterns of motorists who are already traveling on the adjacent study roadways and stop at the site en-route to another primary destination. Data in the *ITE Trip Generation Manual*, 11th Edition, reveals that 20 percent of vehicles at a Free-Standing Discount Store (LUC 815) are pass-by trips during the weekday evening peak hour, and 24 percent of vehicles are pass-by trips during the Saturday peak hour. For purposes of the analysis, pass-by trips were not included in the weekday morning peak hour. For daily trips, ITE data for the weekday evening peak hour (20 percent) was referenced. Pass-by rates for Shopping Plaza (40-150k) (LUC 821) indicate that 40 percent of vehicles are pass-by trips during the weekday evening peak hour, and 31 percent of vehicles are pass-by trips during the Saturday peak hour. For purposes of the analysis, pass-by trips were not included in the weekday morning peak hour. For daily trips, ITE data for the weekday evening peak hour (40 percent) were assumed.

Trip generation projections for the site and outlots were estimated using the ITE data. A summary of the site-generated traffic is presented in **Table 3.2**.

Table 3.2 Site-Generated Traffic Projections¹

Land Use	Size	Weekday							Saturday		
		Daily	AM Peak Hour			PM Peak Hour			Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Site	230,667 SF	10,300	140	60	200	480	485	965	830	795	1,625
Outlots	45,000 SF	3,040	50	30	80	115	120	235	130	120	250
<i>Pass-by Trips (Site)</i>		-2,060	--	--	--	-95	-95	-190	-195	-195	-390
<i>Pass-by Trips (Outlots)</i>		-1,220	--	--	--	-45	-45	-90	-40	-40	-80
Net New Trips		10,060	190	90	280	455	465	920	725	680	1,405

¹Daily trips rounded to the nearest multiple of ten. Peak hour in/out volumes are rounded to the nearest multiple of five.

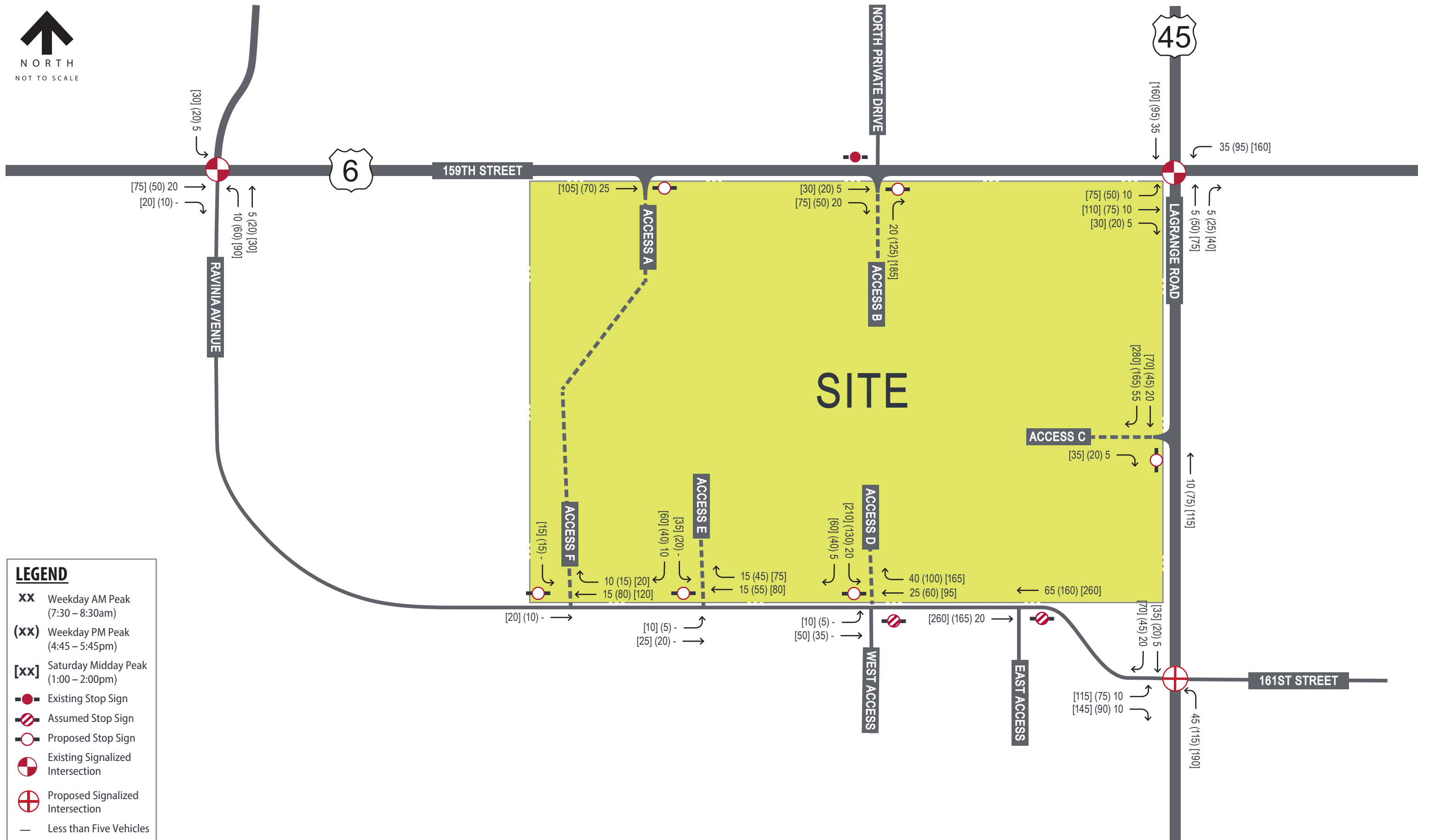
Directional Distribution

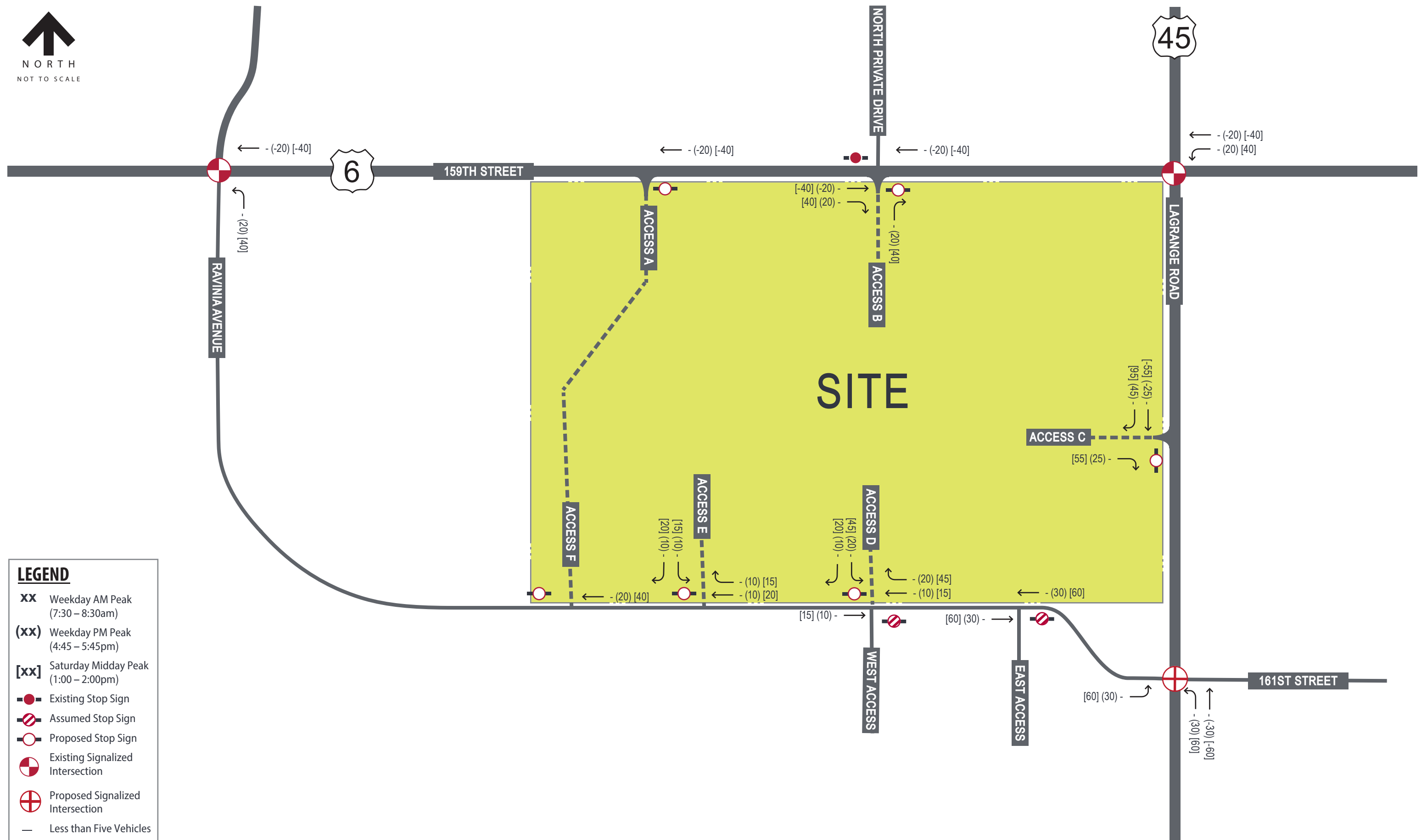
The estimated distribution of site-generated traffic on the surrounding roadway network as it approaches and departs the site is a function of several variables such as prevailing traffic volumes/patterns, characteristics of the street system, and the ease with which vehicles can travel over various sections of that system. **Table 3.3** presents the anticipated directional distribution from which vehicles travel to and from the site.

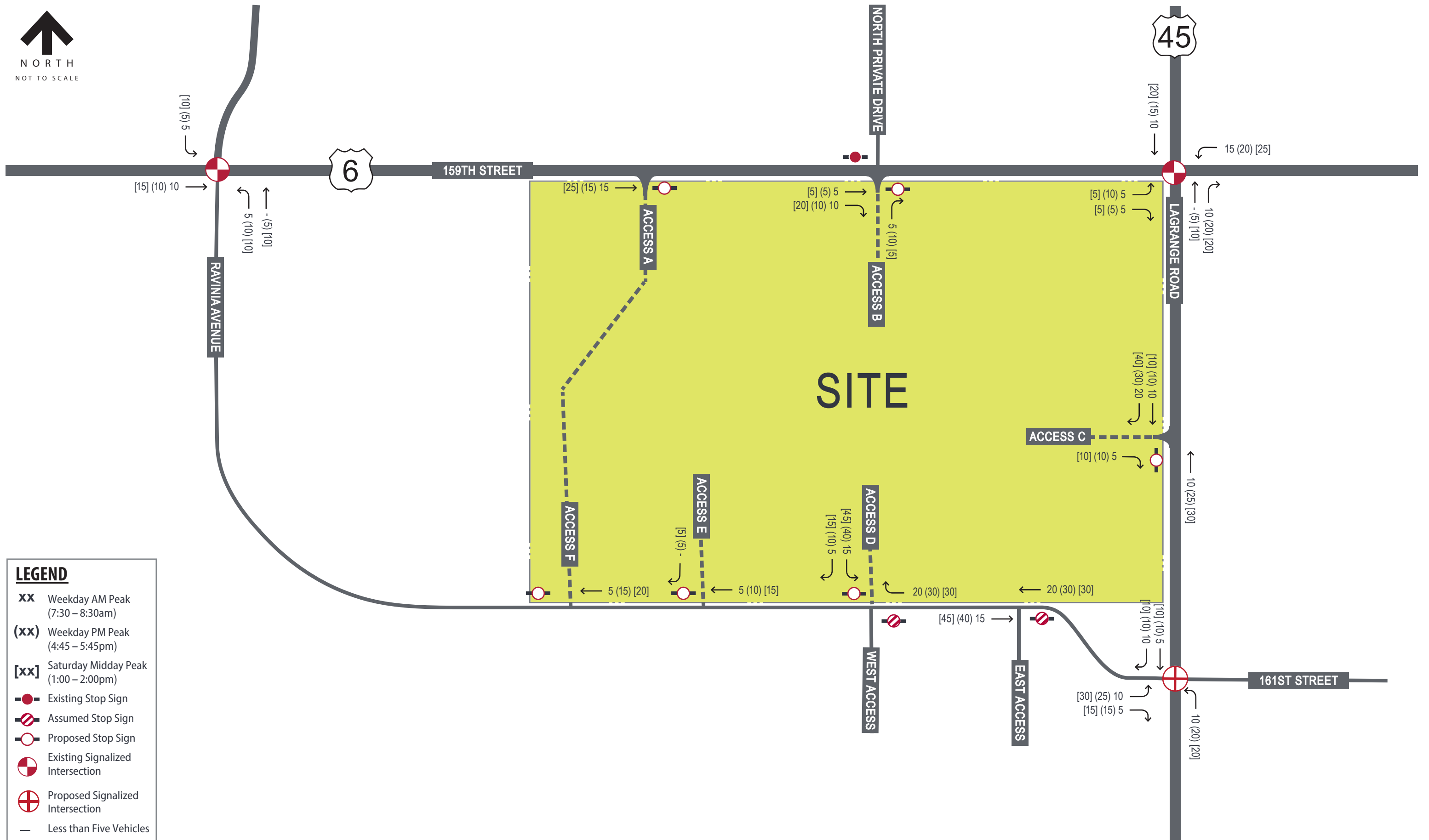
Table 3.3. Directional Distribution

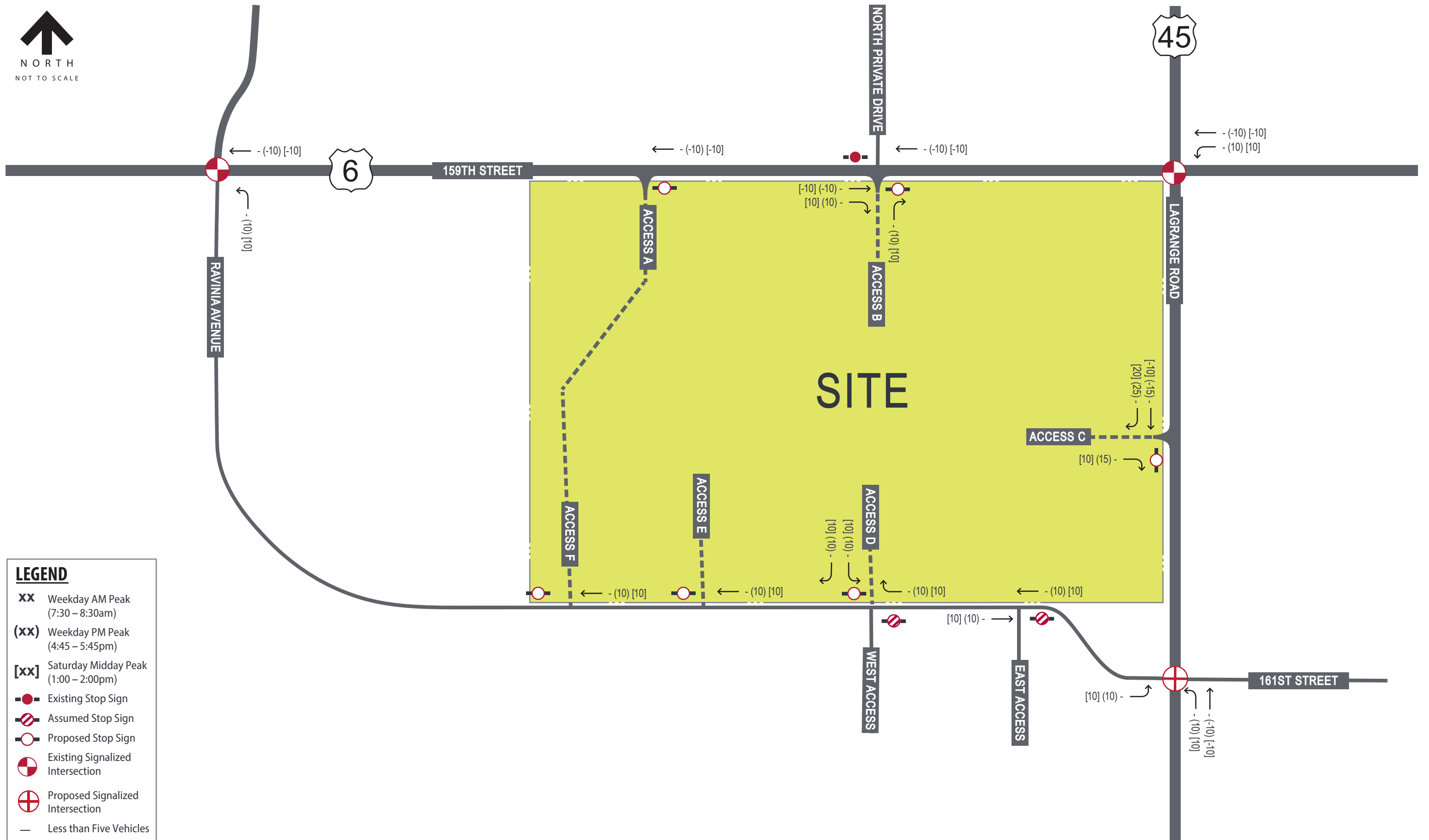
Traveling to/from	Trip Distribution Percentages
East on 159 th Street	25%
West on 159 th Street	15%
North on LaGrange Road	25%
South on LaGrange Road	30%
North on Ravinia Avenue	5%
Total	100%

The site traffic assignment, representing traffic volumes associated with the proposed development at the study intersections, is a function of the estimated trip generation (Table 3.2) and the directional distribution (Table 3.3). Based on these assumptions, primary site trip assignment is depicted in **Exhibit 3**, and pass-by site trip assignment is shown in **Exhibit 4**. For the outlots, primary site trip assignment is depicted in **Exhibit 5**, and pass-by site trip assignment is shown in **Exhibit 6**. The total site-generated traffic is illustrated in **Exhibit 7**.









LEGEND

xx Weekday AM Peak
(7:30 – 8:30am)

(xx) Weekday PM Peak
(4:45 – 5:45pm)

[xx] Saturday Midday Peak
(1:00 – 2:00pm)

● Existing Stop Sign

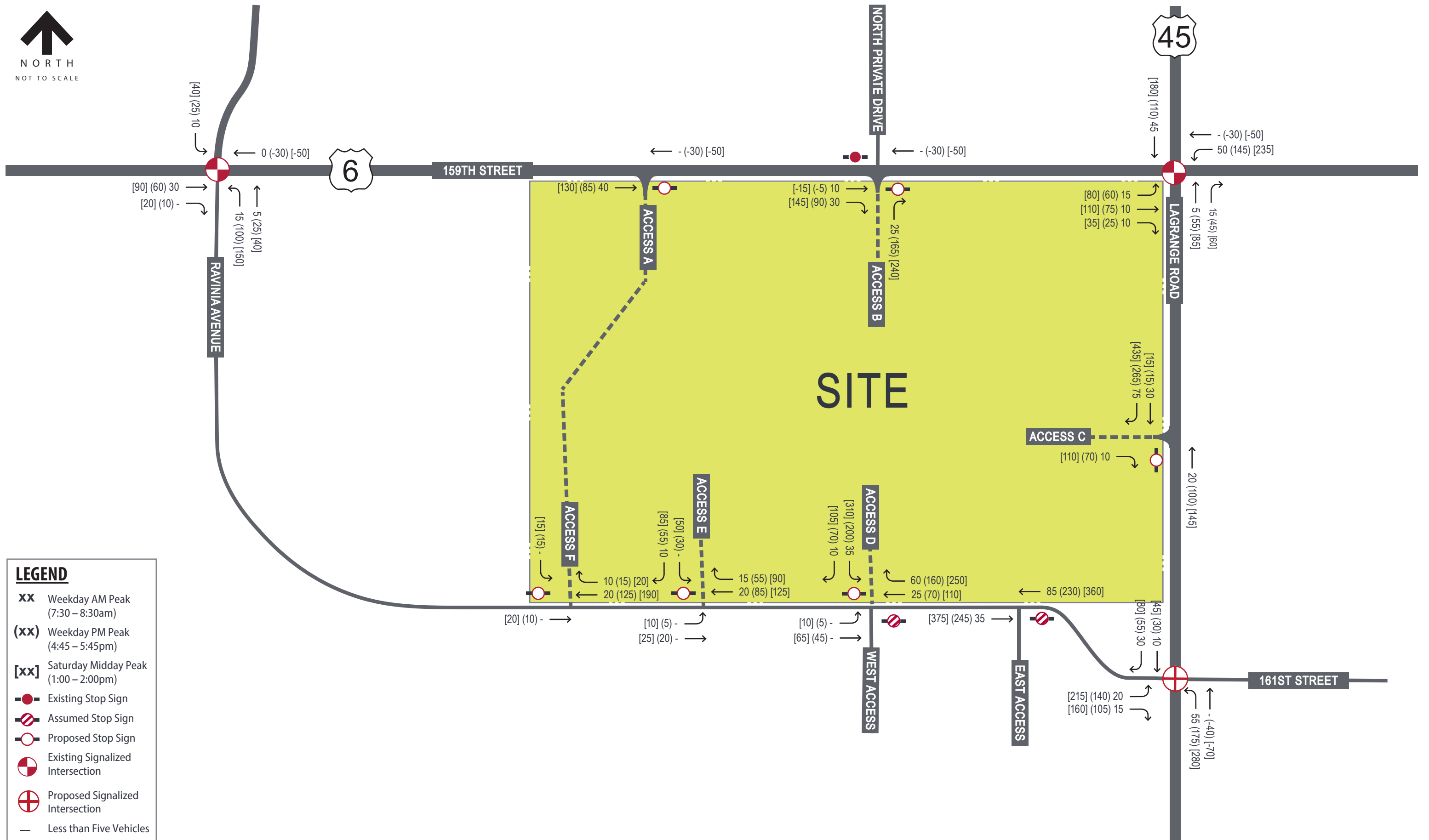
● Assumed Stop Sign

○ Proposed Stop Sign

⊕ Existing Signalized Intersection

⊕ Proposed Signalized Intersection

— Less than Five Vehicles



4. FUTURE CONDITIONS (2033)

This section of the report develops future traffic projections for analyses. The project was assumed to be completed in 2028. Therefore, Year 2033 traffic projections were developed for the analysis, which reflects a build-plus-five years, per typical IDOT requirements.

Future (2033) No-Build Traffic Projections

Background traffic growth estimates were developed using Year 2050 data from the Chicago Metropolitan Agency for Planning (CMAP). As summarized in **Table 4.1**, the average annual growth rate for the area roadway network is approximately 0.61 percent. An annual compounded growth rate of 0.61 percent was applied for the period of eight years to reflect traffic growth between Year 2025 (existing traffic counts) and future Year 2033.

Table 4.1 CMAP Projected Growth Rates

Roadway Segment	CMAP Projected Annual Growth Rate
159 th Street, west of 104 th Avenue	0.62%
159 th Street, between 104 th and LaGrange Road	0.62%
159 th Street, east of LaGrange Road	0.62%
104 th Avenue, south of 159 th Street	0.60%
Ravinia Avenue, north of 159 th Street	0.59%
LaGrange Road, north of 159 th Street	0.61%
LaGrange Road, south of 159 th Street	0.61%
Average Annual Growth Rate	0.61%

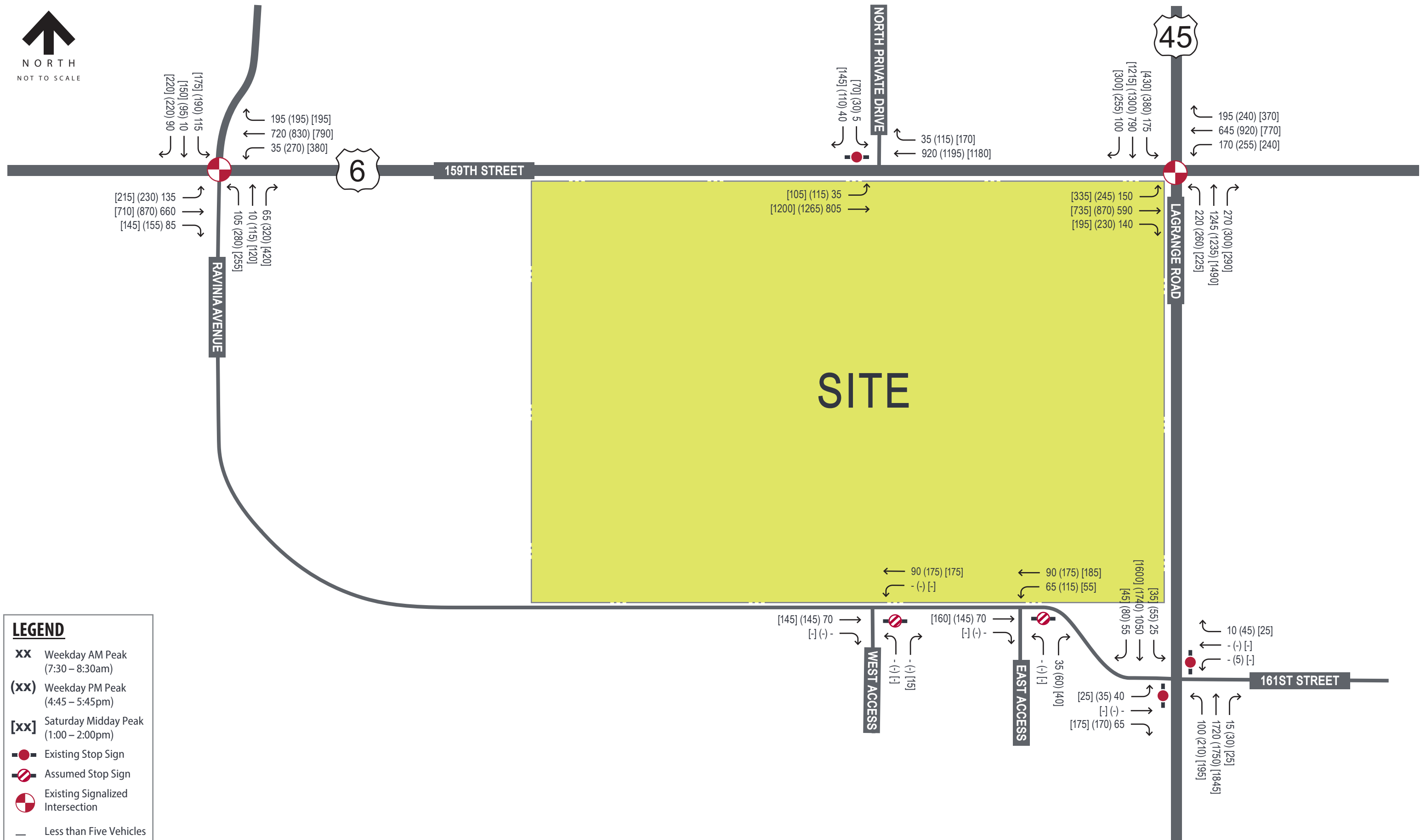
Per input from the Village of Orland Park, by Year 2033, Ravinia Avenue would be extended east to connect to 161st Street. Due to this new connection, it was estimated that 25 percent of eastbound right and northbound left-turning traffic at LaGrange Road/159th Street would utilize the new roadway connection and reroute to 159th Street/Ravinia Avenue.

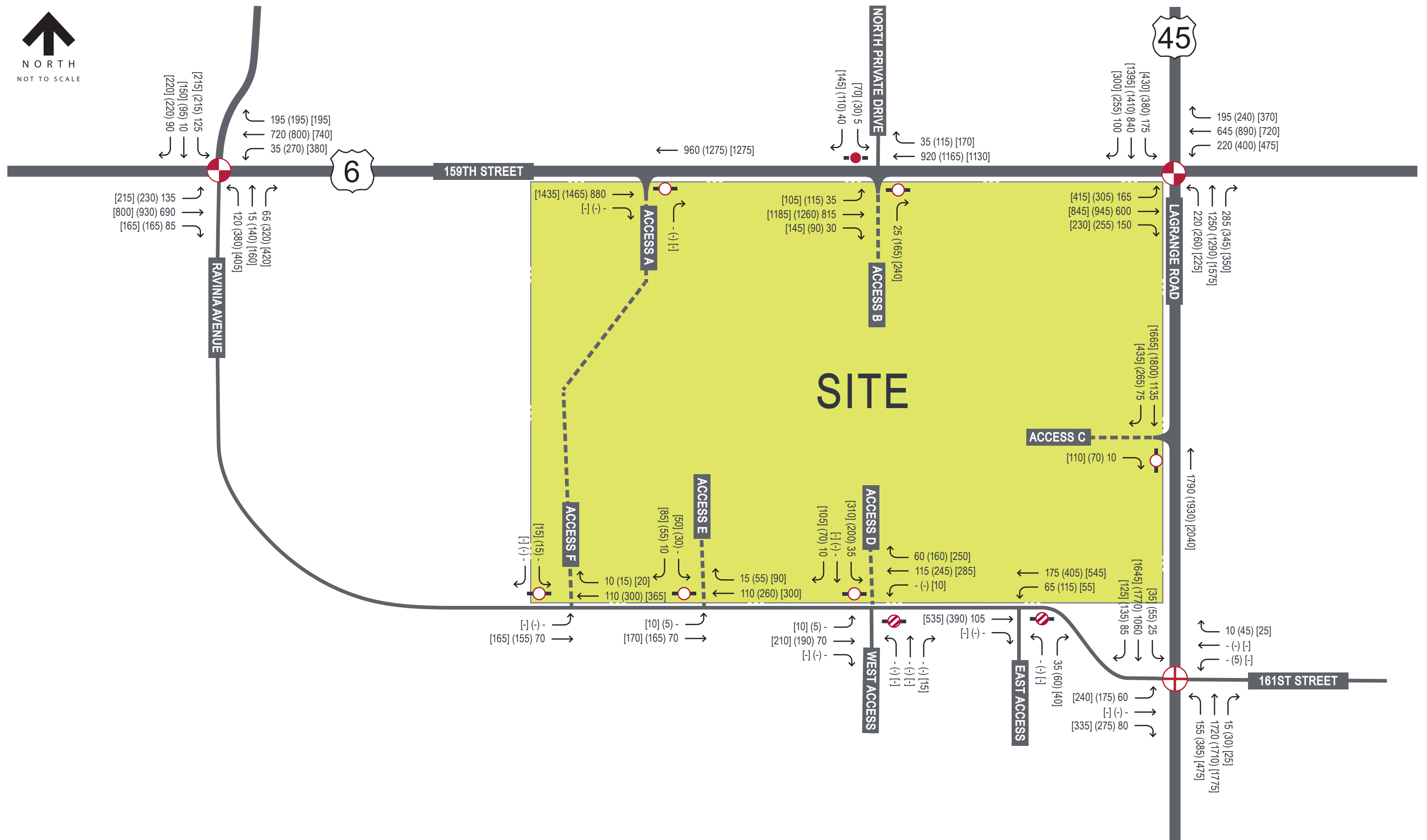
Two background developments were identified in the project vicinity which would impact study area traffic volumes: a gas station on the southeast corner of 159th Street/Ravinia Avenue and a residential development at the southern terminus of Ravinia Avenue. Traffic volumes associated with the offsite developments were referenced from *Traffic Impact Study Costco Wholesale, Orland Park* (prepared by V3 Companies, dated June 25, 2025) and *Traffic Impact Study Proposed Residential Development, Orland Park, Illinois* (prepared by KLOA, dated August 22, 2024). Site-generated trips were then added to the Year 2033 background traffic projections. Trip assignment for adjacent development's associated with the Ravinia Avenue extension are provided in the appendix.

The resulting Year 2033 no-build traffic projections accounting for background growth, the Ravinia Avenue extension, and adjacent developments are presented in **Exhibit 8**.

Future (2033) Build Traffic Projections

To estimate future traffic volumes with the proposed development, the total site-generated trips (Exhibit 7) were added to the background traffic projections (Exhibit 8). The resulting Year 2033 build traffic projections are depicted in **Exhibit 9**.





Future Geometry and Traffic Control

The following provides a summary of future geometry and traffic control at the study intersections. A review of turn lane warrant and signal warrant criteria was completed to assess potential offsite improvements to accommodate site-generated traffic.

Turn Lane Warrant Analysis

For the analysis of future traffic conditions, turn lane warrants were evaluated at the proposed site driveways and study intersections using guidelines in the IDOT *Bureau of Design and Environment (BDE) Manual* and traffic volume projections for the Year 2033 no-build scenario (Exhibit 8) and for the Year 2033 build scenario (Exhibit 9)

The IDOT *BDE Manual* does not provide specific guidelines for unsignalized intersections along a four-lane roadway with a design speed under 50 mph (159th Street and LaGrange Road have posted speed of 40 mph, design speed of 45 mph; 161st Street was assumed to have a posted speed of 30 mph, design speed of 35 mph), or specific guidelines for a six-lane highway; therefore, the guidelines for a four-lane highway with a posted speed limit of 50 mph or greater were referenced (Figure 36-3.B). For a highway with 1,200 vehicles or more in one direction and a minimum of 40 right-turn vehicles during the peak hours, a right-turn lane should be considered. For a highway with less than 500 vehicles in one direction and a minimum of 90 right-turn vehicles during the peak hours, a right-turn lane should be considered. Other factors to be considered when evaluating the need for right-turn lanes include uniformity along the corridor and engineering judgement.

The IDOT *BDE Manual* states the left-turn lanes are to be provided on divided highways, regardless of traffic volumes. Other factors to be considered when evaluating the need for left-turn lanes include uniformity along the corridor, signalized intersections where the left-turn volume is anticipated to be greater than 75 vehicles, with over 300 vehicles warranting consideration of dual left-turn lanes, and engineering judgement.

Based on the IDOT *BDE Manual* criteria, a summary of the turn lane warrant review is outlined below.

Year 2033 No-Build

159th Street / Ravinia Avenue

- An eastbound right-turn lane should be provided; projected traffic volumes satisfy warrant criteria in the weekday evening and Saturday midday peak hour.
 - Based on the design standards outlined in the IDOT BDE Manual, with a design speed of 45 mph the right-turn lane should provide 185 feet of storage and a 200-foot taper.

Year 2033 Build

159th Street / Ravinia Avenue

- An additional northbound left-turn lane should be provided; projected traffic volumes satisfy warrant criteria in the weekday evening and Saturday midday peak hours.
 - To accommodate 95th percentile queues, the left-turn lane storage should be a minimum of 320 feet and due to spacing constraints a taper length of 100 feet should be provided.

LaGrange Road / 161st Street

- An additional northbound left-turn lane should be provided; projected traffic volumes satisfy warrant criteria in the weekday evening and Saturday midday peak hours.
 - To accommodate 95th percentile queues, the left-turn lane storage should be a minimum of 350 feet with a 220-foot taper per the IDOT *BDE Manual*.

159th Street / Access A

- An eastbound right-turn lane is not warranted based on IDOT *BDE Manual* volume criteria. Truck trips are generally expected to occur outside the peak hours; therefore, an eastbound right-turn lane was not included in the analysis of future conditions.

159th Street / North Private Drive-Access B

- An eastbound right-turn lane should be provided; projected traffic volumes satisfy warrant criteria in the weekday evening and Saturday midday peak hours.
 - Based on the spacing distance between Access A and Access B, the turn lane should provide 175 feet of storage with a 100-foot taper.

LaGrange Road / Access C

- A southbound right-turn lane should be provided; projected traffic volumes satisfy criteria in all peak hours analyzed.
 - Based on design standards outlined in the IDOT *BDE Manual*, with a design speed of 45 mph the right-turn lane should provide 185 feet of storage and a 200-foot taper.

161st Street / Access D

- A westbound right-turn lane should be provided; projected traffic volumes satisfy criteria in the weekday evening and Saturday midday peak hours.
 - Based on spacing distance between Access D and East Access, the turn lane should provide 90 feet of storage with a 25-foot taper.

Signal Warrant Analysis

Signal warrant analyses were performed for the intersection of LaGrange Road/161st Street according to criteria set by the *Manual on Uniform Traffic Control Devices (MUTCD)*. The following warrants were evaluated: Warrant 1 (Eight-Hour Vehicular Volume), Warrant 2 (Four-Hour Vehicular Volume), and Warrant 3 (Peak Hour).

Using the 12-hour turning movement count data collected at the intersection of LaGrange Road/161st Street, background traffic projections were developed by applying an average 0.61 percent growth rate (Table 4.1) through Year 2033 and the change in distribution of existing traffic caused by the Ravinia Avenue extension as discussed to estimate future no-build conditions. Site-generated traffic projections were estimated for the 12-hour period using time-of-day distribution data for LUC 815, Free-Standing Discount Store and LUC 820, Strip Retail Plaza (<40k) provided in Appendix A from the ITE *Trip Generation Manual*, 11th Edition. LUC 820 was utilized for the outlots due to ITE having limited data available for LUC 821. These trips were then assigned to the intersection of LaGrange Road/161st Street following the distribution assumptions previously discussed.

The 12-hour traffic projections and signal warrant analysis results for the no-build and build scenarios are provided in **Table 4.2** and **Table 4.3**, respectively. A summary of the three warrants evaluated is provided below.

Table 4.2. Future (2033) No-Build Signal Warrant Summary – LaGrange Road / 161st Street

Time	Major Street (LaGrange Road)	Minor-Leg Approach (161 st Street)	Warrant 1A ¹	Warrant 1B ¹	Warrant 2	Warrant 3
Future (2033) No-Build						
6:00 AM	1963	32	No	No	No	No
7:00 AM	2902	46	No	No	No	No
8:00 AM	2891	50	No	No	No	No
9:00 AM	2878	33	No	No	No	No
10:00 AM	2960	36	No	No	No	No
11:00 AM	3177	37	No	No	No	No
12:00 PM	3189	39	No	No	No	No
1:00 PM	3340	53	No	No	No	No
2:00 PM	3423	52	No	No	No	No
3:00 PM	3341	60	No	No	No	No
4:00 PM	3899	70	No	No	No	No
5:00 PM	3817	91	No	No	No	No
Total Number of Hours Warrant Satisfied			0	0	0	0
Warrant Satisfied?			No	No	No	No

¹To satisfy warrant criteria for the combined Conditions A & B, the minimum volume thresholds for both conditions must be met.

Table 4.3. Future (2033) Build Signal Warrant Summary – LaGrange Road / 161st Street

Time	Major Street (LaGrange Road)	Minor-Leg Approach (161 st St)	Warrant 1A ¹	Warrant 1B ¹	Warrant 2	Warrant 3
Future (2033) Build						
6:00 AM	2017	52	No	No	No	No
7:00 AM	2989	84	No	No	No	No
8:00 AM	3097	171	No	Yes	Yes	Yes
9:00 AM	3136	227	Yes	Yes	Yes	Yes
10:00 AM	3266	279	Yes	Yes	Yes	Yes
11:00 AM	3493	315	Yes	Yes	Yes	Yes
12:00 PM	3520	308	Yes	Yes	Yes	Yes
1:00 PM	3646	329	Yes	Yes	Yes	Yes
2:00 PM	3712	306	Yes	Yes	Yes	Yes
3:00 PM	3623	337	Yes	Yes	Yes	Yes
4:00 PM	4139	308	Yes	Yes	Yes	Yes
5:00 PM	4027	277	Yes	Yes	Yes	Yes
Total Number of Hours Warrant Satisfied			9	10	10	10
Warrant Satisfied?			Yes	Yes	Yes	Yes

¹To satisfy warrant criteria for the combined Conditions A & B, the minimum volume thresholds for both conditions must be met.

Warrant 1: Eight-Hour Vehicular Volume

According to the criteria outlined in Table 4C-1 of the *MUTCD*, traffic volumes at LaGrange Road/161st Street must meet the following criteria for Warrant 1 for at least eight hours on an average day.

- Condition A: 600 vehicles per hour (VPH) on LaGrange Road (major street); 200 VPH on 161st Street (minor street); or
- Condition B: 900 vehicles per hour (VPH) on LaGrange Road (major street); 100 VPH on 161st Street (minor street)

Per Table 4.2, no-build traffic projections do not satisfy the eight-hour criteria for Warrant 1. As shown in Table 4.3, the Future (2033) Build traffic volumes meet the eight-hour minimum requirement for Warrant 1.

Warrant 2: Four-Hour Vehicular Volume

In order to meet the Warrant 2 standards for the installation of a traffic signal, traffic volumes must meet the volume criteria for at least four hours on an average day. The traffic volumes presented in Table 4.2 and Table 4.3 were compared to the Warrant 2 criteria outlined in Figure 4C-1 of the *MUTCD*. Based on the lane geometry at LaGrange Road/161st Street and the volume of traffic on LaGrange Road (both approaches), the warrant threshold volume criteria for 161st Street is 115 vehicles per hour under Warrant 2. The projected build traffic volumes for 161st Street exceed this threshold for 10 hours; and therefore, a traffic signal is warranted under Warrant 2.

Warrant 3: Peak Hour

The traffic volumes presented in Table 4.3 were compared to the Warrant 3 criteria outlined in Figure 4C-3 of the *MUTCD*. Based on the lane geometry at LaGrange Road/161st Street and the volume of traffic on LaGrange Road (both approaches), the warrant threshold volume criteria for 161st Street is 150 vehicles per hour under Warrant 3. As summarized in Table 4.3, the hourly volume on 161st Street exceeds the threshold 10 times during the 12-hour period; and therefore, a traffic signal is warranted under Warrant 3.

Traffic Control Summary

Based on the results of the signal warrant analysis, a traffic signal was warranted for the intersection of LaGrange Road/161st Street in the analysis of future build conditions. For purposes of the analysis, a cycle length of 120 seconds during the weekday morning peak hour and 130 seconds during the weekday evening and Saturday midday peak hours were assumed, consistent with existing signal timings at the intersection of LaGrange Road/159th Street. Splits were optimized at the intersection of LaGrange Road/161st Street. Based on coordination with the Village, this intersection is currently under design for signal control.

For the site access driveways, minor-leg stop control should be posted for outbound traffic. Access A, Access B, and Access C should be designed to allow RIRO movements only; “No Left Turn” signage should be posted for outbound traffic.

Future (2033) Capacity Analysis

Based on projected traffic volumes and future geometry assumptions, capacity results were identified for the study intersections under Year 2033 no-build and build conditions. For purposes of the analysis of future conditions, the existing signal timings for 159th Street/Ravinia Avenue and LaGrange Road/159th Street were utilized. For the analysis of no-build conditions, the intersection of LaGrange Road/161st Street was assumed to operate under minor-leg stop control, consistent with existing conditions. For the build scenario, a traffic signal was included for the intersection of LaGrange Road/161st Street.

The results of the no-build and build capacity analyses are summarized in **Table 4.4** and **Table 4.6**, respectively. The results of the no-build and build queueing analyses are summarized in **Table 4.5** and **Table 4.7**, respectively. The results are based on Synchro’s HCM 7th Edition reports. Copies of the Synchro reports are provided in the appendix.

Table 4.4. Future (2033) No-Build Levels of Service

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
159th Street / Ravinia Avenue ★						
Eastbound	18	B ¹	46	D ²	42	D ²
Westbound	16	B ¹	37	D ¹	44	D ¹
Northbound	65	E	40	D	38	D
Southbound	51	D ³	39	D	37	D
<i>Intersection</i>	24	C	41	D	41	D
159th Street / North Private Drive △						
Eastbound (Left)	10+	B	13	B	13	B
Southbound	15+	C	88	F	>120	F
LaGrange Road / 159th Street ★						
Eastbound	48	D ¹	74	E ⁵	62	E ²
Westbound	49	D ¹	77	E ⁵	54	D ⁴
Northbound	27	C ¹	39	D ¹	44	D ¹
Southbound	27	C ¹	38	D ¹	37	D ¹
<i>Intersection</i>	36	D	54	D	48	D
LaGrange Road / 161st Street △						
Eastbound	>120	F	>120	F	>120	E
Westbound	>120	F	>120	F	94	F
Northbound (Left)	21	C	>120	F	>120	F
Southbound (Left)	33	D	46	E	44	E
161st Street / East Access △						
Westbound (Left)	8	A	8	A	8	A
Northbound	9	A	9	A	9	A
161st Street / West Access △						
Westbound (Left)	8	A	8	A	8	A
Northbound	9	A	9	A	9	A

★ -Signalized Intersection

△ -Minor-Leg Stop-Controlled Intersection

¹Left-turn movement operates at LOS E.

²Left-turn movement operates at LOS F.

³Through movement operates at LOS E.

⁴Left-turn and through movements operate at LOS E.

⁵Through movement operates at LOS F.

With the addition of background traffic growth, adjacent development's site traffic, and the Ravinia Avenue extension the study intersections are expected to operate similar to existing conditions with exceptions noted below. Consistent with existing conditions, most of the through movements on 159th Street and LaGrange Road would not meet IDOT criteria of LOS C or better for SRA routes.

At the intersection of 159th Street/Ravinia Avenue, the southbound through movement is anticipated to operate at LOS E during the weekday morning peak hour compared to LOS D under existing conditions. During the weekday evening peak hour, the westbound approach is projected to operate as LOS D compared to LOS C under existing conditions.

During the weekday evening peak hour at the LaGrange Road/159th Street intersection, both the eastbound and westbound through movements operate at LOS F compared to LOS E under existing conditions.

At the intersection of LaGrange Road/161st Street, the northbound left-turn movement operates at LOS F compared to LOS D under existing conditions.

Table 4.5 No-Build (2033) 95th Percentile Queue Lengths¹

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
159th Street / Ravinia Avenue ★					
Eastbound Left	270	420	218	435 ³	345 ²
Eastbound Through	--	--	178	388	365
Eastbound Right	185	385	30	140	120
Westbound Left	400	670	30	203	285
Westbound Through	--	--	238	380	410
Westbound Right	200	415	133	193	218 ²
Northbound Left	295	375	183	290	270
Northbound Through	--	--	15	143	150
Northbound Right	--	--	103	365	470
Southbound Left	165	240	165	215 ²	203 ²
Southbound Through	--	--	15	125	200
Southbound Right	165	240	130	248 ³	240 ²
159th Street / North Private Drive △					
Eastbound Left	180	350	5	20	18
Westbound Right	175	275	0	0	0
Southbound Left	--	--	3	88	203
Southbound Right	90	180	8	28	40
LaGrange Road / 159th Street ★					
Eastbound Left	160	390	110	210 ²	310 ²
Eastbound Through	--	--	350	648	450
Eastbound Right	400	625	150	253	215
Westbound Left	185	435	125	200 ²	190 ²
Westbound Through	--	--	380	710	503
Westbound Right	460	605	213	248	383
Northbound Left	300	600	160	213	178
Northbound Through	--	--	335	423	563
Northbound Right	170	320	198 ²	273 ²	278 ²
Southbound Left	185	400	128	293 ²	315 ²
Southbound Through	--	--	218	423	393
Southbound Right	135	265	68	218 ²	250 ²

Table 4.5 No-Build (2033) 95th Percentile Queue Lengths (continued)

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
LaGrange Road / 161 st Street △					
Eastbound Left	75	75	15	155 ³	110 ²
Eastbound Through	--	--	10	0	0
Eastbound Right	100	100	130 ³	155 ³	125 ³
Westbound Left	50	50	5	20	13
Westbound Through/Right	50	50	20	43	10
Northbound Left	190	340	35	393 ³	283 ²
Southbound Left	265	425	15	43	28
161 st Street / East Access △					
Westbound Left	--	--	3	8	3
Northbound	--	--	3	5	3
161 st Street / West Access △					
Westbound Left	--	--	0	0	0
Northbound	--	--	0	0	3

★ -Signalized Intersection △-Minor-Leg Stop-Controlled Intersection

¹Queue length in feet based on an assumed 25' vehicle. .

²Exceeds storage lane length.

³Exceeds storage lane and taper length.

With the addition of background traffic growth, the projected 95th percentile queue spillback anticipated is expected to be consistent with existing conditions with the following exceptions. At the intersection of 159th Street/Ravinia Avenue during the weekday evening peak hour, the southbound right-turn queue is projected to exceed the overall turn lane length (inclusive of storage and taper). At the intersection of LaGrange Road/159th Street, during the Saturday midday peak hour the westbound left-turn queue is projected to exceed the turn lane . At the intersection of LaGrange Road/161st Street during each peak hour, the eastbound right-turn queue is projected to exceed the overall turn lane length (inclusive of storage and taper). Additionally, the northbound left-turn queue is projected to exceed the turn lane storage under the Saturday midday peak hour, and the overall turn lane length (inclusive of storage and taper) under the weekday evening peak hour.

Table 4.6. Future (2033) Build Levels of Service

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
159 th Street / Ravinia Avenue *						
Eastbound	18	B ¹	45	D ²	44	D ²
Westbound	15	B ¹	37	D ¹	57	E
Northbound	59	E	50	D ¹	51	D ¹
Southbound	45	D	36	D	36	D
Intersection	23	C	43	D	49	D
159 th Street / North Private Drive-Access B △						
Eastbound (Left)	10+	B	13	B	13	B
Northbound	12	B	20	C	25	C
Southbound	17	C	>120	F	>120	F
LaGrange Road / 159 th Street *						
Eastbound	56	E	<120	F	111	F
Westbound	53	D ¹	72	E ⁴	58	E ²
Northbound	43	D ¹	51	D ¹	63	E
Southbound	29	C ¹	39	D ¹	39	D ¹
Intersection	44	D	73	E	65	E
LaGrange Road / 161 st Street *						
Eastbound	51	D	45	D	43	D
Westbound	59	E	65	E	61	E
Northbound	12	B ¹	23	C ¹	26	C ¹
Southbound	26	C	46	D	5	A
Intersection	19	B	35	D	20	C
161 st Street / East Access △						
Westbound (Left)	8	A	9	A	9	A
Northbound	9	A	10+	B	11	B
161 st Street / West Access-Access D △						
Eastbound (Left)	8	A	8	A	9	A
Westbound (Left)	7	A	8	A	8	A
Northbound	10-	A	12	B	10-	A
Southbound	10-	A	16	C	36	E
159 th Street / Access A △						
Northbound	12	B	16	C	15	C
LaGrange Road / Access C △						
Eastbound	15	B	29	D	31	D

Table 4.6. Future (2033) Build Levels of Service (continued)

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
161 st Street / Access E △						
Eastbound (Left)	8	A	8	A	8	A
Southbound	9	A	11	B	12	B
161 st Street / Access F △						
Eastbound (Left)	8	A	8	A	8	A
Southbound	9	A	11	B	12	B

★ -Signalized Intersection △ -Minor-Leg Stop-Controlled Intersection

¹Left-turn movement operates at LOS E.

²Left-turn movement operates at LOS F.

³Left-turn and through movements operate at LOS F.

⁴Through movement operates at LOS F.

The addition of site-generated traffic is not expected to materially impact the study intersections with installation of the geometric and traffic control improvements previously identified. Under the future build scenario, the intersections are generally projected to operate similar to no-build conditions, with exceptions noted below.

At the intersection of 159th Street/Ravinia Avenue during the Saturday midday peak hour, the westbound approach is projected to operate at LOS E (compared to LOS D under no-build conditions) with the change in delay being approximately 13 seconds per vehicle and within two seconds of acceptable levels. The northbound left-turn movement is anticipated to operate at LOS E during the weekday evening and Saturday midday peaks, while the approaches are anticipated to operate at an acceptable LOS D.

At the intersection of LaGrange Road/159th Street during the Saturday midday peak hours, the eastbound, westbound, and northbound approaches LOS drops one letter grade, bringing the overall intersection to LOS E. During the weekday evening peak hour, the eastbound approach operates at LOS F compared to LOS E during no-build conditions and the overall intersection operates at LOS E compared to LOS D during the no-build conditions. During the weekday AM peak hour, the eastbound approach operates at LOS E compared to LOS D during no build conditions.

At the intersection of LaGrange Road/161st Street, the westbound approach is projected to operate at LOS E during the peak hours. The projected delay is a function of the traffic signal priority given to north-south through movements along the SRA route (i.e., LaGrange Road). As a result, relatively limited green time is allocated to 161st Street, which is projected to serve no more than 50 vehicles in a peak hour.

Access A, Access D, Access E, and Access F are projected to operate with acceptable delay at LOS D or better during the peak hours, with one exception. During the Saturday midday peak hour, Access D is projected to operate at LOS E for outbound traffic.

Table 4.7 Build (2033) 95th Percentile Queue Lengths¹

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
159th Street / Ravinia Avenue ★					
Eastbound Left	270	420	215	435 ³	345 ²
Eastbound Through	--	--	168	425	430
Eastbound Right	185	385	30	113	143
Westbound Left	400	670	28	203	305
Westbound Through	--	--	220	370	483
Westbound Right	200	415	123	198	283 ²
Northbound Left	320	420	90	265	303
Northbound Through	--	--	23	175	203
Northbound Right	--	--	98	365	468
Southbound Left	165	240	163	230 ²	238 ²
Southbound Through	--	--	15	123	198
Southbound Right	165	240	115	238 ²	238 ²
159th Street / North Private Drive- Access B △					
Eastbound Left	180	350	5	20	18
Eastbound Right	175	275	0	0	0
Westbound Right	175	275	0	0	0
Northbound Right	--	--	3	53	93
Southbound Left	--	--	5	120	263
Southbound Right	90	180	8	28	38
LaGrange Road / 159th Street ★					
Eastbound Left	160	390	133	285 ²	340 ²
Eastbound Through	--	--	398	1,020	800
Eastbound Right	400	625	183	295	273
Westbound Left	185	435	175	310 ²	353 ²
Westbound Through	--	--	410	658	475
Westbound Right	460	605	230	248	393
Northbound Left	300	600	190	223	190
Northbound Through	--	--	508	550	715
Northbound Right	170	320	318	373 ³	375 ³
Southbound Left	185	400	140	293 ²	373 ²
Southbound Through	--	--	243	470	473
Southbound Right	135	265	73	218 ²	243 ²

Table 4.7 Build (2033) 95th Percentile Queue Lengths (continued)

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
LaGrange Road / 161st Street ★					
Eastbound Left	75	75	88 ³	238 ³	65
Eastbound Through	--	--	3	3	0
Eastbound Right	100	100	113 ³	328 ³	365 ³
Westbound Left	50	50	3	8	3
Westbound Through	50	50	0	0	0
Westbound Right	50	50	18	78 ³	43
Northbound Left	350	570	123	285	343
Northbound Through	--	--	238	330	370
Northbound Right	--	--	263	363	408
Southbound Left	265	425	10	35	25
Southbound Through	--	--	430	743	53
Southbound Right	--	--	455	800	85
161st Street / East Access △					
Westbound Left	--	--	3	10	5
Northbound	--	--	3	8	5
161st Street / West Access-Access D △					
Eastbound Left	--	--	0	0	0
Westbound Left	--	--	0	0	0
Northbound	--	--	0	0	3
Southbound	--	--	5	60	205
159th Street / Access A △					
Northbound Right	--	--	0	0	0
LaGrange Road / Access C △					
Eastbound Right	--	--	3	35	58
161st Street / Access E △					
Eastbound Left	--	--	0	0	0
Southbound	--	--	0	10	20
161st Street / Access F △					
Eastbound Left	--	--	0	0	0
Southbound	--	--	0	3	3

★ -Signalized Intersection △ -Minor-Leg Stop-Controlled Intersection

¹Queue length in feet based on an assumed 25' vehicle.

²Exceeds storage lane length.

³Exceeds storage lane and taper length.

With the addition of site-generated, the 95th percentile queue spillback anticipated is expected to be consistent with no-build conditions with exceptions noted below.

At the intersection of LaGrange Road/159th Street minor signal timing adjustments were made and should be considered to limit queue spillback of the eastbound left-turn lane. During the weekday evening and Saturday midday peak hours, the northbound right-turn queue projection is anticipated to exceed the overall turn lane length (inclusive of storage and taper).

At the intersection of LaGrange Road/161st Street, the westbound right-turn queue projection is anticipated to exceed the overall turn lane length (inclusive of storage and taper). As previously discussed, this approach gets relatively limited green time due to serving no more than 50 vehicles in the peak hour.

At the site driveways, the 95th percentile queues are expected to be approximately nine (9) vehicles (205 feet) or less during the peak hours. With the highest on-site queues occurring for outbound traffic at Access B and Access D traffic, “Do No Block Intersection” signage should be considered at the adjacent internal intersections to maintain free-flow inbound traffic.

5. FUTURE CONDITIONS (2050)

This section of the report outlines the anticipated impacts to the proposed site plan and develops future traffic projections for analysis for Year 2050.

Development Characteristics

The development characteristics remain consistent with Year 2033 conditions. The development includes an approximately 230,667 square-foot retail building and a total of 45,000 square feet of retail/restaurant buildings.

Trip Generation

Trip generation was calculated using data from the ITE *Trip Generation Manual*, 11th Edition. Trip generation for the primary site and outlots would be consistent with Year 2033 conditions, as summarized in Table 3.1. Similarly, trip generation projections would be unchanged, as shown in Table 3.2.

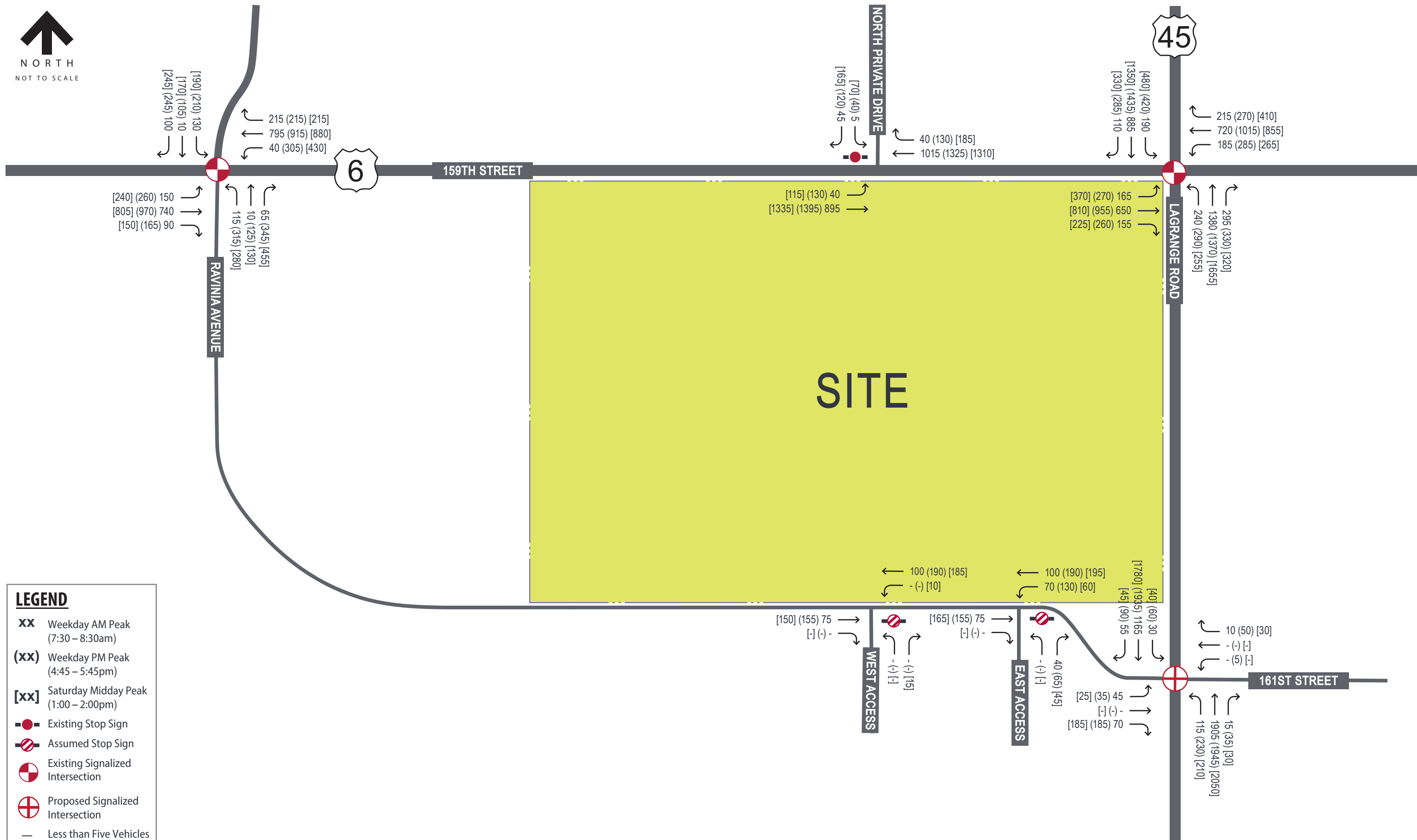
Future (2050) No-Build Traffic Projections

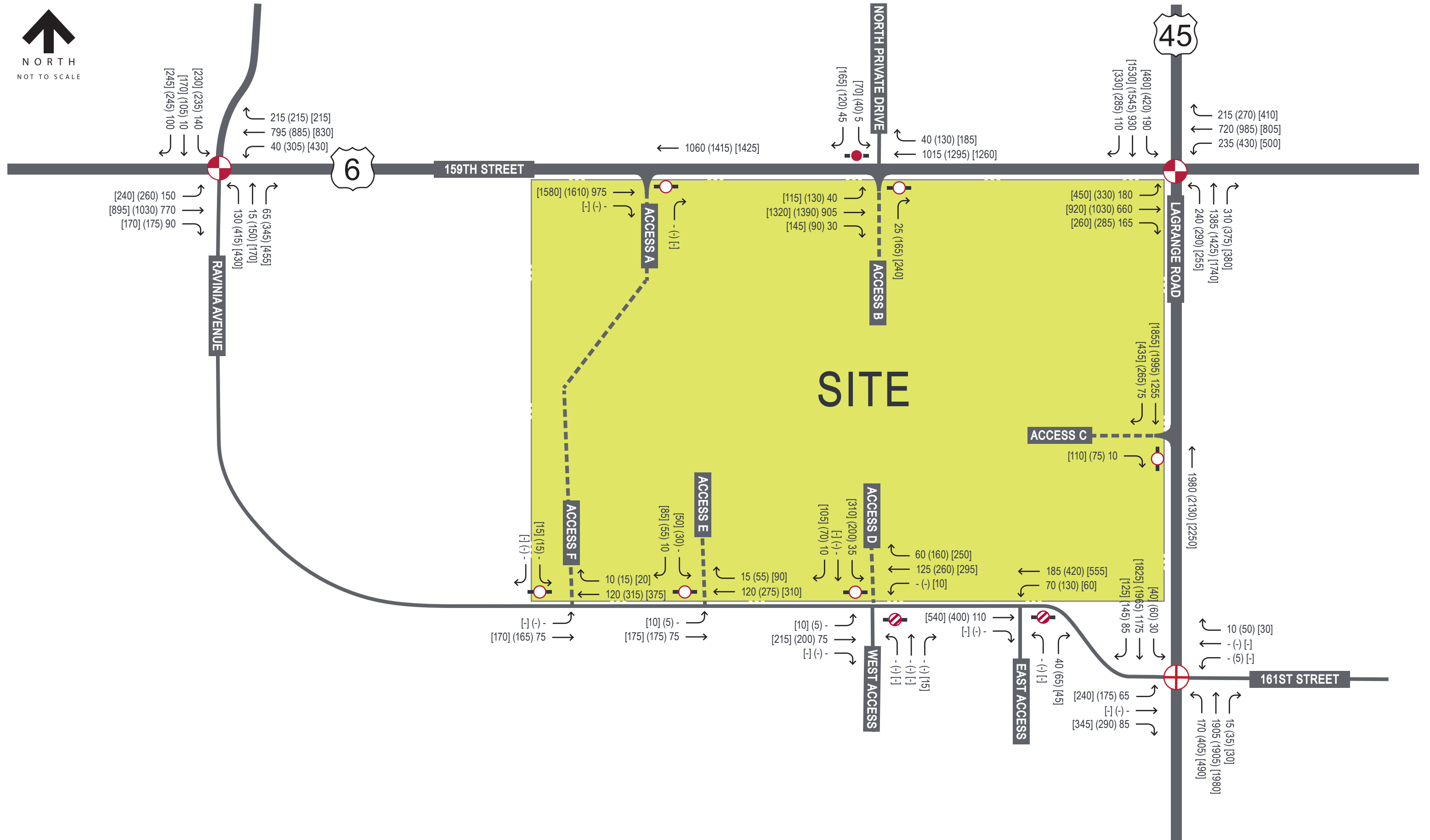
Background traffic growth estimates were developed using Year 2050 data from the Chicago Metropolitan Agency for Planning (CMAP). As summarized in Table 4.1 the average annual growth rate for the area roadway network is approximately 0.61 percent. An annual compounded growth rate of 0.61 percent was applied for the period of twenty-five years to reflect traffic growth between Year 2025 (existing traffic counts) and future Year 2050. Consistent with No-Build (2033) conditions, the Ravinia Avenue extension and two known offsite developments in the project vicinity were included in the No-Build (2050) traffic projections.

The resulting Year 2050 no-build traffic projections are presented in **Exhibit 10**.

Future (2050) Build Traffic Projections

To estimate future traffic volumes with the proposed development, the total site-generated trips (Exhibit 7) were added to the background traffic projections (Exhibit 10). The resulting Year 2050 build traffic projections are depicted in **Exhibit 11**.





Future Geometry and Traffic Control

The following provides a summary of future geometry and traffic control at the study intersections. A review of turn lane warrants and signal warrant criteria was completed to assess potential offsite improvements to accommodate site-generated traffic.

Turn Lane Warrant Analysis

For the analysis of future traffic conditions, turn lane warrants were reevaluated at the proposed site driveways and study intersections using guidelines in the IDOT *Bureau of Design and Environment (BDE) Manual* and traffic volume projections for the Year 2050 no-build (Exhibit 10) and build (Exhibit 11) scenarios. Based on the analysis, all turn lanes identified under Year 2033 conditions continue to be warranted in Year 2050 and were included in the analyses. It is to be noted that under No-Build (2050) conditions, at the 159th Street/Ravinia Road intersection, the northbound left-turn volumes meet warranting criteria for dual-left turn lanes due to the impacts of the Ravinia Avenue extension.

Signal Warrant Analysis

Based on the analysis of Year 2033 conditions and discussions with the Village of Orland Park, the traffic signal at LaGrange Road/161st Street with the addition of dual northbound left-turn lanes was assumed in Year 2050 conditions.

Future (2050) Capacity Analysis

Based on projected traffic volumes and future geometry assumptions, capacity results were identified for the study intersections under Year 2050 no-build and build conditions.

The results of the no-build and build capacity analyses are summarized in **Table 5.1** and **Table 5.3**, respectively. The no-build and build 95th percentile queues are summarized in **Table 5.2** and **Table 5.4**, respectively. The results are based on Synchro's HCM 7th Edition reports. Copies of the Synchro reports are provided in the appendix.

Table 5.1. Future (2050) No-Build Levels of Service

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
159th Street / Ravinia Avenue ★						
Eastbound	18	B ¹	58	E ²	46	D ²
Westbound	16	B ¹	37	D ¹	48	D ¹
Northbound	57	E	49	D ¹	48	D ¹
Southbound	49	D	35+	D	34	C
<i>Intersection</i>	23	C	46	D	45	D
159th Street / North Private Drive △						
Eastbound (Left)	11	B	15+	C	15-	B
Southbound	17	C	>120	F	>120	F
LaGrange Road / 159th Street ★						
Eastbound	49	D ¹	98	F	74	E ²
Westbound	50	D ¹	103	F	61	E
Northbound	11	B	54	D ¹	69	E
Southbound	29	C ¹	41	D ¹	40	D ¹
<i>Intersection</i>	31	C	70	E	60	E
LaGrange Road / 161st Street ★						
Eastbound	50	D	48	D	53	D
Westbound	54	D	55+	E	53	D
Northbound	8	A	16	B	11	B
Southbound	1	A	39	D	1	A
<i>Intersection</i>	7	A	29	C	9	A
161st Street / East Access △						
Westbound (Left)	8	A	8	A	8	A
Northbound	9	A	9	A	9	A
161st Street / West Access △						
Westbound (Left)	7	A	8	A	8	A
Northbound	9	A	10-	A	9	A

★ -Signalized Intersection

△ -Minor-Leg Stop-Controlled Intersection

¹Left-turn movement operates at LOS E.

²Left-turn movement operates at LOS F.

³Right-turn and through movement operate at LOS E.

⁴Through movement operates at LOS E.

With the addition of background traffic growth, adjacent development's site traffic, and the Ravinia Avenue extension, the study intersections are expected to operate similar to Year 2033 no-build conditions with exceptions noted below. Consistent with existing conditions, most of the through movements on 159th Street and LaGrange Road would not meet IDOT criteria of LOS C or better for SRA routes.

At the intersection of 159th Street/Ravinia Avenue the eastbound approach is projected to operate at LOS E during the weekday evening peak hour (compared to LOS D under Year 2033 no-build conditions).

At the intersection of LaGrange Road/159th Street the eastbound and westbound approaches are projected to operate at LOS F during the weekday evening peak hour (compared to LOS E during no-build 2033 conditions), bringing the overall intersection to a LOS E (compared to LOS D during no-build 2033 conditions). The westbound and northbound approaches are projected to operate at LOS E during the weekday evening peak hour (compared to LOS D during no-build 2033 conditions), bringing the overall intersection to a LOS E (compared to LOS D during no-build 2033 conditions).

With the improvements identified at the LaGrange Road/161st Street intersection the westbound approach is projected to operate at LOS E during the weekday evening peak hour. The projected delay is a function of the traffic signal priority given to north-south through movements along the SRA route (i.e., LaGrange Road). As a result, relatively limited green time is allocated to 161st Street, which is projected to serve no more than 50 vehicles in a peak hour

Table 5.2 No-Build (2050) 95th Percentile Queue Lengths¹

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
159th Street / Ravinia Avenue ★					
Eastbound Left	270	420	240	558 ³	388 ²
Eastbound Through	--	--	193	453	433
Eastbound Right	185	385	45	158	138
Westbound Left	400	670	33	228	323
Westbound Through	--	--	260	428	478
Westbound Right	200	415	148	170	245 ²
Northbound Left	295	375	83	223	215
Northbound Through	--	--	18	158	165
Northbound Right	--	--	108	393	510
Southbound Left	165	240	188 ²	223 ²	210 ²
Southbound Through	--	--	15	130	215
Southbound Right	165	240	138	258 ³	250 ³
159th Street / North Private Drive △					
Eastbound Left	180	350	5	28	25
Westbound Right	175	275	0	0	0
Southbound Left	--	--	5	140	230
Southbound Right	90	180	8	35	55
LaGrange Road / 159th Street ★					
Eastbound Left	160	390	123	230 ²	373 ²
Eastbound Through	--	--	380	828	528
Eastbound Right	400	625	163	283	243
Westbound Left	185	435	135	223 ²	208 ²
Westbound Through	--	--	428	913	603
Westbound Right	460	605	228	273	420
Northbound Left	300	600	158	230	195
Northbound Through	--	--	80	563	745
Northbound Right	170	320	50	360 ³	360 ³
Southbound Left	185	400	138	323 ²	350 ²
Southbound Through	--	--	250	488	453
Southbound Right	135	265	80	248 ²	283 ³

Table 5.2 No-Build (2050) 95th Percentile Queue Lengths (continued)

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
LaGrange Road / 161 st Street △					
Eastbound Left	75	75	60	48	35
Eastbound Through	--	--	3	3	3
Eastbound Right	100	100	98 ³	248 ³	258 ³
Westbound Left	50	50	3	8	3
Westbound Through	50	50	0	0	0
Westbound Right	50	50	18	78 ³	45
Northbound Left	190	340	30	338 ²	80
Northbound Through	--	--	253	340	353
Northbound Right	--	--	280	375	390
Southbound Left	265	425	10	30	18
Southbound Through	--	--	5	718	10
Southbound Right	--	--	10	775	20
161 st Street / East Access △					
Westbound Left	--	--	5	8	3
Northbound	--	--	3	5	5
161 st Street / West Access △					
Westbound Left	--	--	0	0	0
Northbound	--	--	0	0	3

★ -Signalized Intersection △-Minor-Leg Stop-Controlled Intersection

¹Queue length in feet based on an assumed 25' vehicle.

²Exceeds storage lane length.

³Exceeds storage lane and taper length.

With the addition of background traffic growth through year 2050, adjacent development's site traffic, and the Ravinia Avenue extension, the projected 95th percentile queue spillback anticipated is expected to be consistent with no-build 2033 conditions with the following exceptions.

At the intersection of 159th Street/Ravinia Avenue during the weekday morning peak hour, the southbound left-turn queue is projected to exceed the storage space. Additionally, during the Saturday midday peak hour, the southbound right-turn queue is projected to exceed the overall turn lane length (inclusive of storage and taper).

At the intersection of 159th Street/LaGrange Road during the weekday evening and Saturday midday peak hour, the northbound right-turn queue is projected to exceed the overall turn lane length (inclusive of storage and taper). Additionally, during the Saturday midday peak hour the southbound right-turn queue is projected to exceed the overall turn lane length (inclusive of storage and taper).

At the intersection of LaGrange Road/161st Street during the weekday evening peak hour, the northbound left-turn queue is projected to exceed the turn lane storage.

Table 5.3. Future (2050) Build Levels of Service

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
159 th Street / Ravinia Avenue *						
Eastbound	19	B ¹	58	E ²	50	D ²
Westbound	17	B ¹	40	D ¹	61	E
Northbound	58	E	51	D ¹	52	D ¹
Southbound	44	D	37	D	36	D
Intersection	24	C	48	D	52	D
159 th Street / North Private Drive- Access B △						
Eastbound (Left)	11	B	15	B	14	B
Northbound	12	B	24	C	31	D
Southbound	19	C	>120	F	>120	F
LaGrange Road / 159 th Street *						
Eastbound	57	E	>120	F	>120	F
Westbound	55	D ⁶	95	F	65	E
Northbound	46	D ¹	55	D ⁶	95	F
Southbound	30	C ¹	42	D ¹	43	D ¹
Intersection	46	D	90	F	84	F
LaGrange Road / 161 st Street *						
Eastbound	50	D	45	D	43	D
Westbound	59	E	68	E	63	E
Northbound	13	B ¹	23	C ¹	27	C ¹
Southbound	27	C	39	D	8	A
Intersection	20	C	33	D	21	C
161 st Street / East Access △						
Westbound (Left)	8	A	9	A	9	A
Northbound	9	A	10+	B	11	B
161 st Street / West Access-Access D △						
Eastbound (Left)	8	A	8	A	9	A
Westbound (Left)	7	A	8	A	8	A
Northbound	10-	A	13	B	10-	A
Southbound	10-	A	16	C	38	E
159 th Street / Access A △						
Northbound	12	B	17	C	17	C
LaGrange Road / Access C △						
Eastbound	16	C	35	D	40	E

Table 5.3. Future (2050) Build Levels of Service (continued)

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Saturday Midday Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
161 st Street / Access E △						
Eastbound (Left)	8	A	8	A	8	A
Southbound	9	A	11	B	12	B
161 st Street / Access F △						
Eastbound (Left)	8	A	8	A	8	A
Southbound	9	A	12	B	12	B

★ -Signalized Intersection △ -Minor-Leg Stop-Controlled Intersection

¹Left-turn movement operates at LOS E.

²Left-turn movement operates at LOS F.

³Left-turn and through movements operate at LOS F.

⁴Right-turn and through movements operate at LOS E.

⁵Through movement operates at LOS E.

⁶Left-turn and through movements operate at LOS E.

The addition of site-generated traffic is not expected to materially impact the study intersections with installation of the geometric and traffic control improvements previously identified. Under the future build scenario, the intersections are generally projected to operate similar to no-build conditions or 2033 build conditions, with exceptions noted below.

The addition of site-generated traffic is not expected to materially impact the study intersections with installation of the geometric and traffic control improvements previously identified. Under the future build scenario, the intersections are generally projected to operate similar to no-build conditions or 2033 build conditions, with exceptions noted below.

The intersection of LaGrange Road/159th Street is projected to operate at LOS F during the weekday evening and Saturday midday peak hours, compared to LOS E under the Year 2050 no-build conditions. During the weekday morning peak hour, the eastbound approach is expected to operate at LOS E compared to LOS D under the Year 2050 no-build conditions. Additionally, the eastbound and northbound approaches are projected to operate at LOS F during the Saturday midday peak hour, compared to LOS E under the Year 2050 no-build conditions. The intersection is built out with dual left-turn lanes and dedicated right-turn lanes on each approach.

Access A, Access E, and Access F are projected to operate with acceptable delay at LOS D or better during the peak hours. During the Saturday midday peak hour, Access C and Access D is projected to operate at LOS E for outbound traffic.

Table 5.4 Build (2050) 95th Percentile Queue Lengths¹

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
159th Street / Ravinia Avenue ★					
Eastbound Left	270	420	240	558 ³	388 ²
Eastbound Through	--	--	198	503	515
Eastbound Right	185	385	33	123	153
Westbound Left	400	670	30	228	343
Westbound Through	--	--	257	423	545
Westbound Right	200	415	143	218 ²	310 ²
Northbound Left	295	375	98	288	323 ²
Northbound Through	--	--	23	190	215
Northbound Right	--	--	98	393	508
Southbound Left	165	240	183 ²	248 ³	258 ³
Southbound Through	--	--	15	133	223
Southbound Right	165	240	125	265 ³	258 ³
159th Street / North Private Drive △					
Eastbound Left	180	350	5	28	23
Eastbound Right	175	275	0	0	0
Westbound Right	175	275	0	0	0
Northbound Right	--	--	5	63	123
Southbound Left	--	--	8	168	275
Southbound Right	90	180	8	35	53
LaGrange Road / 159th Street ★					
Eastbound Left	160	390	148	328 ²	400 ³
Eastbound Through	--	--	435	1,280	1,008
Eastbound Right	400	625	195	333	308
Westbound Left	185	435	188	340 ²	373 ²
Westbound Through	--	--	463	845	580
Westbound Right	460	605	248	273	435
Northbound Left	300	600	208	248	210
Northbound Through	--	--	565	610	870
Northbound Right	170	320	345 ³	403 ³	405 ³
Southbound Left	185	400	150	323 ²	350 ²
Southbound Through	--	--	278	535	545
Southbound Right	135	265	85	248 ²	273 ³

Table 5.4 Build (2050) 95th Percentile Queue Lengths (continued)

Intersection	Storage Length Vehicles (feet)	Storage + Taper Length Vehicles (feet)	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Midday Peak Hour
LaGrange Road / 161st Street *					
Eastbound Left	75	75	95 ³	238 ³	315 ³
Eastbound Through	--	--	3	3	0
Eastbound Right	100	100	120 ³	345 ³	373 ³
Westbound Left	50	50	3	8	3
Westbound Through/Right	50	50	18	90 ³	53 ³
Northbound Left	350	570	135	298	355 ²
Northbound Through	--	--	278	383	433
Northbound Right	--	--	305	420	480
Southbound Left	265	425	13	38	30
Southbound Through	--	--	470	740	80
Southbound Right	--	--	498	815	128
161st Street / East Access △					
Westbound Left	--	--	5	10	5
Northbound	--	--	3	8	5
161st Street / West Access-Access D △					
Eastbound Left	--	--	0	0	0
Westbound Left	--	--	0	0	0
Northbound	--	--	0	0	3
Southbound	--	--	5	65	215
159th Street / Access A △					
Northbound Right	--	--	0	0	0
LaGrange Road / Access C △					
Eastbound Right	--	--	3	43	70
161st Street / Access E △					
Eastbound Left	--	--	0	0	0
Southbound	--	--	0	10	20
161st Street / Access F △					
Eastbound Left	--	--	0	0	0
Southbound	--	--	0	3	3

* -Signalized Intersection △ -Minor-Leg Stop-Controlled Intersection

¹Queue length in feet based on an assumed 25' vehicle.

²Exceeds storage lane length.

³Exceeds storage lane and taper length.

With the addition site-generated traffic the projected 95th percentile queue spillback anticipated is expected to be similar to no-build 2050 or 2033 build conditions with the following exceptions.

At the intersection of 159th Street/Ravinia Avenue during the weekday morning peak hour the southbound left-turn queue is projected to exceed the turn lane storage, while during weekday evening and Saturday midday peak hours, queue is projected to exceed the overall turn lane length (inclusive of storage and taper).

At the intersection of LaGrange Road/159th Street during the Saturday midday peak hour, the eastbound left-turn and southbound right-turn queues are projected to exceed the overall turn lane length (inclusive of storage and taper) by approximately 10 feet (less than one vehicle).

At the intersection of LaGrange Road/161st Street during the Saturday midday peak hour, the eastbound left-turn and westbound right-turn queues are expected to exceed the overall turn lane length (inclusive of storage and taper), with the northbound left-turn queue expected to exceed the turn lane storage, but would be accommodated for with the proposed geometry.

6. RECOMMENDATIONS & CONCLUSIONS

Based on Kimley-Horn's review of the proposed site plan and evaluation of existing and future traffic conditions, the following recommendations were identified to facilitate access to the site and limit the impact of the proposed development on the surrounding area's traffic conditions:

Year 2033 No-Build

Ravinia Avenue Extension

- Per coordination with the Village of Orland Park, Ravinia Avenue will be extended east to connect to 161st Street by 2033.

159th Street / Ravinia Avenue

- Install an eastbound right-turn lane. Per design standards outlined in the IDOT *BDE Manual*, the turn lane should provide 185 feet of storage with a 200-foot taper.
- The eastbound right-turn lanes should be considered with the Ravinia Avenue extension.

Year 2033 Build

LaGrange Road / 159th Street

- Consider signal timing adjustments to limit queue spillback of the eastbound left-turn movement.

159th Street / Ravinia Avenue

- Install an additional northbound left-turn lane. To accommodate 95th percentile queues, the left-turn lane storage should be a minimum of 320 feet and based on space constraints a taper length of 100 feet should be provided.
- The dual northbound left-turn lanes should be considered with the Ravinia Avenue extension.

LaGrange Street / 161st Street

- Install a traffic signal. Per IDOT standards, the traffic signal will be installed once traffic volumes satisfy *MUTCD* warrant criteria. Based upon coordination with the Village of Orland Park, the intersection is currently under design for signal control and should be designed per IDOT standards.
- Install an additional northbound left-turn lane. To accommodate 95th percentile queues, the left-turn lane storage should be a minimum of 350 feet with a 220-foot taper per the IDOT *BDE Manual*.
- The dual northbound left-turn lanes should be considered with the Ravinia Avenue extension and/or signal plans currently under design at the intersection.

159th Street / Access A

- Limit access to RIRO movements only. Install "No Left Turn" signage for outbound traffic.
- Provide a single inbound and a single outbound lane.
- Design Access A to accommodate truck turning movements.
- Install minor-leg stop control with a stop bar for outbound traffic.

159th Street / North Private Drive-Access B

- Limit access to RIRO movements only. Install “No Left Turn” signage for outbound traffic.
- Provide an eastbound right-turn lane. Based on the spacing distance from Access A, the turn lane should provide 175 feet of storage with a 100-foot taper.
- Design Access B to include a single inbound lane and a single outbound lane.
- Install minor-leg stop control with a stop bar for outbound traffic.
- Install “Do Not Block Intersection” signage for northbound traffic approaching the internal/onsite intersection south of 159th Street in order to maintain free-flow condition for inbound site traffic.

LaGrange Road / Access C

- Provide a southbound right-turn lane. Per design standards outlined in the IDOT *BDE Manual*, the turn lane should provide 185 feet of storage with a 200-foot taper.
- Design Access C to accommodate RIRO movements only. Install “No Left Turn” signage for outbound traffic.
- Provide a single inbound and a single outbound lane.
- Install minor-leg stop control with a stop bar for outbound traffic.

161st Street / West Access-Access D

- Provide a westbound right-turn lane. Based on the spacing distance between Access D and East Access, the turn lane should provide 90 feet of storage with a 25-foot taper.
- Provide a single inbound lane and a single outbound lane.
- Install minor-leg stop control with a stop bar for outbound traffic.
- Install “Do Not Block Intersection” signage for southbound traffic approaching the internal/onsite intersection north of 161st Street in order to maintain free-flow condition for inbound site traffic.

161st Street / Access E

- Provide a single inbound lane and a single outbound lane.
- Install minor-leg stop control with stop bars for outbound traffic.

161st Street / Access F

- Provide a single inbound lane and a single outbound lane.
- Install minor-leg stop control with stop bars for outbound traffic.

Regardless of the final configuration of the intersection geometrics, several additional items should be taken into consideration when preparing site and roadway improvement plans for the subject development. As the site design progresses, care should be taken with landscaping, signage, and monumentation at the site access locations to ensure that adequate horizontal sight distance is maintained. If alterations to the site plan or land use should occur, changes to the analysis provided within this traffic impact study may be needed.

APPENDIX

Site Plan

Traffic Count Data

Existing Year (2025) Capacity Reports

Data from ITE *Trip Generation Manual*, 11th Edition

Background Development Traffic Impact Studies

Ravinia Avenue Rerouting

Edition CMAP Year 2050 Traffic Projections

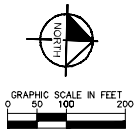
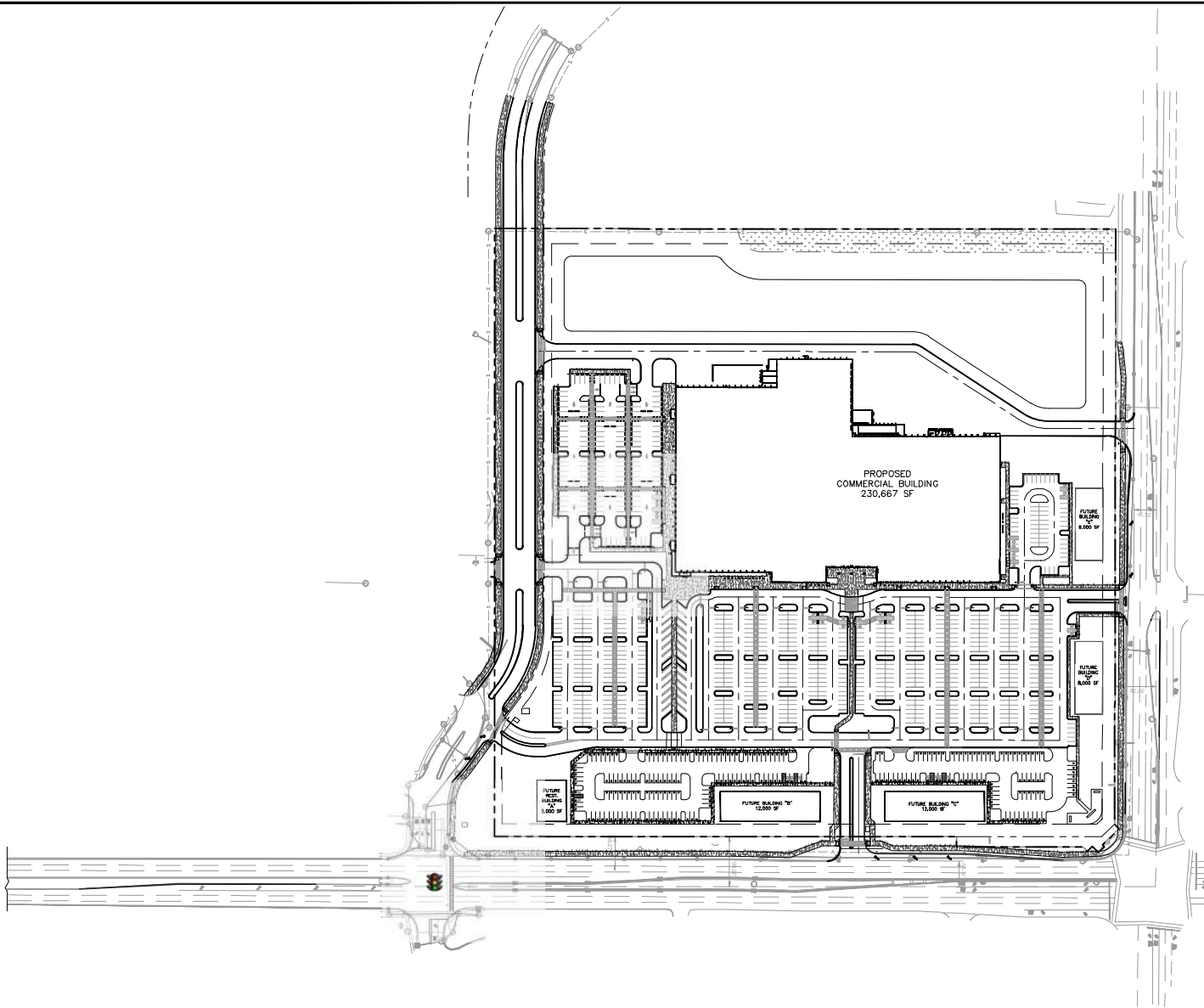
Future (2033) No-Build Capacity Reports

Future (2033) Build Capacity Reports

Future (2050) No-Build Capacity Reports

Future (2050) Build Capacity Reports

SITE PLAN



GENERAL NOTES

1. ALL DIMENSIONS REFER TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
2. BUILDING DIMENSIONS ARE TO THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
3. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS TO VERIFY ALL BUILDING DIMENSIONS.
4. RADIi ADJACENT TO PARKING STALL AND NOT DIMENSIONED ON THIS PLAN SHALL BE 3- FEET, TYPICAL.
5. ALL PROPOSED ON-SITE STRIPING SHALL BE PAINTED UNLESS OTHERWISE NOTED.

SITE DATA TABLE

SITE INFORMATION			
TOTAL SITE AREA	=	36.05 AC	(1,526,540 SF)
TOTAL DEVELOPMENT AREA	=	34.24 AC	(1,491,367 SF)
IMPERVIOUS AREA	=	21.07 AC	(917,809 SF) 63% OF DEVELOPMENT AREA
PERVIOUS AREA	=	10.38 AC	(453,153 SF) 31% OF DEVELOPMENT AREA
BIORETENTION AREA	=	3.60 AC	(156,578 SF) 11% OF DEVELOPMENT AREA

<u>ZONING</u>	
EXISTING ZONING:	COR MIXED USE DISTRICT
PROPOSED ZONING:	COR MIXED USE DISTRICT
EXISTING LAND USE:	VACANT
PROPOSED LAND USE:	COMMERCIAL

<u>BUILDING SETBACKS:</u>	<u>REQUIRED</u>	<u>PROVIDED</u>
LaGRANGE ROAD:	25 FT	507.4 FT
150th STREET:	25 FT	234.8 FT
161st STREET:	15 FT	359.1 FT
REAR:	30 FT	265.8 FT

PARKING DIMENSION:	9' X 18'
DRIVE AISLE WIDTH:	24" MIN.

PARKING SUMMARY

FLOOR AREA	= 230,677 SF
PARKING REQUIRED (1 SPACE PER 250 SF)	= 922 SPACES
PARKING PROVIDED	= 857 SPACES
STANDARD PARKING PROVIDED	= 829 SPACES
ADA PARKING REQUIRED	= 17 SPACES
ADA PARKING PROVIDED	= 28 SPACES

PAVING AND CURB LEGEND

	<u>STANDARD DUTY ASPHALT PAVEMENT</u>
	<u>HEAVY DUTY ASPHALT PAVEMENT</u>
	<u>CONCRETE SIDEWALK</u>
	<u>CONCRETE CURB AND GUTTER</u>

TRAFFIC COUNT DATA

159th Street & LaGrange Road - TMC

Wed Apr 30, 2025

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291682, Location: 41.601381, -87.852861



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							LaGrange Rd Northbound							LaGrange Rd Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-04-30 6:00AM	15	39	26	0	80	0		28	76	23	0	127	0		20	165	17	0	202	0		16	107	9	0	132	0		541
6:15AM	22	46	28	0	96	1		23	84	32	0	139	0		36	221	26	0	283	0		10	127	15	0	152	0		670
6:30AM	19	74	39	0	132	0		29	98	38	0	165	0		31	229	29	1	290	0		15	131	16	0	162	0		749
6:45AM	30	82	39	0	151	0		26	98	32	1	157	0		51	299	40	0	390	0		28	150	20	0	198	0		896
Hourly Total	86	241	132	0	459	1		106	356	125	1	588	0		138	914	112	1	1165	0		69	515	60	0	644	0		2856
7:00AM	35	88	46	0	169	0		35	120	39	1	195	0		56	266	48	0	370	0		32	137	14	0	183	0		917
7:15AM	39	127	44	0	210	0		38	133	39	2	212	0		49	328	43	0	420	0		34	208	18	0	260	0		1102
7:30AM	33	149	60	0	242	1		45	170	52	0	267	0		65	289	62	0	416	0		38	197	30	0	265	0		1190
7:45AM	30	145	48	0	223	0		36	158	40	1	235	0		76	326	63	0	465	0		59	198	18	1	276	0		1199
Hourly Total	137	509	198	0	844	1		154	581	170	4	909	0		246	1209	216	0	1671	0		163	740	80	1	984	0		4408
8:00AM	35	147	33	0	215	1		44	162	41	2	249	0		62	279	60	1	402	0		31	155	19	0	205	0		1071
8:15AM	26	118	47	0	191	0		35	120	53	2	210	0		80	292	68	0	440	0		38	202	30	4	274	0		1115
8:30AM	41	122	44	1	208	0		51	149	52	1	253	0		62	243	66	0	371	0		35	215	18	1	269	0		1101
8:45AM	41	136	47	0	224	0		51	119	41	2	213	0		97	289	74	0	460	0		47	186	29	2	264	0		1161
Hourly Total	143	523	171	1	838	1		181	550	187	7	925	0		301	1103	268	1	1673	0		151	758	96	7	1012	0		4448
3:00PM	43	129	80	0	252	0		62	170	45	3	280	0		92	267	66	0	425	1		83	252	54	1	390	0		1347
3:15PM	48	165	66	0	279	0		54	147	53	1	255	0		92	273	48	0	413	0		90	236	47	1	374	0		1321
3:30PM	41	162	82	0	285	0		63	160	58	4	285	0		96	329	72	0	497	0		86	248	65	0	399	0		1466
3:45PM	58	178	82	0	318	0		46	178	64	0	288	0		79	326	77	0	482	0		73	229	37	0	339	2		1427
Hourly Total	190	634	310	0	1134	0		225	655	220	8	1108	0		359	1195	263	0	1817	1		332	965	203	2	1502	2		5561
4:00PM	38	174	79	1	292	0		69	184	54	2	309	0		103	310	79	1	493	0		97	394	63	0	554	0		1648
4:15PM	52	168	83	0	303	0		54	180	62	4	300	0		107	296	56	0	459	0		74	283	57	1	415	0		1477
4:30PM	36	179	85	1	301	0		58	157	65	7	287	0		85	310	70	0	465	0		88	337	66	1	492	0		1545
4:45PM	44	195	78	0	317	0		51	188	52	4	295	0		93	277	88	0	458	0		64	303	55	2	424	0		1494
Hourly Total	170	716	325	2	1213	0		232	709	233	17	1191	0		388	1193	293	1	1875	0		323	1317	241	4	1885	0		6164
5:00PM	67	189	99	0	355	0		65	228	52	5	350	0		98	313	53	0	464	0		101	329	79	2	511	0		1680
5:15PM	51	192	81	0	324	0		63	229	68	3	363	0		97	281	63	0	441	0		81	284	48	0	413	0		1541
5:30PM	58	194	91	0	343	0		56	219	57	0	332	0		95	304	80	0	479	0		112	299	61	1	473	0		1627
5:45PM	54	178	92	0	324	0		58	194	66	3	321	0		97	295	64	0	456	0		86	288	49	1	424	0		1525
Hourly Total	230	753	363	0	1346	0		242	870	243	11	1366	0		387	1193	260	0	1840	0		380	1200	237	4	1821	0		6373
Total	956	3376	1499	3	5834	3		1140	3721	1178	48	6087	0		1819	6807	1412	3	10041	1		1418	5495	917	18	7848	2		29810
% Approach	16.4%	57.9%	25.7%	0.1%	-	-		18.7%	61.1%	19.4%	0.8%	-	-		18.1%	67.8%	14.1%	0%	-	-		18.1%	70.0%	11.7%	0.2%	-	-	-	
% Total	3.2%	11.3%	5.0%	0%	19.6%	-		3.8%	12.5%	4.0%	0.2%	20.4%	-		6.1%	22.8%	4.7%	0%	33.7%	-		4.8%	18.4%	3.1%	0.1%	26.3%	-		-
Lights	926	3288	1446	3	5663	-		1106	3626	1161	48	5941	-		1771	6622	1369	3	9765	-		1396	5313	889	18	7616	-		28985
% Lights	96.9%	97.4%	96.5%	100%	97.1%	-		97.0%	97.4%	98.6%	100%	97.6%	-		97.4%	97.3%	97.0%	100%	97.3%	-		98.4%	96.7%	96.9%	100%	97.0%	-		97.2%
Articulated Trucks	14	23	22	0	59	-		8	30	3	0	41	-		12	65	13	0	90	-		5	66	14	0	85	-		275
% Articulated Trucks	1.5%	0.7%	1.5%	0%	1.0%	-		0.7%	0.8%	0.3%	0%	0.7%	-		0.7%	1.0%	0.9%	0%	0.9%	-		0.4%	1.2%	1.5%	0%	1.1%	-		0.9%
Buses and Single-Unit Trucks	16	63	31	0	110	-		26	65	14	0	105	-		36	120	30	0	186	-		17	116	14	0	147	-		548
% Buses and Single-Unit Trucks	1.7%	1.9%	2.1%	0%	1.9%	-		2.3%	1.7%	1.2%	0%	1.7%	-		2.0%	1.8%	2.1%	0%	1.9%	-		1.2%	2.1%	1.5%	0%	1.9%	-		1.8%
Bicycles on Road	0	2	0	0	2	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		2
% Bicycles on Road	0%	0.1%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	3		-	-	-	-	-	0		-	-	-	-	-	1		-	-	-	-	-	1		-
% Pedestrians	-	-	-	-	-	100%		-	-	-	-	-	-		-	-	-	-	-	100%		-	-	-	-	-	50.0%		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	1		-
% Bicycles on Crosswalk	-	-	-	-	-	0%		-	-	-	-	-	-		-	-	-	-	-	0%		-	-	-	-	-	50.0%		-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & LaGrange Road - TMC

Wed Apr 30, 2025

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291682, Location: 41.601381, -87.852861



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound						159th St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-04-30 7:30AM	33	149	60	0	242	1	45	170	52	0	267	0	65	289	62	0	416	0	38	197	30	0	265	0	1190
7:45AM	30	145	48	0	223	0	36	158	40	1	235	0	76	326	63	0	465	0	59	198	18	1	276	0	1199
8:00AM	35	147	33	0	215	1	44	162	41	2	249	0	62	279	60	1	402	0	31	155	19	0	205	0	1071
8:15AM	26	118	47	0	191	0	35	120	53	2	210	0	80	292	68	0	440	0	38	202	30	4	274	0	1115
Total	124	559	188	0	871	2	160	610	186	5	961	0	283	1186	253	1	1723	0	166	752	97	5	1020	0	4575
% Approach	14.2%	64.2%	21.6%	0%	-	-	16.6%	63.5%	19.4%	0.5%	-	-	16.4%	68.8%	14.7%	0.1%	-	-	16.3%	73.7%	9.5%	0.5%	-	-	-
% Total	2.7%	12.2%	4.1%	0%	19.0%	-	3.5%	13.3%	4.1%	0.1%	21.0%	-	6.2%	25.9%	5.5%	0%	37.7%	-	3.6%	16.4%	2.1%	0.1%	22.3%	-	-
PHF	0.886	0.938	0.783	-	0.900	-	0.889	0.897	0.877	0.625	0.900	-	0.884	0.910	0.930	0.250	0.926	-	0.703	0.931	0.808	0.313	0.924	-	0.954
Lights	118	533	173	0	824	-	156	573	181	5	915	-	274	1133	249	1	1657	-	155	702	93	5	955	-	4351
% Lights	95.2%	95.3%	92.0%	0%	94.6%	-	97.5%	93.9%	97.3%	100%	95.2%	-	96.8%	95.5%	98.4%	100%	96.2%	-	93.4%	93.4%	95.9%	100%	93.6%	-	95.1%
Articulated Trucks	3	4	5	0	12	-	1	8	1	0	10	-	3	18	2	0	23	-	2	19	2	0	23	-	68
% Articulated Trucks	2.4%	0.7%	2.7%	0%	1.4%	-	0.6%	1.3%	0.5%	0%	1.0%	-	1.1%	1.5%	0.8%	0%	1.3%	-	1.2%	2.5%	2.1%	0%	2.3%	-	1.5%
Buses and Single-Unit Trucks	3	22	10	0	35	-	3	29	4	0	36	-	6	35	2	0	43	-	9	31	2	0	42	-	156
% Buses and Single-Unit Trucks	2.4%	3.9%	5.3%	0%	4.0%	-	1.9%	4.8%	2.2%	0%	3.7%	-	2.1%	3.0%	0.8%	0%	2.5%	-	5.4%	4.1%	2.1%	0%	4.1%	-	3.4%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & LaGrange Road - TMC

Wed Apr 30, 2025

Forced Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291682, Location: 41.601381, -87.852861



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound						159th St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-04-30 4:45PM	44	195	78	0	317	0	51	188	52	4	295	0	93	277	88	0	458	0	64	303	55	2	424	0	1494
5:00PM	67	189	99	0	355	0	65	228	52	5	350	0	98	313	53	0	464	0	101	329	79	2	511	0	1680
5:15PM	51	192	81	0	324	0	63	229	68	3	363	0	97	281	63	0	441	0	81	284	48	0	413	0	1541
5:30PM	58	194	91	0	343	0	56	219	57	0	332	0	95	304	80	0	479	0	112	299	61	1	473	0	1627
Total	220	770	349	0	1339	0	235	864	229	12	1340	0	383	1175	284	0	1842	0	358	1215	243	5	1821	0	6342
% Approach	16.4%	57.5%	26.1%	0%	-	-	17.5%	64.5%	17.1%	0.9%	-	-	20.8%	63.8%	15.4%	0%	-	-	19.7%	66.7%	13.3%	0.3%	-	-	-
% Total	3.5%	12.1%	5.5%	0%	21.1%	-	3.7%	13.6%	3.6%	0.2%	21.1%	-	6.0%	18.5%	4.5%	0%	29.0%	-	5.6%	19.2%	3.8%	0.1%	28.7%	-	-
PHF	0.821	0.987	0.881	-	0.943	-	0.904	0.943	0.842	0.600	0.923	-	0.977	0.938	0.807	-	0.961	-	0.799	0.923	0.769	0.625	0.891	-	0.944
Lights	219	764	348	0	1331	-	233	855	229	12	1329	-	379	1165	280	0	1824	-	356	1202	239	5	1802	-	6286
% Lights	99.5%	99.2%	99.7%	0%	99.4%	-	99.1%	99.0%	100%	100%	99.2%	-	99.0%	99.1%	98.6%	0%	99.0%	-	99.4%	98.9%	98.4%	100%	99.0%	-	99.1%
Articulated Trucks	0	3	1	0	4	-	2	1	0	0	3	-	0	5	2	0	7	-	0	5	3	0	8	-	22
% Articulated Trucks	0%	0.4%	0.3%	0%	0.3%	-	0.9%	0.1%	0%	0%	0.2%	-	0%	0.4%	0.7%	0%	0.4%	-	0%	0.4%	1.2%	0%	0.4%	-	0.3%
Buses and Single-Unit Trucks	1	3	0	0	4	-	0	8	0	0	8	-	4	5	2	0	11	-	2	8	1	0	11	-	34
% Buses and Single-Unit Trucks	0.5%	0.4%	0%	0%	0.3%	-	0%	0.9%	0%	0%	0.6%	-	1.0%	0.4%	0.7%	0%	0.6%	-	0.6%	0.7%	0.4%	0%	0.6%	-	0.5%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & LaGrange Road - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291690, Location: 41.601263, -87.852819



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound						159th St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-05-03 11:00AM	75	158	57	0	290	0	51	166	80	2	299	0	102	278	59	0	439	0	83	238	53	0	374	0	1402
11:15AM	74	167	87	1	329	0	49	162	90	2	303	0	86	325	79	0	490	0	103	256	65	0	424	0	1546
11:30AM	66	165	80	0	311	0	52	176	76	4	308	0	101	353	61	0	515	0	92	236	57	1	386	0	1520
11:45AM	70	160	94	1	325	0	54	186	85	2	327	0	107	365	82	0	554	0	94	269	62	0	425	0	1631
Hourly Total	285	650	318	2	1255	0	206	690	331	10	1237	0	396	1321	281	0	1998	0	372	999	237	1	1609	0	6099
12:00PM	62	158	78	0	298	0	55	186	70	2	313	0	104	319	64	0	487	0	116	273	68	3	460	0	1558
12:15PM	72	162	81	0	315	0	60	175	72	0	307	0	115	321	66	0	502	0	98	293	72	1	464	0	1588
12:30PM	82	172	102	0	356	0	51	168	102	2	323	0	80	325	57	0	462	0	84	271	73	1	429	0	1570
12:45PM	74	149	84	0	307	0	45	168	79	4	296	0	109	301	65	0	475	0	94	300	55	2	451	0	1529
Hourly Total	290	641	345	0	1276	0	211	697	323	8	1239	0	408	1266	252	0	1926	0	392	1137	268	7	1804	0	6245
1:00PM	78	161	84	3	326	0	56	195	84	3	338	0	99	342	77	0	518	0	116	326	64	0	506	0	1688
1:15PM	80	163	73	1	317	0	63	182	85	5	335	0	105	329	64	0	498	0	107	282	89	0	478	1	1628
1:30PM	75	172	74	2	323	0	43	188	78	2	311	1	69	386	72	0	527	0	91	273	63	1	428	1	1589
1:45PM	74	161	87	1	323	0	61	166	104	6	337	0	88	363	61	0	512	0	94	265	69	0	428	1	1600
Hourly Total	307	657	318	7	1289	0	223	731	351	16	1321	1	361	1420	274	0	2055	0	408	1146	285	1	1840	3	6505
Total	882	1948	981	9	3820	0	640	2118	1005	34	3797	1	1165	4007	807	0	5979	0	1172	3282	790	9	5253	3	18849
% Approach	23.1%	51.0%	25.7%	0.2%	-	-	16.9%	55.8%	26.5%	0.9%	-	-	19.5%	67.0%	13.5%	0%	-	-	22.3%	62.5%	15.0%	0.2%	-	-	-
% Total	4.7%	10.3%	5.2%	0%	20.3%	-	3.4%	11.2%	5.3%	0.2%	20.1%	-	6.2%	21.3%	4.3%	0%	31.7%	-	6.2%	17.4%	4.2%	0%	27.9%	-	-
Lights	879	1944	970	9	3802	-	633	2107	1002	34	3776	-	1150	3977	801	0	5928	-	1167	3250	782	9	5208	-	18714
% Lights	99.7%	99.8%	98.9%	100%	99.5%	-	98.9%	99.5%	99.7%	100%	99.4%	-	98.7%	99.3%	99.3%	0%	99.1%	-	99.6%	99.0%	99.0%	100%	99.1%	-	99.3%
Articulated Trucks	0	1	4	0	5	-	3	3	2	0	8	-	3	9	4	0	16	-	2	10	2	0	14	-	43
% Articulated Trucks	0%	0.1%	0.4%	0%	0.1%	-	0.5%	0.1%	0.2%	0%	0.2%	-	0.3%	0.2%	0.5%	0%	0.3%	-	0.2%	0.3%	0.3%	0%	0.3%	-	0.2%
Buses and Single-Unit Trucks	3	3	7	0	13	-	4	8	1	0	13	-	12	21	2	0	35	-	3	22	6	0	31	-	92
% Buses and Single-Unit Trucks	0.3%	0.2%	0.7%	0%	0.3%	-	0.6%	0.4%	0.1%	0%	0.3%	-	1.0%	0.5%	0.2%	0%	0.6%	-	0.3%	0.7%	0.8%	0%	0.6%	-	0.5%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & LaGrange Road - TMC

Sat May 3, 2025

Midday Peak (WKND), PM Peak (WKND), Forced Peak (1 PM - 2 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291690, Location: 41.601263, -87.852819



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound						159th St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-05-03 1:00PM	78	161	84	3	326	0	56	195	84	3	338	0	99	342	77	0	518	0	116	326	64	0	506	0	1688
1:15PM	80	163	73	1	317	0	63	182	85	5	335	0	105	329	64	0	498	0	107	282	89	0	478	1	1628
1:30PM	75	172	74	2	323	0	43	188	78	2	311	1	69	386	72	0	527	0	91	273	63	1	428	1	1589
1:45PM	74	161	87	1	323	0	61	166	104	6	337	0	88	363	61	0	512	0	94	265	69	0	428	1	1600
Total	307	657	318	7	1289	0	223	731	351	16	1321	1	361	1420	274	0	2055	0	408	1146	285	1	1840	3	6505
% Approach	23.8%	51.0%	24.7%	0.5%	-	-	16.9%	55.3%	26.6%	1.2%	-	-	17.6%	69.1%	13.3%	0%	-	-	22.2%	62.3%	15.5%	0.1%	-	-	-
% Total	4.7%	10.1%	4.9%	0.1%	19.8%	-	3.4%	11.2%	5.4%	0.2%	20.3%	-	5.5%	21.8%	4.2%	0%	31.6%	-	6.3%	17.6%	4.4%	0%	28.3%	-	-
PHF	0.959	0.955	0.914	0.583	0.988	-	0.885	0.937	0.844	0.667	0.977	-	0.860	0.920	0.890	-	0.975	-	0.879	0.879	0.801	0.250	0.909	-	0.963
Lights	307	655	316	7	1285	-	220	729	351	16	1316	-	356	1409	271	0	2036	-	405	1133	282	1	1821	-	6458
% Lights	100%	99.7%	99.4%	100%	99.7%	-	98.7%	99.7%	100%	100%	99.6%	-	98.6%	99.2%	98.9%	0%	99.1%	-	99.3%	98.9%	98.9%	100%	99.0%	-	99.3%
Articulated Trucks	0	1	1	0	2	-	2	1	0	0	3	-	1	4	1	0	6	-	1	5	1	0	7	-	18
% Articulated Trucks	0%	0.2%	0.3%	0%	0.2%	-	0.9%	0.1%	0%	0%	0.2%	-	0.3%	0.3%	0.4%	0%	0.3%	-	0.2%	0.4%	0.4%	0%	0.4%	-	0.3%
Buses and Single-Unit Trucks	0	1	1	0	2	-	1	1	0	0	2	-	4	7	2	0	13	-	2	8	2	0	12	-	29
% Buses and Single-Unit Trucks	0%	0.2%	0.3%	0%	0.2%	-	0.4%	0.1%	0%	0%	0.2%	-	1.1%	0.5%	0.7%	0%	0.6%	-	0.5%	0.7%	0.7%	0%	0.7%	-	0.4%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & North Private Drive - TMC

Wed Apr 30, 2025

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291684, Location: 41.60136, -87.855002



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound					159th St Westbound					Private Dr Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 6:00AM	2	82	0	84	0	102	4	0	106	0	1	2	0	3	0	193
6:15AM	3	99	0	102	0	129	1	1	131	0	1	3	0	4	1	237
6:30AM	5	120	0	125	0	148	2	0	150	0	0	6	0	6	0	281
6:45AM	6	153	0	159	0	155	8	0	163	0	1	10	0	11	0	333
Hourly Total	16	454	0	470	0	534	15	1	550	0	3	21	0	24	1	1044
7:00AM	5	168	1	174	0	185	5	0	190	0	0	10	0	10	0	374
7:15AM	10	189	1	200	0	194	6	1	201	0	1	9	0	10	0	411
7:30AM	5	197	0	202	0	243	3	2	248	0	0	9	0	9	1	459
7:45AM	12	209	0	221	0	255	11	1	267	0	0	6	0	6	0	494
Hourly Total	32	763	2	797	0	877	25	4	906	0	1	34	0	35	1	1738
8:00AM	6	195	0	201	0	218	11	2	231	0	4	10	0	14	0	446
8:15AM	13	196	1	210	0	230	10	1	241	0	1	13	0	14	0	465
8:30AM	15	200	0	215	0	206	17	2	225	0	0	10	0	10	0	450
8:45AM	19	232	0	251	0	231	18	1	250	0	2	7	0	9	0	510
Hourly Total	53	823	1	877	0	885	56	6	947	0	7	40	0	47	0	1871
3:00PM	16	248	2	266	0	288	23	6	317	0	4	27	0	31	0	614
3:15PM	25	266	0	291	0	270	24	2	296	0	3	23	0	26	0	613
3:30PM	27	244	0	271	0	299	36	1	336	0	7	26	0	33	0	640
3:45PM	25	300	0	325	0	269	30	1	300	0	8	18	0	26	0	651
Hourly Total	93	1058	2	1153	0	1126	113	10	1249	0	22	94	0	116	0	2518
4:00PM	19	280	1	300	0	327	30	0	357	0	8	19	0	27	0	684
4:15PM	18	284	1	303	0	316	29	2	347	0	7	26	0	33	0	683
4:30PM	27	303	0	330	0	297	28	1	326	0	4	27	0	31	0	687
4:45PM	30	298	0	328	0	321	26	2	349	0	5	26	0	31	0	708
Hourly Total	94	1165	2	1261	0	1261	113	5	1379	0	24	98	0	122	0	2762
5:00PM	25	308	0	333	0	308	32	0	340	0	10	22	0	32	0	705
5:15PM	30	338	1	369	0	337	31	1	369	0	8	28	0	36	0	774
5:30PM	23	323	1	347	0	299	23	1	323	0	7	25	0	32	0	702
5:45PM	24	290	0	314	0	303	30	5	338	0	6	17	0	23	0	675
Hourly Total	102	1259	2	1363	0	1247	116	7	1370	0	31	92	0	123	0	2856
Total	390	5522	9	5921	0	5930	438	33	6401	0	88	379	0	467	2	12789
% Approach	6.6%	93.3%	0.2%	-	-	92.6%	6.8%	0.5%	-	-	18.8%	81.2%	0%	-	-	-
% Total	3.0%	43.2%	0.1%	46.3%	-	46.4%	3.4%	0.3%	50.1%	-	0.7%	3.0%	0%	3.7%	-	-
Lights	389	5355	8	5752	-	5759	433	33	6225	-	85	376	0	461	-	12438
% Lights	99.7%	97.0%	88.9%	97.1%	-	97.1%	98.9%	100%	97.3%	-	96.6%	99.2%	0%	98.7%	-	97.3%
Articulated Trucks	0	56	0	56	-	54	0	0	54	-	1	0	0	1	-	111
% Articulated Trucks	0%	1.0%	0%	0.9%	-	0.9%	0%	0%	0.8%	-	1.1%	0%	0%	0.2%	-	0.9%
Buses and Single-Unit Trucks	1	111	1	113	-	117	5	0	122	-	2	3	0	5	-	240
% Buses and Single-Unit Trucks	0.3%	2.0%	11.1%	1.9%	-	2.0%	1.1%	0%	1.9%	-	2.3%	0.8%	0%	1.1%	-	1.9%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & North Private Drive - TMC

Wed Apr 30, 2025

Forced Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291684, Location: 41.60136, -87.855002



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound					159th St Westbound					Private Dr Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 7:30AM	5	197	0	202	0	243	3	2	248	0	0	9	0	9	1	459
7:45AM	12	209	0	221	0	255	11	1	267	0	0	6	0	6	0	494
8:00AM	6	195	0	201	0	218	11	2	231	0	4	10	0	14	0	446
8:15AM	13	196	1	210	0	230	10	1	241	0	1	13	0	14	0	465
Total	36	797	1	834	0	946	35	6	987	0	5	38	0	43	1	1864
% Approach	4.3%	95.6%	0.1%	-	-	95.8%	3.5%	0.6%	-	-	11.6%	88.4%	0%	-	-	-
% Total	1.9%	42.8%	0.1%	44.7%	-	50.8%	1.9%	0.3%	53.0%	-	0.3%	2.0%	0%	2.3%	-	-
PHF	0.692	0.953	0.250	0.943	-	0.927	0.795	0.750	0.924	-	0.313	0.731	-	0.768	-	0.943
Lights	36	747	1	784	-	897	35	6	938	-	5	38	0	43	-	1765
% Lights	100%	93.7%	100%	94.0%	-	94.8%	100%	100%	95.0%	-	100%	100%	0%	100%	-	94.7%
Articulated Trucks	0	13	0	13	-	17	0	0	17	-	0	0	0	0	-	30
% Articulated Trucks	0%	1.6%	0%	1.6%	-	1.8%	0%	0%	1.7%	-	0%	0%	0%	0%	-	1.6%
Buses and Single-Unit Trucks	0	37	0	37	-	32	0	0	32	-	0	0	0	0	-	69
% Buses and Single-Unit Trucks	0%	4.6%	0%	4.4%	-	3.4%	0%	0%	3.2%	-	0%	0%	0%	0%	-	3.7%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & North Private Drive - TMC

Wed Apr 30, 2025

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291684, Location: 41.60136, -87.855002



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound					159th St Westbound					Private Dr Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 4:45PM	30	298	0	328	0	321	26	2	349	0	5	26	0	31	0	708
5:00PM	25	308	0	333	0	308	32	0	340	0	10	22	0	32	0	705
5:15PM	30	338	1	369	0	337	31	1	369	0	8	28	0	36	0	774
5:30PM	23	323	1	347	0	299	23	1	323	0	7	25	0	32	0	702
Total	108	1267	2	1377	0	1265	112	4	1381	0	30	101	0	131	0	2889
% Approach	7.8%	92.0%	0.1%	-	-	91.6%	8.1%	0.3%	-	-	22.9%	77.1%	0%	-	-	-
% Total	3.7%	43.9%	0.1%	47.7%	-	43.8%	3.9%	0.1%	47.8%	-	1.0%	3.5%	0%	4.5%	-	-
PHF	0.900	0.937	0.500	0.933	-	0.938	0.875	0.500	0.936	-	0.750	0.902	-	0.910	-	0.933
Lights	108	1257	2	1367	-	1250	111	4	1365	-	30	101	0	131	-	2863
% Lights	100%	99.2%	100%	99.3%	-	98.8%	99.1%	100%	98.8%	-	100%	100%	0%	100%	-	99.1%
Articulated Trucks	0	6	0	6	-	2	0	0	2	-	0	0	0	0	-	8
% Articulated Trucks	0%	0.5%	0%	0.4%	-	0.2%	0%	0%	0.1%	-	0%	0%	0%	0%	-	0.3%
Buses and Single-Unit Trucks	0	4	0	4	-	13	1	0	14	-	0	0	0	0	-	18
% Buses and Single-Unit Trucks	0%	0.3%	0%	0.3%	-	1.0%	0.9%	0%	1.0%	-	0%	0%	0%	0%	-	0.6%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & North Private Drive - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291689, Location: 41.601279, -87.854986



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound					159th St Westbound					Private Dr Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2025-05-03 11:00AM	32	289	0	321	0	291	26	0	317	0	5	27	0	32	0	670
11:15AM	39	308	0	347	0	292	37	0	329	0	8	27	0	35	0	711
11:30AM	35	319	0	354	0	294	48	2	344	0	2	33	0	35	0	733
11:45AM	30	304	0	334	0	325	43	1	369	0	6	32	0	38	0	741
Hourly Total	136	1220	0	1356	0	1202	154	3	1359	0	21	119	0	140	0	2855
12:00PM	24	299	0	323	0	321	48	0	369	0	12	28	0	40	0	732
12:15PM	33	306	0	339	0	323	39	0	362	0	5	33	0	38	0	739
12:30PM	33	338	0	371	0	283	37	1	321	0	10	29	0	39	0	731
12:45PM	33	287	0	320	0	293	49	1	343	0	8	28	0	36	0	699
Hourly Total	123	1230	0	1353	0	1220	173	2	1395	0	35	118	0	153	0	2901
1:00PM	23	302	0	325	0	307	45	6	358	0	14	27	1	42	0	725
1:15PM	34	300	0	334	0	341	43	2	386	0	13	32	0	45	0	765
1:30PM	18	300	0	318	0	302	42	8	352	0	22	42	0	64	0	734
1:45PM	23	310	0	333	0	315	28	6	349	0	15	40	0	55	0	737
Hourly Total	98	1212	0	1310	0	1265	158	22	1445	0	64	141	1	206	0	2961
Total	357	3662	0	4019	0	3687	485	27	4199	0	120	378	1	499	0	8717
% Approach	8.9%	91.1%	0%	-	-	87.8%	11.6%	0.6%	-	-	24.0%	75.8%	0.2%	-	-	-
% Total	4.1%	42.0%	0%	46.1%	-	42.3%	5.6%	0.3%	48.2%	-	1.4%	4.3%	0%	5.7%	-	-
Lights	357	3644	0	4001	-	3652	482	27	4161	-	118	377	1	496	-	8658
% Lights	100%	99.5%	0%	99.6%	-	99.1%	99.4%	100%	99.1%	-	98.3%	99.7%	100%	99.4%	-	99.3%
Articulated Trucks	0	5	0	5	-	8	0	0	8	-	0	0	0	0	-	13
% Articulated Trucks	0%	0.1%	0%	0.1%	-	0.2%	0%	0%	0.2%	-	0%	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	13	0	13	-	27	3	0	30	-	2	1	0	3	-	46
% Buses and Single-Unit Trucks	0%	0.4%	0%	0.3%	-	0.7%	0.6%	0%	0.7%	-	1.7%	0.3%	0%	0.6%	-	0.5%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & North Private Drive - TMC

Sat May 3, 2025

Midday Peak (WKND), PM Peak (WKND), Forced Peak (1 PM - 2 PM) -

Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks,
Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291689, Location: 41.601279, -87.854986



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound						159th St Westbound						Private Dr Southbound						
Time	L	T	U	App	Ped*		T	R	U	App	Ped*		L	R	U	App	Ped*	Int	
2025-05-03 1:00PM	23	302	0	325	0		307	45	6	358	0		14	27	1	42	0	725	
1:15PM	34	300	0	334	0		341	43	2	386	0		13	32	0	45	0	765	
1:30PM	18	300	0	318	0		302	42	8	352	0		22	42	0	64	0	734	
1:45PM	23	310	0	333	0		315	28	6	349	0		15	40	0	55	0	737	
Total	98	1212	0	1310	0		1265	158	22	1445	0		64	141	1	206	0	2961	
% Approach	7.5%	92.5%	0%	-	-		87.5%	10.9%	1.5%	-	-		31.1%	68.4%	0.5%	-	-	-	
% Total	3.3%	40.9%	0%	44.2%	-		42.7%	5.3%	0.7%	48.8%	-		2.2%	4.8%	0%	7.0%	-	-	
PHF	0.721	0.977	-	0.981	-		0.927	0.878	0.688	0.936	-		0.727	0.839	0.250	0.805	-	0.968	
Lights	98	1206	0	1304	-		1255	156	22	1433	-		63	140	1	204	-	2941	
% Lights	100%	99.5%	0%	99.5%	-		99.2%	98.7%	100%	99.2%	-		98.4%	99.3%	100%	99.0%	-	99.3%	
Articulated Trucks	0	1	0	1	-		4	0	0	4	-		0	0	0	0	-	5	
% Articulated Trucks	0%	0.1%	0%	0.1%	-		0.3%	0%	0%	0.3%	-		0%	0%	0%	0%	-	0.2%	
Buses and Single-Unit Trucks	0	5	0	5	-		6	2	0	8	-		1	1	0	2	-	15	
% Buses and Single-Unit Trucks	0%	0.4%	0%	0.4%	-		0.5%	1.3%	0%	0.6%	-		1.6%	0.7%	0%	1.0%	-	0.5%	
Bicycles on Road	0	0	0	0	-		0	0	0	0	-		0	0	0	0	-	0	
% Bicycles on Road	0%	0%	0%	0%	-		0%	0%	0%	0%	-		0%	0%	0%	0%	-	0%	
Pedestrians	-	-	-	-	0		-	-	-	-	0		-	-	-	-	0		
% Pedestrians	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0		-	-	-	-	0		-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-	-	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & Ravinia Avenue - TMC

Wed Apr 30, 2025

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291683, Location: 41.601256, -87.859733



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							Ravinia Ave Northbound							Ravinia Ave Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-04-30 6:00AM	3	70	1	0	74	0		4	79	12	0	95	0		1	0	0	0	1	0		12	0	12	0	24	0		194
6:15AM	12	91	1	1	105	0		2	124	14	0	140	0		0	0	1	0	1	0		11	1	8	0	20	0		266
6:30AM	14	114	0	0	128	0		7	120	13	0	140	0		1	0	0	0	1	0		18	3	13	0	34	0		303
6:45AM	25	143	1	3	172	0		7	145	28	0	180	0		2	0	1	0	3	0		18	6	10	0	34	0		389
Hourly Total	54	418	3	4	479	0		20	468	67	0	555	0		4	0	2	0	6	0		59	10	43	0	112	0		1152
7:00AM	27	130	0	0	157	0		9	141	33	0	183	0		1	1	3	0	5	1		15	4	22	0	41	0		386
7:15AM	27	182	1	1	211	0		1	182	30	1	214	0		0	2	0	0	2	0		27	3	18	0	48	0		475
7:30AM	21	180	0	1	202	0		9	191	43	0	243	0		0	1	1	0	2	0		35	5	13	0	53	0		500
7:45AM	44	193	0	0	237	0		14	200	54	0	268	0		2	0	2	0	4	0		26	2	26	0	54	0		563
Hourly Total	119	685	1	2	807	0		33	714	160	1	908	0		3	4	6	0	13	1		103	14	79	0	196	0		1924
8:00AM	35	162	1	1	199	0		5	168	35	1	209	0		5	1	3	0	9	0		20	2	25	0	47	0		464
8:15AM	30	189	1	0	220	0		6	196	52	0	254	0		2	1	0	0	3	0		27	3	23	0	53	0		530
8:30AM	28	180	1	0	209	0		11	167	25	0	203	0		7	2	0	0	9	0		30	12	29	0	71	0		492
8:45AM	56	233	1	2	292	0		16	194	37	0	247	0		2	0	0	0	2	0		24	3	21	0	48	0		589
Hourly Total	149	764	4	3	920	0		38	725	149	1	913	0		16	4	3	0	23	0		101	20	98	0	219	0		2075
3:00PM	37	182	1	3	223	0		55	211	42	1	309	0		26	23	55	0	104	0		39	30	38	0	107	0		743
3:15PM	38	215	3	2	258	0		52	216	42	1	311	0		24	18	54	0	96	0		33	16	50	0	99	0		764
3:30PM	26	225	3	4	258	0		76	201	49	0	326	0		26	23	47	0	96	0		48	39	53	0	140	0		820
3:45PM	40	234	0	3	277	0		51	201	44	2	298	0		31	25	54	0	110	0		37	24	39	0	100	0		785
Hourly Total	141	856	7	12	1016	0		234	829	177	4	1244	0		107	89	210	0	406	0		157	109	180	0	446	0		3112
4:00PM	44	200	3	2	249	0		71	231	47	1	350	0		33	9	35	0	77	0		57	18	47	0	122	0		798
4:15PM	45	225	3	0	273	0		77	217	51	0	345	0		28	16	54	0	98	0		42	32	40	0	114	0		830
4:30PM	43	261	1	4	309	0		66	214	43	0	323	0		20	19	52	0	91	0		47	30	33	0	110	0		833
4:45PM	59	238	3	3	303	0		68	229	53	2	352	0		34	21	49	0	104	0		42	16	35	0	93	0		852
Hourly Total	191	924	10	9	1134	0		282	891	194	3	1370	0		115	65	190	0	370	0		188	96	155	0	439	0		3313
5:00PM	53	213	4	2	272	0		82	207	26	2	317	0		36	23	49	0	108	0		54	37	70	0	161	0		858
5:15PM	65	287	1	2	355	0		76	232	59	2	369	0		36	18	50	0	104	0		31	24	49	0	104	0		932
5:30PM	52	238	4	0	294	0		66	218	45	1	330	0		34	22	46	0	102	0		47	14	54	0	115	0		841
5:45PM	33	204	1	4	242	0		64	185	48	3	300	0		31	12	45	0	88	0		41	31	49	0	121	0		751
Hourly Total	203	942	10	8	1163	0		288	842	178	8	1316	0		137	75	190	0	402	0		173	106	222	0	501	0		3382
Total	857	4589	35	38	5519	0		895	4469	925	17	6306	0		382	237	601	0	1220	1		781	355	777	0	1913	0		14958
% Approach	15.5%	83.1%	0.6%	0.7%	-	-		14.2%	70.9%	14.7%	0.3%	-	-		31.3%	19.4%	49.3%	0%	-	-		40.8%	18.6%	40.6%	0%	-	-		-
% Total	5.7%	30.7%	0.2%	0.3%	36.9%	-		6.0%	29.9%	6.2%	0.1%	42.2%	-		2.6%	1.6%	4.0%	0%	8.2%	-		5.2%	2.4%	5.2%	0%	12.8%	-		-
Lights	841	4427	30	38	5336	-		886	4312	911	17	6126	-		375	237	600	0	1212	-		759	354	753	0	1866	-		14540
% Lights	98.1%	96.5%	85.7%	100%	96.7%	-		99.0%	96.5%	98.5%	100%	97.1%	-		98.2%	100%	99.8%	0%	99.3%	-		97.2%	99.7%	96.9%	0%	97.5%	-		97.2%
Articulated Trucks	0	63	4	0	67	-		4	42	0	0	46	-		4	0	0	0	4	-		1	0	1	0	2	-		119
% Articulated Trucks	0%	1.4%	11.4%	0%	1.2%	-		0.4%	0.9%	0%	0%	0.7%	-		1.0%	0%	0%	0%	0.3%	-		0.1%	0%	0.1%	0%	0.1%	-		0.8%
Buses and Single-Unit Trucks	16	98	1	0	115	-		5	115	14	0	134	-		3	0	1	0	4	-		21	1	23	0	45	-		298
% Buses and Single-Unit Trucks	1.9%	2.1%	2.9%	0%	2.1%	-		0.6%	2.6%	1.5%	0%	2.1%	-		0.8%	0%	0.2%	0%	0.3%	-		2.7%	0.3%	3.0%	0%	2.4%	-		2.0%
Bicycles on Road	0	1	0	0	1	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		1
% Bicycles on Road	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	1		-	-	-	-	-	0		-
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	100%		-	-	-	-	-	-		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Bicycles on Crosswalk	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	0%		-	-	-	-	-	-		-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & Ravinia Avenue - TMC

Wed Apr 30, 2025

Forced Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291683, Location: 41.601256, -87.859733



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							Ravinia Ave Northbound							Ravinia Ave Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-04-30 7:30AM	21	180	0	1	202	0		9	191	43	0	243	0		0	1	1	0	2	0		35	5	13	0	53	0		500
7:45AM	44	193	0	0	237	0		14	200	54	0	268	0		2	0	2	0	4	0		26	2	26	0	54	0		563
8:00AM	35	162	1	1	199	0		5	168	35	1	209	0		5	1	3	0	9	0		20	2	25	0	47	0		464
8:15AM	30	189	1	0	220	0		6	196	52	0	254	0		2	1	0	0	3	0		27	3	23	0	53	0		530
Total	130	724	2	2	858	0		34	755	184	1	974	0		9	3	6	0	18	0		108	12	87	0	207	0		2057
% Approach	15.2%	84.4%	0.2%	0.2%	-	-		3.5%	77.5%	18.9%	0.1%	-	-		50.0%	16.7%	33.3%	0%	-	-		52.2%	5.8%	42.0%	0%	-	-		-
% Total	6.3%	35.2%	0.1%	0.1%	41.7%	-		1.7%	36.7%	8.9%	0%	47.4%	-		0.4%	0.1%	0.3%	0%	0.9%	-		5.3%	0.6%	4.2%	0%	10.1%	-		-
PHF	0.739	0.938	0.500	0.500	0.905	-		0.607	0.944	0.852	0.250	0.909	-		0.450	0.750	0.500	-	0.500	-		0.771	0.600	0.837	-	0.958	-		0.913
Lights	128	675	1	2	806	-		32	708	181	1	922	-		7	3	6	0	16	-		102	12	80	0	194	-		1938
% Lights	98.5%	93.2%	50.0%	100%	93.9%	-		94.1%	93.8%	98.4%	100%	94.7%	-		77.8%	100%	100%	0%	88.9%	-		94.4%	100%	92.0%	0%	93.7%	-		94.2%
Articulated Trucks	0	18	1	0	19	-		1	10	0	0	11	-		2	0	0	0	2	-		0	0	0	0	0	-		32
% Articulated Trucks	0%	2.5%	50.0%	0%	2.2%	-		2.9%	1.3%	0%	0%	1.1%	-		22.2%	0%	0%	0%	11.1%	-		0%	0%	0%	0%	0%	-		1.6%
Buses and Single-Unit Trucks	2	31	0	0	33	-		1	37	3	0	41	-		0	0	0	0	0	-		6	0	7	0	13	-		87
% Buses and Single-Unit Trucks	1.5%	4.3%	0%	0%	3.8%	-		2.9%	4.9%	1.6%	0%	4.2%	-		0%	0%	0%	0%	0%	-		5.6%	0%	8.0%	0%	6.3%	-		4.2%
Bicycles on Road	0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		0
% Bicycles on Road	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Bicycles on Crosswalk	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & Ravinia Avenue - TMC

Wed Apr 30, 2025

PM Peak, Forced Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291683, Location: 41.601256, -87.859733



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							Ravinia Ave Northbound							Ravinia Ave Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-04-30 4:45PM	59	238	3	3	303	0		68	229	53	2	352	0		34	21	49	0	104	0		42	16	35	0	93	0		852
5:00PM	53	213	4	2	272	0		82	207	26	2	317	0		36	23	49	0	108	0		54	37	70	0	161	0		858
5:15PM	65	287	1	2	355	0		76	232	59	2	369	0		36	18	50	0	104	0		31	24	49	0	104	0		932
5:30PM	52	238	4	0	294	0		66	218	45	1	330	0		34	22	46	0	102	0		47	14	54	0	115	0		841
Total	229	976	12	7	1224	0		292	886	183	7	1368	0		140	84	194	0	418	0		174	91	208	0	473	0		3483
% Approach	18.7%	79.7%	1.0%	0.6%	-	-		21.3%	64.8%	13.4%	0.5%	-	-		33.5%	20.1%	46.4%	0%	-	-		36.8%	19.2%	44.0%	0%	-	-		-
% Total	6.6%	28.0%	0.3%	0.2%	35.1%	-		8.4%	25.4%	5.3%	0.2%	39.3%	-		4.0%	2.4%	5.6%	0%	12.0%	-		5.0%	2.6%	6.0%	0%	13.6%	-		-
PHF	0.881	0.850	0.750	0.583	0.862	-		0.890	0.955	0.775	0.875	0.927	-		0.972	0.913	0.970	-	0.968	-		0.806	0.615	0.743	-	0.734	-		0.934
Lights	228	968	12	7	1215	-		290	875	183	7	1355	-		139	84	194	0	417	-		173	91	206	0	470	-		3457
% Lights	99.6%	99.2%	100%	100%	99.3%	-		99.3%	98.8%	100%	100%	99.0%	-		99.3%	100%	100%	0%	99.8%	-		99.4%	100%	99.0%	0%	99.4%	-		99.3%
Articulated Trucks	0	5	0	0	5	-		0	2	0	0	2	-		0	0	0	0	0	-		0	0	0	0	0	-		7
% Articulated Trucks	0%	0.5%	0%	0%	0.4%	-		0%	0.2%	0%	0%	0.1%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0.2%
Buses and Single-Unit Trucks	1	3	0	0	4	-		2	9	0	0	11	-		1	0	0	0	1	-		1	0	2	0	3	-		19
% Buses and Single-Unit Trucks	0.4%	0.3%	0%	0%	0.3%	-		0.7%	1.0%	0%	0%	0.8%	-		0.7%	0%	0%	0%	0.2%	-		0.6%	0%	1.0%	0%	0.6%	-		0.5%
Bicycles on Road	0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		0
% Bicycles on Road	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Bicycles on Crosswalk	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & Ravinia Avenue - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291688, Location: 41.601151, -87.859761



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							Ravinia Ave Northbound							Ravinia Ave Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-05-03 11:00AM	41	217	2	4	264	0		122	180	34	1	337	0		30	32	62	0	124	0		26	32	31	0	89	0		814
11:15AM	44	254	2	8	308	0		104	175	45	0	324	0		35	31	67	0	133	0		40	29	30	0	99	0		864
11:30AM	40	248	3	2	293	0		99	174	42	2	317	0		28	30	66	0	124	0		32	42	37	0	111	0		845
11:45AM	50	197	2	4	253	0		121	208	45	0	374	0		29	29	71	0	129	0		44	33	28	0	105	0		861
Hourly Total	175	916	9	18	1118	0		446	737	166	3	1352	0		122	122	266	0	510	0		142	136	126	0	404	0		3384
12:00PM	45	205	4	3	257	1		88	208	45	0	341	0		37	15	69	0	121	0		45	40	47	0	132	0		851
12:15PM	35	235	1	7	278	0		130	199	48	2	379	0		30	25	61	0	116	0		41	47	51	0	139	0		912
12:30PM	50	240	1	10	301	0		98	188	28	2	316	0		37	30	98	0	165	0		32	43	42	0	117	0		899
12:45PM	83	213	2	2	300	0		92	170	45	3	310	0		31	21	75	0	127	0		39	40	45	0	124	0		861
Hourly Total	213	893	8	22	1136	1		408	765	166	7	1346	0		135	91	303	0	529	0		157	170	185	0	512	0		3523
1:00PM	47	201	2	4	254	0		115	193	40	2	350	0		41	19	79	0	139	0		40	45	59	0	144	0		887
1:15PM	60	223	4	2	289	0		109	218	44	1	372	0		24	19	66	0	109	0		33	32	51	0	116	0		886
1:30PM	51	222	3	3	279	0		79	203	50	3	335	0		26	20	67	0	113	0		41	35	44	0	120	0		847
1:45PM	62	187	4	4	257	0		110	230	51	2	393	0		26	26	75	0	127	0		44	31	58	0	133	0		910
Hourly Total	220	833	13	13	1079	0		413	844	185	8	1450	0		117	84	287	0	488	0		158	143	212	0	513	0		3530
Total	608	2642	30	53	3333	1		1267	2346	517	18	4148	0		374	297	856	0	1527	0		457	449	523	0	1429	0		10437
% Approach	18.2%	79.3%	0.9%	1.6%	-	-		30.5%	56.6%	12.5%	0.4%	-	-		24.5%	19.4%	56.1%	0%	-	-		32.0%	31.4%	36.6%	0%	-	-		-
% Total	5.8%	25.3%	0.3%	0.5%	31.9%	-		12.1%	22.5%	5.0%	0.2%	39.7%	-		3.6%	2.8%	8.2%	0%	14.6%	-		4.4%	4.3%	5.0%	0%	13.7%	-		-
Lights	606	2630	28	53	3317	-		1262	2312	517	18	4109	-		371	296	854	0	1521	-		455	449	517	0	1421	-		10368
% Lights	99.7%	99.5%	93.3%	100%	99.5%	-		99.6%	98.6%	100%	100%	99.1%	-		99.2%	99.7%	99.8%	0%	99.6%	-		99.6%	100%	98.9%	0%	99.4%	-		99.3%
Articulated Trucks	0	5	2	0	7	-		2	5	0	0	7	-		2	0	0	0	2	-		0	0	1	0	1	-		17
% Articulated Trucks	0%	0.2%	6.7%	0%	0.2%	-		0.2%	0.2%	0%	0%	0.2%	-		0.5%	0%	0%	0%	0.1%	-		0%	0%	0.2%	0%	0.1%	-		0.2%
Buses and Single-Unit Trucks	2	6	0	0	8	-		3	29	0	0	32	-		1	1	2	0	4	-		2	0	5	0	7	-		51
% Buses and Single-Unit Trucks	0.3%	0.2%	0%	0%	0.2%	-		0.2%	1.2%	0%	0%	0.8%	-		0.3%	0.3%	0.2%	0%	0.3%	-		0.4%	0%	1.0%	0%	0.5%	-		0.5%
Bicycles on Road	0	1	0	0	1	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		1
% Bicycles on Road	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	1		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		
% Pedestrians	-	-	-	-	-	100%		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	0%		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

159th Street & Ravinia Avenue - TMC

Sat May 3, 2025

PM Peak (WKND), Forced Peak (1 PM - 2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291688, Location: 41.601151, -87.859761



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	159th St Eastbound							159th St Westbound							Ravinia Ave Northbound							Ravinia Ave Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2025-05-03 1:00PM	47	201	2	4	254	0		115	193	40	2	350	0		41	19	79	0	139	0		40	45	59	0	144	0		887
1:15PM	60	223	4	2	289	0		109	218	44	1	372	0		24	19	66	0	109	0		33	32	51	0	116	0		886
1:30PM	51	222	3	3	279	0		79	203	50	3	335	0		26	20	67	0	113	0		41	35	44	0	120	0		847
1:45PM	62	187	4	4	257	0		110	230	51	2	393	0		26	26	75	0	127	0		44	31	58	0	133	0		910
Total	220	833	13	13	1079	0		413	844	185	8	1450	0		117	84	287	0	488	0		158	143	212	0	513	0		3530
% Approach	20.4%	77.2%	1.2%	1.2%	-	-		28.5%	58.2%	12.8%	0.6%	-	-		24.0%	17.2%	58.8%	0%	-	-		30.8%	27.9%	41.3%	0%	-	-		-
% Total	6.2%	23.6%	0.4%	0.4%	30.6%	-		11.7%	23.9%	5.2%	0.2%	41.1%	-		3.3%	2.4%	8.1%	0%	13.8%	-		4.5%	4.1%	6.0%	0%	14.5%	-		-
PHF	0.887	0.937	0.813	0.813	0.936	-		0.898	0.917	0.907	0.667	0.922	-		0.713	0.808	0.908	-	0.878	-		0.898	0.794	0.898	-	0.891	-		0.970
Lights	219	831	13	13	1076	-		413	832	185	8	1438	-		116	84	287	0	487	-		158	143	209	0	510	-		3511
% Lights	99.5%	99.8%	100%	100%	99.7%	-		100%	98.6%	100%	100%	99.2%	-		99.1%	100%	100%	0%	99.8%	-		100%	100%	98.6%	0%	99.4%	-		99.5%
Articulated Trucks	0	0	0	0	0	-		0	3	0	0	3	-		1	0	0	0	1	-		0	0	1	0	1	-		5
% Articulated Trucks	0%	0%	0%	0%	0%	-		0%	0.4%	0%	0%	0.2%	-		0.9%	0%	0%	0%	0.2%	-		0%	0%	0.5%	0%	0.2%	-		0.1%
Buses and Single-Unit Trucks	1	1	0	0	2	-		0	9	0	0	9	-		0	0	0	0	0	-		0	0	2	0	2	-		13
% Buses and Single-Unit Trucks	0.5%	0.1%	0%	0%	0.2%	-		0%	1.1%	0%	0%	0.6%	-		0%	0%	0%	0%	0%	-		0%	0%	0.9%	0%	0.4%	-		0.4%
Bicycles on Road	0	1	0	0	1	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		1
% Bicycles on Road	0%	0.1%	0%	0%	0.1%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%
Pedestrians	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-
% Bicycles on Crosswalk	-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & East Access - TMC

Wed Apr 30, 2025

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291686, Location: 41.597408, -87.85338



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	West Eastbound					From US 45 Westbound					South Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 6:00AM	0	0	0	0	0	4	0	0	4	0	0	3	0	3	0	7
6:15AM	0	0	0	0	0	2	2	0	4	0	0	5	0	5	0	9
6:30AM	0	0	0	0	0	11	0	0	11	0	0	10	0	10	0	21
6:45AM	0	0	0	0	0	4	0	0	4	0	0	6	0	6	0	10
Hourly Total	0	0	0	0	0	21	2	0	23	0	0	24	0	24	0	47
7:00AM	0	0	0	0	0	7	1	0	8	0	0	3	0	3	0	11
7:15AM	0	0	0	0	0	11	0	0	11	0	0	11	0	11	0	22
7:30AM	0	0	0	0	0	16	0	0	16	0	0	7	0	7	0	23
7:45AM	0	0	0	0	0	15	1	0	16	1	0	11	0	11	1	27
Hourly Total	0	0	0	0	0	49	2	0	51	1	0	32	0	32	1	83
8:00AM	1	0	0	1	0	19	1	0	20	0	0	10	0	10	0	31
8:15AM	0	0	0	0	0	8	0	0	8	0	0	8	0	8	0	16
8:30AM	0	0	0	0	0	15	0	0	15	0	0	7	0	7	0	22
8:45AM	1	0	0	1	0	18	0	0	18	0	0	9	0	9	0	28
Hourly Total	2	0	0	2	0	60	1	0	61	0	0	34	0	34	0	97
3:00PM	2	0	0	2	0	15	3	0	18	1	0	4	0	4	1	24
3:15PM	2	0	0	2	0	19	1	0	20	0	0	9	0	9	0	31
3:30PM	1	0	0	1	0	23	2	0	25	0	0	10	0	10	0	36
3:45PM	0	0	0	0	0	21	2	0	23	0	0	10	0	10	0	33
Hourly Total	5	0	0	5	0	78	8	0	86	1	0	33	0	33	1	124
4:00PM	0	0	0	0	0	18	2	0	20	0	0	6	0	6	0	26
4:15PM	3	0	0	3	0	21	1	0	22	0	0	8	0	8	0	33
4:30PM	2	0	0	2	0	21	3	0	24	0	0	6	0	6	0	32
4:45PM	0	2	0	2	0	31	0	0	31	0	0	10	0	10	0	43
Hourly Total	5	2	0	7	0	91	6	0	97	0	0	30	0	30	0	134
5:00PM	1	0	0	1	0	25	1	0	26	0	0	15	0	15	0	42
5:15PM	0	0	0	0	0	27	0	0	27	0	0	15	0	15	0	42
5:30PM	0	0	0	0	0	23	1	1	25	0	0	16	0	16	0	41
5:45PM	0	0	0	0	0	22	1	0	23	0	0	9	0	9	0	32
Hourly Total	1	0	0	1	0	97	3	1	101	0	0	55	0	55	0	157
Total	13	2	0	15	0	396	22	1	419	2	0	208	0	208	2	642
% Approach	86.7%	13.3%	0%	-	-	94.5%	5.3%	0.2%	-	-	0%	100%	0%	-	-	-
% Total	2.0%	0.3%	0%	2.3%	-	61.7%	3.4%	0.2%	65.3%	-	0%	32.4%	0%	32.4%	-	-
Lights	13	2	0	15	-	391	22	0	413	-	0	206	0	206	-	634
% Lights	100%	100%	0%	100%	-	98.7%	100%	0%	98.6%	-	0%	99.0%	0%	99.0%	-	98.8%
Articulated Trucks	0	0	0	0	-	0	0	1	1	-	0	0	0	0	-	1
% Articulated Trucks	0%	0%	0%	0%	-	0%	0%	100%	0.2%	-	0%	0%	0%	0%	-	0.2%
Buses and Single-Unit Trucks	0	0	0	0	-	5	0	0	5	-	0	2	0	2	-	7
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	1.3%	0%	0%	1.2%	-	0%	1.0%	0%	1.0%	-	1.1%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	-	2	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & East Access - TMC

Wed Apr 30, 2025

Forced Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291686, Location: 41.597408, -87.85338



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	West Eastbound					From US 45 Westbound					South Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 7:30AM	0	0	0	0	0	16	0	0	16	0	0	7	0	7	0	23
7:45AM	0	0	0	0	0	15	1	0	16	1	0	11	0	11	1	27
8:00AM	1	0	0	1	0	19	1	0	20	0	0	10	0	10	0	31
8:15AM	0	0	0	0	0	8	0	0	8	0	0	8	0	8	0	16
Total	1	0	0	1	0	58	2	0	60	1	0	36	0	36	1	97
% Approach	100%	0%	0%	-	-	96.7%	3.3%	0%	-	-	0%	100%	0%	-	-	-
% Total	1.0%	0%	0%	1.0%	-	59.8%	2.1%	0%	61.9%	-	0%	37.1%	0%	37.1%	-	-
PHF	0.250	-	-	0.250	-	0.763	0.500	-	0.750	-	-	0.818	-	0.818	-	0.782
Lights	1	0	0	1	-	57	2	0	59	-	0	35	0	35	-	95
% Lights	100%	0%	0%	100%	-	98.3%	100%	0%	98.3%	-	0%	97.2%	0%	97.2%	-	97.9%
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	-	1	0	0	1	-	0	1	0	1	-	2
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	1.7%	0%	0%	1.7%	-	0%	2.8%	0%	2.8%	-	2.1%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & East Access - TMC

Wed Apr 30, 2025

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291686, Location: 41.597408, -87.85338



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	West Eastbound					From US 45 Westbound					South Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2025-04-30 4:45PM	0	2	0	2	0	31	0	0	31	0	0	10	0	10	0	43
5:00PM	1	0	0	1	0	25	1	0	26	0	0	15	0	15	0	42
5:15PM	0	0	0	0	0	27	0	0	27	0	0	15	0	15	0	42
5:30PM	0	0	0	0	0	23	1	1	25	0	0	16	0	16	0	41
Total	1	2	0	3	0	106	2	1	109	0	0	56	0	56	0	168
% Approach	33.3%	66.7%	0%	-	-	97.2%	1.8%	0.9%	-	-	0%	100%	0%	-	-	-
% Total	0.6%	1.2%	0%	1.8%	-	63.1%	1.2%	0.6%	64.9%	-	0%	33.3%	0%	33.3%	-	-
PHF	0.250	0.250	-	0.375	-	0.855	0.500	0.250	0.879	-	-	0.875	-	0.875	-	0.977
Lights	1	2	0	3	-	105	2	0	107	-	0	56	0	56	-	166
% Lights	100%	100%	0%	100%	-	99.1%	100%	0%	98.2%	-	0%	100%	0%	100%	-	98.8%
Articulated Trucks	0	0	0	0	-	0	0	1	1	-	0	0	0	0	-	1
% Articulated Trucks	0%	0%	0%	0%	-	0%	0%	100%	0.9%	-	0%	0%	0%	0%	-	0.6%
Buses and Single-Unit Trucks	0	0	0	0	-	1	0	0	1	-	0	0	0	0	-	1
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	0.9%	0%	0%	0.9%	-	0%	0%	0%	0%	-	0.6%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & East Access - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291692, Location: 41.597394, -87.853372



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	West Eastbound					From US 45 Westbound					South Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2025-05-03 11:00AM	0	0	0	0	0	7	2	1	10	0	0	9	0	9	0	19
11:15AM	1	0	0	1	0	13	1	0	14	0	0	6	0	6	0	21
11:30AM	0	0	0	0	0	15	4	0	19	0	0	7	0	7	0	26
11:45AM	2	0	0	2	0	8	2	0	10	0	0	9	0	9	0	21
Hourly Total	3	0	0	3	0	43	9	1	53	0	0	31	0	31	0	87
12:00PM	2	0	0	2	0	11	2	0	13	0	0	13	0	13	0	28
12:15PM	1	0	0	1	0	18	3	1	22	0	0	7	0	7	0	30
12:30PM	1	1	0	2	0	13	6	0	19	0	1	5	0	6	0	27
12:45PM	2	0	0	2	0	10	0	1	11	0	0	11	0	11	0	24
Hourly Total	6	1	0	7	0	52	11	2	65	0	1	36	0	37	0	109
1:00PM	2	0	0	2	0	10	1	0	11	0	0	13	0	13	0	26
1:15PM	1	0	0	1	0	17	4	1	22	0	0	13	0	13	0	36
1:30PM	5	0	1	6	0	15	4	0	19	0	2	3	0	5	0	30
1:45PM	5	0	0	5	0	10	1	1	12	0	0	5	0	5	0	22
Hourly Total	13	0	1	14	0	52	10	2	64	0	2	34	0	36	0	114
Total	22	1	1	24	0	147	30	5	182	0	3	101	0	104	0	310
% Approach	91.7%	4.2%	4.2%	-	-	80.8%	16.5%	2.7%	-	-	2.9%	97.1%	0%	-	-	-
% Total	7.1%	0.3%	0.3%	7.7%	-	47.4%	9.7%	1.6%	58.7%	-	1.0%	32.6%	0%	33.5%	-	-
Lights	22	1	1	24	-	144	30	5	179	-	3	98	0	101	-	304
% Lights	100%	100%	100%	100%	-	98.0%	100%	100%	98.4%	-	100%	97.0%	0%	97.1%	-	98.1%
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	-	3	0	0	3	-	0	3	0	3	-	6
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	2.0%	0%	0%	1.6%	-	0%	3.0%	0%	2.9%	-	1.9%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & East Access - TMC

Sat May 3, 2025

PM Peak (WKND), Forced Peak (1 PM - 2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291692, Location: 41.597394, -87.853372



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	West Eastbound					From US 45 Westbound					South Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2025-05-03 1:00PM	2	0	0	2	0	10	1	0	11	0	0	13	0	13	0	26
1:15PM	1	0	0	1	0	17	4	1	22	0	0	13	0	13	0	36
1:30PM	5	0	1	6	0	15	4	0	19	0	2	3	0	5	0	30
1:45PM	5	0	0	5	0	10	1	1	12	0	0	5	0	5	0	22
Total	13	0	1	14	0	52	10	2	64	0	2	34	0	36	0	114
% Approach	92.9%	0%	7.1%	-	-	81.3%	15.6%	3.1%	-	-	5.6%	94.4%	0%	-	-	-
% Total	11.4%	0%	0.9%	12.3%	-	45.6%	8.8%	1.8%	56.1%	-	1.8%	29.8%	0%	31.6%	-	-
PHF	0.650	-	0.250	0.583	-	0.765	0.625	0.500	0.727	-	0.250	0.654	-	0.692	-	0.792
Lights	13	0	1	14	-	50	10	2	62	-	2	32	0	34	-	110
% Lights	100%	0%	100%	100%	-	96.2%	100%	100%	96.9%	-	100%	94.1%	0%	94.4%	-	96.5%
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	-	2	0	0	2	-	0	2	0	2	-	4
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	3.8%	0%	0%	3.1%	-	0%	5.9%	0%	5.6%	-	3.5%
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

161st Street & West Access - TMC

Wed Apr 30, 2025

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291685, Location: 41.597597, -87.853924



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	East Westbound				South Northbound				
Time	L	U	App	Ped*	R	U	App	Ped*	Int
2025-04-30 6:00AM	0	0	0	0	0	0	0	0	0
6:15AM	2	0	2	0	0	0	0	0	2
6:30AM	0	0	0	0	0	0	0	0	0
6:45AM	0	0	0	0	0	0	0	0	0
Hourly Total	2	0	2	0	0	0	0	0	2
7:00AM	1	0	1	0	0	0	0	0	1
7:15AM	0	0	0	0	0	0	0	0	0
7:30AM	0	0	0	0	0	0	0	0	0
7:45AM	1	0	1	0	0	0	0	0	1
Hourly Total	2	0	2	0	0	0	0	0	2
8:00AM	1	0	1	0	1	0	1	0	2
8:15AM	0	0	0	0	0	0	0	0	0
8:30AM	0	0	0	0	0	0	0	0	0
8:45AM	0	0	0	0	1	0	1	0	1
Hourly Total	1	0	1	0	2	0	2	0	3
3:00PM	2	1	3	0	1	0	1	0	4
3:15PM	1	0	1	0	2	0	2	0	3
3:30PM	2	0	2	0	1	0	1	0	3
3:45PM	2	0	2	0	0	0	0	0	2
Hourly Total	7	1	8	0	4	0	4	0	12
4:00PM	2	0	2	0	0	0	0	0	2
4:15PM	0	0	0	0	3	0	3	1	3
4:30PM	2	0	2	0	2	0	2	2	4
4:45PM	0	0	0	0	1	0	1	3	1
Hourly Total	4	0	4	0	6	0	6	6	10
5:00PM	1	0	1	0	0	0	0	0	1
5:15PM	0	0	0	0	0	0	0	0	0
5:30PM	1	0	1	0	0	0	0	0	1
5:45PM	1	0	1	0	0	0	0	0	1
Hourly Total	3	0	3	0	0	0	0	0	3
Total	19	1	20	0	12	0	12	6	32
% Approach	95.0%	5.0%	-	-	100%	0%	-	-	-
% Total	59.4%	3.1%	62.5%	-	37.5%	0%	37.5%	-	-
Lights	19	1	20	-	12	0	12	-	32
% Lights	100%	100%	100%	-	100%	0%	100%	-	100%
Articulated Trucks	0	0	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	0	0	-	0
% Buses and Single-Unit Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	-	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	-	0%	0%	0%	-	0%
Pedestrians	-	-	-	0	-	-	-	6	-
% Pedestrians	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, U: U-Turn

161st Street & West Access - TMC

Wed Apr 30, 2025

Forced Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291685, Location: 41.597597, -87.853924



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	East Westbound				South Northbound				
Time	L	U	App	Ped*	R	U	App	Ped*	Int
2025-04-30 4:45PM	0	0	0	0	1	0	1	3	1
5:00PM	1	0	1	0	0	0	0	0	1
5:15PM	0	0	0	0	0	0	0	0	0
5:30PM	1	0	1	0	0	0	0	0	1
Total	2	0	2	0	1	0	1	3	3
% Approach	100%	0%	-	-	100%	0%	-	-	-
% Total	66.7%	0%	66.7%	-	33.3%	0%	33.3%	-	-
PHF	0.500	-	0.500	-	0.250	-	0.250	-	0.750
Lights	2	0	2	-	1	0	1	-	3
% Lights	100%	0%	100%	-	100%	0%	100%	-	100%
Articulated Trucks	0	0	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	0	0	-	0
% Buses and Single-Unit Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	-	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	-	0%	0%	0%	-	0%
Pedestrians	-	-	-	0	-	-	-	3	
% Pedestrians	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, U: U-Turn

161st Street & West Access - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291693, Location: 41.597587, -87.853881



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	East Westbound				South Northbound				
Time	L	U	App	Ped*	R	U	App	Ped*	Int
2025-05-03 11:00AM	2	0	2	0	1	0	1	0	3
11:15AM	1	0	1	0	1	0	1	0	2
11:30AM	3	0	3	0	0	0	0	0	3
11:45AM	1	0	1	0	2	0	2	0	3
Hourly Total	7	0	7	0	4	0	4	0	11
12:00PM	1	0	1	0	2	0	2	2	3
12:15PM	4	0	4	0	0	0	0	3	4
12:30PM	5	0	5	0	0	0	0	6	5
12:45PM	0	0	0	0	0	0	0	0	0
Hourly Total	10	0	10	0	2	0	2	11	12
1:00PM	2	0	2	0	2	0	2	1	4
1:15PM	4	0	4	0	1	0	1	7	5
1:30PM	5	0	5	2	5	0	5	2	10
1:45PM	1	0	1	2	2	0	2	5	3
Hourly Total	12	0	12	4	10	0	10	15	22
Total	29	0	29	4	16	0	16	26	45
% Approach	100%	0%	-	-	100%	0%	-	-	-
% Total	64.4%	0%	64.4%	-	35.6%	0%	35.6%	-	-
Lights	29	0	29	-	16	0	16	-	45
% Lights	100%	0%	100%	-	100%	0%	100%	-	100%
Articulated Trucks	0	0	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	0	0	-	0
% Buses and Single-Unit Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	-	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	-	0%	0%	0%	-	0%
Pedestrians	-	-	-	4	-	-	-	26	
% Pedestrians	-	-	-	100%	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	0%	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, U: U-Turn

161st Street & West Access - TMC

Sat May 3, 2025

Midday Peak (WKND), PM Peak (WKND), Forced Peak (1 PM - 2 PM) -

Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks,
Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291693, Location: 41.597587, -87.853881



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	East Westbound				South Northbound				
Time	L	U	App	Ped*	R	U	App	Ped*	Int
2025-05-03 1:00PM	2	0	2	0	2	0	2	1	4
1:15PM	4	0	4	0	1	0	1	7	5
1:30PM	5	0	5	2	5	0	5	2	10
1:45PM	1	0	1	2	2	0	2	5	3
Total	12	0	12	4	10	0	10	15	22
% Approach	100%	0%	-	-	100%	0%	-	-	-
% Total	54.5%	0%	54.5%	-	45.5%	0%	45.5%	-	-
PHF	0.600	-	0.600	-	0.500	-	0.500	-	0.550
Lights	12	0	12	-	10	0	10	-	22
% Lights	100%	0%	100%	-	100%	0%	100%	-	100%
Articulated Trucks	0	0	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	0	0	-	0
% Buses and Single-Unit Trucks	0%	0%	0%	-	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	-	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	-	0%	0%	0%	-	0%
Pedestrians	-	-	-	4	-	-	-	15	-
% Pedestrians	-	-	-	100%	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	0%	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, U: U-Turn

LaGrange Street & 161st Street - TMC

Wed Apr 30, 2025

Full Length (6 AM-7 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291687, Location: 41.597364, -87.852739



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	161st St Eastbound						161st St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-04-30 6:00AM	1	0	1	0	2	0	0	0	0	0	0	0	3	198	2	0	203	0	2	165	1	1	169	0	374
6:15AM	5	0	1	0	6	1	0	0	1	0	1	0	1	259	1	0	261	0	2	162	3	0	167	0	435
6:30AM	9	0	1	0	10	0	0	0	0	0	0	0	4	301	1	0	306	0	2	203	7	2	214	0	530
6:45AM	5	0	0	0	5	0	0	0	2	0	2	0	0	374	1	0	375	0	9	195	4	0	208	0	590
Hourly Total	20	0	3	0	23	1	0	0	3	0	3	0	8	1132	5	0	1145	0	15	725	15	3	758	0	1929
7:00AM	3	0	0	0	3	0	0	1	4	0	5	0	3	401	4	0	408	0	5	229	5	1	240	0	656
7:15AM	9	0	2	0	11	0	1	0	1	0	2	0	4	392	2	1	399	0	5	263	6	0	274	0	686
7:30AM	7	0	0	0	7	1	0	0	3	0	3	0	7	442	0	0	449	0	4	314	9	1	328	0	787
7:45AM	10	0	0	0	10	0	0	0	3	0	3	0	4	437	5	1	447	0	11	242	11	0	264	0	724
Hourly Total	29	0	2	0	31	1	1	1	11	0	13	0	18	1672	11	2	1703	0	25	1048	31	2	1106	0	2853
8:00AM	11	0	1	0	12	0	0	0	2	0	2	0	8	405	5	1	419	0	4	233	12	0	249	0	682
8:15AM	7	0	1	0	8	0	0	0	3	0	3	0	2	425	3	2	432	0	7	261	6	0	274	0	717
8:30AM	5	0	1	0	6	0	0	0	6	0	6	0	6	380	3	0	389	0	7	308	9	1	325	0	726
8:45AM	8	0	1	0	9	0	0	0	5	0	5	0	11	423	7	1	442	0	10	253	6	2	271	0	727
Hourly Total	31	0	4	0	35	0	0	0	16	0	16	0	27	1633	18	4	1682	0	28	1055	33	3	1119	0	2852
9:00AM	7	0	1	0	8	0	0	0	5	0	5	0	4	375	4	0	383	0	8	268	5	2	283	0	679
9:15AM	6	0	1	0	7	0	1	0	1	0	2	0	7	388	5	0	400	0	11	261	8	0	280	0	689
9:30AM	2	0	1	0	3	0	0	0	4	0	4	0	2	399	2	0	403	0	6	301	4	1	312	0	722
9:45AM	2	0	0	0	2	0	1	0	5	0	6	0	5	430	3	0	438	0	8	269	8	2	287	0	733
Hourly Total	17	0	3	0	20	0	2	0	15	0	17	0	18	1592	14	0	1624	0	33	1099	25	5	1162	0	2823
10:00AM	6	0	1	0	7	0	3	0	2	0	5	0	3	353	2	1	359	0	6	258	5	4	273	0	644
10:15AM	5	0	4	0	9	0	1	0	4	0	5	0	3	378	2	0	383	0	7	264	6	1	278	0	675
10:30AM	0	0	1	0	1	0	2	0	10	0	12	0	2	389	3	0	394	0	8	328	11	0	347	0	754
10:45AM	4	0	3	0	7	0	4	0	10	0	14	0	4	485	3	1	493	0	9	326	7	0	342	0	856
Hourly Total	15	0	9	0	24	0	10	0	26	0	36	0	12	1605	10	2	1629	0	30	1176	29	5	1240	0	2929
11:00AM	3	0	0	0	3	0	1	0	12	0	13	0	5	379	1	0	385	0	7	329	3	4	343	0	744
11:15AM	3	0	1	0	4	0	1	0	9	0	10	0	2	456	4	1	463	0	9	327	8	2	346	0	823
11:30AM	3	0	2	0	5	0	2	0	6	0	8	0	2	396	1	0	399	0	12	313	5	4	334	0	746
11:45AM	6	1	3	0	10	0	2	0	11	0	13	0	8	450	9	3	470	0	15	321	5	2	343	0	836
Hourly Total	15	1	6	0	22	0	6	0	38	0	44	0	17	1681	15	4	1717	0	43	1290	21	12	1366	0	3149
12:00PM	3	0	2	0	5	0	3	1	9	0	13	0	1	425	8	2	436	0	14	313	4	1	332	0	786
12:15PM	2	0	2	0	4	0	3	0	14	0	17	0	3	424	8	0	435	0	9	367	10	2	388	0	844
12:30PM	4	0	3	0	7	0	1	0	6	0	7	0	2	392	6	1	401	0	14	330	5	2	351	0	766
12:45PM	1	0	3	0	4	1	2	1	13	0	16	0	4	394	11	1	410	1	13	339	6	2	360	0	790
Hourly Total	10	0	10	0	20	1	9	2	42	0	53	0	10	1635	33	4	1682	1	50	1349	25	7	1431	0	3186
1:00PM	7	0	1	0	8	0	3	1	16	0	20	0	1	403	9	0	413	0	18	422	10	1	451	0	892
1:15PM	2	0	4	0	6	0	4	0	14	0	18	0	2	431	3	0	436	0	14	358	3	0	375	0	835
1:30PM	5	0	7	0	12	0	3	1	9	0	13	0	0	398	3	0	401	0	15	409	6	1	431	0	857
1:45PM	1	0	2	0	3	0	1	0	16	0	17	0	1	347	2	1	351	0	11	381	2	5	399	0	770
Hourly Total	15	0	14	0	29	0	11	2	55	0	68	0	4	1579	17	1	1601	0	58	1570	21	7	1656	0	3354
2:00PM	4	0	3	0	7	0	4	0	13	0	17	0	3	379	6	1	389	0	6	461	6	2	475	0	888
2:15PM	3	0	2	0	5	0	2	0	21	0	23	0	4	374	5	1	384	0	11	403	6	0	420	0	832
2:30PM	7	0	5	0	12	0	5	0	13	0	18	0	4	391	6	0	401	0	9	402	8	4	423	0	854
2:45PM	1	0	1	0	2	0	2	0	6	0	8	0	4	412	3	2	421	0	11	406	8	2	427	0	858
Hourly Total	15	0	11	0	26	0	13	0	53	0	66	0	15	1556	20	4	1595	0	37	1672	28	8	1745	0	3432
3:00PM	3	0	2	0	5	0	1	0	7	0	8	0	4	381	3	0	388	0	14	380	15	4	413	0	814
3:15PM	11	0	1	0	12	0	4	0	7	0	11	0	10	405	0	1	416	0	8	341	10	2	361	0	800
3:30PM	8	0	3	0	11	0	2	0	9	0	11	0	7	462	7	0	476	0	16	359	18	4	397	0	895
3:45PM	8	0	2	0	10	0	0	0	13	0	13	0	14	448	6	0	468	0	12	313	10	1	336	0	827
Hourly Total	30	0	8	0	38	0	7	0	36	0	43	0	35	1696	16	1	1748	0	50	1393	53	11	1507	0	3336
4:00PM	5	0	1	0	6	0	3	0	9	0	12	0	7	476	2	3	488	0	12	496	13	3	524	0	1030
4:15PM	7	0	5	0	12	0	2	0	10	0	12	0	13	433	1	0	447	0	12	396	10	2	420	0	891
4:30PM	3	0	4	0	7	0	0	0	6	0	6	0	9	479	2	3	493	0	13	447	15	4	479	0	985
4:45PM	6	0	5	0	11	0	1	0	11	0	12	0	15	466	6	4	491	0	9	435	16	1	461	0	975
Hourly Total	21	0	15	0	36	0	6	0	36	0	42	0	44	1854	11	10	1919	0	46	1774	54	10	1884	0	3881
5:00PM	13	0	4	0	17	0	1	0	10	0	11	0	13	432	4	0	449	0	14	476	13	0	503	0	980
5:15PM	5	1	5	0	11	0	2	0	15	0	17	0	16	437	11	0	464	0	12	432	12	4	460	0	952
5:30PM	13	0	8	0	21	0	0	2	10	0	12	0	12	450	7	1	470	0	16	442	11	1	470	0	973
5:45PM	7	0	3	0	10	0	3	0	9	0	12	0	7	443	6	1	457	0	22	400	16	3	441	0	920

Leg Direction	161st St Eastbound						161st St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
Hourly Total	38	1	20	0	59	0	6	2	44	0	52	0	48	1762	28	2	1840	0	64	1750	52	8	1874	0	3825
6:00PM	14	0	6	0	20	0	2	0	10	0	12	0	10	337	2	2	351	0	14	453	21	0	488	0	871
6:15PM	14	0	7	0	21	0	4	0	10	0	14	0	17	342	9	0	368	0	8	430	18	3	459	0	862
6:30PM	9	0	3	0	12	0	3	0	12	0	15	0	5	366	5	0	376	0	10	329	3	0	342	0	745
6:45PM	10	0	6	0	16	0	0	0	11	0	11	0	5	349	3	3	360	0	9	329	12	1	351	0	738
Hourly Total	47	0	22	0	69	0	9	0	43	0	52	0	37	1394	19	5	1455	0	41	1541	54	4	1640	0	3216
Total	303	2	127	0	432	3	80	7	418	0	505	0	293	20791	217	39	21340	1	520	17442	441	85	18488	0	40765
% Approach	70.1%	0.5%	29.4%	0%	-	-	15.8%	1.4%	82.8%	0%	-	-	1.4%	97.4%	1.0%	0.2%	-	-	2.8%	94.3%	2.4%	0.5%	-	-	-
% Total	0.7%	0%	0.3%	0%	1.1%	-	0.2%	0%	1.0%	0%	1.2%	-	0.7%	51.0%	0.5%	0.1%	52.3%	-	1.3%	42.8%	1.1%	0.2%	45.4%	-	-
Lights	299	2	126	0	427	-	79	5	407	0	491	-	292	20141	214	39	20686	-	509	16819	429	83	17840	-	39444
% Lights	98.7%	100%	99.2%	0%	98.8%	-	98.8%	71.4%	97.4%	0%	97.2%	-	99.7%	96.9%	98.6%	100%	96.9%	-	97.9%	96.4%	97.3%	97.6%	96.5%	-	96.8%
Articulated Trucks	1	0	1	0	2	-	0	1	2	0	3	-	1	240	1	0	242	-	0	219	1	0	220	-	467
% Articulated Trucks	0.3%	0%	0.8%	0%	0.5%	-	0%	14.3%	0.5%	0%	0.6%	-	0.3%	1.2%	0.5%	0%	1.1%	-	0%	1.3%	0.2%	0%	1.2%	-	1.1%
Buses and Single-Unit Trucks	3	0	0	0	3	-	1	1	9	0	11	-	0	410	2	0	412	-	11	401	11	2	425	-	851
% Buses and Single-Unit Trucks	1.0%	0%	0%	0%	0.7%	-	1.3%	14.3%	2.2%	0%	2.2%	-	0%	2.0%	0.9%	0%	1.9%	-	2.1%	2.3%	2.5%	2.4%	2.3%	-	2.1%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	3	0	0	3	-	3
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

LaGrange Street & 161st Street - TMC

Wed Apr 30, 2025

Forced Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291687, Location: 41.597364, -87.852739



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	161st St Eastbound						161st St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-04-30 7:30AM	7	0	0	0	7	1	0	0	3	0	3	0	7	442	0	0	449	0	4	314	9	1	328	0	787
7:45AM	10	0	0	0	10	0	0	0	3	0	3	0	4	437	5	1	447	0	11	242	11	0	264	0	724
8:00AM	11	0	1	0	12	0	0	0	2	0	2	0	8	405	5	1	419	0	4	233	12	0	249	0	682
8:15AM	7	0	1	0	8	0	0	0	3	0	3	0	2	425	3	2	432	0	7	261	6	0	274	0	717
Total	35	0	2	0	37	1	0	0	11	0	11	0	21	1709	13	4	1747	0	26	1050	38	1	1115	0	2910
% Approach	94.6%	0%	5.4%	0%	-	-	0%	0%	100%	0%	-	-	1.2%	97.8%	0.7%	0.2%	-	-	2.3%	94.2%	3.4%	0.1%	-	-	-
% Total	1.2%	0%	0.1%	0%	1.3%	-	0%	0%	0.4%	0%	0.4%	-	0.7%	58.7%	0.4%	0.1%	60.0%	-	0.9%	36.1%	1.3%	0%	38.3%	-	-
PHF	0.795	-	0.500	-	0.771	-	-	-	0.917	-	0.917	-	0.656	0.967	0.650	0.500	0.973	-	0.591	0.835	0.792	0.250	0.849	-	0.924
Lights	34	0	2	0	36	-	0	0	11	0	11	-	21	1649	13	4	1687	-	25	978	37	1	1041	-	2775
% Lights	97.1%	0%	100%	0%	97.3%	-	0%	0%	100%	0%	100%	-	100%	96.5%	100%	100%	96.6%	-	96.2%	93.1%	97.4%	100%	93.4%	-	95.4%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	21	0	0	21	-	0	24	0	0	24	-	45
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	1.2%	0%	0%	1.2%	-	0%	2.3%	0%	0%	2.2%	-	1.5%
Buses and Single-Unit Trucks	1	0	0	0	1	-	0	0	0	0	0	-	0	39	0	0	39	-	1	47	1	0	49	-	89
% Buses and Single-Unit Trucks	2.9%	0%	0%	0%	2.7%	-	0%	0%	0%	0%	0%	-	0%	2.3%	0%	0%	2.2%	-	3.8%	4.5%	2.6%	0%	4.4%	-	3.1%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

LaGrange Street & 161st Street - TMC

Wed Apr 30, 2025

Forced Peak (4:45 PM - 5:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291687, Location: 41.597364, -87.852739



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	161st St Eastbound						161st St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-04-30 4:45PM	6	0	5	0	11	0	1	0	11	0	12	0	15	466	6	4	491	0	9	435	16	1	461	0	975
5:00PM	13	0	4	0	17	0	1	0	10	0	11	0	13	432	4	0	449	0	14	476	13	0	503	0	980
5:15PM	5	1	5	0	11	0	2	0	15	0	17	0	16	437	11	0	464	0	12	432	12	4	460	0	952
5:30PM	13	0	8	0	21	0	0	2	10	0	12	0	12	450	7	1	470	0	16	442	11	1	470	0	973
Total	37	1	22	0	60	0	4	2	46	0	52	0	56	1785	28	5	1874	0	51	1785	52	6	1894	0	3880
% Approach	61.7%	1.7%	36.7%	0%	-	-	7.7%	3.8%	88.5%	0%	-	-	3.0%	95.3%	1.5%	0.3%	-	-	2.7%	94.2%	2.7%	0.3%	-	-	-
% Total	1.0%	0%	0.6%	0%	1.5%	-	0.1%	0.1%	1.2%	0%	1.3%	-	1.4%	46.0%	0.7%	0.1%	48.3%	-	1.3%	46.0%	1.3%	0.2%	48.8%	-	-
PHF	0.712	0.250	0.688	-	0.714	-	0.500	0.250	0.767	-	0.765	-	0.875	0.958	0.636	0.313	0.954	-	0.797	0.939	0.813	0.375	0.943	-	0.991
Lights	37	1	21	0	59	-	4	1	46	0	51	-	55	1766	27	5	1853	-	51	1766	52	6	1875	-	3838
% Lights	100%	100%	95.5%	0%	98.3%	-	100%	50.0%	100%	0%	98.1%	-	98.2%	98.9%	96.4%	100%	98.9%	-	100%	98.9%	100%	100%	99.0%	-	98.9%
Articulated Trucks	0	0	1	0	1	-	0	0	0	0	0	-	1	6	0	0	7	-	0	8	0	0	8	-	16
% Articulated Trucks	0%	0%	4.5%	0%	1.7%	-	0%	0%	0%	0%	0%	-	1.8%	0.3%	0%	0%	0.4%	-	0%	0.4%	0%	0%	0.4%	-	0.4%
Buses and Single-Unit Trucks	0	0	0	0	0	-	0	1	0	0	1	-	0	13	1	0	14	-	0	10	0	0	10	-	25
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	50.0%	0%	0%	1.9%	-	0%	0.7%	3.6%	0%	0.7%	-	0%	0.6%	0%	0%	0.5%	-	0.6%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

LaGrange Street & 161st Street - TMC

Sat May 3, 2025

Full Length (11 AM-2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291691, Location: 41.597406, -87.852723



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	161st St Eastbound						161st St Westbound						LaGrange Rd Northbound						LaGrange Rd Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2025-05-03 11:00AM	7	0	2	0	9	0	2	1	5	0	8	0	6	429	4	2	441	0	9	329	4	3	345	0	803
11:15AM	5	0	2	0	7	0	3	1	3	0	7	0	6	466	2	1	475	0	17	364	7	0	388	0	877
11:30AM	5	0	2	0	7	0	2	1	6	0	9	0	9	523	7	1	540	0	8	329	10	4	351	0	907
11:45AM	7	1	4	0	12	0	0	0	4	0	4	0	6	508	14	1	529	0	18	403	4	3	428	0	973
Hourly Total	24	1	10	0	35	0	7	3	18	0	28	0	27	1926	27	5	1985	0	52	1425	25	10	1512	0	3560
12:00PM	8	0	4	0	12	0	0	0	4	0	4	0	6	486	11	2	505	0	18	390	7	7	422	0	943
12:15PM	4	0	5	0	9	0	0	0	11	0	11	0	11	517	3	1	532	0	4	387	11	3	405	0	957
12:30PM	4	0	3	0	7	0	0	1	4	0	5	0	6	448	3	1	458	0	7	389	11	2	409	0	879
12:45PM	7	0	5	0	12	0	4	0	13	0	17	0	6	469	11	1	487	0	12	410	7	2	431	0	947
Hourly Total	23	0	17	0	40	0	4	1	32	0	37	0	29	1920	28	5	1982	0	41	1576	36	14	1667	0	3726
1:00PM	10	0	6	0	16	0	1	0	5	0	6	0	7	479	6	2	494	0	5	471	5	2	483	0	999
1:15PM	7	0	8	0	15	0	0	0	3	0	3	0	12	476	6	2	496	0	13	401	7	4	425	0	939
1:30PM	3	0	5	0	8	0	0	0	10	0	10	0	10	490	4	3	507	0	7	381	10	3	401	0	926
1:45PM	6	0	5	0	11	0	0	0	9	0	9	0	6	440	8	0	454	0	10	398	5	4	417	0	891
Hourly Total	26	0	24	0	50	0	1	0	27	0	28	0	35	1885	24	7	1951	0	35	1651	27	13	1726	0	3755
Total	73	1	51	0	125	0	12	4	77	0	93	0	91	5731	79	17	5918	0	128	4652	88	37	4905	0	11041
% Approach	58.4%	0.8%	40.8%	0%	-	-	12.9%	4.3%	82.8%	0%	-	-	1.5%	96.8%	1.3%	0.3%	-	-	2.6%	94.8%	1.8%	0.8%	-	-	-
% Total	0.7%	0%	0.5%	0%	1.1%	-	0.1%	0%	0.7%	0%	0.8%	-	0.8%	51.9%	0.7%	0.2%	53.6%	-	1.2%	42.1%	0.8%	0.3%	44.4%	-	-
Lights	71	0	51	0	122	-	12	4	76	0	92	-	89	5686	79	17	5871	-	126	4608	87	36	4857	-	10942
% Lights	97.3%	0%	100%	0%	97.6%	-	100%	100%	98.7%	0%	98.9%	-	97.8%	99.2%	100%	100%	99.2%	-	98.4%	99.1%	98.9%	97.3%	99.0%	-	99.1%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	1	14	0	0	15	-	1	12	0	1	14	-	29
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	1.1%	0.2%	0%	0%	0.3%	-	0.8%	0.3%	0%	2.7%	0.3%	-	0.3%
Buses and Single-Unit Trucks	2	1	0	0	3	-	0	0	1	0	1	-	1	31	0	0	32	-	1	32	1	0	34	-	70
% Buses and Single-Unit Trucks	2.7%	100%	0%	0%	2.4%	-	0%	0%	1.3%	0%	1.1%	-	1.1%	0.5%	0%	0%	0.5%	-	0.8%	0.7%	1.1%	0%	0.7%	-	0.6%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

LaGrange Street & 161st Street - TMC

Sat May 3, 2025

PM Peak (WKND), Forced Peak (1 PM - 2 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks,
Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1291691, Location: 41.597406, -87.852723



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	161st St Eastbound					161st St Westbound					LaGrange Rd Northbound					LaGrange Rd Southbound							
Time	L	T	R	U	App Ped*	L	T	R	U	App Ped*	L	T	R	U	App Ped*	L	T	R	U	App Ped*	Int		
2025-05-03 1:00PM	10	0	6	0	16	0	1	0	5	6	0	7	479	6	2	494	0	5	471	5	2	483	995
1:15PM	7	0	8	0	15	0	0	0	3	3	0	12	476	6	2	496	0	13	401	7	4	425	939
1:30PM	3	0	5	0	8	0	0	0	10	10	0	10	490	4	3	507	0	7	381	10	3	401	926
1:45PM	6	0	5	0	11	0	0	0	9	9	0	6	440	8	0	454	0	10	398	5	4	417	891
Total	26	0	24	0	50	0	1	0	27	0	28	35	1885	24	7	1951	0	35	1651	27	13	1726	3755
% Approach	52.0%	0%	48.0%	0%	-	-	3.6%	0%	96.4%	0%	-	1.8%	96.6%	1.2%	0.4%	-	-	2.0%	95.7%	1.6%	0.8%	-	-
% Total	0.7%	0%	0.6%	0%	1.3%	-	0%	0%	0.7%	0%	0.7%	0.9%	50.2%	0.6%	0.2%	52.0%	-	0.9%	44.0%	0.7%	0.3%	46.0%	-
PHF	0.650	-	0.750	-	0.781	-	0.250	-	0.675	-	0.700	0.729	0.962	0.750	0.583	0.962	-	0.673	0.876	0.675	0.813	0.893	0.940
Lights	24	0	24	0	48	-	1	0	27	0	28	34	1869	24	7	1934	-	34	1637	26	12	1709	3719
% Lights	92.3%	0%	100%	0%	96.0%	-	100%	0%	100%	0%	100%	97.1%	99.2%	100%	100%	99.1%	-	97.1%	99.2%	96.3%	92.3%	99.0%	99.0%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	1	4	0	0	5	-	1	5	0	1	7	12
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	2.9%	0.2%	0%	0%	0.3%	-	2.9%	0.3%	0%	7.7%	0.4%	0.3%
Buses and Single-Unit Trucks	2	0	0	0	2	-	0	0	0	0	0	0	12	0	0	12	-	0	9	1	0	10	24
% Buses and Single-Unit Trucks	7.7%	0%	0%	0%	4.0%	-	0%	0%	0%	0%	0%	0%	0.6%	0%	0%	0.6%	-	0%	0.5%	3.7%	0%	0.6%	0.6%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

EXISTING YEAR (2025) CAPACITY REPORTS

HCM 7th Signalized Intersection Summary 100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	725	1	35	755	185	10	5	5	110	10	85
Future Volume (veh/h)	130	725	1	35	755	185	10	5	5	110	10	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	137	763	1	37	795	195	11	5	5	116	11	89
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Cap, veh/h	164	2492	3	67	2309	979	156	120	127	273	224	326
Arrive On Green	0.09	0.69	0.69	0.02	0.62	0.62	0.02	0.06	0.06	0.08	0.11	0.11
Sat Flow, veh/h	1781	3613	5	3428	3741	1585	1499	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	137	372	392	37	795	195	11	5	5	116	11	89
Grp Sat Flow(s),veh/h/ln	1781	1763	1855	1714	1870	1585	1499	1969	1585	1781	1969	1585
Q Serve(g_s), s	9.8	10.8	10.8	1.4	13.4	7.0	0.9	0.3	0.4	7.7	0.6	6.1
Cycle Q Clear(g_c), s	9.8	10.8	10.8	1.4	13.4	7.0	0.9	0.3	0.4	7.7	0.6	6.1
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	164	1216	1279	67	2309	979	156	120	127	273	224	326
V/C Ratio(X)	0.84	0.31	0.31	0.55	0.34	0.20	0.07	0.04	0.04	0.43	0.05	0.27
Avail Cap(c_a), veh/h	295	1216	1279	567	2309	979	381	485	421	446	485	536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	7.9	7.9	63.2	12.1	10.9	55.0	57.5	55.2	50.0	51.3	43.4
Incr Delay (d2), s/veh	10.6	0.7	0.6	6.9	0.4	0.5	0.2	0.3	0.3	1.1	0.2	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	7.1	7.4	1.2	9.2	4.6	0.6	0.3	0.3	6.3	0.6	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.6	8.6	8.5	70.1	12.5	11.3	55.2	57.8	55.4	51.0	51.5	44.4
LnGrp LOS	E	A	A	E	B	B	E	E	E	D	D	D
Approach Vol, veh/h	901		1027				21		216			
Approach Delay, s/veh	17.7		14.3				55.9		48.3			
Approach LOS	B		B				E		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	95.7	6.5	20.8	16.5	86.3	13.4	13.9				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	3.4	12.8	2.9	8.1	11.8	15.4	9.7	2.4				
Green Ext Time (p_c), s	0.1	11.9	0.0	0.6	0.2	13.1	0.2	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			19.5									
HCM 7th LOS			B									

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	725	1	35	755	185	10	5	5	110	10	85
Future Volume (veh/h)	130	725	1	35	755	185	10	5	5	110	10	85
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	137	763	1	37	795	195	11	5	5	116	11	89
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	164	2492	3	67	2309	979	156	120	127	273	224	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.09	0.69	0.69	0.02	0.62	0.62	0.02	0.06	0.06	0.08	0.11	0.11
Unsig. Movement Delay												
Ln Grp Delay, s/veh	68.6	8.6	8.5	70.1	12.5	11.3	55.2	57.8	55.4	51.0	51.5	44.4
Ln Grp LOS	E	A	A	E	B	B	E	E	E	D	D	D
Approach Vol, veh/h		901			1027			21			216	
Approach Delay, s/veh		17.7			14.3			55.9			48.3	
Approach LOS		B			B			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	4.0	1.1	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		7.0	95.7	6.5	20.8	16.5	86.3	13.4	13.9			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0			
Max Allow Headway (MAH), s		3.7	9.0	3.9	6.2	3.7	8.8	3.8	6.6			
Max Q Clear (g_c+I1), s		3.4	12.8	2.9	8.1	11.8	15.4	9.7	2.4			
Green Ext Time (g_e), s		0.1	11.9	0.0	0.6	0.2	13.1	0.2	0.0			
Prob of Phs Call (p_c)		0.74	1.00	0.99	1.00	0.99	1.00	1.00	0.99			
Prob of Max Out (p_x)		0.00	0.59	0.00	0.00	0.00	0.75	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3428		1499		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3613		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			5		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	37	0	11	0	137	0	116	0
Grp Sat Flow (s), veh/h/ln	1714	0	1499	0	1781	0	1781	0
Q Serve Time (g_s), s	1.4	0.0	0.9	0.0	9.8	0.0	7.7	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	0.9	0.0	9.8	0.0	7.7	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1090	0	0	0	1405	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	7.9	0.0	0.0	0.0	9.9	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	7.9	0.0	0.0	0.0	7.6	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	67	0	156	0	164	0	273	0
V/C Ratio (X)	0.55	0.00	0.07	0.00	0.84	0.00	0.43	0.00
Avail Cap (c_a), veh/h	567	0	381	0	295	0	446	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	63.2	0.0	55.0	0.0	58.1	0.0	50.0	0.0
Incr Delay (d2), s/veh	6.9	0.0	0.2	0.0	10.6	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	70.1	0.0	55.2	0.0	68.6	0.0	51.0	0.0
1st-Term Q (Q1), veh/ln	0.6	0.0	0.3	0.0	4.4	0.0	3.4	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.74	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.2	0.0	0.6	0.0	8.5	0.0	6.3	0.0
%ile Storage Ratio (RQ%)	0.08	0.00	0.06	0.00	0.80	0.00	0.97	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	1	0	1	0	2	0	1
Grp Vol (v), veh/h	0	372	0	11	0	795	0	5
Grp Sat Flow (s), veh/h/ln	0	1763	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	10.8	0.0	0.6	0.0	13.4	0.0	0.3
Cycle Q Clear Time (g_c), s	0.0	10.8	0.0	0.6	0.0	13.4	0.0	0.3
Lane Grp Cap (c), veh/h	0	1216	0	224	0	2309	0	120
V/C Ratio (X)	0.00	0.31	0.00	0.05	0.00	0.34	0.00	0.04
Avail Cap (c_a), veh/h	0	1216	0	485	0	2309	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.9	0.0	51.3	0.0	12.1	0.0	57.5
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.2	0.0	0.4	0.0	0.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.6	0.0	51.5	0.0	12.5	0.0	57.8
1st-Term Q (Q1), veh/ln	0.0	3.7	0.0	0.3	0.0	5.3	0.0	0.2

HCM 7th Signalized Intersection Capacity Analysis 100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.70	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	7.1	0.0	0.6	0.0	9.2	0.0	0.3
%ile Storage Ratio (RQ%)	0.00	0.15	0.00	0.03	0.00	0.19	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	392	0	89	0	195	0	5
Grp Sat Flow (s), veh/h/ln	0	1855	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	10.8	0.0	6.1	0.0	7.0	0.0	0.4
Cycle Q Clear Time (g_c), s	0.0	10.8	0.0	6.1	0.0	7.0	0.0	0.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	12.0	0.0	0.0	0.0	2.5
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	1279	0	326	0	979	0	127
V/C Ratio (X)	0.00	0.31	0.00	0.27	0.00	0.20	0.00	0.04
Avail Cap (c_a), veh/h	0	1279	0	536	0	979	0	421
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.9	0.0	43.4	0.0	10.9	0.0	55.2
Incr Delay (d2), s/veh	0.0	0.6	0.0	1.0	0.0	0.5	0.0	0.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.5	0.0	44.4	0.0	11.3	0.0	55.4
1st-Term Q (Q1), veh/ln	0.0	3.9	0.0	2.4	0.0	2.4	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	7.4	0.0	4.5	0.0	4.6	0.0	0.3
%ile Storage Ratio (RQ%)	0.00	0.15	0.00	0.70	0.00	0.58	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	19.5
HCM 7th LOS	B

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	805	945	35	5	40
Future Vol, veh/h	35	805	945	35	5	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	847	995	37	5	42

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	995	0	0 1492 497
Stage 1	-	-	- 995 -
Stage 2	-	-	- 497 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	691	-	- 114 518
Stage 1	-	-	- 319 -
Stage 2	-	-	- 576 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	691	-	- 108 518
Mov Cap-2 Maneuver	-	-	- 108 -
Stage 1	-	-	- 302 -
Stage 2	-	-	- 576 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.44	0	15.61
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	691	-	-	-	108	518
HCM Lane V/C Ratio	0.053	-	-	-	0.049	0.081
HCM Control Delay (s/veh)	10.5	-	-	-	40	12.6
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.3

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	560	190	160	610	185	285	1185	255	165	750	95
Future Volume (veh/h)	125	560	190	160	610	185	285	1185	255	165	750	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	132	589	200	168	642	195	300	1247	268	174	789	100
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Cap, veh/h	189	772	490	231	818	455	363	2597	872	237	2381	795
Arrive On Green	0.05	0.21	0.21	0.07	0.22	0.22	0.11	0.48	0.48	0.07	0.45	0.45
Sat Flow, veh/h	3456	3741	1572	3456	3741	1585	3456	5375	1585	3456	5332	1585
Grp Volume(v), veh/h	132	589	200	168	642	195	300	1247	268	174	789	100
Grp Sat Flow(s),veh/h/ln	1728	1870	1572	1728	1870	1585	1728	1792	1585	1728	1777	1585
Q Serve(g_s), s	4.5	17.8	12.0	5.7	19.4	12.0	10.2	18.7	11.0	5.9	11.5	4.0
Cycle Q Clear(g_c), s	4.5	17.8	12.0	5.7	19.4	12.0	10.2	18.7	11.0	5.9	11.5	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	772	490	231	818	455	363	2597	872	237	2381	795
V/C Ratio(X)	0.70	0.76	0.41	0.73	0.79	0.43	0.83	0.48	0.31	0.73	0.33	0.13
Avail Cap(c_a), veh/h	331	772	490	504	935	505	475	2597	872	475	2381	795
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.7	44.9	32.6	54.9	44.2	34.8	52.6	20.9	14.6	54.8	21.6	15.9
Incr Delay (d2), s/veh	4.6	5.3	1.2	4.3	5.1	1.4	8.9	0.6	0.9	4.4	0.4	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	13.5	8.2	4.7	14.4	8.3	8.4	12.2	7.2	4.8	8.3	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.3	50.2	33.8	59.2	49.3	36.1	61.5	21.5	15.5	59.2	21.9	16.3
LnGrp LOS	E	D	C	E	D	D	E	C	B	E	C	B
Approach Vol, veh/h	921				1005				1815			
Approach Delay, s/veh	48.1				48.4				27.2			
Approach LOS	D				D				C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	64.0	12.5	30.8	17.1	59.6	11.1	32.2				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Q Clear Time (g_c+I1), s	7.9	20.7	7.7	19.8	12.2	13.5	6.5	21.4				
Green Ext Time (p_c), s	0.3	17.8	0.3	2.5	0.4	16.0	0.1	4.8				
Intersection Summary												
HCM 7th Control Delay, s/veh	35.7											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	560	190	160	610	185	285	1185	255	165	750	95
Future Volume (veh/h)	125	560	190	160	610	185	285	1185	255	165	750	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	132	589	200	168	642	195	300	1247	268	174	789	100
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	189	772	490	231	818	455	363	2597	872	237	2381	795
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.05	0.21	0.21	0.07	0.22	0.22	0.11	0.48	0.48	0.07	0.45	0.45
Unsig. Movement Delay												
Ln Grp Delay, s/veh	60.3	50.2	33.8	59.2	49.3	36.1	61.5	21.5	15.5	59.2	21.9	16.3
Ln Grp LOS	E	D	C	E	D	D	E	C	B	E	C	B
Approach Vol, veh/h	921			1005			1815			1063		
Approach Delay, s/veh	48.1			48.4			27.2			27.5		
Approach LOS	D			D			C			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	12.7	64.0	12.5	30.8	17.1	59.6	11.1	32.2				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.7	3.7	8.9	3.7	6.8				
Max Q Clear (g_c+I1), s	7.9	20.7	7.7	19.8	12.2	13.5	6.5	21.4				
Green Ext Time (g_e), s	0.3	17.8	0.3	2.5	0.4	16.0	0.1	4.8				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00			
Prob of Max Out (p_x)	0.01	0.90	0.00	1.00	0.67	0.50	0.26	0.86				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		3456		3456					
Through Movement Data												
Assigned Mvmt		2			4		6		8			
Mvmt Sat Flow, veh/h		5375			3741		5332		3741			
Right-Turn Movement Data												
Assigned Mvmt			12			14			16			18
Mvmt Sat Flow, veh/h			1585			1572			1585			1585
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	174	0	168	0	300	0	132	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	5.9	0.0	5.7	0.0	10.2	0.0	4.5	0.0
Cycle Q Clear Time (g_c), s	5.9	0.0	5.7	0.0	10.2	0.0	4.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	237	0	231	0	363	0	189	0
V/C Ratio (X)	0.73	0.00	0.73	0.00	0.83	0.00	0.70	0.00
Avail Cap (c_a), veh/h	475	0	504	0	475	0	331	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.8	0.0	54.9	0.0	52.6	0.0	55.7	0.0
Incr Delay (d2), s/veh	4.4	0.0	4.3	0.0	8.9	0.0	4.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	59.2	0.0	59.2	0.0	61.5	0.0	60.3	0.0
1st-Term Q (Q1), veh/ln	2.5	0.0	2.5	0.0	4.3	0.0	1.9	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.1	0.0	0.4	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.75	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	4.8	0.0	4.7	0.0	8.4	0.0	3.7	0.0
%ile Storage Ratio (RQ%)	0.66	0.00	0.64	0.00	0.71	0.00	0.59	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1247	0	589	0	789	0	642
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1777	0	1870
Q Serve Time (g_s), s	0.0	18.7	0.0	17.8	0.0	11.5	0.0	19.4
Cycle Q Clear Time (g_c), s	0.0	18.7	0.0	17.8	0.0	11.5	0.0	19.4
Lane Grp Cap (c), veh/h	0	2597	0	772	0	2381	0	818
V/C Ratio (X)	0.00	0.48	0.00	0.76	0.00	0.33	0.00	0.79
Avail Cap (c_a), veh/h	0	2597	0	772	0	2381	0	935
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	20.9	0.0	44.9	0.0	21.6	0.0	44.2
Incr Delay (d2), s/veh	0.0	0.6	0.0	5.3	0.0	0.4	0.0	5.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.5	0.0	50.2	0.0	21.9	0.0	49.3
1st-Term Q (Q1), veh/ln	0.0	7.5	0.0	8.1	0.0	4.7	0.0	8.8

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.6	0.0	0.1	0.0	0.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.59	0.00	1.56	0.00	1.75	0.00	1.54
%ile Back of Q (95%), veh/ln	0.0	12.2	0.0	13.5	0.0	8.3	0.0	14.4
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	0.78	0.00	0.22	0.00	0.24
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	268	0	200	0	100	0	195
Grp Sat Flow (s), veh/h/ln	0	1585	0	1572	0	1585	0	1585
Q Serve Time (g_s), s	0.0	11.0	0.0	12.0	0.0	4.0	0.0	12.0
Cycle Q Clear Time (g_c), s	0.0	11.0	0.0	12.0	0.0	4.0	0.0	12.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1572.5	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	8.0	0.0	12.6	0.0	6.6	0.0	8.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	872	0	490	0	795	0	455
V/C Ratio (X)	0.00	0.31	0.00	0.41	0.00	0.13	0.00	0.43
Avail Cap (c_a), veh/h	0	872	0	490	0	795	0	505
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	14.6	0.0	32.6	0.0	15.9	0.0	34.8
Incr Delay (d2), s/veh	0.0	0.9	0.0	1.2	0.0	0.3	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.5	0.0	33.8	0.0	16.3	0.0	36.1
1st-Term Q (Q1), veh/ln	0.0	3.8	0.0	4.5	0.0	1.4	0.0	4.5
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.76	0.00	1.80	0.00	1.76
%ile Back of Q (95%), veh/ln	0.0	7.2	0.0	8.2	0.0	2.7	0.0	8.3
%ile Storage Ratio (RQ%)	0.00	1.07	0.00	0.48	0.00	0.50	0.00	0.46
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	35.7
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

Existing (2025) Traffic Volumes
AM Peak Hour

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑↑		↰	↑↑↑	↱
Traffic Vol, veh/h	35	1	1	1	1	10	20	1710	15	25	1050	40
Future Vol, veh/h	35	1	1	1	1	10	20	1710	15	25	1050	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	-	190	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	3	50	3	2	2	22	2	2	2	2	2
Mvmt Flow	37	1	1	1	1	11	21	1800	16	26	1105	42

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1942	3037	574	2345	3050	908	1147	0	0	1816	0	0
Stage 1	1179	1179	-	1850	1850	-	-	-	-	-	-	-
Stage 2	763	1858	-	495	1200	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.56	8.1	6.46	6.54	7.14	5.74	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.56	-	7.36	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.56	-	6.76	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.03	4.4	3.83	4.02	3.92	3.32	-	-	3.12	-	-
Pot Cap-1 Maneuver	69	12	313	38	12	239	282	-	-	155	-	-
Stage 1	149	260	-	49	123	-	-	-	-	-	-	-
Stage 2	330	120	-	477	256	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	46	10	313	27	10	239	282	-	-	155	-	-
Mov Cap-2 Maneuver	46	10	-	27	10	-	-	-	-	-	-	-
Stage 1	124	216	-	45	114	-	-	-	-	-	-	-
Stage 2	289	111	-	393	213	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/210.78		68.76	0.22	0.74
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	282	-	-	46	10	313	27	75	155	-	-
HCM Lane V/C Ratio	0.075	-	-	0.796	0.11	0.003	0.04	0.155	0.17	-	-
HCM Control Delay (s/veh)	18.8	-	-	210.2	424.9	16.5	146	61.7	32.9	-	-
HCM Lane LOS	C	-	-	F	F	C	F	F	D	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.2	0.3	0	0.1	0.5	0.6	-	-

HCM 7th TWSC
500: East Access & 161st Street

Existing (2025) Traffic Volumes
AM Peak Hour

Intersection						
Int Delay, s/veh	7.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	1	1	60	1	1	35
Future Vol, veh/h	1	1	60	1	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	63	1	1	37
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	128	1
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	127	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1619	-	853	1083
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	819	1083
Mov Cap-2 Maneuver	-	-	-	-	819	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	851	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		7.19		8.48	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBL	WBT
Capacity (veh/h)	1073		-	-	1618	-
HCM Lane V/C Ratio	0.035		-	-	0.039	-
HCM Control Delay (s/veh)	8.5		-	-	7.3	0
HCM Lane LOS	A		-	-	A	A
HCM 95th %tile Q(veh)	0.1		-	-	0.1	-

Intersection						
Int Delay, s/veh	4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	W	
Traffic Vol, veh/h	1	1	1	1	1	1
Future Vol, veh/h	1	1	1	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	1	1	1	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	2	0	4
Stage 1	-	-	-	-	2
Stage 2	-	-	-	-	3
Critical Hdwy	-	-	4.14	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	-	-	2.22	-	3.52
Pot Cap-1 Maneuver	-	-	1619	-	1017
Stage 1	-	-	-	-	1021
Stage 2	-	-	-	-	1020
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1619	-	1016
Mov Cap-2 Maneuver	-	-	-	-	1016
Stage 1	-	-	-	-	1021
Stage 2	-	-	-	-	1019

Approach	EB	WB	NB
HCM Control Delay, s/v	0	3.61	8.44
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1048	-	-	1618	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s/veh)	8.4	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 7th Signalized Intersection Summary

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	990	10	290	885	185	140	85	205	180	90	210
Future Volume (veh/h)	230	990	10	290	885	185	140	85	205	180	90	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	242	1042	11	305	932	195	147	89	216	189	95	221
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1707	18	366	1685	714	348	288	400	365	326	468
Arrive On Green	0.13	0.47	0.47	0.11	0.45	0.45	0.09	0.15	0.15	0.11	0.17	0.17
Sat Flow, veh/h	1781	3602	38	3456	3741	1585	1781	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	242	514	539	305	932	195	147	89	216	189	95	221
Grp Sat Flow(s),veh/h/ln	1781	1777	1864	1728	1870	1585	1781	1969	1585	1781	1969	1585
Q Serve(g_s), s	15.5	25.7	25.7	10.4	21.9	9.2	8.3	4.8	14.2	10.5	5.1	13.7
Cycle Q Clear(g_c), s	15.5	25.7	25.7	10.4	21.9	9.2	8.3	4.8	14.2	10.5	5.1	13.7
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	842	883	366	1685	714	348	288	400	365	326	468
V/C Ratio(X)	1.05	0.61	0.61	0.83	0.55	0.27	0.42	0.31	0.54	0.52	0.29	0.47
Avail Cap(c_a), veh/h	230	842	883	446	1685	714	511	394	485	493	394	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	23.4	23.4	52.6	24.1	20.7	38.4	45.8	38.8	36.9	43.9	34.7
Incr Delay (d2), s/veh	73.6	3.3	3.1	10.8	1.3	0.9	0.8	1.3	2.4	1.1	1.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.4	16.5	17.1	8.6	14.7	6.5	6.7	4.5	9.7	8.3	4.6	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	125.9	26.7	26.5	63.4	25.4	21.6	39.2	47.1	41.3	38.0	44.9	36.2
LnGrp LOS	F	C	C	E	C	C	D	D	D	D	D	D
Approach Vol, veh/h	1295				1432		452				505	
Approach Delay, s/veh	45.1				33.0		41.7				38.5	
Approach LOS	D				C		D				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.2	62.9	14.0	25.9	20.0	60.1	16.4	23.6				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	12.4	27.7	10.3	15.7	17.5	23.9	12.5	16.2				
Green Ext Time (p_c), s	0.3	9.2	0.3	1.5	0.0	12.0	0.3	1.4				
Intersection Summary												
HCM 7th Control Delay, s/veh			39.1									
HCM 7th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	990	10	290	885	185	140	85	205	180	90	210
Future Volume (veh/h)	230	990	10	290	885	185	140	85	205	180	90	210
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	242	1042	11	305	932	195	147	89	216	189	95	221
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1707	18	366	1685	714	348	288	400	365	326	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.47	0.47	0.11	0.45	0.45	0.09	0.15	0.15	0.11	0.17	0.17
Unsig. Movement Delay												
Ln Grp Delay, s/veh	125.9	26.7	26.5	63.4	25.4	21.6	39.2	47.1	41.3	38.0	44.9	36.2
Ln Grp LOS	F	C	C	E	C	C	D	D	D	D	D	D
Approach Vol, veh/h	1295			1432			452			505		
Approach Delay, s/veh	45.1			33.0			41.7			38.5		
Approach LOS	D			C			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	4.0	1.1	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	17.2	62.9	14.0	25.9	20.0	60.1	16.4	23.6				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Allow Headway (MAH), s	3.7	9.0	3.8	6.4	3.7	8.8	3.8	6.4				
Max Q Clear (g_c+I1), s	12.4	27.7	10.3	15.7	17.5	23.9	12.5	16.2				
Green Ext Time (g_e), s	0.3	9.2	0.3	1.5	0.0	12.0	0.3	1.4				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.95	0.00	0.60	1.00	0.87	0.02	0.67				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		1781		1781		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3602		1969		3741		1969				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			38		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	305	0	147	0	242	0	189	0
Grp Sat Flow (s), veh/h/ln	1728	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	10.4	0.0	8.3	0.0	15.5	0.0	10.5	0.0
Cycle Q Clear Time (g_c), s	10.4	0.0	8.3	0.0	15.5	0.0	10.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1064	0	0	0	1074	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	17.6	0.0	0.0	0.0	18.4	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	14.8	0.0	0.0	0.0	12.7	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.4	0.0	0.0	0.0	1.2	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	366	0	348	0	230	0	365	0
V/C Ratio (X)	0.83	0.00	0.42	0.00	1.05	0.00	0.52	0.00
Avail Cap (c_a), veh/h	446	0	511	0	230	0	493	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	52.6	0.0	38.4	0.0	52.3	0.0	36.9	0.0
Incr Delay (d2), s/veh	10.8	0.0	0.8	0.0	73.6	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	63.4	0.0	39.2	0.0	125.9	0.0	38.0	0.0
1st-Term Q (Q1), veh/ln	4.4	0.0	3.6	0.0	6.8	0.0	4.6	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.1	0.0	4.7	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.74	0.00	1.80	0.00	1.52	0.00	1.76	0.00
%ile Back of Q (95%), veh/ln	8.6	0.0	6.7	0.0	17.4	0.0	8.3	0.0
%ile Storage Ratio (RQ%)	0.55	0.00	0.57	0.00	1.64	0.00	1.27	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	1	0	1	0	2	0	1
Grp Vol (v), veh/h	0	514	0	95	0	932	0	89
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	25.7	0.0	5.1	0.0	21.9	0.0	4.8
Cycle Q Clear Time (g_c), s	0.0	25.7	0.0	5.1	0.0	21.9	0.0	4.8
Lane Grp Cap (c), veh/h	0	842	0	326	0	1685	0	288
V/C Ratio (X)	0.00	0.61	0.00	0.29	0.00	0.55	0.00	0.31
Avail Cap (c_a), veh/h	0	842	0	394	0	1685	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	23.4	0.0	43.9	0.0	24.1	0.0	45.8
Incr Delay (d2), s/veh	0.0	3.3	0.0	1.0	0.0	1.3	0.0	1.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	26.7	0.0	44.9	0.0	25.4	0.0	47.1
1st-Term Q (Q1), veh/ln	0.0	10.3	0.0	2.5	0.0	9.3	0.0	2.4

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.8	0.0	0.1	0.0	0.3	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.49	0.00	1.80	0.00	1.53	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	16.5	0.0	4.6	0.0	14.7	0.0	4.5
%ile Storage Ratio (RQ%)	0.00	0.34	0.00	0.26	0.00	0.30	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	539	0	221	0	195	0	216
Grp Sat Flow (s), veh/h/ln	0	1864	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	25.7	0.0	13.7	0.0	9.2	0.0	14.2
Cycle Q Clear Time (g_c), s	0.0	25.7	0.0	13.7	0.0	9.2	0.0	14.2
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	15.5	0.0	0.0	0.0	12.7
Prop RT Outside Lane (P_R)	0.00	0.02	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	883	0	468	0	714	0	400
V/C Ratio (X)	0.00	0.61	0.00	0.47	0.00	0.27	0.00	0.54
Avail Cap (c_a), veh/h	0	883	0	522	0	714	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	23.4	0.0	34.7	0.0	20.7	0.0	38.8
Incr Delay (d2), s/veh	0.0	3.1	0.0	1.6	0.0	0.9	0.0	2.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	26.5	0.0	36.2	0.0	21.6	0.0	41.3
1st-Term Q (Q1), veh/ln	0.0	10.8	0.0	5.3	0.0	3.4	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.0	0.8	0.0	0.2	0.0	0.2	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.70	0.00	1.80	0.00	1.68
%ile Back of Q (95%), veh/ln	0.0	17.1	0.0	9.3	0.0	6.5	0.0	9.7
%ile Storage Ratio (RQ%)	0.00	0.35	0.00	1.44	0.00	0.83	0.00	0.24
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	39.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↱	↱↱	↱↱	↱	↱	↱
Traffic Vol, veh/h	110	1265	1265	110	30	105
Future Vol, veh/h	110	1265	1265	110	30	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	1332	1332	116	32	111

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1332	0	-	0	2229
Stage 1	-	-	-	-	1332
Stage 2	-	-	-	-	897
Critical Hdwy	4.14	-	-	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	2.22	-	-	-	3.52
Pot Cap-1 Maneuver	514	-	-	-	36
Stage 1	-	-	-	-	211
Stage 2	-	-	-	-	358
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	514	-	-	-	~ 28
Mov Cap-2 Maneuver	-	-	-	-	~ 28
Stage 1	-	-	-	-	163
Stage 2	-	-	-	-	358

Approach	EB	WB	SB
HCM Control Delay, s/v	1.12	0	105.64
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	514	-	-	-	28	402
HCM Lane V/C Ratio	0.225	-	-	-	1.12	0.275
HCM Control Delay (s/veh)	14	-	-	-	\$ 414.8	17.3
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.9	-	-	-	3.7	1.1

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	770	350	235	865	230	385	1175	285	360	1215	245
Future Volume (veh/h)	220	770	350	235	865	230	385	1175	285	360	1215	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	232	811	368	247	911	242	405	1237	300	379	1279	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	896	569	308	921	591	412	2060	749	438	2099	750
Arrive On Green	0.08	0.24	0.24	0.09	0.25	0.25	0.12	0.38	0.38	0.13	0.39	0.39
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	232	811	368	247	911	242	405	1237	300	379	1279	258
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	8.6	27.4	25.2	9.1	31.6	14.7	15.2	24.0	16.0	14.0	24.7	13.3
Cycle Q Clear(g_c), s	8.6	27.4	25.2	9.1	31.6	14.7	15.2	24.0	16.0	14.0	24.7	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	285	896	569	308	921	591	412	2060	749	438	2099	750
V/C Ratio(X)	0.81	0.90	0.65	0.80	0.99	0.41	0.98	0.60	0.40	0.87	0.61	0.34
Avail Cap(c_a), veh/h	332	896	569	492	921	591	412	2060	749	518	2099	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.7	48.0	34.8	58.1	48.8	30.2	57.1	32.1	22.3	55.7	31.7	21.6
Incr Delay (d2), s/veh	12.6	13.1	3.5	4.9	27.0	1.0	39.7	1.3	1.6	12.7	1.3	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.6	20.3	15.2	7.5	24.7	9.6	13.7	15.7	10.2	11.0	16.1	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.3	61.1	38.3	63.0	75.9	31.2	96.8	33.4	23.9	68.4	33.0	22.8
LnGrp LOS	E	E	D	E	E	C	F	C	C	E	C	C
Approach Vol, veh/h	1411			1400			1942			1916		
Approach Delay, s/veh	56.8			65.9			45.2			38.6		
Approach LOS	E			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	55.8	16.1	37.1	20.0	56.8	15.2	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	16.0	26.0	11.1	29.4	17.2	26.7	10.6	33.6				
Green Ext Time (p_c), s	0.5	16.9	0.5	0.0	0.0	19.6	0.1	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	50.1											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	770	350	235	865	230	385	1175	285	360	1215	245
Future Volume (veh/h)	220	770	350	235	865	230	385	1175	285	360	1215	245
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	232	811	368	247	911	242	405	1237	300	379	1279	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	285	896	569	308	921	591	412	2060	749	438	2099	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.08	0.24	0.24	0.09	0.25	0.25	0.12	0.38	0.38	0.13	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	71.3	61.1	38.3	63.0	75.9	31.2	96.8	33.4	23.9	68.4	33.0	22.8
Ln Grp LOS	E	E	D	E	E	C	F	C	C	E	C	C
Approach Vol, veh/h	1411			1400			1942			1916		
Approach Delay, s/veh	56.8			65.9			45.2			38.6		
Approach LOS	E			E			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	21.0	55.8	16.1	37.1	20.0	56.8	15.2	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.7	3.7	8.8	3.7	6.8				
Max Q Clear (g_c+I1), s	16.0	26.0	11.1	29.4	17.2	26.7	10.6	33.6				
Green Ext Time (g_e), s	0.5	16.9	0.5	0.0	0.0	19.6	0.1	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.91	0.06	1.00	1.00	0.89	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3		5		7						
Mvmt Sat Flow, veh/h	3456	3456		3456		3456						
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5375			3741			5375			3741		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1585			1585			1585			1585		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	379	0	247	0	405	0	232	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	14.0	0.0	9.1	0.0	15.2	0.0	8.6	0.0
Cycle Q Clear Time (g_c), s	14.0	0.0	9.1	0.0	15.2	0.0	8.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	438	0	308	0	412	0	285	0
V/C Ratio (X)	0.87	0.00	0.80	0.00	0.98	0.00	0.81	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	55.7	0.0	58.1	0.0	57.1	0.0	58.7	0.0
Incr Delay (d2), s/veh	12.7	0.0	4.9	0.0	39.7	0.0	12.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	68.4	0.0	63.0	0.0	96.8	0.0	71.3	0.0
1st-Term Q (Q1), veh/ln	6.0	0.0	3.9	0.0	6.5	0.0	3.7	0.0
2nd-Term Q (Q2), veh/ln	0.8	0.0	0.2	0.0	2.3	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.63	0.00	1.80	0.00	1.55	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	11.0	0.0	7.5	0.0	13.7	0.0	7.6	0.0
%ile Storage Ratio (RQ%)	1.52	0.00	1.02	0.00	1.16	0.00	1.20	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1237	0	811	0	1279	0	911
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	24.0	0.0	27.4	0.0	24.7	0.0	31.6
Cycle Q Clear Time (g_c), s	0.0	24.0	0.0	27.4	0.0	24.7	0.0	31.6
Lane Grp Cap (c), veh/h	0	2060	0	896	0	2099	0	921
V/C Ratio (X)	0.00	0.60	0.00	0.90	0.00	0.61	0.00	0.99
Avail Cap (c_a), veh/h	0	2060	0	896	0	2099	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	32.1	0.0	48.0	0.0	31.7	0.0	48.8
Incr Delay (d2), s/veh	0.0	1.3	0.0	13.1	0.0	1.3	0.0	27.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	33.4	0.0	61.1	0.0	33.0	0.0	75.9
1st-Term Q (Q1), veh/ln	0.0	10.1	0.0	12.5	0.0	10.5	0.0	14.4

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	1.6	0.0	0.3	0.0	3.5
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.51	0.00	1.44	0.00	1.50	0.00	1.39
%ile Back of Q (95%), veh/ln	0.0	15.7	0.0	20.3	0.0	16.1	0.0	24.7
%ile Storage Ratio (RQ%)	0.00	0.29	0.00	1.18	0.00	0.43	0.00	0.42
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	300	0	368	0	258	0	242
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	16.0	0.0	25.2	0.0	13.3	0.0	14.7
Cycle Q Clear Time (g_c), s	0.0	16.0	0.0	25.2	0.0	13.3	0.0	14.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.6	0.0	15.5	0.0	10.7	0.0	16.5
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	749	0	569	0	750	0	591
V/C Ratio (X)	0.00	0.40	0.00	0.65	0.00	0.34	0.00	0.41
Avail Cap (c_a), veh/h	0	749	0	569	0	750	0	591
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	22.3	0.0	34.8	0.0	21.6	0.0	30.2
Incr Delay (d2), s/veh	0.0	1.6	0.0	3.5	0.0	1.3	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	23.9	0.0	38.3	0.0	22.8	0.0	31.2
1st-Term Q (Q1), veh/ln	0.0	5.8	0.0	9.5	0.0	4.8	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.6	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.66	0.00	1.52	0.00	1.73	0.00	1.69
%ile Back of Q (95%), veh/ln	0.0	10.2	0.0	15.2	0.0	8.8	0.0	9.6
%ile Storage Ratio (RQ%)	0.00	1.53	0.00	0.88	0.00	1.65	0.00	0.53
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	50.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

Existing (2025) Traffic Volumes
PM Peak Hour

Intersection												
Int Delay, s/veh	54.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑↑		↰	↑↑↑	
Traffic Vol, veh/h	35	1	20	5	1	45	60	1795	30	50	1785	50
Future Vol, veh/h	35	1	20	5	1	45	60	1795	30	50	1785	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	-	190	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	5	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	1	21	5	1	47	63	1889	32	53	1879	53

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2893	4058	966	2889	4068	961	1932	0	0	1921	0	0
Stage 1	2011	2011	-	2032	2032	-	-	-	-	-	-	-
Stage 2	883	2047	-	857	2037	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.2	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.95	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 17	3	214	17	3	220	135	-	-	137	-	-
Stage 1	38	102	-	37	99	-	-	-	-	-	-	-
Stage 2	278	98	-	288	99	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 4	~ 1	214	~ 5	~ 1	220	135	-	-	137	-	-
Mov Cap-2 Maneuver	~ 4	~ 1	-	~ 5	~ 1	-	-	-	-	-	-	-
Stage 1	~ 23	63	-	19	53	-	-	-	-	-	-	-
Stage 2	114	52	-	157	61	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay (s/veh)	\$ 153.25		\$ 588.59		1.68		1.24	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	135	-	-	4	1	214	5	33	137	-	-
HCM Lane V/C Ratio	0.466	-	-	8.321	1.241	0.098	1.028	1.477	0.384	-	-
HCM Control Delay (s/veh)	52.9	-	-	\$ 4864.5	\$ 5845.1	23.5	\$ 1285.4	\$ 512.8	46.7	-	-
HCM Lane LOS	F	-	-	F	F	C	F	F	E	-	-
HCM 95th %tile Q(veh)	2.1	-	-	6.3	0.6	0.3	1.4	5.3	1.6	-	-

Notes											
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon			

HCM 7th TWSC
500: East Access & 161st Street

Existing (2025) Traffic Volumes
PM Peak Hour

Intersection						
Int Delay, s/veh	7.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	1	1	110	1	1	55
Future Vol, veh/h	1	1	110	1	1	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	116	1	1	58
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	234	1
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	232	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1619	-	734	1083
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	681	1083
Mov Cap-2 Maneuver	-	-	-	-	681	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	728	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		7.33		8.56	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1071	-	-	1618	-	
HCM Lane V/C Ratio	0.055	-	-	0.072	-	
HCM Control Delay (s/veh)	8.6	-	-	7.4	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-	

HCM 7th TWSC
600: West Access & 161st Street

Existing (2025) Traffic Volumes
PM Peak Hour

Intersection						
Int Delay, s/veh	4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	1	1	1	1	1	1
Future Vol, veh/h	1	1	1	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	1	1	1	1
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	4	1
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	3	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1619	-	1017	1083
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1020	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	1016	1083
Mov Cap-2 Maneuver	-	-	-	-	1016	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1019	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		3.61		8.44	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBL	WBT
Capacity (veh/h)	1048		-	-	1618	-
HCM Lane V/C Ratio	0.002		-	-	0.001	-
HCM Control Delay (s/veh)	8.4		-	-	7.2	0
HCM Lane LOS	A		-	-	A	A
HCM 95th %tile Q(veh)	0		-	-	0	-

HCM 7th Signalized Intersection Summary

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	855	15	415	845	185	115	85	290	165	145	210
Future Volume (veh/h)	220	855	15	415	845	185	115	85	290	165	145	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	232	900	16	437	889	195	121	89	305	174	153	221
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	258	1489	26	501	1560	661	330	375	531	373	420	568
Arrive On Green	0.14	0.42	0.42	0.05	0.14	0.14	0.07	0.19	0.19	0.09	0.21	0.21
Sat Flow, veh/h	1781	3572	64	3456	3741	1585	1781	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	232	448	468	437	889	195	121	89	305	174	153	221
Grp Sat Flow(s),veh/h/ln	1781	1777	1859	1728	1870	1585	1781	1969	1585	1781	1969	1585
Q Serve(g_s), s	16.6	25.5	25.5	16.3	28.9	14.4	7.0	5.0	20.6	9.9	8.6	13.5
Cycle Q Clear(g_c), s	16.6	25.5	25.5	16.3	28.9	14.4	7.0	5.0	20.6	9.9	8.6	13.5
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	258	741	775	501	1560	661	330	375	531	373	420	568
V/C Ratio(X)	0.90	0.60	0.60	0.87	0.57	0.30	0.37	0.24	0.57	0.47	0.36	0.39
Avail Cap(c_a), veh/h	295	741	775	572	1560	661	512	485	620	514	485	620
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	29.6	29.6	60.7	45.1	38.9	38.2	44.6	35.6	35.9	43.6	31.1
Incr Delay (d2), s/veh	26.3	3.6	3.5	12.6	1.5	1.1	0.7	0.7	2.1	0.9	1.1	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.2	16.9	17.5	13.2	21.1	10.5	5.7	4.5	13.0	7.9	7.8	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	81.0	33.2	33.0	73.3	46.7	40.0	38.9	45.3	37.7	36.8	44.7	32.0
LnGrp LOS	F	C	C	E	D	D	D	D	D	D	D	C
Approach Vol, veh/h	1148			1521			515			548		
Approach Delay, s/veh	42.8			53.5			39.3			37.1		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.4	60.2	12.7	33.7	23.3	60.2	15.7	30.7				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	18.3	27.5	9.0	15.5	18.6	30.9	11.9	22.6				
Green Ext Time (p_c), s	0.5	5.1	0.2	2.9	0.2	2.7	0.3	2.1				
Intersection Summary												
HCM 7th Control Delay, s/veh	45.8											
HCM 7th LOS	D											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	855	15	415	845	185	115	85	290	165	145	210
Future Volume (veh/h)	220	855	15	415	845	185	115	85	290	165	145	210
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	232	900	16	437	889	195	121	89	305	174	153	221
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	258	1489	26	501	1560	661	330	375	531	373	420	568
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.14	0.42	0.42	0.05	0.14	0.14	0.07	0.19	0.19	0.09	0.21	0.21
Unsig. Movement Delay												
Ln Grp Delay, s/veh	81.0	33.2	33.0	73.3	46.7	40.0	38.9	45.3	37.7	36.8	44.7	32.0
Ln Grp LOS	F	C	C	E	D	D	D	D	D	D	D	C
Approach Vol, veh/h	1148			1521			515			548		
Approach Delay, s/veh	42.8			53.5			39.3			37.1		
Approach LOS	D			D			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	4.0	1.1	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	23.4	60.2	12.7	33.7	23.3	60.2	15.7	30.7				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	9.0	3.8	6.5	3.7	8.8	3.8	6.3				
Max Q Clear (g_c+I1), s	18.3	27.5	9.0	15.5	18.6	30.9	11.9	22.6				
Green Ext Time (g_e), s	0.5	5.1	0.2	2.9	0.2	2.7	0.3	2.1				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	0.00	0.11	1.00	1.00	0.00	0.50				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		1781		1781		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3572		1969		3741		1969				
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			64		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	437	0	121	0	232	0	174	0
Grp Sat Flow (s), veh/h/ln	1728	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	16.3	0.0	7.0	0.0	16.6	0.0	9.9	0.0
Cycle Q Clear Time (g_c), s	16.3	0.0	7.0	0.0	16.6	0.0	9.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1009	0	0	0	990	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	24.7	0.0	0.0	0.0	26.2	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	19.1	0.0	0.0	0.0	19.7	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.8	0.0	0.0	0.0	1.4	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	501	0	330	0	258	0	373	0
V/C Ratio (X)	0.87	0.00	0.37	0.00	0.90	0.00	0.47	0.00
Avail Cap (c_a), veh/h	572	0	512	0	295	0	514	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	60.7	0.0	38.2	0.0	54.7	0.0	35.9	0.0
Incr Delay (d2), s/veh	12.6	0.0	0.7	0.0	26.3	0.0	0.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	73.3	0.0	38.9	0.0	81.0	0.0	36.8	0.0
1st-Term Q (Q1), veh/ln	7.6	0.0	3.1	0.0	7.3	0.0	4.3	0.0
2nd-Term Q (Q2), veh/ln	0.9	0.0	0.1	0.0	1.9	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.56	0.00	1.80	0.00	1.54	0.00	1.78	0.00
%ile Back of Q (95%), veh/ln	13.2	0.0	5.7	0.0	14.2	0.0	7.9	0.0
%ile Storage Ratio (RQ%)	0.84	0.00	0.49	0.00	1.34	0.00	1.21	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	1	0	1	0	2	0	1
Grp Vol (v), veh/h	0	448	0	153	0	889	0	89
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	25.5	0.0	8.6	0.0	28.9	0.0	5.0
Cycle Q Clear Time (g_c), s	0.0	25.5	0.0	8.6	0.0	28.9	0.0	5.0
Lane Grp Cap (c), veh/h	0	741	0	420	0	1560	0	375
V/C Ratio (X)	0.00	0.60	0.00	0.36	0.00	0.57	0.00	0.24
Avail Cap (c_a), veh/h	0	741	0	485	0	1560	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	29.6	0.0	43.6	0.0	45.1	0.0	44.6
Incr Delay (d2), s/veh	0.0	3.6	0.0	1.1	0.0	1.5	0.0	0.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	33.2	0.0	44.7	0.0	46.7	0.0	45.3
1st-Term Q (Q1), veh/ln	0.0	10.6	0.0	4.2	0.0	14.5	0.0	2.5

HCM 7th Signalized Intersection Capacity Analysis

100: Ravina Avenue & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.1	0.0	0.3	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.49	0.00	1.78	0.00	1.43	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	16.9	0.0	7.8	0.0	21.1	0.0	4.5
%ile Storage Ratio (RQ%)	0.00	0.35	0.00	0.44	0.00	0.44	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	468	0	221	0	195	0	305
Grp Sat Flow (s), veh/h/ln	0	1859	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	25.5	0.0	13.5	0.0	14.4	0.0	20.6
Cycle Q Clear Time (g_c), s	0.0	25.5	0.0	13.5	0.0	14.4	0.0	20.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	18.8	0.0	0.0	0.0	18.9
Prop RT Outside Lane (P_R)	0.00	0.03	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	775	0	568	0	661	0	531
V/C Ratio (X)	0.00	0.60	0.00	0.39	0.00	0.30	0.00	0.57
Avail Cap (c_a), veh/h	0	775	0	620	0	661	0	620
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	29.6	0.0	31.1	0.0	38.9	0.0	35.6
Incr Delay (d2), s/veh	0.0	3.5	0.0	0.9	0.0	1.1	0.0	2.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	33.0	0.0	32.0	0.0	40.0	0.0	37.7
1st-Term Q (Q1), veh/ln	0.0	11.1	0.0	5.2	0.0	6.1	0.0	8.0
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.1	0.0	0.2	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.71	0.00	1.65	0.00	1.57
%ile Back of Q (95%), veh/ln	0.0	17.5	0.0	9.2	0.0	10.5	0.0	13.0
%ile Storage Ratio (RQ%)	0.00	0.36	0.00	1.41	0.00	1.33	0.00	0.32
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	45.8
HCM 7th LOS	D

Intersection						
Int Delay, s/veh	19.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↱	↱↱	↱↱	↱	↱	↱
Traffic Vol, veh/h	100	1210	1265	160	65	140
Future Vol, veh/h	100	1210	1265	160	65	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	1274	1332	168	68	147

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1332	0	0 2179 666
Stage 1	-	-	- 1332 -
Stage 2	-	-	- 847 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	514	-	- ~ 39 402
Stage 1	-	-	- 211 -
Stage 2	-	-	- 380 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	514	-	- ~ 31 402
Mov Cap-2 Maneuver	-	-	- ~ 31 -
Stage 1	-	-	- 168 -
Stage 2	-	-	- 380 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.05	0	271.68
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	514	-	-	-	31	402
HCM Lane V/C Ratio	0.205	-	-	-	2.185	0.367
HCM Control Delay (s/veh)	13.8	-	-	-	\$ 815.8	19
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.8	-	-	-	7.9	1.7

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	655	315	225	730	350	360	1420	275	410	1145	285
Future Volume (veh/h)	305	655	315	225	730	350	360	1420	275	410	1145	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	321	689	332	237	768	368	379	1495	289	432	1205	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	955	606	299	890	605	440	1897	696	497	1986	750
Arrive On Green	0.07	0.17	0.17	0.09	0.24	0.24	0.13	0.35	0.35	0.14	0.37	0.37
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	321	689	332	237	768	368	379	1495	289	432	1205	300
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	12.0	22.6	21.8	8.7	25.6	24.3	14.0	32.4	16.3	15.9	23.7	16.0
Cycle Q Clear(g_c), s	12.0	22.6	21.8	8.7	25.6	24.3	14.0	32.4	16.3	15.9	23.7	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	955	606	299	890	605	440	1897	696	497	1986	750
V/C Ratio(X)	0.89	0.72	0.55	0.79	0.86	0.61	0.86	0.79	0.41	0.87	0.61	0.40
Avail Cap(c_a), veh/h	359	955	606	518	921	618	545	1897	696	625	1986	750
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.8	49.5	35.1	58.2	47.5	32.4	55.6	37.7	25.0	54.5	33.3	22.2
Incr Delay (d2), s/veh	23.7	3.3	1.8	4.8	9.1	2.6	11.3	3.4	1.8	10.5	1.4	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.7	16.9	14.0	7.1	18.7	14.6	10.9	20.7	10.4	12.0	15.6	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.5	52.9	36.9	63.0	56.7	34.9	66.9	41.1	26.8	65.0	34.7	23.8
LnGrp LOS	F	D	D	E	E	C	E	D	C	E	C	C
Approach Vol, veh/h	1342				1373				2163			
Approach Delay, s/veh	56.2				51.9				43.7			
Approach LOS	E				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.2	51.9	15.7	39.2	21.1	54.0	18.0	36.9				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Q Clear Time (g_c+I1), s	17.9	34.4	10.7	24.6	16.0	25.7	14.0	27.6				
Green Ext Time (p_c), s	0.8	5.4	0.5	1.0	0.6	15.4	0.0	3.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	46.7											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	655	315	225	730	350	360	1420	275	410	1145	285
Future Volume (veh/h)	305	655	315	225	730	350	360	1420	275	410	1145	285
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	321	689	332	237	768	368	379	1495	289	432	1205	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	359	955	606	299	890	605	440	1897	696	497	1986	750
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.07	0.17	0.17	0.09	0.24	0.24	0.13	0.35	0.35	0.14	0.37	0.37
Unsig. Movement Delay												
Ln Grp Delay, s/veh	83.5	52.9	36.9	63.0	56.7	34.9	66.9	41.1	26.8	65.0	34.7	23.8
Ln Grp LOS	F	D	D	E	E	C	E	D	C	E	C	C
Approach Vol, veh/h	1342			1373			2163			1937		
Approach Delay, s/veh	56.2			51.9			43.7			39.8		
Approach LOS	E			D			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	23.2	51.9	15.7	39.2	21.1	54.0	18.0	36.9				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.7	3.7	8.8	3.7	6.7				
Max Q Clear (g_c+I1), s	17.9	34.4	10.7	24.6	16.0	25.7	14.0	27.6				
Green Ext Time (g_e), s	0.8	5.4	0.5	1.0	0.6	15.4	0.0	3.3				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.35	1.00	0.02	1.00	0.62	0.92	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	432	0	237	0	379	0	321	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	15.9	0.0	8.7	0.0	14.0	0.0	12.0	0.0
Cycle Q Clear Time (g_c), s	15.9	0.0	8.7	0.0	14.0	0.0	12.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	497	0	299	0	440	0	359	0
V/C Ratio (X)	0.87	0.00	0.79	0.00	0.86	0.00	0.89	0.00
Avail Cap (c_a), veh/h	625	0	518	0	545	0	359	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.5	0.0	58.2	0.0	55.6	0.0	59.8	0.0
Incr Delay (d2), s/veh	10.5	0.0	4.8	0.0	11.3	0.0	23.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	65.0	0.0	63.0	0.0	66.9	0.0	83.5	0.0
1st-Term Q (Q1), veh/ln	6.8	0.0	3.8	0.0	6.0	0.0	5.3	0.0
2nd-Term Q (Q2), veh/ln	0.7	0.0	0.2	0.0	0.7	0.0	1.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.60	0.00	1.80	0.00	1.63	0.00	1.64	0.00
%ile Back of Q (95%), veh/ln	12.0	0.0	7.1	0.0	10.9	0.0	10.7	0.0
%ile Storage Ratio (RQ%)	1.65	0.00	0.98	0.00	0.92	0.00	1.70	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1495	0	689	0	1205	0	768
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	32.4	0.0	22.6	0.0	23.7	0.0	25.6
Cycle Q Clear Time (g_c), s	0.0	32.4	0.0	22.6	0.0	23.7	0.0	25.6
Lane Grp Cap (c), veh/h	0	1897	0	955	0	1986	0	890
V/C Ratio (X)	0.00	0.79	0.00	0.72	0.00	0.61	0.00	0.86
Avail Cap (c_a), veh/h	0	1897	0	955	0	1986	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	37.7	0.0	49.5	0.0	33.3	0.0	47.5
Incr Delay (d2), s/veh	0.0	3.4	0.0	3.3	0.0	1.4	0.0	9.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	41.1	0.0	52.9	0.0	34.7	0.0	56.7
1st-Term Q (Q1), veh/ln	0.0	13.8	0.0	10.9	0.0	10.1	0.0	11.7

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Existing (2025) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.4	0.0	0.3	0.0	1.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.43	0.00	1.49	0.00	1.51	0.00	1.46
%ile Back of Q (95%), veh/ln	0.0	20.7	0.0	16.9	0.0	15.6	0.0	18.7
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	0.98	0.00	0.42	0.00	0.32
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	289	0	332	0	300	0	368
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	16.3	0.0	21.8	0.0	16.0	0.0	24.3
Cycle Q Clear Time (g_c), s	0.0	16.3	0.0	21.8	0.0	16.0	0.0	24.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.2	0.0	16.6	0.0	13.5	0.0	18.7
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	696	0	606	0	750	0	605
V/C Ratio (X)	0.00	0.41	0.00	0.55	0.00	0.40	0.00	0.61
Avail Cap (c_a), veh/h	0	696	0	606	0	750	0	618
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	25.0	0.0	35.1	0.0	22.2	0.0	32.4
Incr Delay (d2), s/veh	0.0	1.8	0.0	1.8	0.0	1.6	0.0	2.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	26.8	0.0	36.9	0.0	23.8	0.0	34.9
1st-Term Q (Q1), veh/ln	0.0	6.0	0.0	8.7	0.0	5.8	0.0	9.1
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.3	0.0	0.3	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.65	0.00	1.55	0.00	1.66	0.00	1.53
%ile Back of Q (95%), veh/ln	0.0	10.4	0.0	14.0	0.0	10.2	0.0	14.6
%ile Storage Ratio (RQ%)	0.00	1.56	0.00	0.81	0.00	1.92	0.00	0.81
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	46.7
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

Existing (2025) Traffic Volumes
SAT Peak Hour

Intersection												
Int Delay, s/veh	22.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	1	25	1	1	25	35	1900	25	35	1650	25
Future Vol, veh/h	25	1	25	1	1	25	35	1900	25	35	1650	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	-	190	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	3	2	2	3	2	2
Mvmt Flow	26	1	26	1	1	26	37	2000	26	37	1737	26

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2698	3924	882	2856	3924	1013	1763	0	0	2026	0	0
Stage 1	1824	1824	-	2087	2087	-	-	-	-	-	-	-
Stage 2	874	2100	-	769	1837	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.36	-	-	5.36	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.13	-	-	3.13	-	-
Pot Cap-1 Maneuver	~ 23	3	249	18	3	203	163	-	-	120	-	-
Stage 1	52	127	-	33	93	-	-	-	-	-	-	-
Stage 2	281	92	-	327	125	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 6	2	249	5	2	203	163	-	-	120	-	-
Mov Cap-2 Maneuver	~ 6	2	-	5	2	-	-	-	-	-	-	-
Stage 1	36	88	-	26	72	-	-	-	-	-	-	-
Stage 2	187	71	-	200	86	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay (s/veh)	44.45	51.45	261.91		0.6		0.98	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	163	-	-	6	2	249	5	37	120	-	-
HCM Lane V/C Ratio	0.226	-	-	4.577	0.616	0.106	0.225	0.746	0.308	-	-
HCM Control Delay (s/veh)	33.5	-	-	\$ 2827.9	\$ 2796.1	21.2	\$ 931.3	236.2	47.9	-	-
HCM Lane LOS	D	-	-	F	F	C	F	F	E	-	-
HCM 95th %tile Q(veh)	0.8	-	-	4.7	0.6	0.4	0.4	2.7	1.2	-	-

Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM 7th TWSC
500: East Access & 161st Street

Existing (2025) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	15	1	50	10	1	35
Future Vol, veh/h	15	1	50	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	1	53	11	1	37
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	17	0	127	8
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	111	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1599	-	855	1071
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	902	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1599	-	826	1071
Mov Cap-2 Maneuver	-	-	-	-	826	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	872	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		6.11		8.51	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBL	WBT
Capacity (veh/h)	1062		-	-	1594	-
HCM Lane V/C Ratio	0.036		-	-	0.033	-
HCM Control Delay (s/veh)	8.5		-	-	7.3	0
HCM Lane LOS	A		-	-	A	A
HCM 95th %tile Q(veh)	0.1		-	-	0.1	-

HCM 7th TWSC
600: West Access & 161st Street

Existing (2025) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	7.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	1	1	10	1	1	15
Future Vol, veh/h	1	1	10	1	1	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	11	1	1	16
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	23	1
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	22	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1619	-	990	1083
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	998	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	983	1083
Mov Cap-2 Maneuver	-	-	-	-	983	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	992	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		6.58		8.4	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1076	-	-	1618	-	
HCM Lane V/C Ratio	0.016	-	-	0.007	-	
HCM Control Delay (s/veh)	8.4	-	-	7.2	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

DATA FROM ITE *TRIP GENERATION MANUAL*, 11TH EDITION

Land Use: 815

Free-Standing Discount Store

Description

A discount store is similar to a free-standing discount superstore (Land Use 813) with the exception that it does not contain a full-service grocery department. It is also similar to a department store (Land Use 875) with the exception that it generally offers centralized cashiering and sells products that are advertised at discount prices. Discount stores offer a variety of customer services and typically maintain long store hours 7 days a week. The stores included in this land use are often the only ones on the site but they can also be found in mutual operation with a related or unrelated garden center and/or service station. A free-standing discount store can also be found on a separate parcel within a retail complex, with or without its own dedicated parking. Freestanding discount superstore (Land Use 813), variety store (Land Use 814), and department store (Land Use 875) are related uses.

Additional Data

A garden center contained within the principal outside faces of the exterior building walls is included in the reported gross floor areas. An outdoor or fenced-in area outside the principal outside faces of the exterior building walls is excluded.

To assist in the future analysis of this land use, it is important to collect and include information on the presence and size of garden centers, outdoor fenced-in space and service stations in trip generation data submissions.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Florida, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, South Dakota, and Wisconsin.

Source Numbers

305, 340, 353, 358, 376, 386, 417, 504, 528, 579, 588, 595, 630, 735, 842, 946, 960, 1049

Free-Standing Discount Store (815)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 21

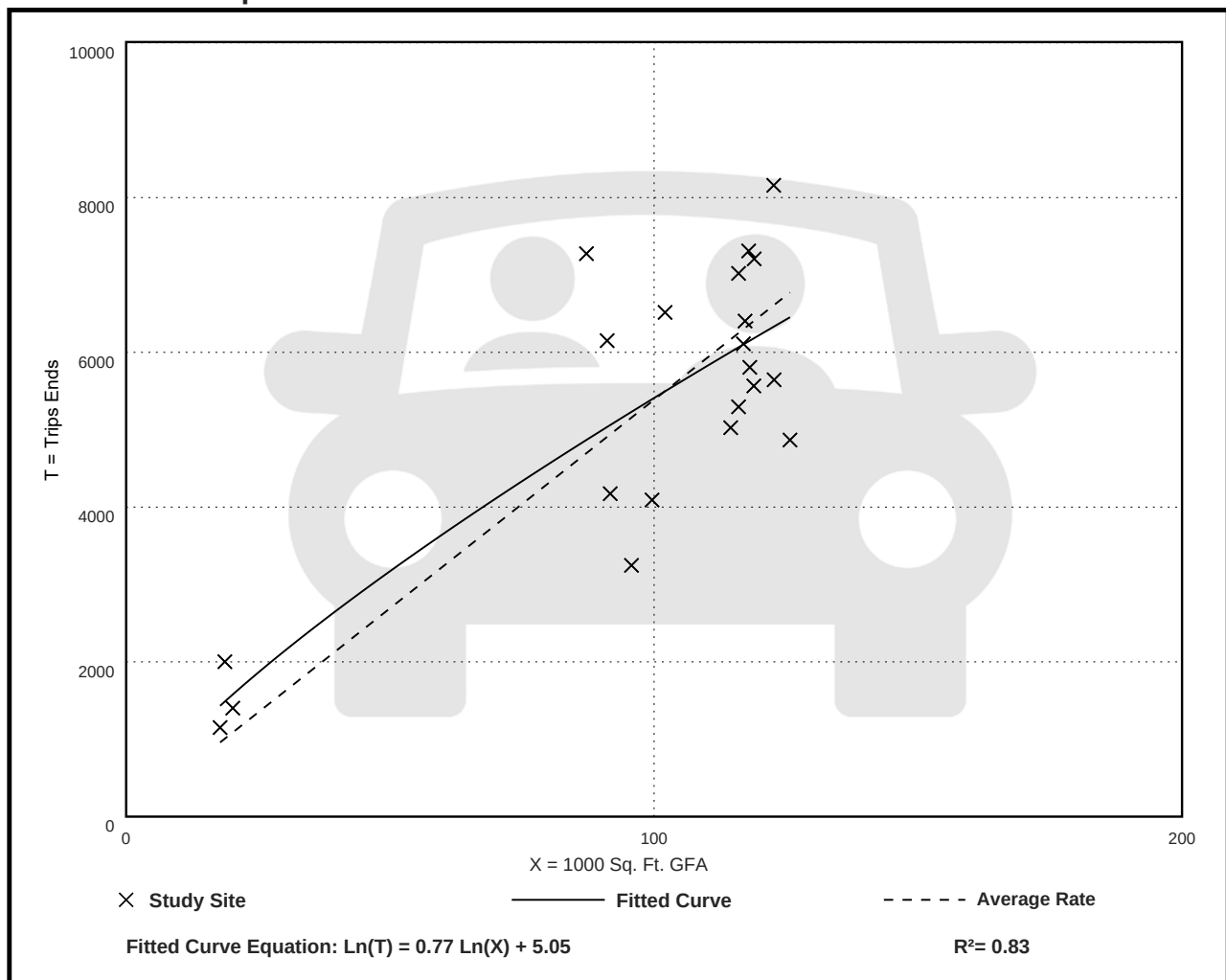
Avg. 1000 Sq. Ft. GFA: 98

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
53.87	33.92 - 107.06	12.93

Data Plot and Equation



Free-Standing Discount Store (815)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 10

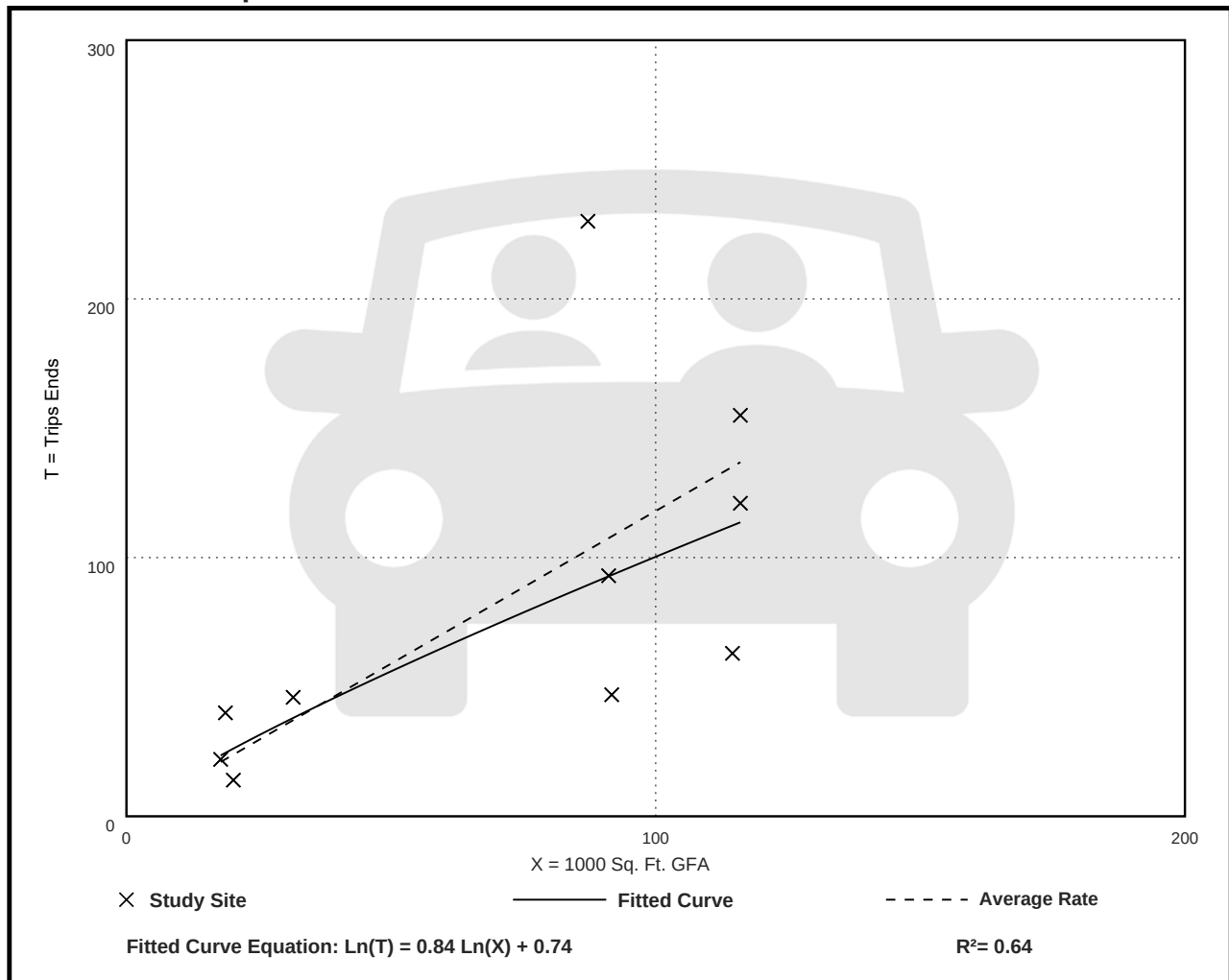
Avg. 1000 Sq. Ft. GFA: 70

Directional Distribution: 70% entering, 30% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.18	0.51 - 2.64	0.69

Data Plot and Equation



Free-Standing Discount Store (815)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 60

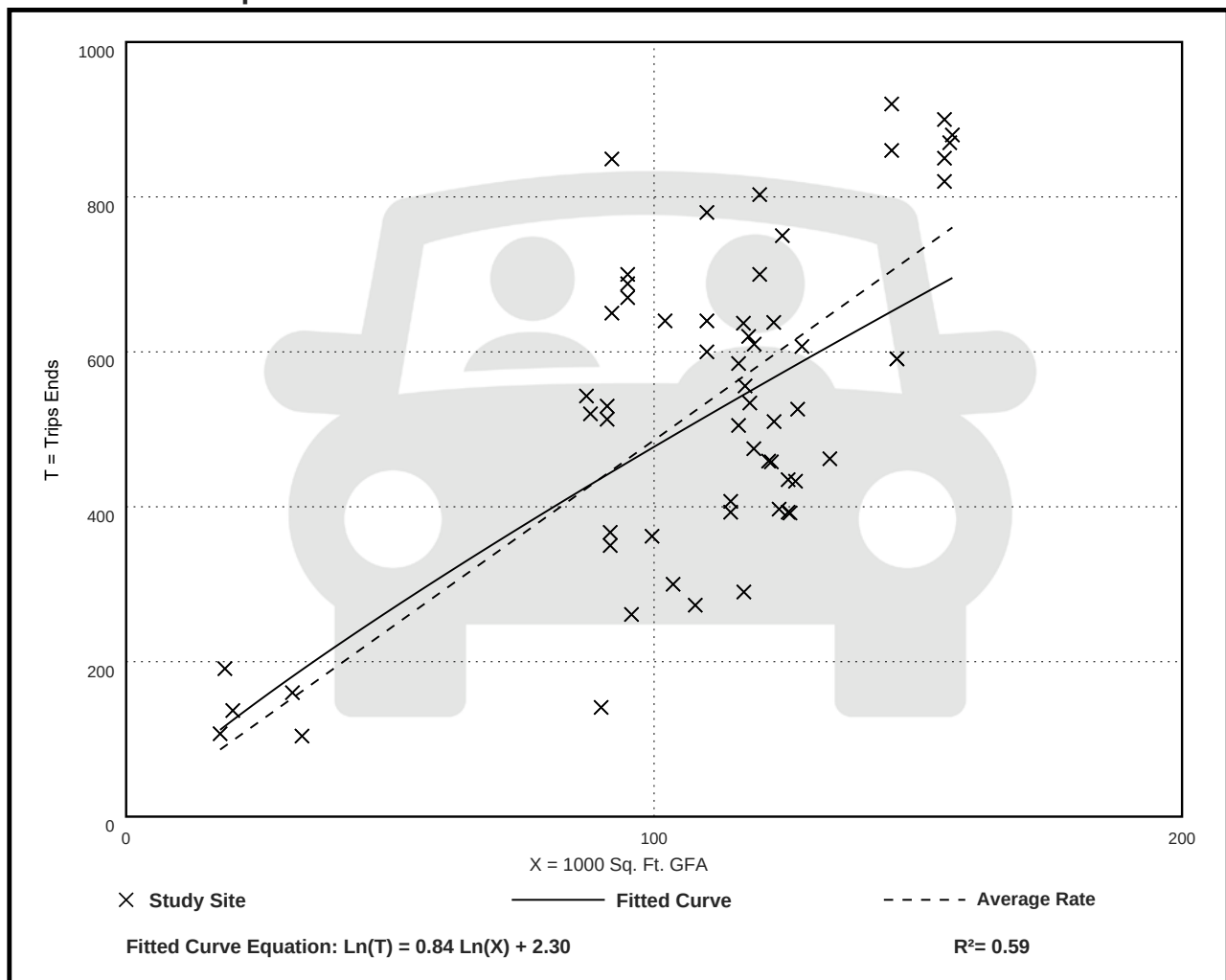
Avg. 1000 Sq. Ft. GFA: 110

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.86	1.57 - 10.21	1.47

Data Plot and Equation



Free-Standing Discount Store (815)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 36

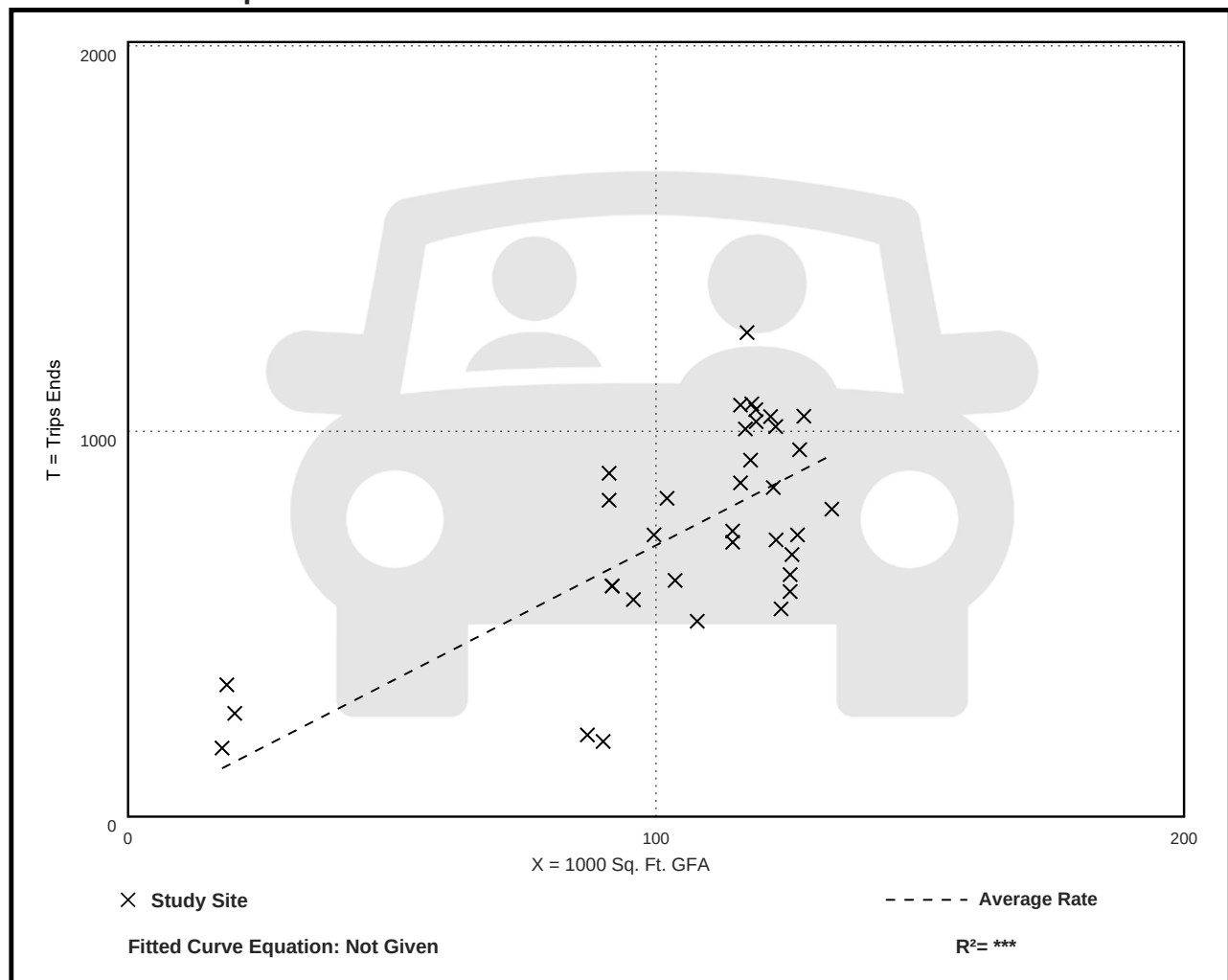
Avg. 1000 Sq. Ft. GFA: 105

Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
7.04	2.17 - 18.29	2.13

Data Plot and Equation



Land Use: 821

Shopping Plaza (40-150k)

Description

A shopping plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has between 40,000 and 150,000 square feet of gross leasable area (GLA). The term “plaza” in the land use name rather than “center” is simply a means of distinction between the different shopping center size ranges. Various other names are commonly used to categorize a shopping plaza within this size range, depending on its specific size and tenants, such as neighborhood center, community center, and fashion center.

Its major tenant is often a supermarket but many sites are anchored by home improvement, discount, or other stores. A shopping plaza typically contains more than retail merchandising facilities. Office space, a movie theater, restaurants, a post office, banks, a health club, and recreational facilities are common tenants. A shopping plaza is almost always open-air and the GLA is the same as the gross floor area of the building.

The 150,000 square feet GLA threshold value between shopping plaza and shopping center (Land Use 820) is based on an examination of trip generation data. For a shopping plaza that is smaller than the threshold value, the presence or absence of a supermarket within the plaza has a measurable effect on site trip generation. For a shopping center that is larger than the threshold value, the trips generated by its other major tenants mask any effects of the presence or absence of an on-site supermarket.

The 40,000 square feet GFA threshold between shopping plaza and strip retail plaza (Land Use 822) was selected based on an examination of the overall shopping center/plaza database. No shopping plaza with a supermarket as its anchor is smaller than 40,000 square feet GLA.

Shopping center (>150k) (Land Use 820), strip retail plaza (<40k) (Land Use 822), and factory outlet center (Land Use 823) are related uses.

Land Use Subcategory

The presence or absence of a supermarket in a shopping plaza has been determined to have a measurable effect on site trip generation. Therefore, data are presented for two subcategories for this land use: sites with a supermarket anchor and sites without a supermarket.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.

Source Numbers

105, 110, 156, 159, 186, 198, 204, 211, 213, 239, 259, 260, 295, 301, 304, 305, 307, 317, 319, 358, 376, 390, 400, 404, 437, 444, 446, 507, 580, 598, 658, 728, 908, 926, 944, 946, 960, 973, 974, 1004, 1009, 1025, 1069

Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA

On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 7

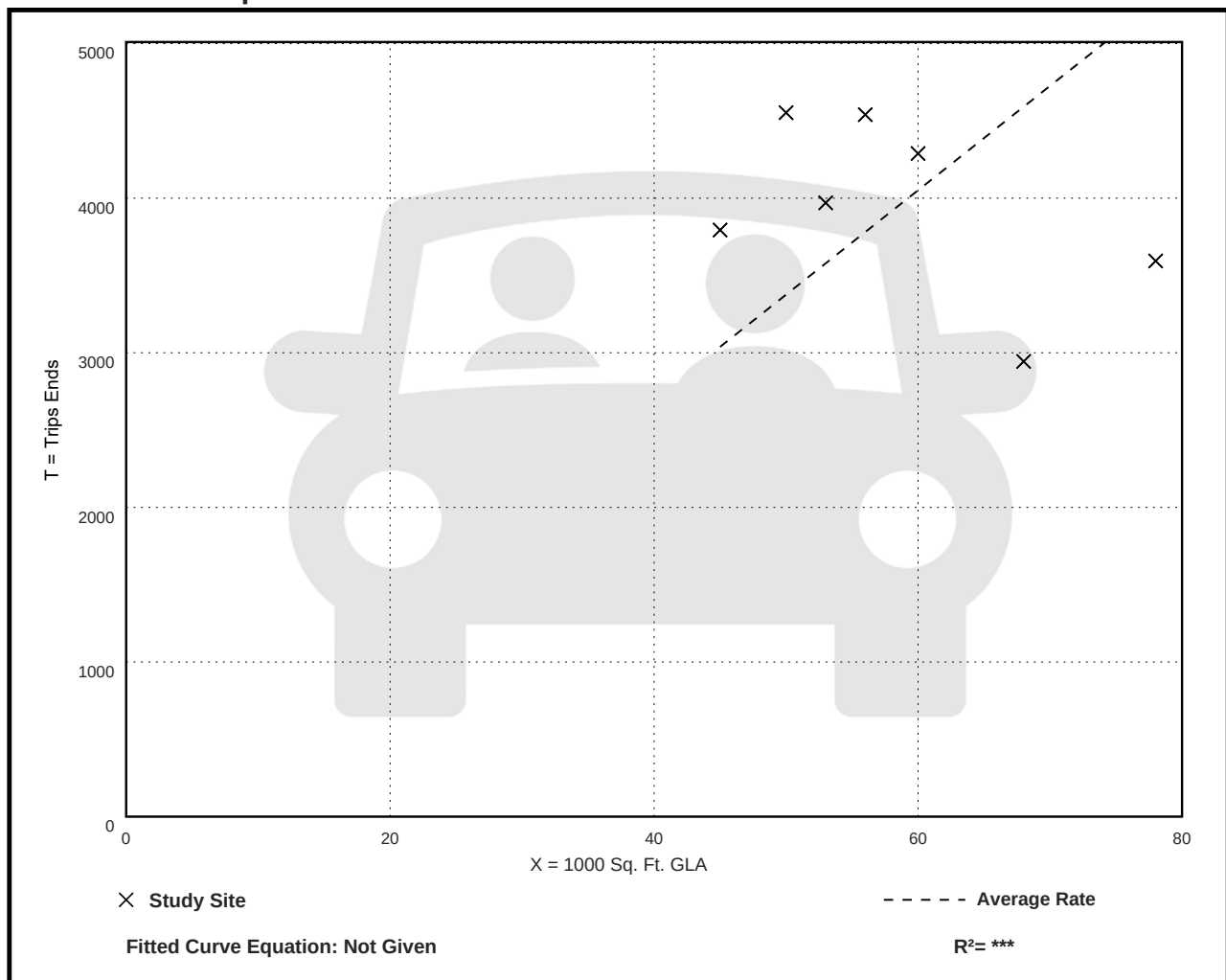
Avg. 1000 Sq. Ft. GLA: 59

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 13

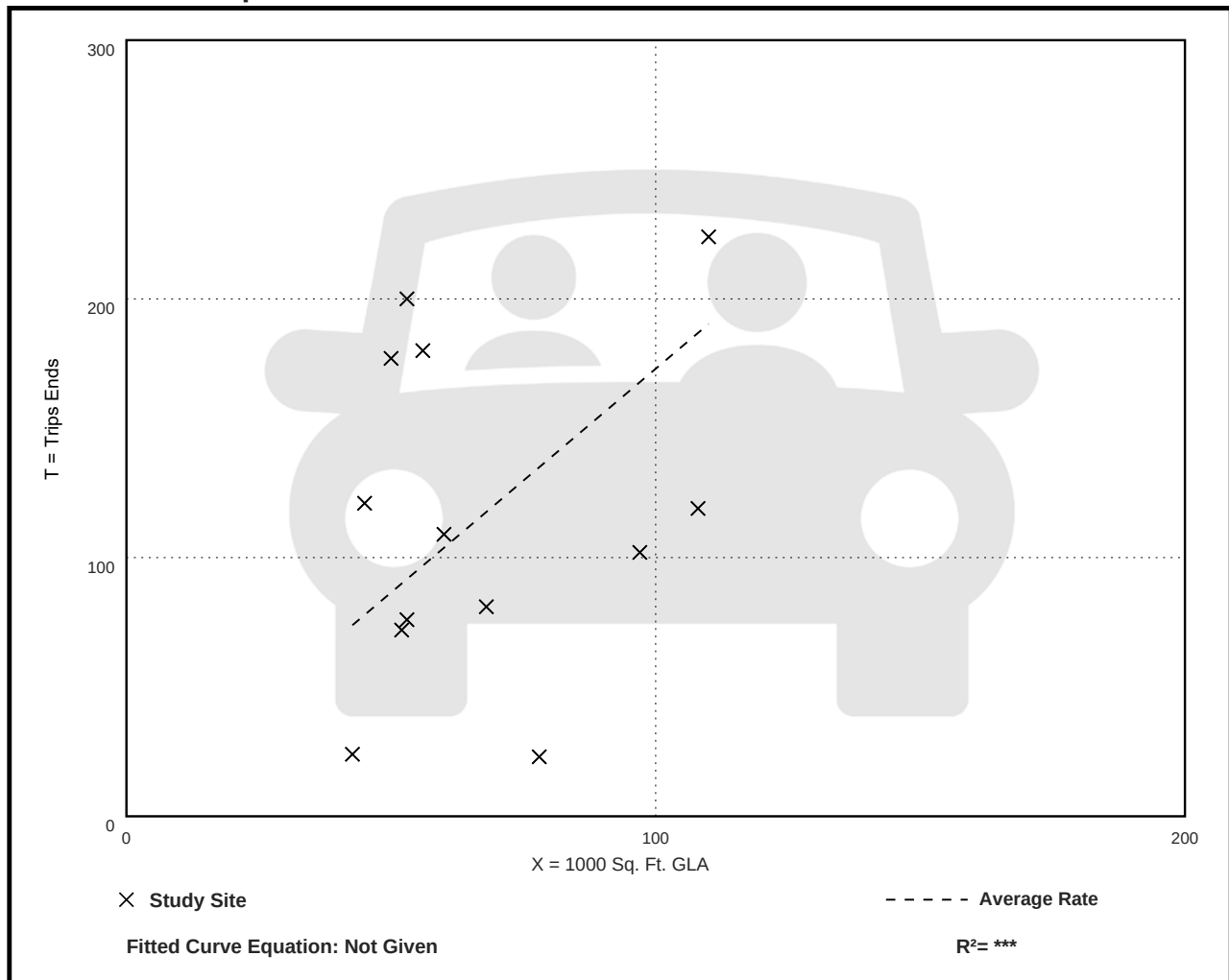
Avg. 1000 Sq. Ft. GLA: 67

Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 42

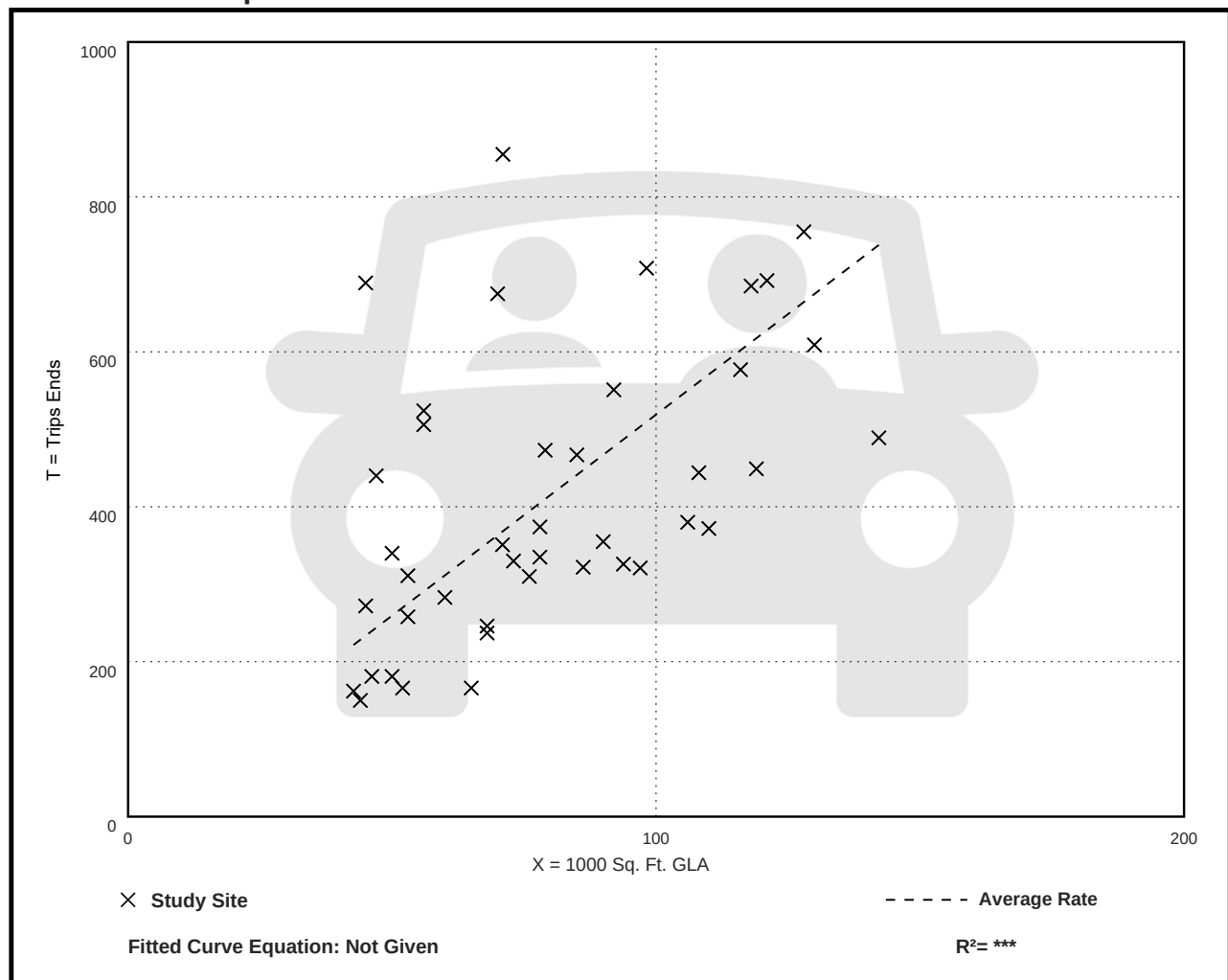
Avg. 1000 Sq. Ft. GLA: 79

Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 8

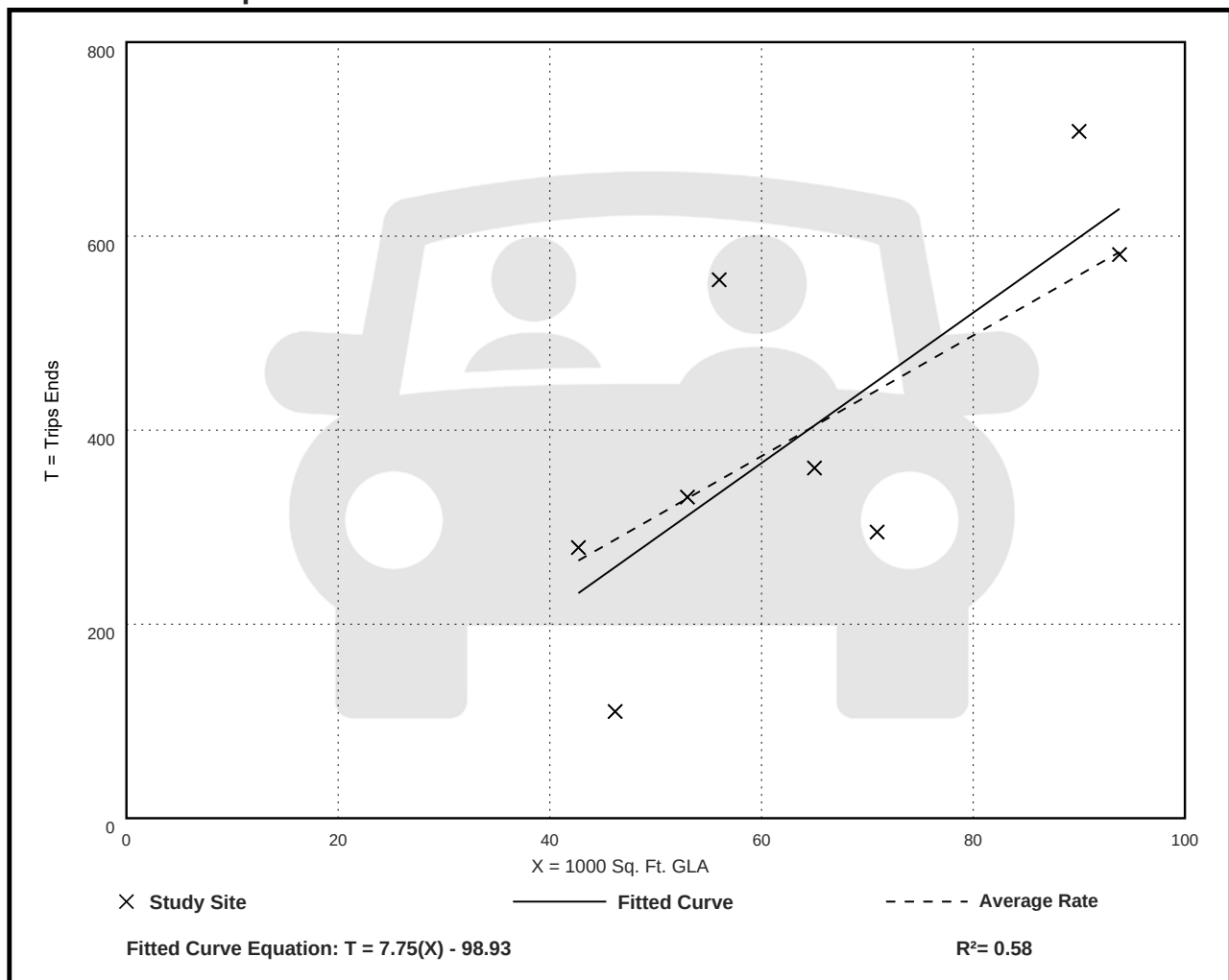
Avg. 1000 Sq. Ft. GLA: 65

Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.22	2.38 - 9.91	2.11

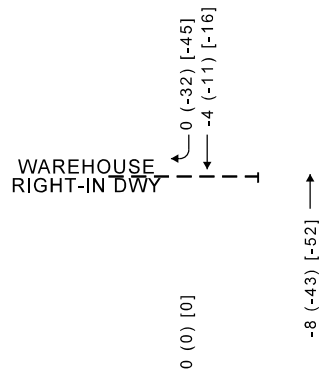
Data Plot and Equation



BACKGROUND DEVELOPMENTS TRAFFIC IMPACT STUDIES

WAREHOUSE
RIGHT-IN DWY

[338]
32 (89) [115]





Existing Rerouted Traffic Volumes with Ravinia Extension

The construction of the Ravinia Avenue extension will result in an adjustment to the existing traffic patterns in the area as adjacent developments will have additional options to access the area roadways and vehicles will be able to use the new extension to avoid some travel movements and intersections. For instance, currently traffic from the south on LaGrange Road has to use 159th Street to access the Costco, but with the extension, those trips can now use Ravinia Avenue.

In coordination with CMAP, it is anticipated that approximately four percent of the average daily traffic (38,900 vehicles reduced to 37,700 vehicles) along LaGrange Road south of 159th Street will utilize the Ravinia Avenue extension. Therefore, a four percent reduction of the northbound and southbound through volumes along LaGrange Road were adjusted and rerouted to use the Ravinia Avenue Extension.

Costco Rerouted Traffic Volumes with Ravinia Extension

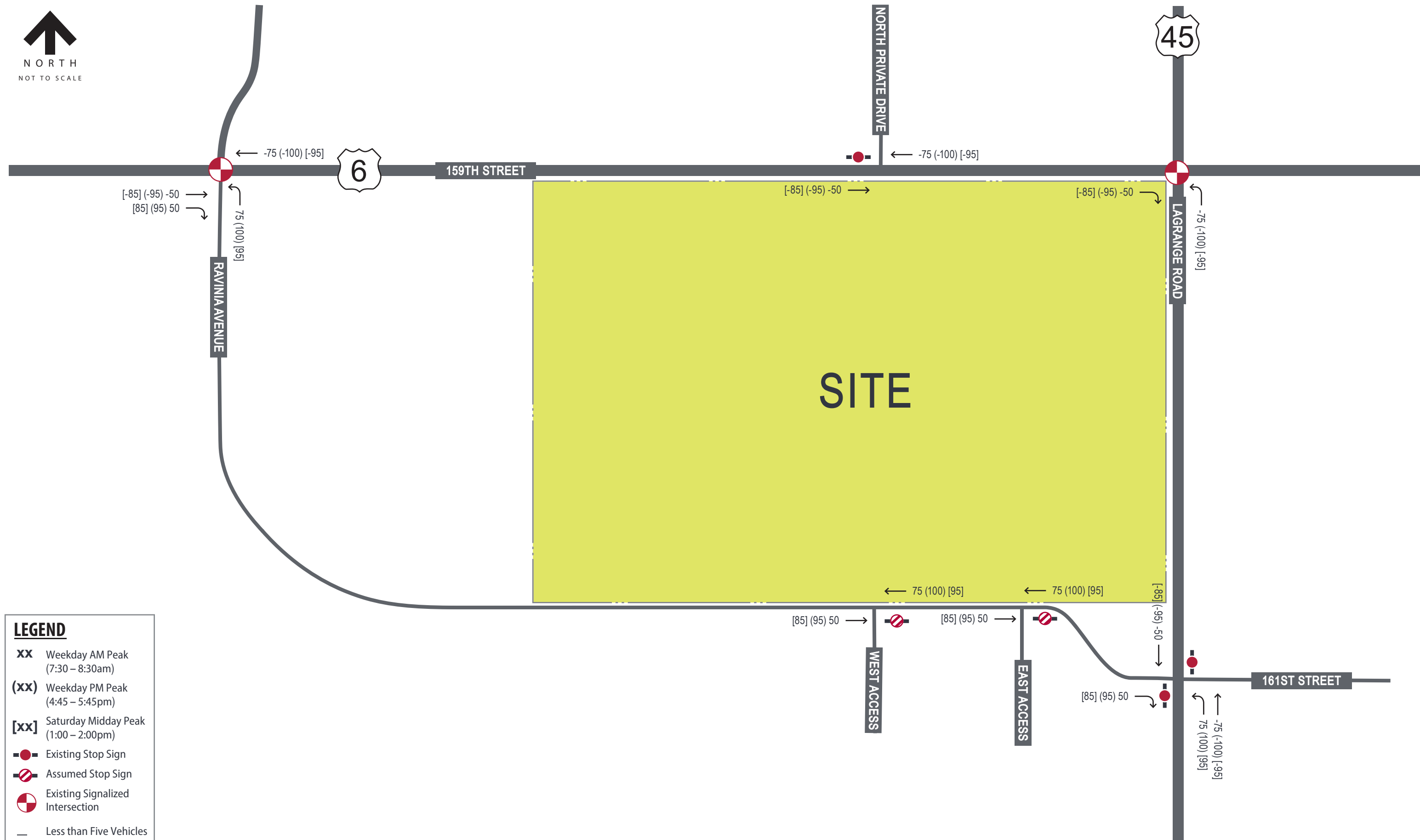
Similar to the existing rerouted traffic volumes along LaGrange Road and 159th Street, it is anticipated that Costco traffic will be rerouted to utilize the new access connecting south of LaGrange Road to 159th Street to the west. Based on the existing Costco traffic patterns, it is estimated that approximately 15 percent of the Costco generated traffic volumes travel to and from the south on LaGrange Road. Therefore, 15 percent of the Costco generated traffic volumes has been rerouted to utilize the Ravinia Extension.

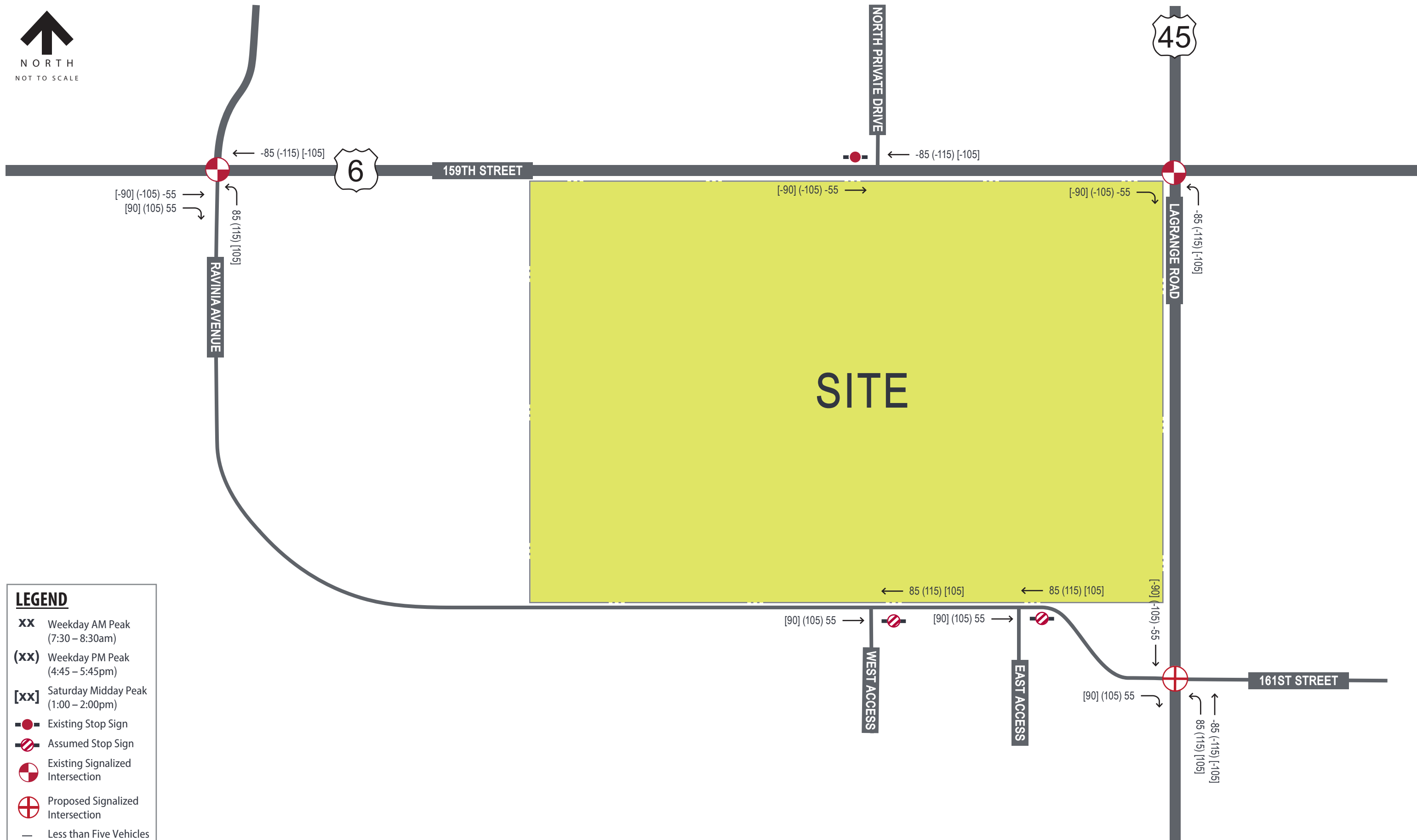
In summary, the future 2050 peak hour traffic volumes the background growth in the area based on CMAP projections, the traffic from the two new developments south and east of Costco, and a redistribution of traffic from 159th Street and LaGrange Road that would likely use the new extension to bypass the 159th Street and LaGrange Road intersection or travel on Ravinia Avenue north of 159th Street, and the redistribution of Costco traffic using the Ravinia Avenue extension. Appendix H includes a summary of traffic volume exhibits that illustrate the development of the 2050 traffic volumes.

The existing rerouted traffic volumes, the adjacent development traffic volumes, and the Costco rerouted traffic volumes total project trips are added to the background volume to obtain the future with project traffic volumes for the study area intersections. Future with project traffic volumes are depicted in Figure 10.

Figure 11 illustrates the proposed lane configuration for the 2050 future with Ravinia Extension scenario.

RAVINIA AVENUE REROUTING





CMAP YEAR 2050 TRAFFIC PROJECTIONS



April 25, 2025

Alainie Sawtelle, E.I.
Kimley-Horn
4201 Winfield Road
Suite 600
Warrenville, IL 60555

Subject: 159th Street from 104th Avenue to 94th Avenue
IDOT

Dear Ms. Sawtelle:

In response to a request made on your behalf and dated April 24, 2025, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current ADT	Year 2050 ADT
159th St, west of 104th Ave	21,300	25,200
159th St, from 104th St to LaGrange Rd	24,200	28,600
159th St east of LaGrange Rd	35,000	41,400
104th Avenue south of 159th St	3,700	4,380
Ravinia Ave north of 159th St	5,600	6,600
LaGrange Rd north of 159th St	33,600	39,600
LaGrange Rd south of 159th St	33,500	39,500

Traffic projections are developed using existing ADT data provided in the request letter and the results from the December 2024 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806 or email me at jrodriguez@cmap.illinois.gov

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

TRAFFIC FORECAST RECORD

Record Number: ck-37-25

Type of Report: Projection

Year Sought: 2050

Analyst: JAR

Organization Requestion Forecast: Kimley-Horn

Contact: Alainie Sawtelle

Email or Phone: alainie.sawtelle@kimley-horn.com

Sponsor: IDOT

Date request was received: 4/24/2025

Date that response was emailed: 4/25/2025

Facility Location: 159th Street from 104th Avenue to 94th Avenue

Municipality: Orland Park

FUTURE (2033) NO-BUILD CAPACITY REPORTS

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	660	85	35	720	195	105	10	65	115	10	90
Future Volume (veh/h)	135	660	85	35	720	195	105	10	65	115	10	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	142	695	89	37	758	205	111	11	68	121	11	95
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Cap, veh/h	169	2339	740	67	2200	932	134	166	165	293	145	267
Arrive On Green	0.09	0.66	0.66	0.02	0.59	0.59	0.09	0.08	0.08	0.08	0.07	0.07
Sat Flow, veh/h	1781	3526	982	3428	3741	1585	1499	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	142	695	89	37	758	205	111	11	68	121	11	95
Grp Sat Flow(s),veh/h/ln	1781	1763	982	1714	1870	1585	1499	1969	1585	1781	1969	1585
Q Serve(g_s), s	10.2	10.7	3.2	1.4	13.6	8.0	9.5	0.7	5.2	8.0	0.7	6.9
Cycle Q Clear(g_c), s	10.2	10.7	3.2	1.4	13.6	8.0	9.5	0.7	5.2	8.0	0.7	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	169	2339	740	67	2200	932	134	166	165	293	145	267
V/C Ratio(X)	0.84	0.30	0.12	0.55	0.34	0.22	0.83	0.07	0.41	0.41	0.08	0.36
Avail Cap(c_a), veh/h	295	2339	740	567	2200	932	259	485	421	461	485	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	9.2	4.4	63.2	13.8	12.7	58.2	54.8	54.5	50.1	56.1	47.8
Incr Delay (d2), s/veh	10.5	0.3	0.3	6.9	0.4	0.5	11.9	0.4	3.5	0.9	0.5	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.7	7.1	1.2	1.2	9.5	5.3	7.3	0.6	4.1	6.6	0.6	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.4	9.5	4.7	70.1	14.3	13.2	70.1	55.2	58.0	51.0	56.6	49.5
LnGrp LOS	E	A	A	E	B	B	E	E	E	D	E	D
Approach Vol, veh/h	926			1000			190			227		
Approach Delay, s/veh	18.1			16.1			64.9			50.7		
Approach LOS	B			B			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.0	92.2	15.2	15.6	16.8	82.4	13.7	17.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	3.4	12.7	11.5	8.9	12.2	15.6	10.0	7.2				
Green Ext Time (p_c), s	0.1	12.2	0.2	0.7	0.2	12.7	0.2	0.5				
Intersection Summary												
HCM 7th Control Delay, s/veh	24.2											
HCM 7th LOS	C											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	660	85	35	720	195	105	10	65	115	10	90
Future Volume (veh/h)	135	660	85	35	720	195	105	10	65	115	10	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No		No				No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	142	695	89	37	758	205	111	11	68	121	11	95
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	169	2339	740	67	2200	932	134	166	165	293	145	267
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.09	0.66	0.66	0.02	0.59	0.59	0.09	0.08	0.08	0.08	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	68.4	9.5	4.7	70.1	14.3	13.2	70.1	55.2	58.0	51.0	56.6	49.5
Ln Grp LOS	E	A	A	E	B	B	E	E	E	D	E	D
Approach Vol, veh/h	926				1000		190				227	
Approach Delay, s/veh	18.1				16.1		64.9				50.7	
Approach LOS	B				B		E				D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	7.0	92.2	15.2	15.6	16.8	82.4	13.7	17.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.9	3.9	6.2	3.7	8.8	3.8	6.2				
Max Q Clear (g_c+I1), s	3.4	12.7	11.5	8.9	12.2	15.6	10.0	7.2				
Green Ext Time (g_e), s	0.1	12.2	0.2	0.7	0.2	12.7	0.2	0.5				
Prob of Phs Call (p_c)	0.74	1.00	1.00	1.00	0.99	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.00	0.57	0.00	0.00	0.01	0.74	0.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3428	1499	1781	1781								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	3526	1969	3741	1969								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	982	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	37	0	111	0	142	0	121	0
Grp Sat Flow (s), veh/h/ln	1714	0	1499	0	1781	0	1781	0
Q Serve Time (g_s), s	1.4	0.0	9.5	0.0	10.2	0.0	8.0	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	9.5	0.0	10.2	0.0	8.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1320	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	67	0	134	0	169	0	293	0
V/C Ratio (X)	0.55	0.00	0.83	0.00	0.84	0.00	0.41	0.00
Avail Cap (c_a), veh/h	567	0	259	0	295	0	461	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	63.2	0.0	58.2	0.0	57.9	0.0	50.1	0.0
Incr Delay (d2), s/veh	6.9	0.0	11.9	0.0	10.5	0.0	0.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	70.1	0.0	70.1	0.0	68.4	0.0	51.0	0.0
1st-Term Q (Q1), veh/ln	0.6	0.0	3.6	0.0	4.5	0.0	3.6	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.4	0.0	0.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.73	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.2	0.0	7.3	0.0	8.7	0.0	6.6	0.0
%ile Storage Ratio (RQ%)	0.08	0.00	0.72	0.00	0.82	0.00	1.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	695	0	11	0	758	0	11
Grp Sat Flow (s), veh/h/ln	0	1763	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	10.7	0.0	0.7	0.0	13.6	0.0	0.7
Cycle Q Clear Time (g_c), s	0.0	10.7	0.0	0.7	0.0	13.6	0.0	0.7
Lane Grp Cap (c), veh/h	0	2339	0	145	0	2200	0	166
V/C Ratio (X)	0.00	0.30	0.00	0.08	0.00	0.34	0.00	0.07
Avail Cap (c_a), veh/h	0	2339	0	485	0	2200	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.2	0.0	56.1	0.0	13.8	0.0	54.8
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.5	0.0	0.4	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.5	0.0	56.6	0.0	14.3	0.0	55.2
1st-Term Q (Q1), veh/ln	0.0	3.8	0.0	0.3	0.0	5.5	0.0	0.3

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.69	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	7.1	0.0	0.6	0.0	9.5	0.0	0.6
%ile Storage Ratio (RQ%)	0.00	0.15	0.00	0.04	0.00	0.27	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	89	0	95	0	205	0	68
Grp Sat Flow (s), veh/h/ln	0	982	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	3.2	0.0	6.9	0.0	8.0	0.0	5.2
Cycle Q Clear Time (g_c), s	0.0	3.2	0.0	6.9	0.0	8.0	0.0	5.2
Prot RT Sat Flow (s_R), veh/h/ln	0.0	982.2	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.7	0.0	12.3	0.0	0.0	0.0	2.5
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	740	0	267	0	932	0	165
V/C Ratio (X)	0.00	0.12	0.00	0.36	0.00	0.22	0.00	0.41
Avail Cap (c_a), veh/h	0	740	0	541	0	932	0	421
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	4.4	0.0	47.8	0.0	12.7	0.0	54.5
Incr Delay (d2), s/veh	0.0	0.3	0.0	1.7	0.0	0.5	0.0	3.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.7	0.0	49.5	0.0	13.2	0.0	58.0
1st-Term Q (Q1), veh/ln	0.0	0.6	0.0	2.7	0.0	2.8	0.0	2.1
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	1.2	0.0	5.2	0.0	5.3	0.0	4.1
%ile Storage Ratio (RQ%)	0.00	0.22	0.00	0.79	0.00	0.68	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	24.2
HCM 7th LOS	C

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	805	920	35	5	40
Future Vol, veh/h	35	805	920	35	5	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	847	968	37	5	42

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	968	0	0 1466 484
Stage 1	-	-	- 968 -
Stage 2	-	-	- 497 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	707	-	- 119 529
Stage 1	-	-	- 329 -
Stage 2	-	-	- 576 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	707	-	- 113 529
Mov Cap-2 Maneuver	-	-	- 113 -
Stage 1	-	-	- 312 -
Stage 2	-	-	- 576 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.43	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	707	-	-	-	113	529
HCM Lane V/C Ratio	0.052	-	-	-	0.047	0.08
HCM Control Delay (s/veh)	10.4	-	-	-	38.5	12.4
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	590	140	170	645	195	220	1245	270	175	795	100
Future Volume (veh/h)	150	590	140	170	645	195	220	1245	270	175	795	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	158	621	147	179	679	205	232	1311	284	184	837	105
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Cap, veh/h	216	815	477	243	844	471	296	2501	849	247	2405	814
Arrive On Green	0.06	0.22	0.22	0.07	0.23	0.23	0.09	0.47	0.47	0.07	0.45	0.45
Sat Flow, veh/h	3456	3741	1572	3456	3741	1585	3456	5375	1585	3456	5332	1585
Grp Volume(v), veh/h	158	621	147	179	679	205	232	1311	284	184	837	105
Grp Sat Flow(s),veh/h/ln	1728	1870	1572	1728	1870	1585	1728	1792	1585	1728	1777	1585
Q Serve(g_s), s	5.4	18.7	8.6	6.1	20.6	12.5	7.9	20.7	12.2	6.3	12.3	4.1
Cycle Q Clear(g_c), s	5.4	18.7	8.6	6.1	20.6	12.5	7.9	20.7	12.2	6.3	12.3	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	216	815	477	243	844	471	296	2501	849	247	2405	814
V/C Ratio(X)	0.73	0.76	0.31	0.74	0.80	0.44	0.78	0.52	0.33	0.74	0.35	0.13
Avail Cap(c_a), veh/h	331	815	477	504	935	510	475	2501	849	475	2405	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.2	44.0	32.1	54.7	44.0	34.0	53.8	22.7	15.8	54.6	21.4	15.2
Incr Delay (d2), s/veh	4.7	5.0	0.8	4.3	5.8	1.4	4.5	0.8	1.1	4.4	0.4	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	14.0	6.0	5.0	15.2	8.5	6.4	13.4	7.9	5.1	8.7	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	59.9	49.0	32.9	59.0	49.8	35.4	58.3	23.5	16.8	59.0	21.8	15.5
LnGrp LOS	E	D	C	E	D	D	E	C	B	E	C	B
Approach Vol, veh/h	926			1063			1827			1126		
Approach Delay, s/veh	48.3			48.6			26.9			27.3		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	61.8	12.9	32.1	14.8	60.1	12.0	33.1				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Q Clear Time (g_c+I1), s	8.3	22.7	8.1	20.7	9.9	14.3	7.4	22.6				
Green Ext Time (p_c), s	0.3	16.6	0.4	2.0	0.4	16.5	0.2	4.5				

Intersection Summary

HCM 7th Control Delay, s/veh	35.7
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	590	140	170	645	195	220	1245	270	175	795	100
Future Volume (veh/h)	150	590	140	170	645	195	220	1245	270	175	795	100
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	158	621	147	179	679	205	232	1311	284	184	837	105
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	216	815	477	243	844	471	296	2501	849	247	2405	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.06	0.22	0.22	0.07	0.23	0.23	0.09	0.47	0.47	0.07	0.45	0.45
Unsig. Movement Delay												
Ln Grp Delay, s/veh	59.9	49.0	32.9	59.0	49.8	35.4	58.3	23.5	16.8	59.0	21.8	15.5
Ln Grp LOS	E	D	C	E	D	D	E	C	B	E	C	B
Approach Vol, veh/h	926			1063			1827			1126		
Approach Delay, s/veh	48.3			48.6			26.9			27.3		
Approach LOS	D			D			C			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	13.1	61.8	12.9	32.1	14.8	60.1	12.0	33.1				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.9	3.7	6.8				
Max Q Clear (g_c+I1), s	8.3	22.7	8.1	20.7	9.9	14.3	7.4	22.6				
Green Ext Time (g_e), s	0.3	16.6	0.4	2.0	0.4	16.5	0.2	4.5				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00			
Prob of Max Out (p_x)	0.02	0.93	0.00	1.00	0.09	0.55	0.69	0.95				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5332	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1572	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	184	0	179	0	232	0	158	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	6.3	0.0	6.1	0.0	7.9	0.0	5.4	0.0
Cycle Q Clear Time (g_c), s	6.3	0.0	6.1	0.0	7.9	0.0	5.4	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	247	0	243	0	296	0	216	0
V/C Ratio (X)	0.74	0.00	0.74	0.00	0.78	0.00	0.73	0.00
Avail Cap (c_a), veh/h	475	0	504	0	475	0	331	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.6	0.0	54.7	0.0	53.8	0.0	55.2	0.0
Incr Delay (d2), s/veh	4.4	0.0	4.3	0.0	4.5	0.0	4.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	59.0	0.0	59.0	0.0	58.3	0.0	59.9	0.0
1st-Term Q (Q1), veh/ln	2.7	0.0	2.6	0.0	3.4	0.0	2.3	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.1	0.0	0.2	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	5.1	0.0	5.0	0.0	6.4	0.0	4.4	0.0
%ile Storage Ratio (RQ%)	0.70	0.00	0.68	0.00	0.54	0.00	0.70	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1311	0	621	0	837	0	679
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1777	0	1870
Q Serve Time (g_s), s	0.0	20.7	0.0	18.7	0.0	12.3	0.0	20.6
Cycle Q Clear Time (g_c), s	0.0	20.7	0.0	18.7	0.0	12.3	0.0	20.6
Lane Grp Cap (c), veh/h	0	2501	0	815	0	2405	0	844
V/C Ratio (X)	0.00	0.52	0.00	0.76	0.00	0.35	0.00	0.80
Avail Cap (c_a), veh/h	0	2501	0	815	0	2405	0	935
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	22.7	0.0	44.0	0.0	21.4	0.0	44.0
Incr Delay (d2), s/veh	0.0	0.8	0.0	5.0	0.0	0.4	0.0	5.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	23.5	0.0	49.0	0.0	21.8	0.0	49.8
1st-Term Q (Q1), veh/ln	0.0	8.4	0.0	8.5	0.0	4.9	0.0	9.3

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.6	0.0	0.1	0.0	0.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.56	0.00	1.55	0.00	1.73	0.00	1.52
%ile Back of Q (95%), veh/ln	0.0	13.4	0.0	14.0	0.0	8.7	0.0	15.2
%ile Storage Ratio (RQ%)	0.00	0.25	0.00	0.81	0.00	0.23	0.00	0.26
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	284	0	147	0	105	0	205
Grp Sat Flow (s), veh/h/ln	0	1585	0	1572	0	1585	0	1585
Q Serve Time (g_s), s	0.0	12.2	0.0	8.6	0.0	4.1	0.0	12.5
Cycle Q Clear Time (g_c), s	0.0	12.2	0.0	8.6	0.0	4.1	0.0	12.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1572.5	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	8.4	0.0	10.3	0.0	7.5	0.0	8.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	849	0	477	0	814	0	471
V/C Ratio (X)	0.00	0.33	0.00	0.31	0.00	0.13	0.00	0.44
Avail Cap (c_a), veh/h	0	849	0	477	0	814	0	510
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	15.8	0.0	32.1	0.0	15.2	0.0	34.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.8	0.0	0.3	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.8	0.0	32.9	0.0	15.5	0.0	35.4
1st-Term Q (Q1), veh/ln	0.0	4.2	0.0	3.2	0.0	1.4	0.0	4.7
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.78	0.00	1.80	0.00	1.80	0.00	1.74
%ile Back of Q (95%), veh/ln	0.0	7.9	0.0	6.0	0.0	2.7	0.0	8.5
%ile Storage Ratio (RQ%)	0.00	1.18	0.00	0.35	0.00	0.51	0.00	0.47
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	35.7
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

No-Build (2033) Traffic Volumes

AM Peak Hour

Intersection												
Int Delay, s/veh	10.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱	↑	↲	↱	↑	↲	↱	↑↑↑		↱	↑↑↑	↲
Traffic Vol, veh/h	40	1	65	1	1	10	100	1720	15	25	1050	55
Future Vol, veh/h	40	1	65	1	1	10	100	1720	15	25	1050	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	55	-	0	0	-	-	325	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	1	68	1	1	11	105	1811	16	26	1105	58
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2122	3224	582	2524	3245	913	1163	0	0	1826	0	0
Stage 1	1187	1187	-	2029	2029	-	-	-	-	-	-	-
Stage 2	935	2037	-	495	1216	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	53	9	391	30	9	237	326	-	-	153	-	-
Stage 1	147	260	-	37	100	-	-	-	-	-	-	-
Stage 2	258	99	-	479	252	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 25	5	391	12	5	237	326	-	-	153	-	-
Mov Cap-2 Maneuver	~ 25	5	-	12	5	-	-	-	-	-	-	-
Stage 1	122	215	-	25	68	-	-	-	-	-	-	-
Stage 2	164	67	-	326	209	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s/270.12				124.98			1.16			0.74		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR	
Capacity (veh/h)	326	-	-	25	5	391	12	47	153	-	-	
HCM Lane V/C Ratio	0.323	-	-	1.688	0.198	0.175	0.087	0.249	0.172	-	-	
HCM Control Delay (s/veh)	21.2	-	-	\$ 669.4	\$ 806	16.1	\$ 330.6	106.3	33.3	-	-	
HCM Lane LOS	C	-	-	F	F	C	F	F	D	-	-	
HCM 95th %tile Q(veh)	1.4	-	-	5.2	0.4	0.6	0.2	0.8	0.6	-	-	
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2033) Traffic Volumes
AM Peak Hour

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	70	1	65	90	1	35
Future Vol, veh/h	70	1	65	90	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	1	68	95	1	37
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	258	37
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1523	-	708	1026
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	829	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1523	-	676	1026
Mov Cap-2 Maneuver	-	-	-	-	676	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	791	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		3.22		8.7	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1012	-	-	1483	-	
HCM Lane V/C Ratio	0.037	-	-	0.045	-	
HCM Control Delay (s/veh)	8.7	-	-	7.5	0.1	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	70	1	1	90	1	1
Future Vol, veh/h	70	1	1	90	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	1	1	95	1	1
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	75	0	124	37
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	49	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1523	-	858	1026
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	967	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1523	-	858	1026
Mov Cap-2 Maneuver	-	-	-	-	858	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	966	-
Approach	EB	WB		NB		
HCM Control Delay, s/v	0	0.09		8.86		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	935	-	-	40	-	
HCM Lane V/C Ratio	0.002	-	-	0.001	-	
HCM Control Delay (s/veh)	8.9	-	-	7.4	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	230	870	155	270	830	195	280	115	320	190	95	220	
Future Volume (veh/h)	230	870	155	270	830	195	280	115	320	190	95	220	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870	
Adj Flow Rate, veh/h	242	916	163	284	874	205	295	121	337	200	100	232	
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	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	230	1498	668	346	1468	622	451	394	476	397	313	457	
Arrive On Green	0.13	0.42	0.42	0.10	0.39	0.39	0.15	0.20	0.20	0.11	0.16	0.16	
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	1781	1969	1585	1781	1969	1585	
Grp Volume(v), veh/h	242	916	163	284	874	205	295	121	337	200	100	232	
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1781	1969	1585	1781	1969	1585	
Q Serve(g_s), s	15.5	24.1	8.0	9.7	22.2	10.8	16.0	6.3	22.7	11.1	5.4	14.6	
Cycle Q Clear(g_c), s	15.5	24.1	8.0	9.7	22.2	10.8	16.0	6.3	22.7	11.1	5.4	14.6	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Lane Grp Cap(c), veh/h	230	1498	668	346	1468	622	451	394	476	397	313	457	
V/C Ratio(X)	1.05	0.61	0.24	0.82	0.60	0.33	0.65	0.31	0.71	0.50	0.32	0.51	
Avail Cap(c_a), veh/h	230	1498	668	446	1468	622	499	394	476	517	394	522	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	52.3	27.1	22.4	52.9	28.9	25.4	32.8	40.9	37.3	35.9	44.7	35.6	
Incr Delay (d2), s/veh	73.6	1.9	0.9	9.2	1.8	1.4	2.7	0.9	6.0	1.0	1.2	1.9	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	17.4	15.5	5.6	8.1	15.2	7.7	11.6	5.7	14.6	8.6	5.0	9.9	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	125.9	28.9	23.3	62.1	30.7	26.9	35.4	41.8	43.4	36.9	45.9	37.5	
LnGrp LOS	F	C	C	E	C	C	D	D	D	D	D	D	
Approach Vol, veh/h	1321				1363				753				532
Approach Delay, s/veh	46.0				36.7				40.0				38.9
Approach LOS	D				D				D				D
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	16.5	56.6	21.8	25.1	20.0	53.1	16.9	30.0					
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0					
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0					
Max Q Clear Time (g_c+I1), s	11.7	26.1	18.0	16.6	17.5	24.2	13.1	24.7					
Green Ext Time (p_c), s	0.3	10.3	0.3	1.5	0.0	11.5	0.3	0.0					
Intersection Summary													
HCM 7th Control Delay, s/veh	40.7												
HCM 7th LOS	D												
Notes													
User approved pedestrian interval to be less than phase max green.													

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	870	155	270	830	195	280	115	320	190	95	220
Future Volume (veh/h)	230	870	155	270	830	195	280	115	320	190	95	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A _{pbT})	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	242	916	163	284	874	205	295	121	337	200	100	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1498	668	346	1468	622	451	394	476	397	313	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.42	0.42	0.10	0.39	0.39	0.15	0.20	0.20	0.11	0.16	0.16
Unsig. Movement Delay												
Ln Grp Delay, s/veh	125.9	28.9	23.3	62.1	30.7	26.9	35.4	41.8	43.4	36.9	45.9	37.5
Ln Grp LOS	F	C	C	E	C	C	D	D	D	D	D	D
Approach Vol, veh/h		1321			1363			753			532	
Approach Delay, s/veh		46.0			36.7			40.0			38.9	
Approach LOS		D			D			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	3.0	1.1	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		16.5	56.6	21.8	25.1	20.0	53.1	16.9	30.0			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0			
Max Allow Headway (MAH), s		3.7	8.9	3.8	6.4	3.7	8.8	3.8	6.4			
Max Q Clear (g _{c+I1}), s		11.7	26.1	18.0	16.6	17.5	24.2	13.1	24.7			
Green Ext Time (g _e), s		0.3	10.3	0.3	1.5	0.0	11.5	0.3	0.0			
Prob of Phs Call (p _c)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Prob of Max Out (p _x)		0.93	0.91	1.00	0.78	1.00	0.87	0.03	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3456		1781		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3554		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1585		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	284	0	295	0	242	0	200	0
Grp Sat Flow (s), veh/h/ln	1728	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	9.7	0.0	16.0	0.0	15.5	0.0	11.1	0.0
Cycle Q Clear Time (g_c), s	9.7	0.0	16.0	0.0	15.5	0.0	11.1	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1048	0	0	0	934	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	21.1	0.0	0.0	0.0	19.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	13.7	0.0	0.0	0.0	17.7	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	2.9	0.0	0.0	0.0	0.4	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	346	0	451	0	230	0	397	0
V/C Ratio (X)	0.82	0.00	0.65	0.00	1.05	0.00	0.50	0.00
Avail Cap (c_a), veh/h	446	0	499	0	230	0	517	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	52.9	0.0	32.8	0.0	52.3	0.0	35.9	0.0
Incr Delay (d2), s/veh	9.2	0.0	2.7	0.0	73.6	0.0	1.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	62.1	0.0	35.4	0.0	125.9	0.0	36.9	0.0
1st-Term Q (Q1), veh/ln	4.1	0.0	6.9	0.0	6.8	0.0	4.8	0.0
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.3	0.0	4.7	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.77	0.00	1.61	0.00	1.52	0.00	1.74	0.00
%ile Back of Q (95%), veh/ln	8.1	0.0	11.6	0.0	17.4	0.0	8.6	0.0
%ile Storage Ratio (RQ%)	0.51	0.00	1.00	0.00	1.64	0.00	1.32	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	916	0	100	0	874	0	121
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	24.1	0.0	5.4	0.0	22.2	0.0	6.3
Cycle Q Clear Time (g_c), s	0.0	24.1	0.0	5.4	0.0	22.2	0.0	6.3
Lane Grp Cap (c), veh/h	0	1498	0	313	0	1468	0	394
V/C Ratio (X)	0.00	0.61	0.00	0.32	0.00	0.60	0.00	0.31
Avail Cap (c_a), veh/h	0	1498	0	394	0	1468	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	27.1	0.0	44.7	0.0	28.9	0.0	40.9
Incr Delay (d2), s/veh	0.0	1.9	0.0	1.2	0.0	1.8	0.0	0.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	28.9	0.0	45.9	0.0	30.7	0.0	41.8
1st-Term Q (Q1), veh/ln	0.0	9.8	0.0	2.6	0.0	9.7	0.0	3.1

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.1	0.0	0.4	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.51	0.00	1.80	0.00	1.52	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	15.5	0.0	5.0	0.0	15.2	0.0	5.7
%ile Storage Ratio (RQ%)	0.00	0.32	0.00	0.28	0.00	0.57	0.00	0.15
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	163	0	232	0	205	0	337
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	8.0	0.0	14.6	0.0	10.8	0.0	22.7
Cycle Q Clear Time (g_c), s	0.0	8.0	0.0	14.6	0.0	10.8	0.0	22.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	15.5	0.0	0.0	0.0	12.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	668	0	457	0	622	0	476
V/C Ratio (X)	0.00	0.24	0.00	0.51	0.00	0.33	0.00	0.71
Avail Cap (c_a), veh/h	0	668	0	522	0	622	0	476
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	22.4	0.0	35.6	0.0	25.4	0.0	37.3
Incr Delay (d2), s/veh	0.0	0.9	0.0	1.9	0.0	1.4	0.0	6.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	23.3	0.0	37.5	0.0	26.9	0.0	43.4
1st-Term Q (Q1), veh/ln	0.0	3.0	0.0	5.7	0.0	4.1	0.0	8.7
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.68	0.00	1.79	0.00	1.53
%ile Back of Q (95%), veh/ln	0.0	5.6	0.0	9.9	0.0	7.7	0.0	14.6
%ile Storage Ratio (RQ%)	0.00	0.78	0.00	1.52	0.00	0.98	0.00	0.38
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	40.7
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	1265	1195	115	30	110
Future Vol, veh/h	115	1265	1195	115	30	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	1332	1258	121	32	116
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1258	0	-	0	2166	629
Stage 1	-	-	-	-	1258	-
Stage 2	-	-	-	-	908	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	549	-	-	-	40	425
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	354	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	549	-	-	-	~ 31	425
Mov Cap-2 Maneuver	-	-	-	-	~ 31	-
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	354	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	1.12	0		88.06		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	549	-	-	-	31	425
HCM Lane V/C Ratio	0.221	-	-	-	1.008	0.272
HCM Control Delay (s/veh)	13.4	-	-	-	\$ 350.1	16.6
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.8	-	-	-	3.5	1.1
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 7th Signalized Intersection Summary 300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	870	230	255	920	240	260	1235	300	380	1300	255
Future Volume (veh/h)	245	870	230	255	920	240	260	1235	300	380	1300	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	258	916	242	268	968	253	274	1300	316	400	1368	268
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	900	533	329	921	600	330	1992	738	457	2189	787
Arrive On Green	0.09	0.24	0.24	0.10	0.25	0.25	0.10	0.37	0.37	0.13	0.41	0.41
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	258	916	242	268	968	253	274	1300	316	400	1368	268
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	9.5	31.3	15.6	9.9	32.0	15.3	10.1	26.1	17.3	14.8	26.3	13.3
Cycle Q Clear(g_c), s	9.5	31.3	15.6	9.9	32.0	15.3	10.1	26.1	17.3	14.8	26.3	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	900	533	329	921	600	330	1992	738	457	2189	787
V/C Ratio(X)	0.83	1.02	0.45	0.81	1.05	0.42	0.83	0.65	0.43	0.88	0.62	0.34
Avail Cap(c_a), veh/h	332	900	533	492	921	600	412	1992	738	518	2189	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	49.4	33.8	57.7	49.0	29.9	57.7	34.0	23.2	55.4	30.6	19.8
Incr Delay (d2), s/veh	15.7	34.6	1.3	6.4	44.1	1.0	11.0	1.7	1.8	14.2	1.4	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.4	25.9	10.1	8.0	28.4	9.9	8.5	16.9	10.9	11.7	16.9	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	73.9	84.0	35.1	64.1	93.1	30.9	68.8	35.6	25.0	69.6	32.0	21.0
LnGrp LOS	E	F	D	E	F	C	E	D	C	E	C	C
Approach Vol, veh/h	1416			1489			1890			2036		
Approach Delay, s/veh	73.8			77.3			38.7			37.9		
Approach LOS	E			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.7	54.2	16.9	37.3	16.9	58.9	16.1	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	16.8	28.1	11.9	33.3	12.1	28.3	11.5	34.0				
Green Ext Time (p_c), s	0.4	15.4	0.5	0.0	0.3	18.8	0.1	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	54.2											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	870	230	255	920	240	260	1235	300	380	1300	255
Future Volume (veh/h)	245	870	230	255	920	240	260	1235	300	380	1300	255
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	258	916	242	268	968	253	274	1300	316	400	1368	268
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	309	900	533	329	921	600	330	1992	738	457	2189	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.09	0.24	0.24	0.10	0.25	0.25	0.10	0.37	0.37	0.13	0.41	0.41
Unsig. Movement Delay												
Ln Grp Delay, s/veh	73.9	84.0	35.1	64.1	93.1	30.9	68.8	35.6	25.0	69.6	32.0	21.0
Ln Grp LOS	E	F	D	E	F	C	E	D	C	E	C	C
Approach Vol, veh/h	1416			1489			1890			2036		
Approach Delay, s/veh	73.8			77.3			38.7			37.9		
Approach LOS	E			E			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	21.7	54.2	16.9	37.3	16.9	58.9	16.1	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.8				
Max Q Clear (g_c+I1), s	16.8	28.1	11.9	33.3	12.1	28.3	11.5	34.0				
Green Ext Time (g_e), s	0.4	15.4	0.5	0.0	0.3	18.8	0.1	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.94	0.11	1.00	1.00	0.92	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		3456		3456					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5375		3741		5375		3741				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	400	0	268	0	274	0	258	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	14.8	0.0	9.9	0.0	10.1	0.0	9.5	0.0
Cycle Q Clear Time (g_c), s	14.8	0.0	9.9	0.0	10.1	0.0	9.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	457	0	329	0	330	0	309	0
V/C Ratio (X)	0.88	0.00	0.81	0.00	0.83	0.00	0.83	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	55.4	0.0	57.7	0.0	57.7	0.0	58.2	0.0
Incr Delay (d2), s/veh	14.2	0.0	6.4	0.0	11.0	0.0	15.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	69.6	0.0	64.1	0.0	68.8	0.0	73.9	0.0
1st-Term Q (Q1), veh/ln	6.3	0.0	4.3	0.0	4.4	0.0	4.1	0.0
2nd-Term Q (Q2), veh/ln	0.9	0.0	0.3	0.0	0.5	0.0	0.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.61	0.00	1.77	0.00	1.74	0.00	1.75	0.00
%ile Back of Q (95%), veh/ln	11.7	0.0	8.0	0.0	8.5	0.0	8.4	0.0
%ile Storage Ratio (RQ%)	1.60	0.00	1.11	0.00	0.72	0.00	1.33	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1300	0	916	0	1368	0	968
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	26.1	0.0	31.3	0.0	26.3	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	26.1	0.0	31.3	0.0	26.3	0.0	32.0
Lane Grp Cap (c), veh/h	0	1992	0	900	0	2189	0	921
V/C Ratio (X)	0.00	0.65	0.00	1.02	0.00	0.62	0.00	1.05
Avail Cap (c_a), veh/h	0	1992	0	900	0	2189	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	34.0	0.0	49.4	0.0	30.6	0.0	49.0
Incr Delay (d2), s/veh	0.0	1.7	0.0	34.6	0.0	1.4	0.0	44.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	35.6	0.0	84.0	0.0	32.0	0.0	93.1
1st-Term Q (Q1), veh/ln	0.0	11.1	0.0	14.3	0.0	11.1	0.0	14.6

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	4.3	0.0	0.3	0.0	5.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.49	0.00	1.40	0.00	1.49	0.00	1.41
%ile Back of Q (95%), veh/ln	0.0	16.9	0.0	25.9	0.0	16.9	0.0	28.4
%ile Storage Ratio (RQ%)	0.00	0.32	0.00	1.50	0.00	0.45	0.00	0.48
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	4.1	0.0	0.0	0.0	11.8
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	316	0	242	0	268	0	253
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	17.3	0.0	15.6	0.0	13.3	0.0	15.3
Cycle Q Clear Time (g_c), s	0.0	17.3	0.0	15.6	0.0	13.3	0.0	15.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	12.4	0.0	12.4	0.0	11.6	0.0	17.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	738	0	533	0	787	0	600
V/C Ratio (X)	0.00	0.43	0.00	0.45	0.00	0.34	0.00	0.42
Avail Cap (c_a), veh/h	0	738	0	533	0	787	0	600
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	23.2	0.0	33.8	0.0	19.8	0.0	29.9
Incr Delay (d2), s/veh	0.0	1.8	0.0	1.3	0.0	1.2	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	25.0	0.0	35.1	0.0	21.0	0.0	30.9
1st-Term Q (Q1), veh/ln	0.0	6.3	0.0	5.9	0.0	4.8	0.0	5.7
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.2	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.64	0.00	1.67	0.00	1.73	0.00	1.67
%ile Back of Q (95%), veh/ln	0.0	10.9	0.0	10.1	0.0	8.7	0.0	9.9
%ile Storage Ratio (RQ%)	0.00	1.63	0.00	0.59	0.00	1.64	0.00	0.55
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	54.2
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

No-Build (2033) Traffic Volumes
PM Peak Hour

Intersection												
Int Delay, s/veh	26.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑		↰	↑↑↑		↰	↑↑↑	
Traffic Vol, veh/h	35	1	170	5	1	45	210	1750	30	55	1740	80
Future Vol, veh/h	35	1	170	5	1	45	210	1750	30	55	1740	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	55	-	0	0	-	-	325	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	5	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	1	179	5	1	47	221	1842	32	58	1832	84
Major/Minor	Minor2		Minor1		Major1		Major2		Major2		Major2	
Conflicting Flow All	3169	4305	958	3149	4332	937	1916	0	0	1874	0	0
Stage 1	1989	1989	-	2300	2300	-	-	-	-	-	-	-
Stage 2	1179	2316	-	849	2032	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.2	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.95	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 11	2	217	12	2	229	~ 138	-	-	145	-	-
Stage 1	39	104	-	23	72	-	-	-	-	-	-	-
Stage 2	182	71	-	292	99	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 5	0	217	~ 1	0	229	~ 138	-	-	145	-	-
Mov Cap-2 Maneuver	~ 5	0	-	~ 1	0	-	-	-	-	-	-	-
Stage 1	~ 24	63	-	23	0	-	-	-	-	-	-	-
Stage 2	144	0	-	30	60	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB		SB		SB	
HCM Control Delay, s/v			\$ 628.63		37.93		1.33					
HCM LOS	-		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR	
Capacity (veh/h)	~ 138	-	-	5	-	217	1	229	145	-	-	
HCM Lane V/C Ratio	1.602	-	-	6.832	-	0.825	4.297	0.212	0.4	-	-	
HCM Control Delay (s/veh)	\$ 359.4	-	-	\$ 3927.3	-	70.1	6182.6	24.9	45.5	-	-	
HCM Lane LOS	F	-	-	F	-	F	F	C	E	-	-	
HCM 95th %tile Q(veh)	15.7	-	-	6.2	-	6.2	1.7	0.8	1.7	-	-	
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2033) Traffic Volumes
PM Peak Hour

Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	145	1	115	175	1	60
Future Vol, veh/h	145	1	115	175	1	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	153	1	121	184	1	63
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	154	0	487	77
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	334	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1424	-	509	969
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	697	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	464	969
Mov Cap-2 Maneuver	-	-	-	-	464	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	635	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		3.26		9.06	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	952	-	-	1351	-	
HCM Lane V/C Ratio	0.067	-	-	0.085	-	
HCM Control Delay (s/veh)	9.1	-	-	7.8	0.3	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.3	-	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	145	1	1	175	1	1
Future Vol, veh/h	145	1	1	175	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	153	1	1	184	1	1
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	154	0	247	77
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	94	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1424	-	720	969
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	719	969
Mov Cap-2 Maneuver	-	-	-	-	719	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	918	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.05		9.37	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	825	-	-	20	-	
HCM Lane V/C Ratio	0.003	-	-	0.001	-	
HCM Control Delay (s/veh)	9.4	-	-	7.5	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	710	145	380	790	195	255	120	420	175	150	220
Future Volume (veh/h)	215	710	145	380	790	195	255	120	420	175	150	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	226	747	153	400	832	205	268	126	442	184	158	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	1310	794	462	1350	572	433	485	602	393	417	560
Arrive On Green	0.14	0.37	0.37	0.13	0.36	0.36	0.13	0.25	0.25	0.10	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	1781	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	226	747	153	400	832	205	268	126	442	184	158	232
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1781	1969	1585	1781	1969	1585
Q Serve(g_s), s	16.2	21.8	6.9	14.7	23.8	12.3	14.8	6.7	31.2	10.3	8.9	14.4
Cycle Q Clear(g_c), s	16.2	21.8	6.9	14.7	23.8	12.3	14.8	6.7	31.2	10.3	8.9	14.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	252	1310	794	462	1350	572	433	485	602	393	417	560
V/C Ratio(X)	0.90	0.57	0.19	0.87	0.62	0.36	0.62	0.26	0.73	0.47	0.38	0.41
Avail Cap(c_a), veh/h	295	1310	794	572	1350	572	506	485	602	528	485	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.9	32.8	17.9	55.2	34.1	30.5	32.1	39.5	34.7	34.6	43.9	31.8
Incr Delay (d2), s/veh	25.4	1.8	0.5	11.2	2.1	1.7	1.8	0.6	5.6	0.9	1.2	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.8	14.6	4.8	11.4	16.4	8.7	10.8	6.0	18.8	8.1	8.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	80.2	34.6	18.5	66.4	36.3	32.2	33.8	40.1	40.3	35.5	45.1	32.9
LnGrp LOS	F	C	B	E	D	C	C	D	D	D	D	C
Approach Vol, veh/h	1126			1437			836			574		
Approach Delay, s/veh	41.6			44.1			38.2			37.1		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.9	53.9	20.7	33.5	22.9	52.9	16.2	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	16.7	23.8	16.8	16.4	18.2	25.8	12.3	33.2				
Green Ext Time (p_c), s	0.6	7.5	0.4	3.0	0.2	6.7	0.3	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	41.1											
HCM 7th LOS	D											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	710	145	380	790	195	255	120	420	175	150	220
Future Volume (veh/h)	215	710	145	380	790	195	255	120	420	175	150	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	226	747	153	400	832	205	268	126	442	184	158	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	252	1310	794	462	1350	572	433	485	602	393	417	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.14	0.37	0.37	0.13	0.36	0.36	0.13	0.25	0.25	0.10	0.21	0.21
Unsig. Movement Delay												
Ln Grp Delay, s/veh	80.2	34.6	18.5	66.4	36.3	32.2	33.8	40.1	40.3	35.5	45.1	32.9
Ln Grp LOS	F	C	B	E	D	C	C	D	D	D	D	C
Approach Vol, veh/h	1126			1437			836			574		
Approach Delay, s/veh	41.6			44.1			38.2			37.1		
Approach LOS	D			D			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	1.1	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	21.9	53.9	20.7	33.5	22.9	52.9	16.2	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.8	6.5	3.7	8.8	3.8	6.3				
Max Q Clear (g_c+I1), s	16.7	23.8	16.8	16.4	18.2	25.8	12.3	33.2				
Green Ext Time (g_e), s	0.6	7.5	0.4	3.0	0.2	6.7	0.3	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.55	0.95	0.28	0.14	1.00	1.00	0.01	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3		5		7						
Mvmt Sat Flow, veh/h	3456	1781		1781		1781						
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	3554			1969			3741			1969		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1585			1585			1585			1585		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	1	0	1	0	1	0
Grp Vol (v), veh/h	400	0	268	0	226	0	184	0
Grp Sat Flow (s), veh/h/ln	1728	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	14.7	0.0	14.8	0.0	16.2	0.0	10.3	0.0
Cycle Q Clear Time (g_c), s	14.7	0.0	14.8	0.0	16.2	0.0	10.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	994	0	0	0	843	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	29.5	0.0	0.0	0.0	27.5	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	18.6	0.0	0.0	0.0	25.3	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	4.0	0.0	0.0	0.0	0.6	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	462	0	433	0	252	0	393	0
V/C Ratio (X)	0.87	0.00	0.62	0.00	0.90	0.00	0.47	0.00
Avail Cap (c_a), veh/h	572	0	506	0	295	0	528	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	55.2	0.0	32.1	0.0	54.9	0.0	34.6	0.0
Incr Delay (d2), s/veh	11.2	0.0	1.8	0.0	25.4	0.0	0.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	66.4	0.0	33.8	0.0	80.2	0.0	35.5	0.0
1st-Term Q (Q1), veh/ln	6.3	0.0	6.4	0.0	7.2	0.0	4.5	0.0
2nd-Term Q (Q2), veh/ln	0.7	0.0	0.2	0.0	1.8	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.62	0.00	1.64	0.00	1.55	0.00	1.76	0.00
%ile Back of Q (95%), veh/ln	11.4	0.0	10.8	0.0	13.8	0.0	8.1	0.0
%ile Storage Ratio (RQ%)	0.72	0.00	0.93	0.00	1.30	0.00	1.25	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	747	0	158	0	832	0	126
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	21.8	0.0	8.9	0.0	23.8	0.0	6.7
Cycle Q Clear Time (g_c), s	0.0	21.8	0.0	8.9	0.0	23.8	0.0	6.7
Lane Grp Cap (c), veh/h	0	1310	0	417	0	1350	0	485
V/C Ratio (X)	0.00	0.57	0.00	0.38	0.00	0.62	0.00	0.26
Avail Cap (c_a), veh/h	0	1310	0	485	0	1350	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	32.8	0.0	43.9	0.0	34.1	0.0	39.5
Incr Delay (d2), s/veh	0.0	1.8	0.0	1.2	0.0	2.1	0.0	0.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	34.6	0.0	45.1	0.0	36.3	0.0	40.1
1st-Term Q (Q1), veh/ln	0.0	9.2	0.0	4.4	0.0	10.6	0.0	3.3

HCM 7th Signalized Intersection Capacity Analysis 100: Ravinia Avenue & 159th Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.4	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.53	0.00	1.77	0.00	1.50	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	14.6	0.0	8.0	0.0	16.4	0.0	6.0
%ile Storage Ratio (RQ%)	0.00	0.30	0.00	0.45	0.00	0.62	0.00	0.16
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	153	0	232	0	205	0	442
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	6.9	0.0	14.4	0.0	12.3	0.0	31.2
Cycle Q Clear Time (g_c), s	0.0	6.9	0.0	14.4	0.0	12.3	0.0	31.2
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	17.2	0.0	18.4	0.0	0.0	0.0	17.4
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	794	0	560	0	572	0	602
V/C Ratio (X)	0.00	0.19	0.00	0.41	0.00	0.36	0.00	0.73
Avail Cap (c_a), veh/h	0	794	0	615	0	572	0	602
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	17.9	0.0	31.8	0.0	30.5	0.0	34.7
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.0	0.0	1.7	0.0	5.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.5	0.0	32.9	0.0	32.2	0.0	40.3
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	5.6	0.0	4.7	0.0	11.9
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.2	0.0	0.3	0.0	0.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.69	0.00	1.73	0.00	1.46
%ile Back of Q (95%), veh/ln	0.0	4.8	0.0	9.6	0.0	8.7	0.0	18.8
%ile Storage Ratio (RQ%)	0.00	0.66	0.00	1.48	0.00	1.11	0.00	0.49
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	41.1
HCM 7th LOS	D

Intersection						
Int Delay, s/veh	19.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	105	1200	1180	170	70	145
Future Vol, veh/h	105	1200	1180	170	70	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	1263	1242	179	74	153

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1242	0	0 2095 621
Stage 1	-	-	- 1242 -
Stage 2	-	-	- 853 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	556	-	- ~ 45 430
Stage 1	-	-	- 236 -
Stage 2	-	-	- 378 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	556	-	- ~ 36 430
Mov Cap-2 Maneuver	-	-	- ~ 36 -
Stage 1	-	-	- 189 -
Stage 2	-	-	- 378 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.05	0	247.92
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	556	-	-	-	36	430
HCM Lane V/C Ratio	0.199	-	-	-	2.046	0.355
HCM Control Delay (s/veh)	13.1	-	-	-	\$ 724.4	17.9
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.7	-	-	-	8.1	1.6

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	735	195	240	770	370	225	1490	290	430	1215	300
Future Volume (veh/h)	335	735	195	240	770	370	225	1490	290	430	1215	300
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	353	774	205	253	811	389	237	1568	305	453	1279	316
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	953	541	315	905	621	299	1844	688	517	2182	808
Arrive On Green	0.10	0.25	0.25	0.09	0.24	0.24	0.09	0.34	0.34	0.15	0.41	0.41
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	353	774	205	253	811	389	237	1568	305	453	1279	316
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	13.3	25.3	12.7	9.3	27.3	25.7	8.7	35.2	17.5	16.7	24.1	15.9
Cycle Q Clear(g_c), s	13.3	25.3	12.7	9.3	27.3	25.7	8.7	35.2	17.5	16.7	24.1	15.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	953	541	315	905	621	299	1844	688	517	2182	808
V/C Ratio(X)	0.98	0.81	0.38	0.80	0.90	0.63	0.79	0.85	0.44	0.88	0.59	0.39
Avail Cap(c_a), veh/h	359	953	541	518	921	627	545	1844	688	625	2182	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	45.5	32.4	57.9	47.7	31.9	58.2	39.6	25.8	54.1	30.1	19.5
Incr Delay (d2), s/veh	43.0	6.1	0.9	4.8	11.9	2.8	4.7	5.2	2.1	11.7	1.2	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.4	18.0	8.6	7.6	20.1	15.3	7.1	22.5	11.1	12.6	15.7	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	101.1	51.6	33.3	62.7	59.6	34.7	62.9	44.8	27.8	65.8	31.3	20.9
LnGrp LOS	F	D	C	E	E	C	E	D	C	E	C	C
Approach Vol, veh/h	1332				1453				2110			
Approach Delay, s/veh	61.9				53.5				44.3			
Approach LOS	E				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.9	50.6	16.3	39.1	15.8	58.8	18.0	37.5				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Q Clear Time (g_c+I1), s	18.7	37.2	11.3	27.3	10.7	26.1	15.3	29.3				
Green Ext Time (p_c), s	0.8	2.8	0.5	0.0	0.5	15.4	0.0	2.2				
Intersection Summary												
HCM 7th Control Delay, s/veh	47.5											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	735	195	240	770	370	225	1490	290	430	1215	300
Future Volume (veh/h)	335	735	195	240	770	370	225	1490	290	430	1215	300
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	353	774	205	253	811	389	237	1568	305	453	1279	316
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	359	953	541	315	905	621	299	1844	688	517	2182	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.25	0.25	0.09	0.24	0.24	0.09	0.34	0.34	0.15	0.41	0.41
Unsig. Movement Delay												
Ln Grp Delay, s/veh	101.1	51.6	33.3	62.7	59.6	34.7	62.9	44.8	27.8	65.8	31.3	20.9
Ln Grp LOS	F	D	C	E	E	C	E	D	C	E	C	C
Approach Vol, veh/h	1332			1453			2110			2048		
Approach Delay, s/veh	61.9			53.5			44.3			37.3		
Approach LOS	E			D			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	23.9	50.6	16.3	39.1	15.8	58.8	18.0	37.5				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.7				
Max Q Clear (g_c+I1), s	18.7	37.2	11.3	27.3	10.7	26.1	15.3	29.3				
Green Ext Time (g_e), s	0.8	2.8	0.5	0.0	0.5	15.4	0.0	2.2				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.56	1.00	0.03	1.00	0.01	0.94	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	453	0	253	0	237	0	353	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	16.7	0.0	9.3	0.0	8.7	0.0	13.3	0.0
Cycle Q Clear Time (g_c), s	16.7	0.0	9.3	0.0	8.7	0.0	13.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	517	0	315	0	299	0	359	0
V/C Ratio (X)	0.88	0.00	0.80	0.00	0.79	0.00	0.98	0.00
Avail Cap (c_a), veh/h	625	0	518	0	545	0	359	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.1	0.0	57.9	0.0	58.2	0.0	58.1	0.0
Incr Delay (d2), s/veh	11.7	0.0	4.8	0.0	4.7	0.0	43.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	65.8	0.0	62.7	0.0	62.9	0.0	101.1	0.0
1st-Term Q (Q1), veh/ln	7.1	0.0	4.0	0.0	3.8	0.0	5.7	0.0
2nd-Term Q (Q2), veh/ln	0.8	0.0	0.2	0.0	0.2	0.0	2.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.58	0.00	1.80	0.00	1.80	0.00	1.59	0.00
%ile Back of Q (95%), veh/ln	12.6	0.0	7.6	0.0	7.1	0.0	12.4	0.0
%ile Storage Ratio (RQ%)	1.73	0.00	1.04	0.00	0.60	0.00	1.97	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1568	0	774	0	1279	0	811
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	35.2	0.0	25.3	0.0	24.1	0.0	27.3
Cycle Q Clear Time (g_c), s	0.0	35.2	0.0	25.3	0.0	24.1	0.0	27.3
Lane Grp Cap (c), veh/h	0	1844	0	953	0	2182	0	905
V/C Ratio (X)	0.00	0.85	0.00	0.81	0.00	0.59	0.00	0.90
Avail Cap (c_a), veh/h	0	1844	0	953	0	2182	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	39.6	0.0	45.5	0.0	30.1	0.0	47.7
Incr Delay (d2), s/veh	0.0	5.2	0.0	6.1	0.0	1.2	0.0	11.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.8	0.0	51.6	0.0	31.3	0.0	59.6
1st-Term Q (Q1), veh/ln	0.0	15.0	0.0	11.5	0.0	10.1	0.0	12.4

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2033) Traffic Volumes

SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.9	0.0	0.8	0.0	0.2	0.0	1.5
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.41	0.00	1.47	0.00	1.51	0.00	1.44
%ile Back of Q (95%), veh/ln	0.0	22.5	0.0	18.0	0.0	15.7	0.0	20.1
%ile Storage Ratio (RQ%)	0.00	0.42	0.00	1.05	0.00	0.42	0.00	0.34
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	305	0	205	0	316	0	389
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	17.5	0.0	12.7	0.0	15.9	0.0	25.7
Cycle Q Clear Time (g_c), s	0.0	17.5	0.0	12.7	0.0	15.9	0.0	25.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.8	0.0	11.3	0.0	13.5	0.0	19.4
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	688	0	541	0	808	0	621
V/C Ratio (X)	0.00	0.44	0.00	0.38	0.00	0.39	0.00	0.63
Avail Cap (c_a), veh/h	0	688	0	541	0	808	0	627
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	25.8	0.0	32.4	0.0	19.5	0.0	31.9
Incr Delay (d2), s/veh	0.0	2.1	0.0	0.9	0.0	1.4	0.0	2.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	27.8	0.0	33.3	0.0	20.9	0.0	34.7
1st-Term Q (Q1), veh/ln	0.0	6.5	0.0	4.8	0.0	5.7	0.0	9.6
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.1	0.0	0.3	0.0	0.5
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.63	0.00	1.74	0.00	1.67	0.00	1.52
%ile Back of Q (95%), veh/ln	0.0	11.1	0.0	8.6	0.0	10.0	0.0	15.3
%ile Storage Ratio (RQ%)	0.00	1.66	0.00	0.50	0.00	1.88	0.00	0.85
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	47.5
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
400: LaGrange Road & 161st Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

Intersection												
Int Delay, s/veh	10.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑↑		↰	↑↑↑	↱
Traffic Vol, veh/h	25	1	175	1	1	25	195	1845	25	35	1600	45
Future Vol, veh/h	25	1	175	1	1	25	195	1845	25	35	1600	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	55	-	0	0	-	-	325	-	-	265	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	3	2	2	3	2	2
Mvmt Flow	26	1	184	1	1	26	205	1942	26	37	1684	47

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2969	4161	866	3114	4171	984	1732	0	0	1968	0	0
Stage 1	1782	1782	-	2366	2366	-	-	-	-	-	-	-
Stage 2	1188	2379	-	748	1805	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.36	-	-	5.36	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.13	-	-	3.13	-	-
Pot Cap-1 Maneuver	~ 15	2	255	12	2	213	~ 169	-	-	128	-	-
Stage 1	56	133	-	21	67	-	-	-	-	-	-	-
Stage 2	179	66	-	337	129	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 10	0	255	2	0	213	~ 169	-	-	128	-	-
Mov Cap-2 Maneuver	~ 10	0	-	2	0	-	-	-	-	-	-	-
Stage 1	40	95	-	21	0	-	-	-	-	-	-	-
Stage 2	157	0	-	66	92	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v		94.35	18.22	0.92
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	~ 169	-	-	10	-	255	2	213	128	-	-
HCM Lane V/C Ratio	1.215	-	-	2.755	-	0.723	0.433	0.129	0.287	-	-
HCM Control Delay (s/veh)	193	-	-	\$ 1566.1	-	48.9	1912.3	24.4	44	-	-
HCM Lane LOS	F	-	-	F	-	E	F	C	E	-	-
HCM 95th %tile Q(veh)	11.3	-	-	4.4	-	5	0.5	0.4	1.1	-	-

Notes											
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon			

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	160	1	55	185	1	40
Future Vol, veh/h	160	1	55	185	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	168	1	58	195	1	42
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	169	0	382	85
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1405	-	593	957
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1405	-	567	957
Mov Cap-2 Maneuver	-	-	-	-	567	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	767	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		1.92		9.01	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	942	-	-	825	-	
HCM Lane V/C Ratio	0.046	-	-	0.041	-	
HCM Control Delay (s/veh)	9	-	-	7.7	0.2	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

HCM 7th TWSC
600: West Access & 161st Street

No-Build (2033) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	145	1	10	175	1	15
Future Vol, veh/h	145	1	10	175	1	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	153	1	11	184	1	16
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	154	0	266	77
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	113	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1424	-	700	969
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	899	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	695	969
Mov Cap-2 Maneuver	-	-	-	-	695	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	892	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.46		8.88	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	945	-	-	195	-	
HCM Lane V/C Ratio	0.018	-	-	0.007	-	
HCM Control Delay (s/veh)	8.9	-	-	7.5	0.1	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

FUTURE (2033) BUILD CAPACITY REPORTS

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	690	85	35	720	195	120	15	65	125	10	90
Future Volume (veh/h)	135	690	85	35	720	195	120	15	65	125	10	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	142	726	89	37	758	205	126	16	68	132	11	95
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	2352	1136	68	2193	929	190	131	137	289	191	304
Arrive On Green	0.10	0.66	0.66	0.02	0.59	0.59	0.05	0.07	0.07	0.09	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	142	726	89	37	758	205	126	16	68	132	11	95
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	9.4	10.4	2.0	1.3	12.6	7.4	4.3	0.9	4.9	8.0	0.6	6.2
Cycle Q Clear(g_c), s	9.4	10.4	2.0	1.3	12.6	7.4	4.3	0.9	4.9	8.0	0.6	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	170	2352	1136	68	2193	929	190	131	137	289	191	304
V/C Ratio(X)	0.84	0.31	0.08	0.55	0.35	0.22	0.66	0.12	0.50	0.46	0.06	0.31
Avail Cap(c_a), veh/h	230	2352	1136	446	2193	929	619	394	348	457	394	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.4	8.6	5.1	58.3	12.9	11.8	55.6	52.7	52.3	44.8	49.2	41.7
Incr Delay (d2), s/veh	17.6	0.3	0.1	6.7	0.4	0.5	3.9	0.9	5.9	1.1	0.3	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.6	6.7	1.2	1.1	8.8	4.9	3.6	0.9	3.9	6.5	0.6	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.0	9.0	5.2	65.0	13.3	12.3	59.5	53.6	58.2	46.0	49.5	42.9
LnGrp LOS	E	A	A	E	B	B	E	D	E	D	D	D
Approach Vol, veh/h	957		1000				210		238			
Approach Delay, s/veh	17.8		15.0				58.7		44.9			
Approach LOS	B		B				E		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	85.4	10.1	17.6	15.9	76.4	13.7	14.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	3.3	12.4	6.3	8.2	11.4	14.6	10.0	6.9				
Green Ext Time (p_c), s	0.0	14.7	0.3	0.5	0.1	15.6	0.2	0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh	22.9											
HCM 7th LOS	C											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	690	85	35	720	195	120	15	65	125	10	90
Future Volume (veh/h)	135	690	85	35	720	195	120	15	65	125	10	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	142	726	89	37	758	205	126	16	68	132	11	95
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	170	2352	1136	68	2193	929	190	131	137	289	191	304
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.66	0.66	0.02	0.59	0.59	0.05	0.07	0.07	0.09	0.10	0.10
Unsig. Movement Delay												
Ln Grp Delay, s/veh	71.0	9.0	5.2	65.0	13.3	12.3	59.5	53.6	58.2	46.0	49.5	42.9
Ln Grp LOS	E	A	A	E	B	B	E	D	E	D	D	D
Approach Vol, veh/h		957			1000			210			238	
Approach Delay, s/veh		17.8			15.0			58.7			44.9	
Approach LOS		B			B			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		6.9	85.4	10.1	17.6	15.9	76.4	13.7	14.0			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0			
Max Allow Headway (MAH), s		3.7	8.9	3.8	6.2	3.7	8.8	3.8	6.3			
Max Q Clear (g_c+I1), s		3.3	12.4	6.3	8.2	11.4	14.6	10.0	6.9			
Green Ext Time (g_e), s		0.0	14.7	0.3	0.5	0.1	15.6	0.2	0.4			
Prob of Phs Call (p_c)		0.71	1.00	1.00	1.00	0.99	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.00	0.47	0.00	0.00	0.71	0.61	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3456		3456		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3554		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1585		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	37	0	126	0	142	0	132	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	1.3	0.0	4.3	0.0	9.4	0.0	8.0	0.0
Cycle Q Clear Time (g_c), s	1.3	0.0	4.3	0.0	9.4	0.0	8.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1314	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	68	0	190	0	170	0	289	0
V/C Ratio (X)	0.55	0.00	0.66	0.00	0.84	0.00	0.46	0.00
Avail Cap (c_a), veh/h	446	0	619	0	230	0	457	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	58.3	0.0	55.6	0.0	53.4	0.0	44.8	0.0
Incr Delay (d2), s/veh	6.7	0.0	3.9	0.0	17.6	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	65.0	0.0	59.5	0.0	71.0	0.0	46.0	0.0
1st-Term Q (Q1), veh/ln	0.5	0.0	1.9	0.0	4.1	0.0	3.5	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.1	0.0	0.8	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.74	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.1	0.0	3.6	0.0	8.6	0.0	6.5	0.0
%ile Storage Ratio (RQ%)	0.07	0.00	0.28	0.00	0.81	0.00	1.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	726	0	11	0	758	0	16
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	10.4	0.0	0.6	0.0	12.6	0.0	0.9
Cycle Q Clear Time (g_c), s	0.0	10.4	0.0	0.6	0.0	12.6	0.0	0.9
Lane Grp Cap (c), veh/h	0	2352	0	191	0	2193	0	131
V/C Ratio (X)	0.00	0.31	0.00	0.06	0.00	0.35	0.00	0.12
Avail Cap (c_a), veh/h	0	2352	0	394	0	2193	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	8.6	0.0	49.2	0.0	12.9	0.0	52.7
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.3	0.0	0.4	0.0	0.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.0	0.0	49.5	0.0	13.3	0.0	53.6
1st-Term Q (Q1), veh/ln	0.0	3.6	0.0	0.3	0.0	5.0	0.0	0.5

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.73	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	6.7	0.0	0.6	0.0	8.8	0.0	0.9
%ile Storage Ratio (RQ%)	0.00	0.14	0.00	0.03	0.00	0.25	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	89	0	95	0	205	0	68
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	2.0	0.0	6.2	0.0	7.4	0.0	4.9
Cycle Q Clear Time (g_c), s	0.0	2.0	0.0	6.2	0.0	7.4	0.0	4.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	6.6	0.0	11.4	0.0	0.0	0.0	2.4
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	1136	0	304	0	929	0	137
V/C Ratio (X)	0.00	0.08	0.00	0.31	0.00	0.22	0.00	0.50
Avail Cap (c_a), veh/h	0	1136	0	468	0	929	0	348
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	5.1	0.0	41.7	0.0	11.8	0.0	52.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.2	0.0	0.5	0.0	5.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.2	0.0	42.9	0.0	12.3	0.0	58.2
1st-Term Q (Q1), veh/ln	0.0	0.6	0.0	2.4	0.0	2.6	0.0	2.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	1.2	0.0	4.6	0.0	4.9	0.0	3.9
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.70	0.00	0.62	0.00	0.10
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	22.9
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2033) Traffic Volumes
AM Peak Hour

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↗↗	↰		↗↗	↰			↰	↰		↰
Traffic Vol, veh/h	35	815	30	0	920	35	0	0	25	5	0	40
Future Vol, veh/h	35	815	30	0	920	35	0	0	25	5	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	858	32	0	968	37	0	0	26	5	0	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	968	0	0	-	-	0	-	-	429	1471	-	484
Stage 1	-	-	-	-	-	-	-	-	-	968	-	-
Stage 2	-	-	-	-	-	-	-	-	-	503	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	707	-	-	0	-	-	0	0	574	89	0	529
Stage 1	-	-	-	0	-	-	0	0	-	272	0	-
Stage 2	-	-	-	0	-	-	0	0	-	519	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	707	-	-	-	-	-	-	-	574	80	-	529
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	80	-	-
Stage 1	-	-	-	-	-	-	-	-	-	272	-	-
Stage 2	-	-	-	-	-	-	-	-	-	470	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.41	0	11.57	16.92
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	574	707	-	-	-	-	80	529
HCM Lane V/C Ratio	0.046	0.052	-	-	-	-	0.066	0.08
HCM Control Delay (s/veh)	11.6	10.4	-	-	-	-	53.1	12.4
HCM Lane LOS	B	B	-	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	-	-	0.2	0.3

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	600	150	220	645	195	220	1250	285	175	840	100
Future Volume (veh/h)	165	600	150	220	645	195	220	1250	285	175	840	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	174	632	158	232	679	205	232	1316	300	184	884	105
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	764	458	293	833	465	292	2574	893	244	2499	842
Arrive On Green	0.07	0.20	0.20	0.08	0.22	0.22	0.03	0.16	0.16	0.07	0.46	0.46
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	174	632	158	232	679	205	232	1316	300	184	884	105
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	6.4	21.0	10.2	8.6	22.4	13.6	8.7	29.2	18.5	6.8	13.7	4.3
Cycle Q Clear(g_c), s	6.4	21.0	10.2	8.6	22.4	13.6	8.7	29.2	18.5	6.8	13.7	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	764	458	293	833	465	292	2574	893	244	2499	842
V/C Ratio(X)	0.76	0.83	0.35	0.79	0.81	0.44	0.79	0.51	0.34	0.75	0.35	0.12
Avail Cap(c_a), veh/h	332	764	458	492	921	502	412	2574	893	518	2499	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.7	49.5	36.5	58.4	48.0	37.3	62.1	40.8	26.5	59.3	22.3	15.3
Incr Delay (d2), s/veh	6.0	8.3	1.0	4.8	6.3	1.4	7.0	0.7	1.0	4.7	0.4	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	15.9	7.3	7.0	16.4	9.2	7.6	20.3	12.7	5.6	9.7	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.7	57.8	37.5	63.2	54.3	38.7	69.0	41.5	27.5	64.0	22.7	15.6
LnGrp LOS	E	E	D	E	D	D	E	D	C	E	C	B
Approach Vol, veh/h	964				1116				1848			
Approach Delay, s/veh	55.9				53.3				42.7			
Approach LOS	E				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	68.3	15.5	32.6	15.5	66.4	13.1	35.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	8.8	31.2	10.6	23.0	10.7	15.7	8.4	24.4				
Green Ext Time (p_c), s	0.4	12.8	0.5	1.9	0.3	20.0	0.2	4.6				
Intersection Summary												
HCM 7th Control Delay, s/veh	44.3											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	600	150	220	645	195	220	1250	285	175	840	100
Future Volume (veh/h)	165	600	150	220	645	195	220	1250	285	175	840	100
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	174	632	158	232	679	205	232	1316	300	184	884	105
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	229	764	458	293	833	465	292	2574	893	244	2499	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.07	0.20	0.20	0.08	0.22	0.22	0.03	0.16	0.16	0.07	0.46	0.46
Unsig. Movement Delay												
Ln Grp Delay, s/veh	65.7	57.8	37.5	63.2	54.3	38.7	69.0	41.5	27.5	64.0	22.7	15.6
Ln Grp LOS	E	E	D	E	D	D	E	D	C	E	C	B
Approach Vol, veh/h	964			1116			1848			1173		
Approach Delay, s/veh	55.9			53.3			42.7			28.5		
Approach LOS	E			D			D			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	13.7	68.3	15.5	32.6	15.5	66.4	13.1	35.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.9	3.7	6.8				
Max Q Clear (g_c+I1), s	8.8	31.2	10.6	23.0	10.7	15.7	8.4	24.4				
Green Ext Time (g_e), s	0.4	12.8	0.5	1.9	0.3	20.0	0.2	4.6				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.00	0.96	0.03	1.00	0.41	0.48	0.73	0.94				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	184	0	232	0	232	0	174	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	6.8	0.0	8.6	0.0	8.7	0.0	6.4	0.0
Cycle Q Clear Time (g_c), s	6.8	0.0	8.6	0.0	8.7	0.0	6.4	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	244	0	293	0	292	0	229	0
V/C Ratio (X)	0.75	0.00	0.79	0.00	0.79	0.00	0.76	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	59.3	0.0	58.4	0.0	62.1	0.0	59.7	0.0
Incr Delay (d2), s/veh	4.7	0.0	4.8	0.0	7.0	0.0	6.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.0	0.0	63.2	0.0	69.0	0.0	65.7	0.0
1st-Term Q (Q1), veh/ln	2.9	0.0	3.7	0.0	3.9	0.0	2.8	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.3	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	5.6	0.0	7.0	0.0	7.6	0.0	5.3	0.0
%ile Storage Ratio (RQ%)	0.77	0.00	0.96	0.00	0.64	0.00	0.85	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1316	0	632	0	884	0	679
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	29.2	0.0	21.0	0.0	13.7	0.0	22.4
Cycle Q Clear Time (g_c), s	0.0	29.2	0.0	21.0	0.0	13.7	0.0	22.4
Lane Grp Cap (c), veh/h	0	2574	0	764	0	2499	0	833
V/C Ratio (X)	0.00	0.51	0.00	0.83	0.00	0.35	0.00	0.81
Avail Cap (c_a), veh/h	0	2574	0	764	0	2499	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	40.8	0.0	49.5	0.0	22.3	0.0	48.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	8.3	0.0	0.4	0.0	6.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	41.5	0.0	57.8	0.0	22.7	0.0	54.3
1st-Term Q (Q1), veh/ln	0.0	14.0	0.0	9.7	0.0	5.6	0.0	10.3

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.9	0.0	0.1	0.0	0.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.44	0.00	1.51	0.00	1.69	0.00	1.49
%ile Back of Q (95%), veh/ln	0.0	20.3	0.0	15.9	0.0	9.7	0.0	16.4
%ile Storage Ratio (RQ%)	0.00	0.80	0.00	0.92	0.00	0.26	0.00	0.28
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	300	0	158	0	105	0	205
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	18.5	0.0	10.2	0.0	4.3	0.0	13.6
Cycle Q Clear Time (g_c), s	0.0	18.5	0.0	10.2	0.0	4.3	0.0	13.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.0	0.0	11.0	0.0	8.6	0.0	9.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	893	0	458	0	842	0	465
V/C Ratio (X)	0.00	0.34	0.00	0.35	0.00	0.12	0.00	0.44
Avail Cap (c_a), veh/h	0	893	0	458	0	842	0	502
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	26.5	0.0	36.5	0.0	15.3	0.0	37.3
Incr Delay (d2), s/veh	0.0	1.0	0.0	1.0	0.0	0.3	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	27.5	0.0	37.5	0.0	15.6	0.0	38.7
1st-Term Q (Q1), veh/ln	0.0	7.8	0.0	3.9	0.0	1.5	0.0	5.2
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.58	0.00	1.80	0.00	1.80	0.00	1.71
%ile Back of Q (95%), veh/ln	0.0	12.7	0.0	7.3	0.0	2.9	0.0	9.2
%ile Storage Ratio (RQ%)	0.00	1.90	0.00	0.42	0.00	0.54	0.00	0.51
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	44.3
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary 400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	80	1	1	10	155	1720	15	25	1060	85
Future Volume (veh/h)	60	1	80	1	1	10	155	1720	15	25	1060	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	1	84	1	1	11	163	1811	16	26	1116	89
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	201	258	135	8	88	223	3845	34	233	3308	264
Arrive On Green	0.04	0.10	0.10	0.00	0.06	0.06	0.06	0.74	0.74	0.00	0.23	0.23
Sat Flow, veh/h	1781	1969	1547	1781	134	1472	3456	5220	46	1781	4821	384
Grp Volume(v), veh/h	63	1	84	1	0	12	163	1181	646	26	788	417
Grp Sat Flow(s),veh/h/ln	1781	1969	1547	1781	0	1605	1728	1702	1862	1781	1702	1801
Q Serve(g_s), s	4.2	0.1	6.2	0.1	0.0	0.9	6.0	18.2	18.2	0.6	25.2	25.2
Cycle Q Clear(g_c), s	4.2	0.1	6.2	0.1	0.0	0.9	6.0	18.2	18.2	0.6	25.2	25.2
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.02	1.00		0.21
Lane Grp Cap(c), veh/h	207	201	258	135	0	96	223	2508	1372	233	2336	1236
V/C Ratio(X)	0.31	0.00	0.33	0.01	0.00	0.13	0.73	0.47	0.47	0.11	0.34	0.34
Avail Cap(c_a), veh/h	383	333	362	332	0	222	598	2508	1372	297	2336	1236
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	52.4	47.7	57.4	0.0	57.9	59.7	6.9	6.9	6.6	25.5	25.5
Incr Delay (d2), s/veh	0.8	0.0	1.5	0.0	0.0	1.2	4.6	0.6	1.2	0.2	0.4	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.1	4.5	0.1	0.0	0.7	4.9	9.5	10.5	0.4	17.2	18.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	53.2	52.4	49.3	57.4	0.0	59.1	64.3	7.5	8.1	6.8	25.9	26.3
LnGrp LOS	D	D	D	E		E	E	A	A	A	C	C
Approach Vol, veh/h	148			13			1990			1231		
Approach Delay, s/veh	51.0			59.0			12.4			25.6		
Approach LOS	D			E			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	101.8	3.6	19.3	11.9	95.2	9.1	13.8				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Q Clear Time (g_c+I2), s	12.6	20.2	2.1	8.2	8.0	27.2	6.2	2.9				
Green Ext Time (p_c), s	0.0	42.9	0.0	0.4	0.4	19.2	0.1	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh 19.1
HCM 7th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	80	1	1	10	155	1720	15	25	1060	85
Future Volume (veh/h)	60	1	80	1	1	10	155	1720	15	25	1060	85
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	1	84	1	1	11	163	1811	16	26	1116	89
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	207	201	258	135	8	88	223	3845	34	233	3308	264
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Prop Arrive On Green	0.04	0.10	0.10	0.00	0.06	0.06	0.06	0.74	0.74	0.00	0.23	0.23
Unsig. Movement Delay												
Ln Grp Delay, s/veh	53.2	52.4	49.3	57.4	0.0	59.1	64.3	7.5	8.1	6.8	25.9	26.3
Ln Grp LOS	D	D	D	E		E	E	A	A	A	C	C
Approach Vol, veh/h	148			13			1990			1231		
Approach Delay, s/veh	51.0			59.0			12.4			25.6		
Approach LOS	D			E			B			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	5.3	101.8	3.6	19.3	11.9	95.2	9.1	13.8				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	2.6	20.2	2.1	8.2	8.0	27.2	6.2	2.9				
Green Ext Time (g_e), s	0.0	42.9	0.0	0.4	0.4	19.2	0.1	0.0				
Prob of Phs Call (p_c)	0.61	1.00	0.04	1.00	1.00	1.00	0.90	0.97				
Prob of Max Out (p_x)	0.73	0.87	0.00	0.01	0.00	0.77	0.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1781		1781		3456		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5220		1969		4821		134				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		46		1547		384		1472				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	26	0	1	0	163	0	63	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1728	0	1781	0
Q Serve Time (g_s), s	0.6	0.0	0.1	0.0	6.0	0.0	4.2	0.0
Cycle Q Clear Time (g_c), s	0.6	0.0	0.1	0.0	6.0	0.0	4.2	0.0
Perm LT Sat Flow (s_l), veh/h/ln	255	0	1313	0	0	0	1402	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	89.2	0.0	7.8	0.0	0.0	0.0	9.8	0.0
Perm LT Serve Time (g_u), s	77.6	0.0	7.8	0.0	0.0	0.0	6.8	0.0
Perm LT Q Serve Time (g_ps), s	1.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	233	0	135	0	223	0	207	0
V/C Ratio (X)	0.11	0.00	0.01	0.00	0.73	0.00	0.31	0.00
Avail Cap (c_a), veh/h	297	0	332	0	598	0	383	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	6.6	0.0	57.4	0.0	59.7	0.0	52.4	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	4.6	0.0	0.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	6.8	0.0	57.4	0.0	64.3	0.0	53.2	0.0
1st-Term Q (Q1), veh/ln	0.2	0.0	0.0	0.0	2.6	0.0	1.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	0.4	0.0	0.1	0.0	4.9	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.04	0.00	0.00	0.00	0.36	0.00	1.61	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1181	0	1	0	788	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	18.2	0.0	0.1	0.0	25.2	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	18.2	0.0	0.1	0.0	25.2	0.0	0.0
Lane Grp Cap (c), veh/h	0	2508	0	201	0	2336	0	0
V/C Ratio (X)	0.00	0.47	0.00	0.00	0.00	0.34	0.00	0.00
Avail Cap (c_a), veh/h	0	2508	0	333	0	2336	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	6.9	0.0	52.4	0.0	25.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	0.4	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	7.5	0.0	52.4	0.0	25.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	5.4	0.0	0.0	0.0	11.5	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.69	0.00	1.80	0.00	1.48	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	9.5	0.0	0.1	0.0	17.2	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.13	0.00	0.01	0.00	0.68	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	646	0	84	0	417	0	12
Grp Sat Flow (s), veh/h/ln	0	1862	0	1547	0	1801	0	1605
Q Serve Time (g_s), s	0.0	18.2	0.0	6.2	0.0	25.2	0.0	0.9
Cycle Q Clear Time (g_c), s	0.0	18.2	0.0	6.2	0.0	25.2	0.0	0.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1547.4	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.02	0.00	1.00	0.00	0.21	0.00	0.92
Lane Grp Cap (c), veh/h	0	1372	0	258	0	1236	0	96
V/C Ratio (X)	0.00	0.47	0.00	0.33	0.00	0.34	0.00	0.13
Avail Cap (c_a), veh/h	0	1372	0	362	0	1236	0	222
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	6.9	0.0	47.7	0.0	25.5	0.0	57.9
Incr Delay (d2), s/veh	0.0	1.2	0.0	1.5	0.0	0.7	0.0	1.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.1	0.0	49.3	0.0	26.3	0.0	59.1
1st-Term Q (Q1), veh/ln	0.0	5.9	0.0	2.4	0.0	12.1	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.1	0.0	0.3	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.65	0.00	1.80	0.00	1.47	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	10.5	0.0	4.5	0.0	18.2	0.0	0.7
%ile Storage Ratio (RQ%)	0.00	0.15	0.00	1.16	0.00	0.71	0.00	0.06
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	19.1
HCM 7th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	2.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	105	1	65	175	1	35
Future Vol, veh/h	105	1	65	175	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	1	68	184	1	37
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	112	0	340	56
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1476	-	630	999
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1476	-	599	999
Mov Cap-2 Maneuver	-	-	-	-	599	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	749	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		2.2		8.82	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	981	-	-	975	-	
HCM Lane V/C Ratio	0.039	-	-	0.046	-	
HCM Control Delay (s/veh)	8.8	-	-	7.6	0.2	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↗		↔			↔	
Traffic Vol, veh/h	1	70	1	1	115	60	1	1	1	35	1	10
Future Vol, veh/h	1	70	1	1	115	60	1	1	1	35	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	74	1	1	121	63	1	1	1	37	1	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	184	0	0	75	0	0	139	263	37	163	200	61
Stage 1	-	-	-	-	-	-	76	76	-	123	123	-
Stage 2	-	-	-	-	-	-	63	186	-	39	77	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1388	-	-	1523	-	-	817	641	1026	787	695	992
Stage 1	-	-	-	-	-	-	924	831	-	868	793	-
Stage 2	-	-	-	-	-	-	940	745	-	970	830	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1388	-	-	1523	-	-	806	640	1026	784	694	992
Mov Cap-2 Maneuver	-	-	-	-	-	-	806	640	-	784	694	-
Stage 1	-	-	-	-	-	-	923	830	-	867	792	-
Stage 2	-	-	-	-	-	-	928	744	-	967	830	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.11			0.05			9.55			9.67		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	794	49	-	-	31	-	-	819
HCM Lane V/C Ratio	0.004	0.001	-	-	0.001	-	-	0.059
HCM Control Delay (s/veh)	9.6	7.6	0	-	7.4	0	-	9.7
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	880	1	0	960	0	1
Future Vol, veh/h	880	1	0	960	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	926	1	0	1011	0	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 464
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	- 0	- 0 545
Stage 1	-	- 0	- 0 -
Stage 2	-	- 0	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 545
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	11.62
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	545	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s/veh)	11.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	10	0	1790	1135	75
Future Vol, veh/h	0	10	0	1790	1135	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	0	1884	1195	79

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 597	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.14	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.92	- -	- -
Pot Cap-1 Maneuver	0 382	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 382	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s/v14.69		0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 382	- -	- -
HCM Lane V/C Ratio	- 0.028	- -	- -
HCM Control Delay (s/veh)	- 14.7	- -	- -
HCM Lane LOS	- B	- -	- -
HCM 95th %tile Q(veh)	- 0.1	- -	- -

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	70	110	15	1	10
Future Vol, veh/h	1	70	110	15	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	74	116	16	1	11
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	132	0	-	0	163	66
Stage 1	-	-	-	-	124	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1451	-	-	-	812	984
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1451	-	-	-	812	984
Mov Cap-2 Maneuver	-	-	-	-	812	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	979	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.11	0		8.77		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	51	-	-	-	966	
HCM Lane V/C Ratio	0.001	-	-	-	0.012	
HCM Control Delay (s/veh)	7.5	0	-	-	8.8	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	70	110	10	1	1
Future Vol, veh/h	1	70	110	10	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	74	116	11	1	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	126	0	0 160 63
Stage 1	-	-	- 121 -
Stage 2	-	-	- 39 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	1458	-	- 815 988
Stage 1	-	-	- 891 -
Stage 2	-	-	- 979 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1458	-	- 815 988
Mov Cap-2 Maneuver	-	-	- 815 -
Stage 1	-	-	- 890 -
Stage 2	-	-	- 979 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.11	0	9.04
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	51	-	-	-	893
HCM Lane V/C Ratio	0.001	-	-	-	0.002
HCM Control Delay (s/veh)	7.5	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	930	165	270	800	195	380	140	320	215	95	220
Future Volume (veh/h)	230	930	165	270	800	195	380	140	320	215	95	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	242	979	174	284	842	205	400	147	337	226	100	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1466	870	346	1434	608	471	394	476	398	363	497
Arrive On Green	0.13	0.41	0.41	0.10	0.38	0.38	0.14	0.20	0.20	0.12	0.18	0.18
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	242	979	174	284	842	205	400	147	337	226	100	232
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	15.5	26.8	6.7	9.7	21.5	11.0	13.6	7.7	22.7	12.1	5.2	14.1
Cycle Q Clear(g_c), s	15.5	26.8	6.7	9.7	21.5	11.0	13.6	7.7	22.7	12.1	5.2	14.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1466	870	346	1434	608	471	394	476	398	363	497
V/C Ratio(X)	1.05	0.67	0.20	0.82	0.59	0.34	0.85	0.37	0.71	0.57	0.28	0.47
Avail Cap(c_a), veh/h	230	1466	870	446	1434	608	619	394	476	503	394	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	28.6	13.7	52.9	29.4	26.2	50.6	41.5	37.3	33.4	42.0	33.1
Incr Delay (d2), s/veh	73.6	2.4	0.5	9.2	1.8	1.5	8.6	1.3	6.0	1.3	0.9	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.4	17.0	4.5	8.1	14.8	7.9	10.6	7.0	14.6	9.2	4.8	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	125.9	31.0	14.2	62.1	31.2	27.7	59.2	42.8	43.4	34.6	42.9	34.6
LnGrp LOS	F	C	B	E	C	C	E	D	D	C	D	C
Approach Vol, veh/h	1395				1331				884			
Approach Delay, s/veh	45.4				37.3				50.4			
Approach LOS	D				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	55.5	19.8	28.1	20.0	52.0	18.0	30.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	11.7	28.8	15.6	16.1	17.5	23.5	14.1	24.7				
Green Ext Time (p_c), s	0.3	8.6	0.8	1.6	0.0	11.7	0.4	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	42.6											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	930	165	270	800	195	380	140	320	215	95	220
Future Volume (veh/h)	230	930	165	270	800	195	380	140	320	215	95	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	242	979	174	284	842	205	400	147	337	226	100	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1466	870	346	1434	608	471	394	476	398	363	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.41	0.41	0.10	0.38	0.38	0.14	0.20	0.20	0.12	0.18	0.18
Unsig. Movement Delay												
Ln Grp Delay, s/veh	125.9	31.0	14.2	62.1	31.2	27.7	59.2	42.8	43.4	34.6	42.9	34.6
Ln Grp LOS	F	C	B	E	C	C	E	D	D	C	D	C
Approach Vol, veh/h		1395			1331			884			558	
Approach Delay, s/veh		45.4			37.3			50.4			36.1	
Approach LOS		D			D			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		16.5	55.5	19.8	28.1	20.0	52.0	18.0	30.0			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0			
Max Allow Headway (MAH), s		3.7	8.9	3.8	6.4	3.7	8.8	3.8	6.4			
Max Q Clear (g_c+I1), s		11.7	28.8	15.6	16.1	17.5	23.5	14.1	24.7			
Green Ext Time (g_e), s		0.3	8.6	0.8	1.6	0.0	11.7	0.4	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.93	0.97	0.30	0.68	1.00	0.84	0.07	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3456		3456		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3554		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1585		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	284	0	400	0	242	0	226	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	9.7	0.0	13.6	0.0	15.5	0.0	12.1	0.0
Cycle Q Clear Time (g_c), s	9.7	0.0	13.6	0.0	15.5	0.0	12.1	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	911	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	22.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	16.3	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	346	0	471	0	230	0	398	0
V/C Ratio (X)	0.82	0.00	0.85	0.00	1.05	0.00	0.57	0.00
Avail Cap (c_a), veh/h	446	0	619	0	230	0	503	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	52.9	0.0	50.6	0.0	52.3	0.0	33.4	0.0
Incr Delay (d2), s/veh	9.2	0.0	8.6	0.0	73.6	0.0	1.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	62.1	0.0	59.2	0.0	125.9	0.0	34.6	0.0
1st-Term Q (Q1), veh/ln	4.1	0.0	5.9	0.0	6.8	0.0	5.2	0.0
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.6	0.0	4.7	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.77	0.00	1.65	0.00	1.52	0.00	1.71	0.00
%ile Back of Q (95%), veh/ln	8.1	0.0	10.6	0.0	17.4	0.0	9.2	0.0
%ile Storage Ratio (RQ%)	0.51	0.00	0.84	0.00	1.64	0.00	1.41	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	979	0	100	0	842	0	147
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	26.8	0.0	5.2	0.0	21.5	0.0	7.7
Cycle Q Clear Time (g_c), s	0.0	26.8	0.0	5.2	0.0	21.5	0.0	7.7
Lane Grp Cap (c), veh/h	0	1466	0	363	0	1434	0	394
V/C Ratio (X)	0.00	0.67	0.00	0.28	0.00	0.59	0.00	0.37
Avail Cap (c_a), veh/h	0	1466	0	394	0	1434	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	28.6	0.0	42.0	0.0	29.4	0.0	41.5
Incr Delay (d2), s/veh	0.0	2.4	0.0	0.9	0.0	1.8	0.0	1.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	31.0	0.0	42.9	0.0	31.2	0.0	42.8
1st-Term Q (Q1), veh/ln	0.0	11.0	0.0	2.6	0.0	9.4	0.0	3.8

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.1	0.0	0.4	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.80	0.00	1.53	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	17.0	0.0	4.8	0.0	14.8	0.0	7.0
%ile Storage Ratio (RQ%)	0.00	0.35	0.00	0.27	0.00	0.42	0.00	0.18
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	174	0	232	0	205	0	337
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	6.7	0.0	14.1	0.0	11.0	0.0	22.7
Cycle Q Clear Time (g_c), s	0.0	6.7	0.0	14.1	0.0	11.0	0.0	22.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	16.3	0.0	15.5	0.0	0.0	0.0	12.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	870	0	497	0	608	0	476
V/C Ratio (X)	0.00	0.20	0.00	0.47	0.00	0.34	0.00	0.71
Avail Cap (c_a), veh/h	0	870	0	522	0	608	0	476
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.7	0.0	33.1	0.0	26.2	0.0	37.3
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.5	0.0	1.5	0.0	6.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	14.2	0.0	34.6	0.0	27.7	0.0	43.4
1st-Term Q (Q1), veh/ln	0.0	2.4	0.0	5.4	0.0	4.2	0.0	8.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.2	0.0	0.3	0.0	0.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.69	0.00	1.78	0.00	1.53
%ile Back of Q (95%), veh/ln	0.0	4.5	0.0	9.5	0.0	7.9	0.0	14.6
%ile Storage Ratio (RQ%)	0.00	0.62	0.00	1.47	0.00	1.00	0.00	0.38
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	42.6
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

Intersection												
Int Delay, s/veh	15											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱	↱↱	↱		↱↱	↱			↱	↱		↱
Traffic Vol, veh/h	115	1260	90	0	1165	115	0	0	165	30	0	110
Future Vol, veh/h	115	1260	90	0	1165	115	0	0	165	30	0	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	121	1326	95	0	1226	121	0	0	174	32	0	116

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1226	0	0	-	-	0	-	-	663	2132	-	613
Stage 1	-	-	-	-	-	-	-	-	-	1226	-	-
Stage 2	-	-	-	-	-	-	-	-	-	905	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	564	-	-	0	-	-	0	0	404	~ 28	0	435
Stage 1	-	-	-	0	-	-	0	0	-	189	0	-
Stage 2	-	-	-	0	-	-	0	0	-	298	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	564	-	-	-	-	-	-	-	404	~ 13	-	435
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 13	-	-
Stage 1	-	-	-	-	-	-	-	-	-	189	-	-
Stage 2	-	-	-	-	-	-	-	-	-	133	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1.03	0	20.49	291.04
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	404	564	-	-	-	-	13	435
HCM Lane V/C Ratio	0.43	0.215	-	-	-	-	2.518	0.266
HCM Control Delay (s/veh)	20.5	13.1	-	-	-	-	\$ 1298.6	16.2
HCM Lane LOS	C	B	-	-	-	-	F	C
HCM 95th %tile Q(veh)	2.1	0.8	-	-	-	-	4.8	1.1

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	945	255	400	890	240	260	1290	345	380	1410	255
Future Volume (veh/h)	305	945	255	400	890	240	260	1290	345	380	1410	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	321	995	268	421	937	253	274	1358	363	400	1484	268
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	770	479	472	921	600	333	1956	793	457	2148	786
Arrive On Green	0.10	0.21	0.21	0.14	0.25	0.25	0.03	0.12	0.12	0.13	0.40	0.40
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	321	995	268	421	937	253	274	1358	363	400	1484	268
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	12.0	26.8	18.5	15.6	32.0	15.3	10.2	31.5	22.3	14.8	29.8	13.3
Cycle Q Clear(g_c), s	12.0	26.8	18.5	15.6	32.0	15.3	10.2	31.5	22.3	14.8	29.8	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	770	479	472	921	600	333	1956	793	457	2148	786
V/C Ratio(X)	0.97	1.29	0.56	0.89	1.02	0.42	0.82	0.69	0.46	0.88	0.69	0.34
Avail Cap(c_a), veh/h	332	770	479	492	921	600	412	1956	793	518	2148	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.5	51.6	38.1	55.2	49.0	29.9	61.8	50.2	30.1	55.4	32.4	19.9
Incr Delay (d2), s/veh	40.2	141.1	2.5	17.9	34.1	1.0	10.5	2.1	1.9	14.2	1.8	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.4	40.8	11.8	12.4	26.3	9.9	8.9	22.0	14.9	11.7	18.8	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	98.7	192.8	40.6	73.1	83.1	30.9	72.3	52.3	32.0	69.6	34.2	21.1
LnGrp LOS	F	F	D	E	F	C	E	D	C	E	C	C
Approach Vol, veh/h	1584			1611			1995			2152		
Approach Delay, s/veh	147.9			72.3			51.4			39.1		
Approach LOS	F			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.7	53.3	22.2	32.8	17.0	58.0	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	16.8	33.5	17.6	28.8	12.2	31.8	14.0	34.0				
Green Ext Time (p_c), s	0.4	10.9	0.2	0.0	0.3	16.2	0.0	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	73.2
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	945	255	400	890	240	260	1290	345	380	1410	255
Future Volume (veh/h)	305	945	255	400	890	240	260	1290	345	380	1410	255
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	321	995	268	421	937	253	274	1358	363	400	1484	268
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	332	770	479	472	921	600	333	1956	793	457	2148	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.21	0.21	0.14	0.25	0.25	0.03	0.12	0.12	0.13	0.40	0.40
Unsig. Movement Delay												
Ln Grp Delay, s/veh	98.7	192.8	40.6	73.1	83.1	30.9	72.3	52.3	32.0	69.6	34.2	21.1
Ln Grp LOS	F	F	D	E	F	C	E	D	C	E	C	C
Approach Vol, veh/h	1584			1611			1995			2152		
Approach Delay, s/veh	147.9			72.3			51.4			39.1		
Approach LOS	F			E			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	21.7	53.3	22.2	32.8	17.0	58.0	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.8				
Max Q Clear (g_c+I1), s	16.8	33.5	17.6	28.8	12.2	31.8	14.0	34.0				
Green Ext Time (g_e), s	0.4	10.9	0.2	0.0	0.3	16.2	0.0	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.98	1.00	1.00	1.00	1.00	0.96	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		3456		3456					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5375		3741		5375		3741				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	400	0	421	0	274	0	321	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	14.8	0.0	15.6	0.0	10.2	0.0	12.0	0.0
Cycle Q Clear Time (g_c), s	14.8	0.0	15.6	0.0	10.2	0.0	12.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	457	0	472	0	333	0	332	0
V/C Ratio (X)	0.88	0.00	0.89	0.00	0.82	0.00	0.97	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	55.4	0.0	55.2	0.0	61.8	0.0	58.5	0.0
Incr Delay (d2), s/veh	14.2	0.0	17.9	0.0	10.5	0.0	40.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	69.6	0.0	73.1	0.0	72.3	0.0	98.7	0.0
1st-Term Q (Q1), veh/ln	6.3	0.0	6.7	0.0	4.7	0.0	5.2	0.0
2nd-Term Q (Q2), veh/ln	0.9	0.0	1.2	0.0	0.5	0.0	1.9	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.61	0.00	1.59	0.00	1.72	0.00	1.62	0.00
%ile Back of Q (95%), veh/ln	11.7	0.0	12.4	0.0	8.9	0.0	11.4	0.0
%ile Storage Ratio (RQ%)	1.60	0.00	1.71	0.00	0.75	0.00	1.81	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1358	0	995	0	1484	0	937
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	31.5	0.0	26.8	0.0	29.8	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	31.5	0.0	26.8	0.0	29.8	0.0	32.0
Lane Grp Cap (c), veh/h	0	1956	0	770	0	2148	0	921
V/C Ratio (X)	0.00	0.69	0.00	1.29	0.00	0.69	0.00	1.02
Avail Cap (c_a), veh/h	0	1956	0	770	0	2148	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.2	0.0	51.6	0.0	32.4	0.0	49.0
Incr Delay (d2), s/veh	0.0	2.1	0.0	141.1	0.0	1.8	0.0	34.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	52.3	0.0	192.8	0.0	34.2	0.0	83.1
1st-Term Q (Q1), veh/ln	0.0	15.1	0.0	12.3	0.0	12.5	0.0	14.6

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	15.1	0.0	0.4	0.0	4.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.42	0.00	1.49	0.00	1.46	0.00	1.39
%ile Back of Q (95%), veh/ln	0.0	22.0	0.0	40.8	0.0	18.8	0.0	26.3
%ile Storage Ratio (RQ%)	0.00	0.86	0.00	2.37	0.00	0.50	0.00	0.45
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	56.3	0.0	0.0	0.0	4.1
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	363	0	268	0	268	0	253
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	22.3	0.0	18.5	0.0	13.3	0.0	15.3
Cycle Q Clear Time (g_c), s	0.0	22.3	0.0	18.5	0.0	13.3	0.0	15.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	17.7	0.0	12.5	0.0	12.5	0.0	17.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	793	0	479	0	786	0	600
V/C Ratio (X)	0.00	0.46	0.00	0.56	0.00	0.34	0.00	0.42
Avail Cap (c_a), veh/h	0	793	0	479	0	786	0	600
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	30.1	0.0	38.1	0.0	19.9	0.0	29.9
Incr Delay (d2), s/veh	0.0	1.9	0.0	2.5	0.0	1.2	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	32.0	0.0	40.6	0.0	21.1	0.0	30.9
1st-Term Q (Q1), veh/ln	0.0	9.4	0.0	7.1	0.0	4.8	0.0	5.7
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.3	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.52	0.00	1.60	0.00	1.73	0.00	1.67
%ile Back of Q (95%), veh/ln	0.0	14.9	0.0	11.8	0.0	8.7	0.0	9.9
%ile Storage Ratio (RQ%)	0.00	2.23	0.00	0.69	0.00	1.64	0.00	0.55
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	73.2
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary 400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1	275	5	1	45	385	1710	30	55	1770	135
Future Volume (veh/h)	175	1	275	5	1	45	385	1710	30	55	1770	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	184	1	289	5	1	47	405	1800	32	58	1863	142
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	297	333	472	131	2	98	469	3382	60	221	2639	200
Arrive On Green	0.11	0.17	0.17	0.00	0.06	0.06	0.14	0.65	0.65	0.01	0.18	0.18
Sat Flow, veh/h	1781	1969	1547	1781	33	1557	3456	5166	92	1781	4841	368
Grp Volume(v), veh/h	184	1	289	5	0	48	405	1186	646	58	1308	697
Grp Sat Flow(s),veh/h/ln	1781	1969	1547	1781	0	1590	1728	1702	1854	1781	1702	1804
Q Serve(g_s), s	12.2	0.1	20.8	0.3	0.0	3.8	14.9	24.0	24.0	1.9	46.9	47.2
Cycle Q Clear(g_c), s	12.2	0.1	20.8	0.3	0.0	3.8	14.9	24.0	24.0	1.9	46.9	47.2
Prop In Lane	1.00		1.00	1.00		0.98	1.00		0.05	1.00		0.20
Lane Grp Cap(c), veh/h	297	333	472	131	0	100	469	2228	1213	221	1856	984
V/C Ratio(X)	0.62	0.00	0.61	0.04	0.00	0.48	0.86	0.53	0.53	0.26	0.70	0.71
Avail Cap(c_a), veh/h	355	333	472	323	0	220	598	2228	1213	264	1856	984
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.9	44.9	38.6	56.8	0.0	58.9	55.0	11.9	11.9	13.1	43.5	43.6
Incr Delay (d2), s/veh	2.4	0.0	3.5	0.1	0.0	7.5	10.3	0.9	1.7	0.6	2.3	4.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.1	13.1	0.3	0.0	3.1	11.4	13.2	14.5	1.4	29.7	32.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.3	44.9	42.1	56.9	0.0	66.3	65.3	12.8	13.6	13.7	45.8	47.9
LnGrp LOS	D	D	D	E		E	E	B	B	B	D	D
Approach Vol, veh/h	474			53			2237			2063		
Approach Delay, s/veh	45.3			65.4			22.5			45.6		
Approach LOS	D			E			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	91.1	4.0	28.0	21.1	76.9	17.8	14.2				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Q Clear Time (g_c+I1), s	13.5	26.0	2.3	22.8	16.9	49.2	14.2	5.8				
Green Ext Time (p_c), s	0.0	38.2	0.0	0.0	0.7	2.8	0.2	0.2				

Intersection Summary

HCM 7th Control Delay, s/veh	35.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1	275	5	1	45	385	1710	30	55	1770	135
Future Volume (veh/h)	175	1	275	5	1	45	385	1710	30	55	1770	135
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	184	1	289	5	1	47	405	1800	32	58	1863	142
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	297	333	472	131	2	98	469	3382	60	221	2639	200
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Prop Arrive On Green	0.11	0.17	0.17	0.00	0.06	0.06	0.14	0.65	0.65	0.01	0.18	0.18
Unsig. Movement Delay												
Ln Grp Delay, s/veh	50.3	44.9	42.1	56.9	0.0	66.3	65.3	12.8	13.6	13.7	45.8	47.9
Ln Grp LOS	D	D	D	E		E	E	B	B	B	D	D
Approach Vol, veh/h	474			53			2237			2063		
Approach Delay, s/veh	45.3			65.4			22.5			45.6		
Approach LOS	D			E			C			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	6.9	91.1	4.0	28.0	21.1	76.9	17.8	14.2				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	3.9	26.0	2.3	22.8	16.9	49.2	14.2	5.8				
Green Ext Time (g_e), s	0.0	38.2	0.0	0.0	0.7	2.8	0.2	0.2				
Prob of Phs Call (p_c)	0.88	1.00	0.17	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.89	0.00	1.00	0.33	1.00	0.65	0.07				
Left-Turn Movement Data												
Assigned Mvmt	1	3		5		7						
Mvmt Sat Flow, veh/h	1781	1781		3456		1781						
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5166			1969			4841			33		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	92			1547			368			1557		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	58	0	5	0	405	0	184	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1728	0	1781	0
Q Serve Time (g_s), s	1.9	0.0	0.3	0.0	14.9	0.0	12.2	0.0
Cycle Q Clear Time (g_c), s	1.9	0.0	0.3	0.0	14.9	0.0	12.2	0.0
Perm LT Sat Flow (s_l), veh/h/ln	254	0	1089	0	0	0	1357	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	70.9	0.0	8.2	0.0	0.0	0.0	10.2	0.0
Perm LT Serve Time (g_u), s	61.1	0.0	8.2	0.0	0.0	0.0	4.4	0.0
Perm LT Q Serve Time (g_ps), s	3.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	221	0	131	0	469	0	297	0
V/C Ratio (X)	0.26	0.00	0.04	0.00	0.86	0.00	0.62	0.00
Avail Cap (c_a), veh/h	264	0	323	0	598	0	355	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	13.1	0.0	56.8	0.0	55.0	0.0	47.9	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.0	10.3	0.0	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	13.7	0.0	56.9	0.0	65.3	0.0	50.3	0.0
1st-Term Q (Q1), veh/ln	0.7	0.0	0.2	0.0	6.3	0.0	5.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.7	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.62	0.00	1.69	0.00
%ile Back of Q (95%), veh/ln	1.4	0.0	0.3	0.0	11.4	0.0	9.5	0.0
%ile Storage Ratio (RQ%)	0.13	0.00	0.02	0.00	0.82	0.00	4.38	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1186	0	1	0	1308	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	24.0	0.0	0.1	0.0	46.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	24.0	0.0	0.1	0.0	46.9	0.0	0.0
Lane Grp Cap (c), veh/h	0	2228	0	333	0	1856	0	0
V/C Ratio (X)	0.00	0.53	0.00	0.00	0.00	0.70	0.00	0.00
Avail Cap (c_a), veh/h	0	2228	0	333	0	1856	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	11.9	0.0	44.9	0.0	43.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.0	0.0	2.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	12.8	0.0	44.9	0.0	45.8	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	8.1	0.0	0.0	0.0	21.4	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.57	0.00	1.80	0.00	1.35	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	13.2	0.0	0.1	0.0	29.7	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.18	0.00	0.01	0.00	1.17	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	646	0	289	0	697	0	48
Grp Sat Flow (s), veh/h/ln	0	1854	0	1547	0	1804	0	1590
Q Serve Time (g_s), s	0.0	24.0	0.0	20.8	0.0	47.2	0.0	3.8
Cycle Q Clear Time (g_c), s	0.0	24.0	0.0	20.8	0.0	47.2	0.0	3.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1547.4	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	17.6	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.05	0.00	1.00	0.00	0.20	0.00	0.98
Lane Grp Cap (c), veh/h	0	1213	0	472	0	984	0	100
V/C Ratio (X)	0.00	0.53	0.00	0.61	0.00	0.71	0.00	0.48
Avail Cap (c_a), veh/h	0	1213	0	472	0	984	0	220
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	11.9	0.0	38.6	0.0	43.6	0.0	58.9
Incr Delay (d2), s/veh	0.0	1.7	0.0	3.5	0.0	4.3	0.0	7.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.6	0.0	42.1	0.0	47.9	0.0	66.3
1st-Term Q (Q1), veh/ln	0.0	8.9	0.0	7.9	0.0	22.8	0.0	1.5
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.5	0.0	1.2	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.53	0.00	1.57	0.00	1.33	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	14.5	0.0	13.1	0.0	32.0	0.0	3.1
%ile Storage Ratio (RQ%)	0.00	0.20	0.00	3.33	0.00	1.26	0.00	0.25
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	35.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	W	
Traffic Vol, veh/h	390	1	115	405	1	60
Future Vol, veh/h	390	1	115	405	1	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	1	121	426	1	63

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	412	0	866	206
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1144	-	292	801
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	605	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1144	-	257	801
Mov Cap-2 Maneuver	-	-	-	-	257	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	533	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.39	10.07
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	774	-	-	796	-
HCM Lane V/C Ratio	0.083	-	-	0.106	-
HCM Control Delay (s/veh)	10.1	-	-	8.5	0.7
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.4	-

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↗		↔			↔	
Traffic Vol, veh/h	5	190	1	1	245	160	1	1	1	200	1	70
Future Vol, veh/h	5	190	1	1	245	160	1	1	1	200	1	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	200	1	1	258	168	1	1	1	211	1	74

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	426	0	0	201	0	0	343	639	101	371	472	129
Stage 1	-	-	-	-	-	-	211	211	-	260	260	-
Stage 2	-	-	-	-	-	-	132	428	-	111	212	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1129	-	-	1368	-	-	587	392	935	561	489	897
Stage 1	-	-	-	-	-	-	771	726	-	722	692	-
Stage 2	-	-	-	-	-	-	858	583	-	882	726	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1129	-	-	1368	-	-	535	390	935	555	486	897
Mov Cap-2 Maneuver	-	-	-	-	-	-	535	390	-	555	486	-
Stage 1	-	-	-	-	-	-	768	723	-	722	691	-
Stage 2	-	-	-	-	-	-	786	582	-	875	722	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.25	0.02	11.64	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	545	91	-	-	15	-	-	615
HCM Lane V/C Ratio	0.006	0.005	-	-	0.001	-	-	0.463
HCM Control Delay (s/veh)	11.6	8.2	0	-	7.6	0	-	15.8
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	2.4

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1465	1	0	1275	0	1
Future Vol, veh/h	1465	1	0	1275	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1542	1	0	1342	0	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	772
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	342
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	342
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	15.55
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	342	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-
HCM Control Delay (s/veh)	15.5	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	70	0	1930	1800	265
Future Vol, veh/h	0	70	0	1930	1800	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	74	0	2032	1895	279

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	947	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	225	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	225	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v28.62		0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 225	-	-
HCM Lane V/C Ratio	- 0.328	-	-
HCM Control Delay (s/veh)	- 28.6	-	-
HCM Lane LOS	- D	-	-
HCM 95th %tile Q(veh)	- 1.4	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	5	165	260	55	30	55
Future Vol, veh/h	5	165	260	55	30	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	174	274	58	32	58

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	332	0	0	400	166
Stage 1	-	-	-	303	-
Stage 2	-	-	-	97	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1225	-	-	578	849
Stage 1	-	-	-	723	-
Stage 2	-	-	-	916	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1225	-	-	575	849
Mov Cap-2 Maneuver	-	-	-	575	-
Stage 1	-	-	-	720	-
Stage 2	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.27	0	10.64
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	106	-	-	-	727
HCM Lane V/C Ratio	0.004	-	-	-	0.123
HCM Control Delay (s/veh)	8	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	155	300	15	15	1
Future Vol, veh/h	1	155	300	15	15	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	163	316	16	16	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	332	0	407
Stage 1	-	-	324
Stage 2	-	-	84
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	1225	-	572
Stage 1	-	-	706
Stage 2	-	-	930
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1225	-	571
Mov Cap-2 Maneuver	-	-	571
Stage 1	-	-	705
Stage 2	-	-	930

Approach	EB	WB	SB
HCM Control Delay, s/v	0.06	0	11.36
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	23	-	-	-	583
HCM Lane V/C Ratio	0.001	-	-	-	0.029
HCM Control Delay (s/veh)	7.9	0	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	800	165	380	740	195	405	160	420	215	150	220
Future Volume (veh/h)	215	800	165	380	740	195	405	160	420	215	150	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	226	842	174	400	779	205	426	168	442	226	158	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	1243	779	467	1284	544	489	485	604	403	432	572
Arrive On Green	0.14	0.35	0.35	0.04	0.11	0.11	0.14	0.25	0.25	0.12	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	226	842	174	400	779	205	426	168	442	226	158	232
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	16.2	26.2	8.2	14.9	25.8	15.6	15.7	9.1	31.1	12.6	8.9	14.2
Cycle Q Clear(g_c), s	16.2	26.2	8.2	14.9	25.8	15.6	15.7	9.1	31.1	12.6	8.9	14.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	252	1243	779	467	1284	544	489	485	604	403	432	572
V/C Ratio(X)	0.90	0.68	0.22	0.86	0.61	0.38	0.87	0.35	0.73	0.56	0.37	0.41
Avail Cap(c_a), veh/h	295	1243	779	572	1284	544	598	485	604	506	485	615
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.9	36.0	18.9	60.8	49.3	44.7	54.6	40.4	34.5	33.1	43.0	31.1
Incr Delay (d2), s/veh	25.4	3.0	0.7	10.5	2.1	2.0	11.3	0.9	5.5	1.2	1.1	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.8	17.2	5.7	12.2	19.3	11.3	12.1	8.1	18.7	9.5	7.9	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	80.2	39.0	19.5	71.3	51.4	46.7	66.0	41.3	40.0	34.4	44.1	32.1
LnGrp LOS	F	D	B	E	D	D	E	D	D	C	D	C
Approach Vol, veh/h	1242			1384			1036			616		
Approach Delay, s/veh	43.8			56.5			50.9			36.0		
Approach LOS	D			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.1	51.5	21.9	34.5	22.9	50.6	18.5	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	16.9	28.2	17.7	16.2	18.2	27.8	14.6	33.1				
Green Ext Time (p_c), s	0.6	4.8	0.7	3.0	0.2	5.0	0.4	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	48.5											
HCM 7th LOS	D											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	800	165	380	740	195	405	160	420	215	150	220
Future Volume (veh/h)	215	800	165	380	740	195	405	160	420	215	150	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No		No				No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	226	842	174	400	779	205	426	168	442	226	158	232
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	252	1243	779	467	1284	544	489	485	604	403	432	572
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.14	0.35	0.35	0.04	0.11	0.11	0.14	0.25	0.25	0.12	0.22	0.22
Unsig. Movement Delay												
Ln Grp Delay, s/veh	80.2	39.0	19.5	71.3	51.4	46.7	66.0	41.3	40.0	34.4	44.1	32.1
Ln Grp LOS	F	D	B	E	D	D	E	D	D	C	D	C
Approach Vol, veh/h	1242				1384		1036				616	
Approach Delay, s/veh	43.8				56.5		50.9				36.0	
Approach LOS	D				E		D				D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	22.1	51.5	21.9	34.5	22.9	50.6	18.5	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.8	6.5	3.7	8.8	3.8	6.4				
Max Q Clear (g_c+I1), s	16.9	28.2	17.7	16.2	18.2	27.8	14.6	33.1				
Green Ext Time (g_e), s	0.6	4.8	0.7	3.0	0.2	5.0	0.4	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.62	1.00	0.58	0.14	1.00	1.00	0.05	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	1781	1781								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	3554	1969	3741	1969								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	400	0	426	0	226	0	226	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	14.9	0.0	15.7	0.0	16.2	0.0	12.6	0.0
Cycle Q Clear Time (g_c), s	14.9	0.0	15.7	0.0	16.2	0.0	12.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	811	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	22.9	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	467	0	489	0	252	0	403	0
V/C Ratio (X)	0.86	0.00	0.87	0.00	0.90	0.00	0.56	0.00
Avail Cap (c_a), veh/h	572	0	598	0	295	0	506	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	60.8	0.0	54.6	0.0	54.9	0.0	33.1	0.0
Incr Delay (d2), s/veh	10.5	0.0	11.3	0.0	25.4	0.0	1.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	71.3	0.0	66.0	0.0	80.2	0.0	34.4	0.0
1st-Term Q (Q1), veh/ln	6.9	0.0	6.8	0.0	7.2	0.0	5.5	0.0
2nd-Term Q (Q2), veh/ln	0.7	0.0	0.8	0.0	1.8	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.59	0.00	1.59	0.00	1.55	0.00	1.69	0.00
%ile Back of Q (95%), veh/ln	12.2	0.0	12.1	0.0	13.8	0.0	9.5	0.0
%ile Storage Ratio (RQ%)	0.77	0.00	0.96	0.00	1.30	0.00	1.46	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	842	0	158	0	779	0	168
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	26.2	0.0	8.9	0.0	25.8	0.0	9.1
Cycle Q Clear Time (g_c), s	0.0	26.2	0.0	8.9	0.0	25.8	0.0	9.1
Lane Grp Cap (c), veh/h	0	1243	0	432	0	1284	0	485
V/C Ratio (X)	0.00	0.68	0.00	0.37	0.00	0.61	0.00	0.35
Avail Cap (c_a), veh/h	0	1243	0	485	0	1284	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	36.0	0.0	43.0	0.0	49.3	0.0	40.4
Incr Delay (d2), s/veh	0.0	3.0	0.0	1.1	0.0	2.1	0.0	0.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	39.0	0.0	44.1	0.0	51.4	0.0	41.3
1st-Term Q (Q1), veh/ln	0.0	11.1	0.0	4.3	0.0	12.9	0.0	4.5

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2033) Traffic Volumes

SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.1	0.0	0.4	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.78	0.00	1.45	0.00	1.77
%ile Back of Q (95%), veh/ln	0.0	17.2	0.0	7.9	0.0	19.3	0.0	8.1
%ile Storage Ratio (RQ%)	0.00	0.36	0.00	0.45	0.00	0.58	0.00	0.21
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	174	0	232	0	205	0	442
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	8.2	0.0	14.2	0.0	15.6	0.0	31.1
Cycle Q Clear Time (g_c), s	0.0	8.2	0.0	14.2	0.0	15.6	0.0	31.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	18.4	0.0	18.4	0.0	0.0	0.0	17.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	779	0	572	0	544	0	604
V/C Ratio (X)	0.00	0.22	0.00	0.41	0.00	0.38	0.00	0.73
Avail Cap (c_a), veh/h	0	779	0	615	0	544	0	604
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	18.9	0.0	31.1	0.0	44.7	0.0	34.5
Incr Delay (d2), s/veh	0.0	0.7	0.0	1.0	0.0	2.0	0.0	5.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	19.5	0.0	32.1	0.0	46.7	0.0	40.0
1st-Term Q (Q1), veh/ln	0.0	3.0	0.0	5.5	0.0	6.7	0.0	11.9
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.2	0.0	0.3	0.0	0.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.69	0.00	1.62	0.00	1.46
%ile Back of Q (95%), veh/ln	0.0	5.7	0.0	9.5	0.0	11.3	0.0	18.7
%ile Storage Ratio (RQ%)	0.00	0.78	0.00	1.47	0.00	1.43	0.00	0.48
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	48.5
HCM 7th LOS	D

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2033) Traffic Volumes
SAT Peak Hour

Intersection												
Int Delay, s/veh	73.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱	↱↱	↱		↱↱	↱			↱	↱		↱
Traffic Vol, veh/h	105	1185	145	0	1130	170	0	0	240	70	0	145
Future Vol, veh/h	105	1185	145	0	1130	170	0	0	240	70	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	111	1247	153	0	1189	179	0	0	253	74	0	153

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1189	0	0	-	-	0	-	-	624	2034	-	595
Stage 1	-	-	-	-	-	-	-	-	-	1189	-	-
Stage 2	-	-	-	-	-	-	-	-	-	845	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	583	-	-	0	-	-	0	0	428	~ 33	0	448
Stage 1	-	-	-	0	-	-	0	0	-	199	0	-
Stage 2	-	-	-	0	-	-	0	0	-	324	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	583	-	-	-	-	-	-	-	428	~ 11	-	448
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 11	-	-
Stage 1	-	-	-	-	-	-	-	-	-	199	-	-
Stage 2	-	-	-	-	-	-	-	-	-	108	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.92	0	24.77	\$ 1058.61
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	428	583	-	-	-	-	11	448
HCM Lane V/C Ratio	0.59	0.19	-	-	-	-	6.661	0.341
HCM Control Delay (s/veh)	24.8	12.6	-	-	-	-	\$ 3215.9	17.1
HCM Lane LOS	C	B	-	-	-	-	F	C
HCM 95th %tile Q(veh)	3.7	0.7	-	-	-	-	10.5	1.5

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	845	230	475	720	370	225	1575	350	430	1395	300
Future Volume (veh/h)	415	845	230	475	720	370	225	1575	350	430	1395	300
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	437	889	242	500	758	389	237	1658	368	453	1468	316
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	465	756	459	555	853	599	302	1753	772	517	2086	829
Arrive On Green	0.13	0.20	0.20	0.16	0.23	0.23	0.03	0.11	0.11	0.15	0.39	0.39
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	437	889	242	500	758	389	237	1658	368	453	1468	316
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	16.3	26.3	16.6	18.5	25.5	26.3	8.9	39.8	22.2	16.7	29.9	15.4
Cycle Q Clear(g_c), s	16.3	26.3	16.6	18.5	25.5	26.3	8.9	39.8	22.2	16.7	29.9	15.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	465	756	459	555	853	599	302	1753	772	517	2086	829
V/C Ratio(X)	0.94	1.18	0.53	0.90	0.89	0.65	0.78	0.95	0.48	0.88	0.70	0.38
Avail Cap(c_a), veh/h	465	756	459	598	863	603	545	1753	772	625	2086	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.7	51.9	38.7	53.5	48.6	33.4	61.9	56.9	30.2	54.1	33.5	18.5
Incr Delay (d2), s/veh	27.2	92.7	2.1	16.1	11.8	3.4	4.5	12.0	2.1	11.7	2.0	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.6	32.0	10.9	14.1	19.0	15.7	7.6	28.6	14.9	12.6	18.9	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	82.9	144.6	40.8	69.6	60.4	36.7	66.3	68.9	32.3	65.8	35.5	19.8
LnGrp LOS	F	F	D	E	E	D	E	E	C	E	D	B
Approach Vol, veh/h	1568			1647			2263			2237		
Approach Delay, s/veh	111.4			57.6			62.7			39.4		
Approach LOS	F			E			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.9	48.4	25.4	32.3	15.9	56.5	22.0	35.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	23.5	38.0	22.5	25.0	20.5	41.0	17.5	30.0				
Max Q Clear Time (g_c+I1), s	18.7	41.8	20.5	28.3	10.9	31.9	18.3	28.3				
Green Ext Time (p_c), s	0.8	0.0	0.4	0.0	0.5	8.8	0.0	1.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	64.7											
HCM 7th LOS	E											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	845	230	475	720	370	225	1575	350	430	1395	300
Future Volume (veh/h)	415	845	230	475	720	370	225	1575	350	430	1395	300
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	437	889	242	500	758	389	237	1658	368	453	1468	316
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	465	756	459	555	853	599	302	1753	772	517	2086	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.20	0.20	0.16	0.23	0.23	0.03	0.11	0.11	0.15	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	82.9	144.6	40.8	69.6	60.4	36.7	66.3	68.9	32.3	65.8	35.5	19.8
Ln Grp LOS	F	F	D	E	E	D	E	E	C	E	D	B
Approach Vol, veh/h	1568			1647			2263			2237		
Approach Delay, s/veh	111.4			57.6			62.7			39.4		
Approach LOS	F			E			E			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	23.9	48.4	25.4	32.3	15.9	56.5	22.0	35.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	23.5	38.0	22.5	25.0	20.5	41.0	17.5	30.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.7				
Max Q Clear (g_c+I1), s	18.7	41.8	20.5	28.3	10.9	31.9	18.3	28.3				
Green Ext Time (g_e), s	0.8	0.0	0.4	0.0	0.5	8.8	0.0	1.3				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.56	1.00	1.00	1.00	0.01	1.00	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	453	0	500	0	237	0	437	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	16.7	0.0	18.5	0.0	8.9	0.0	16.3	0.0
Cycle Q Clear Time (g_c), s	16.7	0.0	18.5	0.0	8.9	0.0	16.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	517	0	555	0	302	0	465	0
V/C Ratio (X)	0.88	0.00	0.90	0.00	0.78	0.00	0.94	0.00
Avail Cap (c_a), veh/h	625	0	598	0	545	0	465	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.1	0.0	53.5	0.0	61.9	0.0	55.7	0.0
Incr Delay (d2), s/veh	11.7	0.0	16.1	0.0	4.5	0.0	27.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	65.8	0.0	69.6	0.0	66.3	0.0	82.9	0.0
1st-Term Q (Q1), veh/ln	7.1	0.0	7.9	0.0	4.0	0.0	7.0	0.0
2nd-Term Q (Q2), veh/ln	0.8	0.0	1.2	0.0	0.2	0.0	1.8	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.58	0.00	1.54	0.00	1.80	0.00	1.55	0.00
%ile Back of Q (95%), veh/ln	12.6	0.0	14.1	0.0	7.6	0.0	13.6	0.0
%ile Storage Ratio (RQ%)	1.73	0.00	1.93	0.00	0.64	0.00	2.16	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1658	0	889	0	1468	0	758
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	39.8	0.0	26.3	0.0	29.9	0.0	25.5
Cycle Q Clear Time (g_c), s	0.0	39.8	0.0	26.3	0.0	29.9	0.0	25.5
Lane Grp Cap (c), veh/h	0	1753	0	756	0	2086	0	853
V/C Ratio (X)	0.00	0.95	0.00	1.18	0.00	0.70	0.00	0.89
Avail Cap (c_a), veh/h	0	1753	0	756	0	2086	0	863
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	56.9	0.0	51.9	0.0	33.5	0.0	48.6
Incr Delay (d2), s/veh	0.0	12.0	0.0	92.7	0.0	2.0	0.0	11.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	68.9	0.0	144.6	0.0	35.5	0.0	60.4
1st-Term Q (Q1), veh/ln	0.0	19.1	0.0	12.1	0.0	12.6	0.0	11.7

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

Build (2033) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	1.9	0.0	9.7	0.0	0.4	0.0	1.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.36	0.00	1.47	0.00	1.45	0.00	1.45
%ile Back of Q (95%), veh/ln	0.0	28.6	0.0	32.0	0.0	18.9	0.0	19.0
%ile Storage Ratio (RQ%)	0.00	1.14	0.00	1.86	0.00	0.51	0.00	0.32
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	33.2	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	368	0	242	0	316	0	389
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	22.2	0.0	16.6	0.0	15.4	0.0	26.3
Cycle Q Clear Time (g_c), s	0.0	22.2	0.0	16.6	0.0	15.4	0.0	26.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	20.9	0.0	11.4	0.0	17.5	0.0	19.4
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	772	0	459	0	829	0	599
V/C Ratio (X)	0.00	0.48	0.00	0.53	0.00	0.38	0.00	0.65
Avail Cap (c_a), veh/h	0	772	0	459	0	829	0	603
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	30.2	0.0	38.7	0.0	18.5	0.0	33.4
Incr Delay (d2), s/veh	0.0	2.1	0.0	2.1	0.0	1.3	0.0	3.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	32.3	0.0	40.8	0.0	19.8	0.0	36.7
1st-Term Q (Q1), veh/ln	0.0	9.3	0.0	6.4	0.0	5.5	0.0	9.9
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.3	0.0	0.3	0.0	0.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.52	0.00	1.64	0.00	1.68	0.00	1.51
%ile Back of Q (95%), veh/ln	0.0	14.9	0.0	10.9	0.0	9.7	0.0	15.7
%ile Storage Ratio (RQ%)	0.00	2.23	0.00	0.63	0.00	1.83	0.00	0.87
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	64.7
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes
SAT Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	1	335	1	1	25	475	1775	25	35	1645	125
Future Volume (veh/h)	240	1	335	1	1	25	475	1775	25	35	1645	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	253	1	353	1	1	26	500	1868	26	37	1732	132
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Cap, veh/h	372	400	581	120	4	94	561	3273	46	190	2353	179
Arrive On Green	0.14	0.20	0.20	0.00	0.06	0.06	0.16	0.63	0.63	0.04	0.97	0.97
Sat Flow, veh/h	1781	1969	1585	1781	59	1535	3428	5189	72	1767	4840	368
Grp Volume(v), veh/h	253	1	353	1	0	27	500	1225	669	37	1217	647
Grp Sat Flow(s),veh/h/ln	1781	1969	1585	1781	0	1594	1714	1702	1857	1767	1702	1804
Q Serve(g_s), s	16.8	0.1	23.6	0.1	0.0	2.1	18.6	27.0	27.0	1.4	4.5	4.5
Cycle Q Clear(g_c), s	16.8	0.1	23.6	0.1	0.0	2.1	18.6	27.0	27.0	1.4	4.5	4.5
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.04	1.00		0.20
Lane Grp Cap(c), veh/h	372	400	581	120	0	98	561	2147	1172	190	1655	877
V/C Ratio(X)	0.68	0.00	0.61	0.01	0.00	0.28	0.89	0.57	0.57	0.20	0.74	0.74
Avail Cap(c_a), veh/h	372	400	581	276	0	221	646	2147	1172	244	1655	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	41.3	33.5	57.2	0.0	58.2	53.2	13.8	13.8	16.2	1.0	1.0
Incr Delay (d2), s/veh	5.0	0.0	2.7	0.0	0.0	3.2	13.3	1.1	2.0	0.5	2.9	5.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.6	0.0	14.6	0.1	0.0	1.7	13.7	14.8	16.3	1.0	2.1	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.2	41.3	36.3	57.2	0.0	61.4	66.5	14.9	15.9	16.7	3.9	6.5
LnGrp LOS	D	D	D	E		E	E	B	B	B	A	A
Approach Vol, veh/h	607			28			2394			1901		
Approach Delay, s/veh	42.5			61.3			26.0			5.0		
Approach LOS	D			E			C			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	88.0	3.6	32.4	24.8	69.2	22.0	14.0				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Q Clear Time (g_c+I), s	13.4	29.0	2.1	25.6	20.6	6.5	18.8	4.1				
Green Ext Time (p_c), s	0.0	36.1	0.0	0.0	0.7	39.9	0.0	0.1				

Intersection Summary

HCM 7th Control Delay, s/veh	20.1
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	1	335	1	1	25	475	1775	25	35	1645	125
Future Volume (veh/h)	240	1	335	1	1	25	475	1775	25	35	1645	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No		No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	253	1	353	1	1	26	500	1868	26	37	1732	132
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	372	400	581	120	4	94	561	3273	46	190	2353	179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Prop Arrive On Green	0.14	0.20	0.20	0.00	0.06	0.06	0.16	0.63	0.63	0.04	0.97	0.97
Unsig. Movement Delay												
Ln Grp Delay, s/veh	51.2	41.3	36.3	57.2	0.0	61.4	66.5	14.9	15.9	16.7	3.9	6.5
Ln Grp LOS	D	D	D	E		E	E	B	B	B	A	A
Approach Vol, veh/h	607				28				2394		1901	
Approach Delay, s/veh	42.5				61.3				26.0		5.0	
Approach LOS	D				E				C		A	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	6.0	88.0	3.6	32.4	24.8	69.2	22.0	14.0				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	3.4	29.0	2.1	25.6	20.6	6.5	18.8	4.1				
Green Ext Time (g_e), s	0.0	36.1	0.0	0.0	0.7	39.9	0.0	0.1				
Prob of Phs Call (p_c)	0.74	1.00	0.04	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.91	0.00	1.00	0.89	0.90	1.00	0.01				
Left-Turn Movement Data												
Assigned Mvmt	1	3		5		7						
Mvmt Sat Flow, veh/h	1767	1781		3428		1781						
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5189			1969			4840			59		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	72			1585			368			1535		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	37	0	1	0	500	0	253	0
Grp Sat Flow (s), veh/h/ln	1767	0	1781	0	1714	0	1781	0
Q Serve Time (g_s), s	1.4	0.0	0.1	0.0	18.6	0.0	16.8	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	0.1	0.0	18.6	0.0	16.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	237	0	1027	0	0	0	1383	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	63.2	0.0	8.0	0.0	0.0	0.0	10.0	0.0
Perm LT Serve Time (g_u), s	55.0	0.0	8.0	0.0	0.0	0.0	5.9	0.0
Perm LT Q Serve Time (g_ps), s	1.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	190	0	120	0	561	0	372	0
V/C Ratio (X)	0.20	0.00	0.01	0.00	0.89	0.00	0.68	0.00
Avail Cap (c_a), veh/h	244	0	276	0	646	0	372	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	16.2	0.0	57.2	0.0	53.2	0.0	46.3	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	13.3	0.0	5.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	16.7	0.0	57.2	0.0	66.5	0.0	51.2	0.0
1st-Term Q (Q1), veh/ln	0.5	0.0	0.0	0.0	7.8	0.0	7.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.55	0.00	1.58	0.00
%ile Back of Q (95%), veh/ln	1.0	0.0	0.1	0.0	13.7	0.0	12.6	0.0
%ile Storage Ratio (RQ%)	0.10	0.00	0.00	0.00	1.00	0.00	5.82	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1225	0	1	0	1217	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	27.0	0.0	0.1	0.0	4.5	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	27.0	0.0	0.1	0.0	4.5	0.0	0.0
Lane Grp Cap (c), veh/h	0	2147	0	400	0	1655	0	0
V/C Ratio (X)	0.00	0.57	0.00	0.00	0.00	0.74	0.00	0.00
Avail Cap (c_a), veh/h	0	2147	0	400	0	1655	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	13.8	0.0	41.3	0.0	1.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.0	0.0	2.9	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	14.9	0.0	41.3	0.0	3.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	9.3	0.0	0.0	0.0	0.5	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2033) Traffic Volumes

SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.7	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.53	0.00	1.80	0.00	1.80	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	14.8	0.0	0.0	0.0	2.1	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.21	0.00	0.01	0.00	0.08	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	669	0	353	0	647	0	27
Grp Sat Flow (s), veh/h/ln	0	1857	0	1585	0	1804	0	1594
Q Serve Time (g_s), s	0.0	27.0	0.0	23.6	0.0	4.5	0.0	2.1
Cycle Q Clear Time (g_c), s	0.0	27.0	0.0	23.6	0.0	4.5	0.0	2.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	21.3	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.04	0.00	1.00	0.00	0.20	0.00	0.96
Lane Grp Cap (c), veh/h	0	1172	0	581	0	877	0	98
V/C Ratio (X)	0.00	0.57	0.00	0.61	0.00	0.74	0.00	0.28
Avail Cap (c_a), veh/h	0	1172	0	581	0	877	0	221
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	13.8	0.0	33.5	0.0	1.0	0.0	58.2
Incr Delay (d2), s/veh	0.0	2.0	0.0	2.7	0.0	5.5	0.0	3.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.9	0.0	36.3	0.0	6.5	0.0	61.4
1st-Term Q (Q1), veh/ln	0.0	10.2	0.0	9.1	0.0	0.5	0.0	0.9
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.4	0.0	1.3	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.50	0.00	1.53	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	16.3	0.0	14.6	0.0	3.4	0.0	1.7
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	3.63	0.00	0.13	0.00	0.13
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	20.1
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↓	
Traffic Vol, veh/h	535	1	55	545	1	40
Future Vol, veh/h	535	1	55	545	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	563	1	58	574	1	42
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	564	0	966	282
Stage 1	-	-	-	-	564	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1004	-	252	715
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	644	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1004	-	235	715
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	600	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		1.26		10.64	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	681	-	-	330	-	
HCM Lane V/C Ratio	0.063	-	-	0.058	-	
HCM Control Delay (s/veh)	10.6	-	-	8.8	0.5	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-	

Intersection												
Int Delay, s/veh	12.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↔		↔			↔	
Traffic Vol, veh/h	10	210	1	10	285	250	1	1	15	310	1	105
Future Vol, veh/h	10	210	1	10	285	250	1	1	15	310	1	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	221	1	11	300	263	1	1	16	326	1	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	563	0	0	222	0	0	414	827	111	453	564	150
Stage 1	-	-	-	-	-	-	243	243	-	321	321	-
Stage 2	-	-	-	-	-	-	172	584	-	132	243	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1004	-	-	1344	-	-	522	305	921	490	433	870
Stage 1	-	-	-	-	-	-	739	704	-	665	650	-
Stage 2	-	-	-	-	-	-	813	496	-	858	703	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1004	-	-	1344	-	-	446	299	921	470	424	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	299	-	470	424	-
Stage 1	-	-	-	-	-	-	731	696	-	659	644	-
Stage 2	-	-	-	-	-	-	702	491	-	832	696	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.47			0.18			9.74			36		
HCM LOS							A			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	777	162	-	-	122	-	-	532
HCM Lane V/C Ratio	0.023	0.01	-	-	0.008	-	-	0.824
HCM Control Delay (s/veh)	9.7	8.6	0.1	-	7.7	0.1	-	36
HCM Lane LOS	A	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	8.2

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1435	1	0	1275	0	1
Future Vol, veh/h	1435	1	0	1275	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1511	1	0	1342	0	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 756
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	- 0	- 0 351
Stage 1	-	- 0	- 0 -
Stage 2	-	- 0	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 351
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	15.29
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	351	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-
HCM Control Delay (s/veh)	15.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	110	0	2040	1665	435
Future Vol, veh/h	0	110	0	2040	1665	435
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	116	0	2147	1753	458

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 876	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.14	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.92	- -	- -
Pot Cap-1 Maneuver	0 251	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 251	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s/v31.12		0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 251	- -	- -
HCM Lane V/C Ratio	- 0.462	- -	- -
HCM Control Delay (s/veh)	- 31.1	- -	- -
HCM Lane LOS	- D	- -	- -
HCM 95th %tile Q(veh)	- 2.3	- -	- -

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	10	170	300	90	50	85
Future Vol, veh/h	10	170	300	90	50	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	179	316	95	53	89

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	411	0	0	474	205
Stage 1	-	-	-	363	-
Stage 2	-	-	-	111	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1145	-	-	520	801
Stage 1	-	-	-	674	-
Stage 2	-	-	-	902	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1145	-	-	514	801
Mov Cap-2 Maneuver	-	-	-	514	-
Stage 1	-	-	-	668	-
Stage 2	-	-	-	902	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.52	0	11.89
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	200	-	-	-	664
HCM Lane V/C Ratio	0.009	-	-	-	0.214
HCM Control Delay (s/veh)	8.2	0.1	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	165	365	20	15	1
Future Vol, veh/h	1	165	365	20	15	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	174	384	21	16	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	405	0	0 484 203
Stage 1	-	-	- 395 -
Stage 2	-	-	- 89 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	1150	-	- 512 804
Stage 1	-	-	- 650 -
Stage 2	-	-	- 924 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1150	-	- 512 804
Mov Cap-2 Maneuver	-	-	- 512 -
Stage 1	-	-	- 649 -
Stage 2	-	-	- 924 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.06	0	12.11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	22	-	-	-	523
HCM Lane V/C Ratio	0.001	-	-	-	0.032
HCM Control Delay (s/veh)	8.1	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

FUTURE (2050) NO-BUILD CAPACITY REPORTS

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	740	90	40	795	215	115	10	65	130	10	100
Future Volume (veh/h)	150	740	90	40	795	215	115	10	65	130	10	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	158	779	95	42	837	226	121	11	68	137	11	105
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Cap, veh/h	185	2382	664	75	2221	941	402	121	132	285	182	311
Arrive On Green	0.10	0.68	0.68	0.02	0.59	0.59	0.06	0.06	0.06	0.09	0.09	0.09
Sat Flow, veh/h	1781	3526	982	3428	3741	1585	2908	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	158	779	95	42	837	226	121	11	68	137	11	105
Grp Sat Flow(s),veh/h/ln	1781	1763	982	1714	1870	1585	1454	1969	1585	1781	1969	1585
Q Serve(g_s), s	11.3	12.0	4.5	1.6	15.2	8.8	5.0	0.7	5.3	9.1	0.7	7.4
Cycle Q Clear(g_c), s	11.3	12.0	4.5	1.6	15.2	8.8	5.0	0.7	5.3	9.1	0.7	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	185	2382	664	75	2221	941	402	121	132	285	182	311
V/C Ratio(X)	0.85	0.33	0.14	0.56	0.38	0.24	0.30	0.09	0.51	0.48	0.06	0.34
Avail Cap(c_a), veh/h	295	2382	664	567	2221	941	742	485	425	438	485	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.3	8.8	7.6	63.0	13.8	12.5	52.8	57.6	57.1	49.3	53.8	44.9
Incr Delay (d2), s/veh	12.9	0.4	0.5	6.4	0.5	0.6	0.4	0.7	6.5	1.3	0.3	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	7.7	1.8	1.3	10.4	5.9	3.3	0.7	4.3	7.5	0.6	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	70.1	9.1	8.0	69.3	14.3	13.1	53.2	58.3	63.5	50.5	54.1	46.3
LnGrp LOS	E	A	A	E	B	B	D	E	E	D	D	D
Approach Vol, veh/h	1032			1105			200			253		
Approach Delay, s/veh	18.4			16.2			57.0			48.9		
Approach LOS	B			B			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	93.9	10.8	18.0	18.0	83.2	14.8	14.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	3.6	14.0	7.0	9.4	13.3	17.2	11.1	7.3				
Green Ext Time (p_c), s	0.1	12.9	0.3	0.8	0.2	12.6	0.2	0.5				
Intersection Summary												
HCM 7th Control Delay, s/veh	23.4											
HCM 7th LOS	C											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	740	90	40	795	215	115	10	65	130	10	100
Future Volume (veh/h)	150	740	90	40	795	215	115	10	65	130	10	100
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1856	1159	1856	1969	1870	1574	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	158	779	95	42	837	226	121	11	68	137	11	105
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
Percent Heavy Veh, %	2	3	50	3	2	2	22	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	185	2382	664	75	2221	941	402	121	132	285	182	311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.68	0.68	0.02	0.59	0.59	0.06	0.06	0.06	0.09	0.09	0.09
Unsig. Movement Delay												
Ln Grp Delay, s/veh	70.1	9.1	8.0	69.3	14.3	13.1	53.2	58.3	63.5	50.5	54.1	46.3
Ln Grp LOS	E	A	A	E	B	B	D	E	E	D	D	D
Approach Vol, veh/h	1032			1105			200			253		
Approach Delay, s/veh	18.4			16.2			57.0			48.9		
Approach LOS	B			B			E			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	1.1	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	7.3	93.9	10.8	18.0	18.0	83.2	14.8	14.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.9	3.9	6.2	3.7	8.8	3.8	6.2				
Max Q Clear (g_c+I1), s	3.6	14.0	7.0	9.4	13.3	17.2	11.1	7.3				
Green Ext Time (g_e), s	0.1	12.9	0.3	0.8	0.2	12.6	0.2	0.5				
Prob of Phs Call (p_c)	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.00	0.66	0.00	0.00	0.02	0.82	0.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3428	2908	1781	1781								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	3526	1969	3741	1969								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	982	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
AM Peak Hour

Lane Assignment	L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	42	0	121	0	158	0	137	0
Grp Sat Flow (s), veh/h/ln	1714	0	1454	0	1781	0	1781	0
Q Serve Time (g_s), s	1.6	0.0	5.0	0.0	11.3	0.0	9.1	0.0
Cycle Q Clear Time (g_c), s	1.6	0.0	5.0	0.0	11.3	0.0	9.1	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1042	0	0	0	1320	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	8.0	0.0	0.0	0.0	10.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	8.0	0.0	0.0	0.0	7.3	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	75	0	402	0	185	0	285	0
V/C Ratio (X)	0.56	0.00	0.30	0.00	0.85	0.00	0.48	0.00
Avail Cap (c_a), veh/h	567	0	742	0	295	0	438	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	63.0	0.0	52.8	0.0	57.3	0.0	49.3	0.0
Incr Delay (d2), s/veh	6.4	0.0	0.4	0.0	12.9	0.0	1.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	69.3	0.0	53.2	0.0	70.1	0.0	50.5	0.0
1st-Term Q (Q1), veh/ln	0.7	0.0	1.8	0.0	5.0	0.0	4.0	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.7	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.69	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.3	0.0	3.3	0.0	9.6	0.0	7.5	0.0
%ile Storage Ratio (RQ%)	0.09	0.00	0.39	0.00	0.90	0.00	1.15	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	779	0	11	0	837	0	11
Grp Sat Flow (s), veh/h/ln	0	1763	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	12.0	0.0	0.7	0.0	15.2	0.0	0.7
Cycle Q Clear Time (g_c), s	0.0	12.0	0.0	0.7	0.0	15.2	0.0	0.7
Lane Grp Cap (c), veh/h	0	2382	0	182	0	2221	0	121
V/C Ratio (X)	0.00	0.33	0.00	0.06	0.00	0.38	0.00	0.09
Avail Cap (c_a), veh/h	0	2382	0	485	0	2221	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	8.8	0.0	53.8	0.0	13.8	0.0	57.6
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.3	0.0	0.5	0.0	0.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.1	0.0	54.1	0.0	14.3	0.0	58.3
1st-Term Q (Q1), veh/ln	0.0	4.2	0.0	0.3	0.0	6.1	0.0	0.3

HCM 7th Signalized Intersection Capacity Analysis 100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.79	0.00	1.80	0.00	1.66	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	7.7	0.0	0.6	0.0	10.4	0.0	0.7
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.04	0.00	0.29	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	95	0	105	0	226	0	68
Grp Sat Flow (s), veh/h/ln	0	982	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	4.5	0.0	7.4	0.0	8.8	0.0	5.3
Cycle Q Clear Time (g_c), s	0.0	4.5	0.0	7.4	0.0	8.8	0.0	5.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	13.5	0.0	0.0	0.0	2.8
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	664	0	311	0	941	0	132
V/C Ratio (X)	0.00	0.14	0.00	0.34	0.00	0.24	0.00	0.51
Avail Cap (c_a), veh/h	0	664	0	555	0	941	0	425
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.6	0.0	44.9	0.0	12.5	0.0	57.1
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.4	0.0	0.6	0.0	6.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.0	0.0	46.3	0.0	13.1	0.0	63.5
1st-Term Q (Q1), veh/ln	0.0	0.9	0.0	2.9	0.0	3.1	0.0	2.1
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	1.8	0.0	5.5	0.0	5.9	0.0	4.3
%ile Storage Ratio (RQ%)	0.00	0.34	0.00	0.85	0.00	0.75	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	23.4
HCM 7th LOS	C

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	895	1015	40	5	45
Future Vol, veh/h	40	895	1015	40	5	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None		Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	942	1068	42	5	47
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1068	0	-	0	1624	534
Stage 1	-	-	-	-	1068	-
Stage 2	-	-	-	-	555	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	648	-	-	-	93	490
Stage 1	-	-	-	-	291	-
Stage 2	-	-	-	-	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	648	-	-	-	87	490
Mov Cap-2 Maneuver	-	-	-	-	87	-
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	538	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.47	0		16.7		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	648	-	-	-	87	490
HCM Lane V/C Ratio	0.065	-	-	-	0.06	0.097
HCM Control Delay (s/veh)	10.9	-	-	-	48.9	13.1
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.3

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	650	155	185	720	215	240	1380	295	190	885	110
Future Volume (veh/h)	165	650	155	185	720	215	240	1380	295	190	885	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	174	684	163	195	758	226	253	1453	311	200	932	116
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Cap, veh/h	233	861	504	259	890	498	312	2384	822	264	2290	787
Arrive On Green	0.07	0.23	0.23	0.08	0.24	0.24	0.18	0.89	0.89	0.08	0.43	0.43
Sat Flow, veh/h	3456	3741	1572	3456	3741	1585	3456	5375	1585	3456	5332	1585
Grp Volume(v), veh/h	174	684	163	195	758	226	253	1453	311	200	932	116
Grp Sat Flow(s),veh/h/ln	1728	1870	1572	1728	1870	1585	1728	1792	1585	1728	1777	1585
Q Serve(g_s), s	5.9	20.7	9.4	6.6	23.2	13.7	8.4	8.0	3.8	6.8	14.5	4.8
Cycle Q Clear(g_c), s	5.9	20.7	9.4	6.6	23.2	13.7	8.4	8.0	3.8	6.8	14.5	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	861	504	259	890	498	312	2384	822	264	2290	787
V/C Ratio(X)	0.75	0.79	0.32	0.75	0.85	0.45	0.81	0.61	0.38	0.76	0.41	0.15
Avail Cap(c_a), veh/h	331	861	504	504	935	517	475	2384	822	475	2290	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	43.5	30.9	54.4	43.7	32.9	48.2	4.2	3.0	54.3	23.7	16.4
Incr Delay (d2), s/veh	5.6	5.9	0.8	4.4	8.2	1.4	5.2	1.0	1.1	4.4	0.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	15.2	6.5	5.4	17.1	9.1	6.3	3.2	2.0	5.5	10.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.6	49.5	31.7	58.8	52.0	34.3	53.3	5.2	4.1	58.8	24.2	16.8
LnGrp LOS	E	D	C	E	D	C	D	A	A	E	C	B
Approach Vol, veh/h	1021			1179			2017			1248		
Approach Delay, s/veh	48.5			49.7			11.1			29.1		
Approach LOS	D			D			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	59.2	13.5	33.6	15.4	57.5	12.6	34.5				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Q Clear Time (g_c+I1), s	8.8	10.0	8.6	22.7	10.4	16.5	7.9	25.2				
Green Ext Time (p_c), s	0.4	28.0	0.4	0.9	0.4	16.9	0.2	3.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	30.5											
HCM 7th LOS	C											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	650	155	185	720	215	240	1380	295	190	885	110
Future Volume (veh/h)	165	650	155	185	720	215	240	1380	295	190	885	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No		No				No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1856	1870	1969	1870	1870	1969	1870	1870	1953	1870
Adj Flow Rate, veh/h	174	684	163	195	758	226	253	1453	311	200	932	116
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
Percent Heavy Veh, %	2	2	3	2	2	2	2	2	2	2	3	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	233	861	504	259	890	498	312	2384	822	264	2290	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Prop Arrive On Green	0.07	0.23	0.23	0.08	0.24	0.24	0.18	0.89	0.89	0.08	0.43	0.43
Unsig. Movement Delay												
Ln Grp Delay, s/veh	60.6	49.5	31.7	58.8	52.0	34.3	53.3	5.2	4.1	58.8	24.2	16.8
Ln Grp LOS	E	D	C	E	D	C	D	A	A	E	C	B
Approach Vol, veh/h	1021				1179		2017				1248	
Approach Delay, s/veh	48.5				49.7		11.1				29.1	
Approach LOS	D				D		B				C	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	13.7	59.2	13.5	33.6	15.4	57.5	12.6	34.5				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	16.5	41.0	17.5	24.0	16.5	41.0	11.5	30.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.9	3.7	6.8				
Max Q Clear (g_c+I1), s	8.8	10.0	8.6	22.7	10.4	16.5	7.9	25.2				
Green Ext Time (g_e), s	0.4	28.0	0.4	0.9	0.4	16.9	0.2	3.3				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.03	0.89	0.01	1.00	0.16	0.66	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5332	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1572	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	200	0	195	0	253	0	174	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	6.8	0.0	6.6	0.0	8.4	0.0	5.9	0.0
Cycle Q Clear Time (g_c), s	6.8	0.0	6.6	0.0	8.4	0.0	5.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	264	0	259	0	312	0	233	0
V/C Ratio (X)	0.76	0.00	0.75	0.00	0.81	0.00	0.75	0.00
Avail Cap (c_a), veh/h	475	0	504	0	475	0	331	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.84	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.3	0.0	54.4	0.0	48.2	0.0	55.0	0.0
Incr Delay (d2), s/veh	4.4	0.0	4.4	0.0	5.2	0.0	5.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	58.8	0.0	58.8	0.0	53.3	0.0	60.6	0.0
1st-Term Q (Q1), veh/ln	2.9	0.0	2.8	0.0	3.3	0.0	2.5	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	5.5	0.0	5.4	0.0	6.3	0.0	4.9	0.0
%ile Storage Ratio (RQ%)	0.76	0.00	0.74	0.00	0.54	0.00	0.78	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1453	0	684	0	932	0	758
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1777	0	1870
Q Serve Time (g_s), s	0.0	8.0	0.0	20.7	0.0	14.5	0.0	23.2
Cycle Q Clear Time (g_c), s	0.0	8.0	0.0	20.7	0.0	14.5	0.0	23.2
Lane Grp Cap (c), veh/h	0	2384	0	861	0	2290	0	890
V/C Ratio (X)	0.00	0.61	0.00	0.79	0.00	0.41	0.00	0.85
Avail Cap (c_a), veh/h	0	2384	0	861	0	2290	0	935
Upstream Filter (I)	0.00	0.84	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	4.2	0.0	43.5	0.0	23.7	0.0	43.7
Incr Delay (d2), s/veh	0.0	1.0	0.0	5.9	0.0	0.5	0.0	8.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.2	0.0	49.5	0.0	24.2	0.0	52.0
1st-Term Q (Q1), veh/ln	0.0	1.6	0.0	9.3	0.0	5.9	0.0	10.5

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.7	0.0	0.1	0.0	1.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.52	0.00	1.67	0.00	1.48
%ile Back of Q (95%), veh/ln	0.0	3.2	0.0	15.2	0.0	10.0	0.0	17.1
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.88	0.00	0.27	0.00	0.29
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	311	0	163	0	116	0	226
Grp Sat Flow (s), veh/h/ln	0	1585	0	1572	0	1585	0	1585
Q Serve Time (g_s), s	0.0	3.8	0.0	9.4	0.0	4.8	0.0	13.7
Cycle Q Clear Time (g_c), s	0.0	3.8	0.0	9.4	0.0	4.8	0.0	13.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1572.5	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	9.0	0.0	10.9	0.0	8.1	0.0	9.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	822	0	504	0	787	0	498
V/C Ratio (X)	0.00	0.38	0.00	0.32	0.00	0.15	0.00	0.45
Avail Cap (c_a), veh/h	0	822	0	504	0	787	0	517
Upstream Filter (I)	0.00	0.84	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	3.0	0.0	30.9	0.0	16.4	0.0	32.9
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.8	0.0	0.4	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.1	0.0	31.7	0.0	16.8	0.0	34.3
1st-Term Q (Q1), veh/ln	0.0	0.8	0.0	3.5	0.0	1.7	0.0	5.1
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.71
%ile Back of Q (95%), veh/ln	0.0	2.0	0.0	6.5	0.0	3.2	0.0	9.1
%ile Storage Ratio (RQ%)	0.00	0.29	0.00	0.38	0.00	0.60	0.00	0.50
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	30.5
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1	70	1	1	10	115	1905	15	30	1165	55
Future Volume (veh/h)	45	1	70	1	1	10	115	1905	15	30	1165	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	1	74	1	1	11	121	2005	16	32	1226	58
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	186	207	145	8	93	430	3814	30	208	3549	168
Arrive On Green	0.03	0.09	0.09	0.00	0.06	0.06	0.04	0.73	0.73	0.03	1.00	1.00
Sat Flow, veh/h	1781	1969	1585	1781	134	1472	1781	5225	42	1781	4996	236
Grp Volume(v), veh/h	47	1	74	1	0	12	121	1306	715	32	835	449
Grp Sat Flow(s),veh/h/ln	1781	1969	1585	1781	0	1605	1781	1702	1863	1781	1702	1828
Q Serve(g_s), s	2.9	0.1	5.1	0.1	0.0	0.8	2.2	20.2	20.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.1	5.1	0.1	0.0	0.8	2.2	20.2	20.2	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.02	1.00		0.13
Lane Grp Cap(c), veh/h	196	186	207	145	0	101	430	2484	1360	208	2418	1299
V/C Ratio(X)	0.24	0.01	0.36	0.01	0.00	0.12	0.28	0.53	0.53	0.15	0.35	0.35
Avail Cap(c_a), veh/h	250	361	347	240	0	281	626	2484	1360	290	2418	1299
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.89	0.89	0.89
Uniform Delay (d), s/veh	48.6	49.2	47.6	52.6	0.0	53.1	3.9	7.1	7.1	6.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	2.2	0.0	0.0	1.1	0.4	0.8	1.5	0.3	0.3	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.4	0.1	3.9	0.1	0.0	0.7	1.2	10.1	11.2	0.4	0.2	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.2	49.2	49.8	52.6	0.0	54.2	4.3	7.9	8.6	6.3	0.3	0.6
LnGrp LOS	D	D	D	D		D	A	A	A	A	A	A
Approach Vol, veh/h	122		13			2142			1316			
Approach Delay, s/veh	49.6		54.0			7.9			0.6			
Approach LOS	D		D			A			A			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.5	93.6	3.6	17.4	7.8	91.3	7.4	13.6				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	7.5	65.0	6.5	22.0	17.5	55.0	7.5	21.0				
Max Q Clear Time (g_c+I2), s	12.6	22.2	2.1	7.1	4.2	2.0	4.9	2.8				
Green Ext Time (p_c), s	0.0	40.3	0.0	0.3	0.2	36.0	0.0	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh	6.8
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	1	70	1	1	10	115	1905	15	30	1165	55
Future Volume (veh/h)	45	1	70	1	1	10	115	1905	15	30	1165	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	1	74	1	1	11	121	2005	16	32	1226	58
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	196	186	207	145	8	93	430	3814	30	208	3549	168
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Prop Arrive On Green	0.03	0.09	0.09	0.00	0.06	0.06	0.04	0.73	0.73	0.03	1.00	1.00
Unsig. Movement Delay												
Ln Grp Delay, s/veh	49.2	49.2	49.8	52.6	0.0	54.2	4.3	7.9	8.6	6.3	0.3	0.6
Ln Grp LOS	D	D	D	D		D	A	A	A	A	A	A
Approach Vol, veh/h	122			13			2142			1316		
Approach Delay, s/veh	49.6			54.0			7.9			0.6		
Approach LOS	D			D			A			A		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	1.1	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	5.5	93.6	3.6	17.4	7.8	91.3	7.4	13.6				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	7.5	65.0	6.5	22.0	17.5	55.0	7.5	21.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	2.6	22.2	2.1	7.1	4.2	2.0	4.9	2.8				
Green Ext Time (g_e), s	0.0	40.3	0.0	0.3	0.2	36.0	0.0	0.0				
Prob of Phs Call (p_c)	0.66	1.00	0.03	0.99	0.98	1.00	0.79	0.95				
Prob of Max Out (p_x)	0.16	0.93	0.16	0.00	0.00	0.55	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1781		1781		1781		1781					
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5225			1969			4996			134		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	42			1585			236			1472		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
AM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	32	0	1	0	121	0	47	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	0.6	0.0	0.1	0.0	2.2	0.0	2.9	0.0
Cycle Q Clear Time (g_c), s	0.6	0.0	0.1	0.0	2.2	0.0	2.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	211	0	1325	0	430	0	1402	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	85.3	0.0	7.6	0.0	86.1	0.0	9.6	0.0
Perm LT Serve Time (g_u), s	67.4	0.0	7.6	0.0	85.3	0.0	6.7	0.0
Perm LT Q Serve Time (g_ps), s	3.1	0.0	0.0	0.0	0.3	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	208	0	145	0	430	0	196	0
V/C Ratio (X)	0.15	0.00	0.01	0.00	0.28	0.00	0.24	0.00
Avail Cap (c_a), veh/h	290	0	240	0	626	0	250	0
Upstream Filter (I)	0.89	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	6.0	0.0	52.6	0.0	3.9	0.0	48.6	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.4	0.0	0.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	6.3	0.0	52.6	0.0	4.3	0.0	49.2	0.0
1st-Term Q (Q1), veh/ln	0.2	0.0	0.0	0.0	0.6	0.0	1.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	0.4	0.0	0.1	0.0	1.2	0.0	2.4	0.0
%ile Storage Ratio (RQ%)	0.03	0.00	0.00	0.00	0.09	0.00	1.10	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1306	0	1	0	835	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	20.2	0.0	0.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	20.2	0.0	0.1	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	2484	0	186	0	2418	0	0
V/C Ratio (X)	0.00	0.53	0.00	0.01	0.00	0.35	0.00	0.00
Avail Cap (c_a), veh/h	0	2484	0	361	0	2418	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.89	0.00	0.00
Uniform Delay (d1), s/veh	0.0	7.1	0.0	49.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	7.9	0.0	49.2	0.0	0.3	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.67	0.00	1.80	0.00	1.80	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	10.1	0.0	0.1	0.0	0.2	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.14	0.00	0.01	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	715	0	74	0	449	0	12
Grp Sat Flow (s), veh/h/ln	0	1863	0	1585	0	1828	0	1605
Q Serve Time (g_s), s	0.0	20.2	0.0	5.1	0.0	0.0	0.0	0.8
Cycle Q Clear Time (g_c), s	0.0	20.2	0.0	5.1	0.0	0.0	0.0	0.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.02	0.00	1.00	0.00	0.13	0.00	0.92
Lane Grp Cap (c), veh/h	0	1360	0	207	0	1299	0	101
V/C Ratio (X)	0.00	0.53	0.00	0.36	0.00	0.35	0.00	0.12
Avail Cap (c_a), veh/h	0	1360	0	347	0	1299	0	281
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.89	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.1	0.0	47.6	0.0	0.0	0.0	53.1
Incr Delay (d2), s/veh	0.0	1.5	0.0	2.2	0.0	0.6	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.6	0.0	49.8	0.0	0.6	0.0	54.2
1st-Term Q (Q1), veh/ln	0.0	6.3	0.0	2.0	0.0	0.0	0.0	0.3
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.1	0.0	0.2	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.63	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	11.2	0.0	3.9	0.0	0.4	0.0	0.7
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.90	0.00	0.01	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	6.8
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2050) Traffic Volumes
AM Peak Hour

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	75	1	70	100	1	40
Future Vol, veh/h	75	1	70	100	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	1	74	105	1	42
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	80	0	279	40
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1516	-	687	1022
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1516	-	653	1022
Mov Cap-2 Maneuver	-	-	-	-	653	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	773	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		3.18		8.73	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1009	-	-	1472	-	
HCM Lane V/C Ratio	0.043	-	-	0.049	-	
HCM Control Delay (s/veh)	8.7	-	-	7.5	0.2	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.2	-	

HCM 7th TWSC
600: West Access & 161st Street

No-Build (2050) Traffic Volumes
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	75	1	1	100	1	1
Future Vol, veh/h	75	1	1	100	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	1	1	105	1	1

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	80	0	134	40
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1516	-	846	1022
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	961	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1516	-	845	1022
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	960	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.08	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	925	-	-	36	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s/veh)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	970	165	305	915	215	315	125	345	210	105	245
Future Volume (veh/h)	260	970	165	305	915	215	315	125	345	210	105	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	274	1021	174	321	963	226	332	132	363	221	111	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1445	644	381	1450	799	404	394	492	396	393	521
Arrive On Green	0.13	0.41	0.41	0.11	0.39	0.39	0.12	0.20	0.20	0.12	0.20	0.20
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	274	1021	174	321	963	226	332	132	363	221	111	258
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	15.5	28.7	8.8	10.9	25.5	9.9	11.3	6.9	24.0	11.6	5.7	15.7
Cycle Q Clear(g_c), s	15.5	28.7	8.8	10.9	25.5	9.9	11.3	6.9	24.0	11.6	5.7	15.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1445	644	381	1450	799	404	394	492	396	393	521
V/C Ratio(X)	1.19	0.71	0.27	0.84	0.66	0.28	0.82	0.34	0.74	0.56	0.28	0.49
Avail Cap(c_a), veh/h	230	1445	644	446	1450	799	619	394	492	508	394	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	29.7	23.7	52.4	30.3	17.2	51.8	41.2	37.0	32.3	40.7	32.3
Incr Delay (d2), s/veh	120.6	2.9	1.0	12.1	2.4	0.9	5.3	1.1	7.0	1.2	0.8	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.3	18.1	6.3	9.1	17.1	6.8	8.9	6.3	15.7	8.9	5.2	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	172.9	32.6	24.8	64.5	32.7	18.1	57.0	42.2	44.0	33.5	41.5	33.8
LnGrp LOS	F	C	C	E	C	B	E	D	D	C	D	C
Approach Vol, veh/h	1469			1510			827			590		
Approach Delay, s/veh	57.8			37.3			49.0			35.2		
Approach LOS	E			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	54.8	17.5	30.0	20.0	52.5	17.5	30.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	12.9	30.7	13.3	17.7	17.5	27.5	13.6	26.0				
Green Ext Time (p_c), s	0.3	7.2	0.8	1.5	0.0	9.7	0.4	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh 46.1
HCM 7th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	970	165	305	915	215	315	125	345	210	105	245
Future Volume (veh/h)	260	970	165	305	915	215	315	125	345	210	105	245
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A _{pbT})	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	274	1021	174	321	963	226	332	132	363	221	111	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1445	644	381	1450	799	404	394	492	396	393	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.41	0.41	0.11	0.39	0.39	0.12	0.20	0.20	0.12	0.20	0.20
Unsig. Movement Delay												
Ln Grp Delay, s/veh	172.9	32.6	24.8	64.5	32.7	18.1	57.0	42.2	44.0	33.5	41.5	33.8
Ln Grp LOS	F	C	C	E	C	B	E	D	D	C	D	C
Approach Vol, veh/h		1469			1510			827			590	
Approach Delay, s/veh		57.8			37.3			49.0			35.2	
Approach LOS		E			D			D			D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	17.7	54.8	17.5	30.0	20.0	52.5	17.5	30.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.4	3.7	8.8	3.8	6.4				
Max Q Clear (g _{c+I1}), s	12.9	30.7	13.3	17.7	17.5	27.5	13.6	26.0				
Green Ext Time (g _e), s	0.3	7.2	0.8	1.5	0.0	9.7	0.4	0.0				
Prob of Phs Call (p _c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p _x)	1.00	1.00	0.06	1.00	1.00	0.95	0.05	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		1781		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3554		1969		3741		1969				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	321	0	332	0	274	0	221	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	10.9	0.0	11.3	0.0	15.5	0.0	11.6	0.0
Cycle Q Clear Time (g_c), s	10.9	0.0	11.3	0.0	15.5	0.0	11.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	902	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	24.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	381	0	404	0	230	0	396	0
V/C Ratio (X)	0.84	0.00	0.82	0.00	1.19	0.00	0.56	0.00
Avail Cap (c_a), veh/h	446	0	619	0	230	0	508	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	52.4	0.0	51.8	0.0	52.3	0.0	32.3	0.0
Incr Delay (d2), s/veh	12.1	0.0	5.3	0.0	120.6	0.0	1.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.5	0.0	57.0	0.0	172.9	0.0	33.5	0.0
1st-Term Q (Q1), veh/ln	4.7	0.0	4.9	0.0	6.8	0.0	5.0	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.3	0.0	7.7	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.71	0.00	1.72	0.00	1.54	0.00	1.72	0.00
%ile Back of Q (95%), veh/ln	9.1	0.0	8.9	0.0	22.3	0.0	8.9	0.0
%ile Storage Ratio (RQ%)	0.58	0.00	0.90	0.00	2.10	0.00	1.37	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	1021	0	111	0	963	0	132
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	28.7	0.0	5.7	0.0	25.5	0.0	6.9
Cycle Q Clear Time (g_c), s	0.0	28.7	0.0	5.7	0.0	25.5	0.0	6.9
Lane Grp Cap (c), veh/h	0	1445	0	393	0	1450	0	394
V/C Ratio (X)	0.00	0.71	0.00	0.28	0.00	0.66	0.00	0.34
Avail Cap (c_a), veh/h	0	1445	0	394	0	1450	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	29.7	0.0	40.7	0.0	30.3	0.0	41.2
Incr Delay (d2), s/veh	0.0	2.9	0.0	0.8	0.0	2.4	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	32.6	0.0	41.5	0.0	32.7	0.0	42.2
1st-Term Q (Q1), veh/ln	0.0	11.8	0.0	2.8	0.0	11.1	0.0	3.4

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.1	0.0	0.5	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.47	0.00	1.80	0.00	1.48	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	18.1	0.0	5.2	0.0	17.1	0.0	6.3
%ile Storage Ratio (RQ%)	0.00	0.38	0.00	0.29	0.00	0.54	0.00	0.16
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	174	0	258	0	226	0	363
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	8.8	0.0	15.7	0.0	9.9	0.0	24.0
Cycle Q Clear Time (g_c), s	0.0	8.8	0.0	15.7	0.0	9.9	0.0	24.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	15.5	0.0	14.0	0.0	13.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	644	0	521	0	799	0	492
V/C Ratio (X)	0.00	0.27	0.00	0.49	0.00	0.28	0.00	0.74
Avail Cap (c_a), veh/h	0	644	0	522	0	799	0	492
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	23.7	0.0	32.3	0.0	17.2	0.0	37.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	1.6	0.0	0.9	0.0	7.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	24.8	0.0	33.8	0.0	18.1	0.0	44.0
1st-Term Q (Q1), veh/ln	0.0	3.3	0.0	6.0	0.0	3.6	0.0	9.5
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	0.2	0.0	1.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.66	0.00	1.80	0.00	1.51
%ile Back of Q (95%), veh/ln	0.0	6.3	0.0	10.3	0.0	6.8	0.0	15.7
%ile Storage Ratio (RQ%)	0.00	0.86	0.00	1.59	0.00	0.87	0.00	0.41
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	46.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	13.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	130	1395	1325	130	40	120
Future Vol, veh/h	130	1395	1325	130	40	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	137	1468	1395	137	42	126

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1395	0	0 2403 697
Stage 1	-	-	- 1395 -
Stage 2	-	-	- 1008 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	486	-	- ~ 28 383
Stage 1	-	-	- 195 -
Stage 2	-	-	- 314 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	486	-	- ~ 20 383
Mov Cap-2 Maneuver	-	-	- ~ 20 -
Stage 1	-	-	- 140 -
Stage 2	-	-	- 314 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.3	0	245.22
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	486	-	-	-	20	383
HCM Lane V/C Ratio	0.281	-	-	-	2.119	0.33
HCM Control Delay (s/veh)	15.3	-	-	-	\$ 924	18.9
HCM Lane LOS	C	-	-	-	F	C
HCM 95th %tile Q(veh)	1.1	-	-	-	5.6	1.4

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	955	260	285	1015	270	290	1370	330	420	1435	285
Future Volume (veh/h)	270	955	260	285	1015	270	290	1370	330	420	1435	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	284	1005	274	300	1068	284	305	1442	347	442	1511	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	890	544	360	921	616	363	1899	725	493	2103	773
Arrive On Green	0.10	0.24	0.24	0.10	0.25	0.25	0.03	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	284	1005	274	300	1068	284	305	1442	347	442	1511	300
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	10.5	30.9	17.9	11.1	32.0	17.3	11.4	33.8	22.7	16.3	30.9	15.6
Cycle Q Clear(g_c), s	10.5	30.9	17.9	11.1	32.0	17.3	11.4	33.8	22.7	16.3	30.9	15.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	890	544	360	921	616	363	1899	725	493	2103	773
V/C Ratio(X)	0.85	1.13	0.50	0.83	1.16	0.46	0.84	0.76	0.48	0.90	0.72	0.39
Avail Cap(c_a), veh/h	332	890	544	492	921	616	412	1899	725	518	2103	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.76	0.76	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	49.5	33.9	57.1	49.0	29.6	61.7	52.1	34.5	54.8	33.5	21.1
Incr Delay (d2), s/veh	19.1	72.2	1.6	8.7	84.1	1.1	10.4	2.2	1.7	17.5	2.1	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.2	33.1	11.3	8.9	36.5	10.9	9.2	22.5	14.4	12.9	19.5	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	76.9	121.7	35.5	65.8	133.1	30.7	72.0	54.3	36.3	72.3	35.7	22.5
LnGrp LOS	E	F	D	E	F	C	E	D	D	E	D	C
Approach Vol, veh/h	1563				1652				2094			
Approach Delay, s/veh	98.4				103.3				53.9			
Approach LOS	F				F				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.1	51.9	18.1	36.9	18.1	56.9	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	18.3	35.8	13.1	32.9	13.4	32.9	12.5	34.0				
Green Ext Time (p_c), s	0.2	8.8	0.5	0.0	0.2	15.2	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	70.1											
HCM 7th LOS	E											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	955	260	285	1015	270	290	1370	330	420	1435	285
Future Volume (veh/h)	270	955	260	285	1015	270	290	1370	330	420	1435	285
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	284	1005	274	300	1068	284	305	1442	347	442	1511	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	332	890	544	360	921	616	363	1899	725	493	2103	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.24	0.24	0.10	0.25	0.25	0.03	0.12	0.12	0.14	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	76.9	121.7	35.5	65.8	133.1	30.7	72.0	54.3	36.3	72.3	35.7	22.5
Ln Grp LOS	E	F	D	E	F	C	E	D	D	E	D	C
Approach Vol, veh/h	1563			1652			2094			2253		
Approach Delay, s/veh	98.4			103.3			53.9			41.1		
Approach LOS	F			F			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	23.1	51.9	18.1	36.9	18.1	56.9	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.8				
Max Q Clear (g_c+I1), s	18.3	35.8	13.1	32.9	13.4	32.9	12.5	34.0				
Green Ext Time (g_e), s	0.2	8.8	0.5	0.0	0.2	15.2	0.0	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	0.30	1.00	1.00	1.00	0.97	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		3456		3456					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5375		3741		5375		3741				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	442	0	300	0	305	0	284	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	16.3	0.0	11.1	0.0	11.4	0.0	10.5	0.0
Cycle Q Clear Time (g_c), s	16.3	0.0	11.1	0.0	11.4	0.0	10.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	493	0	360	0	363	0	332	0
V/C Ratio (X)	0.90	0.00	0.83	0.00	0.84	0.00	0.85	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.76	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.8	0.0	57.1	0.0	61.7	0.0	57.9	0.0
Incr Delay (d2), s/veh	17.5	0.0	8.7	0.0	10.4	0.0	19.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	72.3	0.0	65.8	0.0	72.0	0.0	76.9	0.0
1st-Term Q (Q1), veh/ln	7.0	0.0	4.8	0.0	5.3	0.0	4.5	0.0
2nd-Term Q (Q2), veh/ln	1.2	0.0	0.4	0.0	0.5	0.0	0.9	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.57	0.00	1.72	0.00	1.59	0.00	1.71	0.00
%ile Back of Q (95%), veh/ln	12.9	0.0	8.9	0.0	9.2	0.0	9.2	0.0
%ile Storage Ratio (RQ%)	1.77	0.00	1.23	0.00	0.78	0.00	1.46	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1442	0	1005	0	1511	0	1068
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	33.8	0.0	30.9	0.0	30.9	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	33.8	0.0	30.9	0.0	30.9	0.0	32.0
Lane Grp Cap (c), veh/h	0	1899	0	890	0	2103	0	921
V/C Ratio (X)	0.00	0.76	0.00	1.13	0.00	0.72	0.00	1.16
Avail Cap (c_a), veh/h	0	1899	0	890	0	2103	0	921
Upstream Filter (I)	0.00	0.76	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	52.1	0.0	49.5	0.0	33.5	0.0	49.0
Incr Delay (d2), s/veh	0.0	2.2	0.0	72.2	0.0	2.1	0.0	84.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	54.3	0.0	121.7	0.0	35.7	0.0	133.1
1st-Term Q (Q1), veh/ln	0.0	16.2	0.0	14.1	0.0	13.1	0.0	14.6

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	8.9	0.0	0.4	0.0	10.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.35	0.00	1.44	0.00	1.45	0.00	1.44
%ile Back of Q (95%), veh/ln	0.0	22.5	0.0	33.1	0.0	19.5	0.0	36.5
%ile Storage Ratio (RQ%)	0.00	0.42	0.00	1.92	0.00	0.52	0.00	0.62
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	28.7	0.0	0.0	0.0	36.8
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	347	0	274	0	300	0	284
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	22.7	0.0	17.9	0.0	15.6	0.0	17.3
Cycle Q Clear Time (g_c), s	0.0	22.7	0.0	17.9	0.0	15.6	0.0	17.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	13.6	0.0	13.6	0.0	12.5	0.0	18.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	725	0	544	0	773	0	616
V/C Ratio (X)	0.00	0.48	0.00	0.50	0.00	0.39	0.00	0.46
Avail Cap (c_a), veh/h	0	725	0	544	0	773	0	616
Upstream Filter (I)	0.00	0.76	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	34.5	0.0	33.9	0.0	21.1	0.0	29.6
Incr Delay (d2), s/veh	0.0	1.7	0.0	1.6	0.0	1.5	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.3	0.0	35.5	0.0	22.5	0.0	30.7
1st-Term Q (Q1), veh/ln	0.0	9.6	0.0	6.8	0.0	5.6	0.0	6.5
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.2	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.45	0.00	1.62	0.00	1.67	0.00	1.63
%ile Back of Q (95%), veh/ln	0.0	14.4	0.0	11.3	0.0	9.9	0.0	10.9
%ile Storage Ratio (RQ%)	0.00	2.16	0.00	0.66	0.00	1.87	0.00	0.60
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	70.1
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	1	185	5	1	50	230	1945	35	60	1935	90
Future Volume (veh/h)	35	1	185	5	1	50	230	1945	35	60	1935	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	37	1	195	5	1	53	242	2047	37	63	2037	95
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	259	350	193	3	172	271	3580	65	198	3119	145
Arrive On Green	0.02	0.13	0.13	0.00	0.11	0.11	0.09	0.69	0.69	0.01	0.21	0.21
Sat Flow, veh/h	1781	1969	1547	1781	29	1560	1781	5164	93	1781	5000	232
Grp Volume(v), veh/h	37	1	195	5	0	54	242	1349	735	63	1385	747
Grp Sat Flow(s),veh/h/ln	1781	1969	1547	1781	0	1590	1781	1702	1854	1781	1702	1829
Q Serve(g_s), s	2.4	0.1	14.5	0.3	0.0	4.1	9.9	26.2	26.2	1.7	48.5	48.8
Cycle Q Clear(g_c), s	2.4	0.1	14.5	0.3	0.0	4.1	9.9	26.2	26.2	1.7	48.5	48.8
Prop In Lane	1.00		1.00	1.00		0.98	1.00		0.05	1.00		0.13
Lane Grp Cap(c), veh/h	206	259	350	193	0	175	271	2360	1285	198	2124	1141
V/C Ratio(X)	0.18	0.00	0.56	0.03	0.00	0.31	0.89	0.57	0.57	0.32	0.65	0.66
Avail Cap(c_a), veh/h	415	333	409	385	0	220	411	2360	1285	242	2124	1141
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.65	0.65	0.65
Uniform Delay (d), s/veh	48.7	49.1	44.5	51.2	0.0	53.3	37.9	10.1	10.1	10.1	38.7	38.8
Incr Delay (d2), s/veh	0.4	0.0	2.9	0.1	0.0	2.1	14.9	1.0	1.9	0.6	1.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	0.1	9.9	0.3	0.0	3.1	13.5	13.6	15.0	1.2	28.7	31.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.1	49.1	47.5	51.2	0.0	55.4	52.8	11.1	12.0	10.7	39.7	40.7
LnGrp LOS	D	D	D	D		E	D	B	B	B	D	D
Approach Vol, veh/h	233			59			2326			2195		
Approach Delay, s/veh	47.7			55.0			15.7			39.2		
Approach LOS	D			E			B			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	96.1	4.0	23.1	15.8	87.1	6.7	20.3				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Q Clear Time (g_c+I1), s	13.7	28.2	2.3	16.5	11.9	50.8	4.4	6.1				
Green Ext Time (p_c), s	0.0	37.9	0.0	0.6	0.5	1.2	0.0	0.3				

Intersection Summary

HCM 7th Control Delay, s/veh	28.5
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	1	185	5	1	50	230	1945	35	60	1935	90
Future Volume (veh/h)	35	1	185	5	1	50	230	1945	35	60	1935	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	37	1	195	5	1	53	242	2047	37	63	2037	95
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	206	259	350	193	3	172	271	3580	65	198	3119	145
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Prop Arrive On Green	0.02	0.13	0.13	0.00	0.11	0.11	0.09	0.69	0.69	0.01	0.21	0.21
Unsig. Movement Delay												
Ln Grp Delay, s/veh	49.1	49.1	47.5	51.2	0.0	55.4	52.8	11.1	12.0	10.7	39.7	40.7
Ln Grp LOS	D	D	D	D		E	D	B	B	B	D	D
Approach Vol, veh/h	233				59				2326			
Approach Delay, s/veh	47.7				55.0				15.7			
Approach LOS	D				E				B			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	1.1	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	6.8	96.1	4.0	23.1	15.8	87.1	6.7	20.3				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	3.7	28.2	2.3	16.5	11.9	50.8	4.4	6.1				
Green Ext Time (g_e), s	0.0	37.9	0.0	0.6	0.5	1.2	0.0	0.3				
Prob of Phs Call (p_c)	0.90	1.00	0.17	1.00	1.00	1.00	0.74	1.00				
Prob of Max Out (p_x)	1.00	0.95	0.00	1.00	0.01	1.00	0.00	0.09				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1781		1781		1781		1781					
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5164			1969			5000			29		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	93			1547			232			1560		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	63	0	5	0	242	0	37	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1781	0	1781	0
Q Serve Time (g_s), s	1.7	0.0	0.3	0.0	9.9	0.0	2.4	0.0
Cycle Q Clear Time (g_c), s	1.7	0.0	0.3	0.0	9.9	0.0	2.4	0.0
Perm LT Sat Flow (s_l), veh/h/ln	198	0	1187	0	189	0	1350	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	81.1	0.0	14.3	0.0	83.1	0.0	15.6	0.0
Perm LT Serve Time (g_u), s	63.9	0.0	14.3	0.0	32.3	0.0	10.3	0.0
Perm LT Q Serve Time (g_ps), s	8.2	0.0	0.0	0.0	32.3	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	198	0	193	0	271	0	206	0
V/C Ratio (X)	0.32	0.00	0.03	0.00	0.89	0.00	0.18	0.00
Avail Cap (c_a), veh/h	242	0	385	0	411	0	415	0
Upstream Filter (I)	0.65	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	10.1	0.0	51.2	0.0	37.9	0.0	48.7	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.0	14.9	0.0	0.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	10.7	0.0	51.2	0.0	52.8	0.0	49.1	0.0
1st-Term Q (Q1), veh/ln	0.6	0.0	0.1	0.0	7.6	0.0	1.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.56	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.2	0.0	0.3	0.0	13.5	0.0	1.9	0.0
%ile Storage Ratio (RQ%)	0.11	0.00	0.02	0.00	1.06	0.00	0.90	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1349	0	1	0	1385	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	26.2	0.0	0.1	0.0	48.5	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	26.2	0.0	0.1	0.0	48.5	0.0	0.0
Lane Grp Cap (c), veh/h	0	2360	0	259	0	2124	0	0
V/C Ratio (X)	0.00	0.57	0.00	0.00	0.00	0.65	0.00	0.00
Avail Cap (c_a), veh/h	0	2360	0	333	0	2124	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.65	0.00	0.00
Uniform Delay (d1), s/veh	0.0	10.1	0.0	49.1	0.0	38.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	11.1	0.0	49.1	0.0	39.7	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	8.4	0.0	0.0	0.0	22.1	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.56	0.00	1.80	0.00	1.28	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	13.6	0.0	0.1	0.0	28.7	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.19	0.00	0.01	0.00	0.54	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	735	0	195	0	747	0	54
Grp Sat Flow (s), veh/h/ln	0	1854	0	1547	0	1829	0	1590
Q Serve Time (g_s), s	0.0	26.2	0.0	14.5	0.0	48.8	0.0	4.1
Cycle Q Clear Time (g_c), s	0.0	26.2	0.0	14.5	0.0	48.8	0.0	4.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1547.4	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	12.3	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.05	0.00	1.00	0.00	0.13	0.00	0.98
Lane Grp Cap (c), veh/h	0	1285	0	350	0	1141	0	175
V/C Ratio (X)	0.00	0.57	0.00	0.56	0.00	0.66	0.00	0.31
Avail Cap (c_a), veh/h	0	1285	0	409	0	1141	0	220
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.65	0.00	1.00
Uniform Delay (d1), s/veh	0.0	10.1	0.0	44.5	0.0	38.8	0.0	53.3
Incr Delay (d2), s/veh	0.0	1.9	0.0	2.9	0.0	1.9	0.0	2.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	12.0	0.0	47.5	0.0	40.7	0.0	55.4
1st-Term Q (Q1), veh/ln	0.0	9.2	0.0	5.6	0.0	23.9	0.0	1.6
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.3	0.0	0.6	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.52	0.00	1.68	0.00	1.27	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	15.0	0.0	9.9	0.0	31.0	0.0	3.1
%ile Storage Ratio (RQ%)	0.00	0.21	0.00	2.49	0.00	0.58	0.00	0.25
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	28.5
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2050) Traffic Volumes
PM Peak Hour

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	T	
Traffic Vol, veh/h	155	1	130	190	1	65
Future Vol, veh/h	155	1	130	190	1	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	163	1	137	200	1	68
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	537	82
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1412	-	474	961
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	425	961
Mov Cap-2 Maneuver	-	-	-	-	425	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	598	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		3.38		9.12	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	943	-	-	1333	-	
HCM Lane V/C Ratio	0.074	-	-	0.097	-	
HCM Control Delay (s/veh)	9.1	-	-	7.8	0.3	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.3	-	

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	W	
Traffic Vol, veh/h	155	1	1	190	1	1
Future Vol, veh/h	155	1	1	190	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	163	1	1	200	1	1

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	164	0	266	82
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	102	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1412	-	701	961
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1412	-	700	961
Mov Cap-2 Maneuver	-	-	-	-	700	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	910	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.05	9.45
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	810	-	-	19	-
HCM Lane V/C Ratio	0.003	-	-	0.001	-
HCM Control Delay (s/veh)	9.5	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	805	150	430	880	215	280	130	455	190	170	245
Future Volume (veh/h)	240	805	150	430	880	215	280	130	455	190	170	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	253	847	158	453	926	226	295	137	479	200	179	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1247	722	511	1283	543	361	485	624	389	478	632
Arrive On Green	0.16	0.35	0.35	0.15	0.34	0.34	0.10	0.25	0.25	0.10	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	253	847	158	453	926	226	295	137	479	200	179	258
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	18.2	26.4	7.8	16.7	28.1	14.2	10.9	7.3	32.0	10.8	9.8	15.2
Cycle Q Clear(g_c), s	18.2	26.4	7.8	16.7	28.1	14.2	10.9	7.3	32.0	10.8	9.8	15.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	278	1247	722	511	1283	543	361	485	624	389	478	632
V/C Ratio(X)	0.91	0.68	0.22	0.89	0.72	0.42	0.82	0.28	0.77	0.51	0.37	0.41
Avail Cap(c_a), veh/h	295	1247	722	572	1283	543	598	485	624	517	485	637
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	35.9	21.4	54.3	37.3	32.7	57.0	39.7	34.2	31.7	41.0	28.1
Incr Delay (d2), s/veh	29.7	3.0	0.7	14.5	3.5	2.3	4.6	0.7	6.7	1.1	1.0	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.5	17.3	5.5	12.9	19.1	9.8	8.6	6.6	20.4	8.4	8.6	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.7	38.9	22.1	68.9	40.8	35.1	61.6	40.4	40.9	32.8	42.0	29.0
LnGrp LOS	F	D	C	E	D	D	E	D	D	C	D	C
Approach Vol, veh/h	1258			1605			911			637		
Approach Delay, s/veh	45.8			47.9			47.5			33.8		
Approach LOS	D			D			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.7	51.6	17.1	37.6	24.8	50.6	16.7	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	18.7	28.4	12.9	17.2	20.2	30.1	12.8	34.0				
Green Ext Time (p_c), s	0.5	4.6	0.7	3.3	0.1	3.5	0.4	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh				45.2								
HCM 7th LOS				D								

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	805	150	430	880	215	280	130	455	190	170	245
Future Volume (veh/h)	240	805	150	430	880	215	280	130	455	190	170	245
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	253	847	158	453	926	226	295	137	479	200	179	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	278	1247	722	511	1283	543	361	485	624	389	478	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.16	0.35	0.35	0.15	0.34	0.34	0.10	0.25	0.25	0.10	0.24	0.24
Unsig. Movement Delay												
Ln Grp Delay, s/veh	83.7	38.9	22.1	68.9	40.8	35.1	61.6	40.4	40.9	32.8	42.0	29.0
Ln Grp LOS	F	D	C	E	D	D	E	D	D	C	D	C
Approach Vol, veh/h	1258			1605			911			637		
Approach Delay, s/veh	45.8			47.9			47.5			33.8		
Approach LOS	D			D			D			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	23.7	51.6	17.1	37.6	24.8	50.6	16.7	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.8	6.5	3.7	8.8	3.8	6.3				
Max Q Clear (g_c+I1), s	18.7	28.4	12.9	17.2	20.2	30.1	12.8	34.0				
Green Ext Time (g_e), s	0.5	4.6	0.7	3.3	0.1	3.5	0.4	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	0.02	0.20	1.00	1.00	0.01	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		1781		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3554		1969		3741		1969				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	453	0	295	0	253	0	200	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	16.7	0.0	10.9	0.0	18.2	0.0	10.8	0.0
Cycle Q Clear Time (g_c), s	16.7	0.0	10.9	0.0	18.2	0.0	10.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	807	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	31.6	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	24.7	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	511	0	361	0	278	0	389	0
V/C Ratio (X)	0.89	0.00	0.82	0.00	0.91	0.00	0.51	0.00
Avail Cap (c_a), veh/h	572	0	598	0	295	0	517	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.3	0.0	57.0	0.0	54.0	0.0	31.7	0.0
Incr Delay (d2), s/veh	14.5	0.0	4.6	0.0	29.7	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	68.9	0.0	61.6	0.0	83.7	0.0	32.8	0.0
1st-Term Q (Q1), veh/ln	7.2	0.0	4.8	0.0	8.0	0.0	4.7	0.0
2nd-Term Q (Q2), veh/ln	1.0	0.0	0.2	0.0	2.3	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.57	0.00	1.73	0.00	1.51	0.00	1.75	0.00
%ile Back of Q (95%), veh/ln	12.9	0.0	8.6	0.0	15.5	0.0	8.4	0.0
%ile Storage Ratio (RQ%)	0.82	0.00	0.88	0.00	1.46	0.00	1.29	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	847	0	179	0	926	0	137
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	26.4	0.0	9.8	0.0	28.1	0.0	7.3
Cycle Q Clear Time (g_c), s	0.0	26.4	0.0	9.8	0.0	28.1	0.0	7.3
Lane Grp Cap (c), veh/h	0	1247	0	478	0	1283	0	485
V/C Ratio (X)	0.00	0.68	0.00	0.37	0.00	0.72	0.00	0.28
Avail Cap (c_a), veh/h	0	1247	0	485	0	1283	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	35.9	0.0	41.0	0.0	37.3	0.0	39.7
Incr Delay (d2), s/veh	0.0	3.0	0.0	1.0	0.0	3.5	0.0	0.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	38.9	0.0	42.0	0.0	40.8	0.0	40.4
1st-Term Q (Q1), veh/ln	0.0	11.2	0.0	4.8	0.0	12.6	0.0	3.6

HCM 7th Signalized Intersection Capacity Analysis 100: Ravinia Avenue & 159th Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.1	0.0	0.6	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.74	0.00	1.45	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	17.3	0.0	8.6	0.0	19.1	0.0	6.6
%ile Storage Ratio (RQ%)	0.00	0.36	0.00	0.48	0.00	0.65	0.00	0.17
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	158	0	258	0	226	0	479
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	7.8	0.0	15.2	0.0	14.2	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	7.8	0.0	15.2	0.0	14.2	0.0	32.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	13.6	0.0	20.3	0.0	0.0	0.0	19.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	722	0	632	0	543	0	624
V/C Ratio (X)	0.00	0.22	0.00	0.41	0.00	0.42	0.00	0.77
Avail Cap (c_a), veh/h	0	722	0	637	0	543	0	624
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	21.4	0.0	28.1	0.0	32.7	0.0	34.2
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.9	0.0	2.3	0.0	6.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.1	0.0	29.0	0.0	35.1	0.0	40.9
1st-Term Q (Q1), veh/ln	0.0	2.9	0.0	5.8	0.0	5.5	0.0	13.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.2	0.0	0.4	0.0	1.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.67	0.00	1.68	0.00	1.44
%ile Back of Q (95%), veh/ln	0.0	5.5	0.0	10.0	0.0	9.8	0.0	20.4
%ile Storage Ratio (RQ%)	0.00	0.76	0.00	1.53	0.00	1.25	0.00	0.53
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	45.2
HCM 7th LOS	D

Intersection						
Int Delay, s/veh	30.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	1335	1310	185	70	165
Future Vol, veh/h	115	1335	1310	185	70	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	180	-	-	175	-	90
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	1405	1379	195	74	174

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1379	0	0 2324 689
Stage 1	-	-	- 1379 -
Stage 2	-	-	- 945 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	493	-	- ~ 31 388
Stage 1	-	-	- 199 -
Stage 2	-	-	- 338 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	493	-	- ~ 24 388
Mov Cap-2 Maneuver	-	-	- ~ 24 -
Stage 1	-	-	- 150 -
Stage 2	-	-	- 338 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.16	0	\$ 401.55
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	493	-	-	-	24	388
HCM Lane V/C Ratio	0.246	-	-	-	3.117	0.448
HCM Control Delay (s/veh)	14.7	-	-	-	\$ 1297.2	21.6
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	1	-	-	-	9.2	2.2

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	370	810	225	265	855	410	255	1655	320	480	1350	330
Future Volume (veh/h)	370	810	225	265	855	410	255	1655	320	480	1350	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	389	853	237	279	900	432	268	1742	337	505	1421	347
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	940	552	341	921	649	334	1749	672	564	2105	785
Arrive On Green	0.10	0.25	0.25	0.10	0.25	0.25	0.03	0.11	0.11	0.16	0.39	0.39
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	389	853	237	279	900	432	268	1742	337	505	1421	347
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	13.5	28.8	14.9	10.3	31.0	28.8	10.0	42.1	22.7	18.6	28.4	18.4
Cycle Q Clear(g_c), s	13.5	28.8	14.9	10.3	31.0	28.8	10.0	42.1	22.7	18.6	28.4	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	359	940	552	341	921	649	334	1749	672	564	2105	785
V/C Ratio(X)	1.08	0.91	0.43	0.82	0.98	0.67	0.80	1.00	0.50	0.90	0.68	0.44
Avail Cap(c_a), veh/h	359	940	552	518	921	649	545	1749	672	625	2105	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	47.2	32.5	57.4	48.6	31.2	61.7	57.9	37.2	53.3	32.7	21.2
Incr Delay (d2), s/veh	71.8	12.9	1.1	6.1	24.3	3.5	3.3	17.5	1.9	14.7	1.8	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.9	21.1	9.7	8.3	24.1	16.8	7.8	29.8	14.4	14.0	18.1	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	130.1	60.1	33.6	63.5	73.0	34.7	65.0	75.4	39.1	68.0	34.5	23.0
LnGrp LOS	F	E	C	E	E	C	E	E	D	E	C	C
Approach Vol, veh/h	1479			1611			2347			2273		
Approach Delay, s/veh	74.3			61.1			69.0			40.2		
Approach LOS	E			E			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.7	48.3	17.3	38.7	17.1	56.9	18.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Q Clear Time (g_c+I1), s	20.6	44.1	12.3	30.8	12.0	30.4	15.5	33.0				
Green Ext Time (p_c), s	0.6	0.0	0.5	0.0	0.6	11.9	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	59.9											
HCM 7th LOS	E											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	370	810	225	265	855	410	255	1655	320	480	1350	330
Future Volume (veh/h)	370	810	225	265	855	410	255	1655	320	480	1350	330
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	389	853	237	279	900	432	268	1742	337	505	1421	347
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	359	940	552	341	921	649	334	1749	672	564	2105	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.25	0.25	0.10	0.25	0.25	0.03	0.11	0.11	0.16	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	130.1	60.1	33.6	63.5	73.0	34.7	65.0	75.4	39.1	68.0	34.5	23.0
Ln Grp LOS	F	E	C	E	E	C	E	E	D	E	C	C
Approach Vol, veh/h	1479			1611			2347			2273		
Approach Delay, s/veh	74.3			61.1			69.0			40.2		
Approach LOS	E			E			E			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	25.7	48.3	17.3	38.7	17.1	56.9	18.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	23.5	40.0	19.5	26.0	20.5	43.0	13.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.7				
Max Q Clear (g_c+I1), s	20.6	44.1	12.3	30.8	12.0	30.4	15.5	33.0				
Green Ext Time (g_e), s	0.6	0.0	0.5	0.0	0.6	11.9	0.0	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	0.08	1.00	0.03	0.98	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		3456		3456					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5375		3741		5375		3741				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	505	0	279	0	268	0	389	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	18.6	0.0	10.3	0.0	10.0	0.0	13.5	0.0
Cycle Q Clear Time (g_c), s	18.6	0.0	10.3	0.0	10.0	0.0	13.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	564	0	341	0	334	0	359	0
V/C Ratio (X)	0.90	0.00	0.82	0.00	0.80	0.00	1.08	0.00
Avail Cap (c_a), veh/h	625	0	518	0	545	0	359	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.73	0.00	1.00	0.00
Uniform Delay (d1), s/veh	53.3	0.0	57.4	0.0	61.7	0.0	58.2	0.0
Incr Delay (d2), s/veh	14.7	0.0	6.1	0.0	3.3	0.0	71.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	68.0	0.0	63.5	0.0	65.0	0.0	130.1	0.0
1st-Term Q (Q1), veh/ln	7.9	0.0	4.4	0.0	4.6	0.0	5.8	0.0
2nd-Term Q (Q2), veh/ln	1.1	0.0	0.3	0.0	0.2	0.0	3.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.54	0.00	1.76	0.00	1.64	0.00	1.58	0.00
%ile Back of Q (95%), veh/ln	14.0	0.0	8.3	0.0	7.8	0.0	14.9	0.0
%ile Storage Ratio (RQ%)	1.93	0.00	1.14	0.00	0.66	0.00	2.36	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1742	0	853	0	1421	0	900
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	42.1	0.0	28.8	0.0	28.4	0.0	31.0
Cycle Q Clear Time (g_c), s	0.0	42.1	0.0	28.8	0.0	28.4	0.0	31.0
Lane Grp Cap (c), veh/h	0	1749	0	940	0	2105	0	921
V/C Ratio (X)	0.00	1.00	0.00	0.91	0.00	0.68	0.00	0.98
Avail Cap (c_a), veh/h	0	1749	0	940	0	2105	0	921
Upstream Filter (I)	0.00	0.73	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	57.9	0.0	47.2	0.0	32.7	0.0	48.6
Incr Delay (d2), s/veh	0.0	17.5	0.0	12.9	0.0	1.8	0.0	24.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	75.4	0.0	60.1	0.0	34.5	0.0	73.0
1st-Term Q (Q1), veh/ln	0.0	20.3	0.0	13.1	0.0	12.0	0.0	14.1

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	2.8	0.0	1.7	0.0	0.3	0.0	3.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.29	0.00	1.43	0.00	1.47	0.00	1.39
%ile Back of Q (95%), veh/ln	0.0	29.8	0.0	21.1	0.0	18.1	0.0	24.1
%ile Storage Ratio (RQ%)	0.00	0.56	0.00	1.22	0.00	0.48	0.00	0.41
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	337	0	237	0	347	0	432
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	22.7	0.0	14.9	0.0	18.4	0.0	28.8
Cycle Q Clear Time (g_c), s	0.0	22.7	0.0	14.9	0.0	18.4	0.0	28.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	12.8	0.0	12.6	0.0	13.5	0.0	21.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	672	0	552	0	785	0	649
V/C Ratio (X)	0.00	0.50	0.00	0.43	0.00	0.44	0.00	0.67
Avail Cap (c_a), veh/h	0	672	0	552	0	785	0	649
Upstream Filter (I)	0.00	0.73	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	37.2	0.0	32.5	0.0	21.2	0.0	31.2
Incr Delay (d2), s/veh	0.0	1.9	0.0	1.1	0.0	1.8	0.0	3.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	39.1	0.0	33.6	0.0	23.0	0.0	34.7
1st-Term Q (Q1), veh/ln	0.0	9.6	0.0	5.6	0.0	6.6	0.0	10.7
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.2	0.0	0.4	0.0	0.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.44	0.00	1.68	0.00	1.62	0.00	1.49
%ile Back of Q (95%), veh/ln	0.0	14.4	0.0	9.7	0.0	11.3	0.0	16.8
%ile Storage Ratio (RQ%)	0.00	2.14	0.00	0.57	0.00	2.13	0.00	0.93
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	59.9
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
SAT Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1	185	1	1	30	210	2050	30	40	1780	45
Future Volume (veh/h)	25	1	185	1	1	30	210	2050	30	40	1780	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	26	1	195	1	1	32	221	2158	32	42	1874	47
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Cap, veh/h	223	265	305	197	6	183	310	3629	54	174	3385	85
Arrive On Green	0.02	0.13	0.13	0.00	0.12	0.12	0.06	0.70	0.70	0.04	1.00	1.00
Sat Flow, veh/h	1781	1969	1585	1781	48	1544	1767	5184	77	1767	5123	128
Grp Volume(v), veh/h	26	1	195	1	0	33	221	1416	774	42	1245	676
Grp Sat Flow(s),veh/h/ln	1781	1969	1585	1781	0	1592	1767	1702	1857	1767	1702	1847
Q Serve(g_s), s	1.7	0.1	14.7	0.1	0.0	2.4	4.9	27.8	27.9	1.0	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.1	14.7	0.1	0.0	2.4	4.9	27.8	27.9	1.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.97	1.00		0.04	1.00		0.07
Lane Grp Cap(c), veh/h	223	265	305	197	0	188	310	2383	1300	174	2249	1221
V/C Ratio(X)	0.12	0.00	0.64	0.01	0.00	0.18	0.71	0.59	0.60	0.24	0.55	0.55
Avail Cap(c_a), veh/h	446	379	396	353	0	220	541	2383	1300	230	2249	1221
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.69	0.69	0.69
Uniform Delay (d), s/veh	48.8	48.7	48.4	50.5	0.0	51.6	5.6	10.0	10.0	9.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	4.7	0.0	0.0	0.9	3.1	1.1	2.0	0.5	0.7	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.4	0.1	10.3	0.1	0.0	1.8	3.2	14.1	15.6	0.7	0.4	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.0	48.7	53.1	50.5	0.0	52.5	8.7	11.1	12.0	9.8	0.7	1.3
LnGrp LOS	D	D	D	D		D	A	B	B	A	A	A
Approach Vol, veh/h	222			34			2411			1963		
Approach Delay, s/veh	52.6			52.5			11.2			1.1		
Approach LOS	D			D			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	97.0	3.6	23.5	11.0	91.9	5.7	21.4				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Q Clear Time (g_c+I), s	13.0	29.9	2.1	16.7	6.9	2.0	3.7	4.4				
Green Ext Time (p_c), s	0.0	36.9	0.0	0.8	0.5	44.3	0.0	0.1				

Intersection Summary

HCM 7th Control Delay, s/veh 9.2
HCM 7th LOS A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1	185	1	1	30	210	2050	30	40	1780	45
Future Volume (veh/h)	25	1	185	1	1	30	210	2050	30	40	1780	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	26	1	195	1	1	32	221	2158	32	42	1874	47
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	223	265	305	197	6	183	310	3629	54	174	3385	85
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Prop Arrive On Green	0.02	0.13	0.13	0.00	0.12	0.12	0.06	0.70	0.70	0.04	1.00	1.00
Unsig. Movement Delay												
Ln Grp Delay, s/veh	49.0	48.7	53.1	50.5	0.0	52.5	8.7	11.1	12.0	9.8	0.7	1.3
Ln Grp LOS	D	D	D	D		D	A	B	B	A	A	A
Approach Vol, veh/h	222				34				2411			
Approach Delay, s/veh	52.6				52.5				11.2			
Approach LOS	D				D				B			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	1.1	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	5.9	97.0	3.6	23.5	11.0	91.9	5.7	21.4				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	3.0	29.9	2.1	16.7	6.9	2.0	3.7	4.4				
Green Ext Time (g_e), s	0.0	36.9	0.0	0.8	0.5	44.3	0.0	0.1				
Prob of Phs Call (p_c)	0.78	1.00	0.04	1.00	1.00	1.00	0.61	1.00				
Prob of Max Out (p_x)	1.00	0.96	0.00	0.41	0.00	0.90	0.00	0.02				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1767		1781		1767		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5184		1969		5123		48				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		77		1585		128		1544				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	42	0	1	0	221	0	26	0
Grp Sat Flow (s), veh/h/ln	1767	0	1781	0	1767	0	1781	0
Q Serve Time (g_s), s	1.0	0.0	0.1	0.0	4.9	0.0	1.7	0.0
Cycle Q Clear Time (g_c), s	1.0	0.0	0.1	0.0	4.9	0.0	1.7	0.0
Perm LT Sat Flow (s_l), veh/h/ln	177	0	1187	0	231	0	1376	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	85.9	0.0	15.4	0.0	87.9	0.0	16.0	0.0
Perm LT Serve Time (g_u), s	63.1	0.0	15.4	0.0	85.9	0.0	13.0	0.0
Perm LT Q Serve Time (g_ps), s	6.9	0.0	0.0	0.0	45.3	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	174	0	197	0	310	0	223	0
V/C Ratio (X)	0.24	0.00	0.01	0.00	0.71	0.00	0.12	0.00
Avail Cap (c_a), veh/h	230	0	353	0	541	0	446	0
Upstream Filter (I)	0.69	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	9.3	0.0	50.5	0.0	5.6	0.0	48.8	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	3.1	0.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	9.8	0.0	50.5	0.0	8.7	0.0	49.0	0.0
1st-Term Q (Q1), veh/ln	0.3	0.0	0.0	0.0	1.5	0.0	0.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	0.7	0.0	0.1	0.0	3.2	0.0	1.4	0.0
%ile Storage Ratio (RQ%)	0.06	0.00	0.00	0.00	0.25	0.00	0.63	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1416	0	1	0	1245	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	27.8	0.0	0.1	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	27.8	0.0	0.1	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	2383	0	265	0	2249	0	0
V/C Ratio (X)	0.00	0.59	0.00	0.00	0.00	0.55	0.00	0.00
Avail Cap (c_a), veh/h	0	2383	0	379	0	2249	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.69	0.00	0.00
Uniform Delay (d1), s/veh	0.0	10.0	0.0	48.7	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.0	0.0	0.7	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	11.1	0.0	48.7	0.0	0.7	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.2	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.54	0.00	1.80	0.00	1.80	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	14.1	0.0	0.1	0.0	0.4	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.20	0.00	0.01	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	774	0	195	0	676	0	33
Grp Sat Flow (s), veh/h/ln	0	1857	0	1585	0	1847	0	1592
Q Serve Time (g_s), s	0.0	27.9	0.0	14.7	0.0	0.0	0.0	2.4
Cycle Q Clear Time (g_c), s	0.0	27.9	0.0	14.7	0.0	0.0	0.0	2.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.04	0.00	1.00	0.00	0.07	0.00	0.97
Lane Grp Cap (c), veh/h	0	1300	0	305	0	1221	0	188
V/C Ratio (X)	0.00	0.60	0.00	0.64	0.00	0.55	0.00	0.18
Avail Cap (c_a), veh/h	0	1300	0	396	0	1221	0	220
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.69	0.00	1.00
Uniform Delay (d1), s/veh	0.0	10.0	0.0	48.4	0.0	0.0	0.0	51.6
Incr Delay (d2), s/veh	0.0	2.0	0.0	4.7	0.0	1.3	0.0	0.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	12.0	0.0	53.1	0.0	1.3	0.0	52.5
1st-Term Q (Q1), veh/ln	0.0	9.6	0.0	5.8	0.0	0.0	0.0	1.0
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.4	0.0	0.4	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.51	0.00	1.66	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	15.6	0.0	10.3	0.0	0.8	0.0	1.8
%ile Storage Ratio (RQ%)	0.00	0.22	0.00	2.55	0.00	0.01	0.00	0.15
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	9.2
HCM 7th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
500: East Access & 161st Street

No-Build (2050) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	T	
Traffic Vol, veh/h	165	1	60	195	1	45
Future Vol, veh/h	165	1	60	195	1	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	1	63	205	1	47
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	175	0	403	87
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1399	-	575	954
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1399	-	548	954
Mov Cap-2 Maneuver	-	-	-	-	548	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	750	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		1.98		9.04	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	939	-	-	847	-	
HCM Lane V/C Ratio	0.052	-	-	0.045	-	
HCM Control Delay (s/veh)	9	-	-	7.7	0.2	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	W	
Traffic Vol, veh/h	150	1	10	185	1	15
Future Vol, veh/h	150	1	10	185	1	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	1	11	195	1	16

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	159	0	277	79
Stage 1	-	-	-	-	158	-
Stage 2	-	-	-	-	118	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1418	-	690	965
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	894	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1418	-	684	965
Mov Cap-2 Maneuver	-	-	-	-	684	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.44	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	941	-	-	185	-
HCM Lane V/C Ratio	0.018	-	-	0.007	-
HCM Control Delay (s/veh)	8.9	-	-	7.6	0.1
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

FUTURE (2050) BUILD CAPACITY REPORTS

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	770	90	40	795	215	130	15	65	140	10	100
Future Volume (veh/h)	150	770	90	40	795	215	130	15	65	140	10	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	158	811	95	42	837	226	137	16	68	147	11	105
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	2316	1126	76	2130	903	202	131	140	303	199	326
Arrive On Green	0.10	0.65	0.65	0.02	0.57	0.57	0.06	0.07	0.07	0.09	0.10	0.10
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	158	811	95	42	837	226	137	16	68	147	11	105
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	10.5	12.4	2.2	1.4	14.9	8.6	4.7	0.9	4.9	8.9	0.6	6.8
Cycle Q Clear(g_c), s	10.5	12.4	2.2	1.4	14.9	8.6	4.7	0.9	4.9	8.9	0.6	6.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	186	2316	1126	76	2130	903	202	131	140	303	199	326
V/C Ratio(X)	0.85	0.35	0.08	0.55	0.39	0.25	0.68	0.12	0.48	0.49	0.06	0.32
Avail Cap(c_a), veh/h	230	2316	1126	446	2130	903	619	394	352	457	394	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	9.4	5.4	58.1	14.3	13.0	55.4	52.7	52.1	44.4	48.7	40.6
Incr Delay (d2), s/veh	21.4	0.4	0.1	6.2	0.5	0.7	4.0	0.9	5.4	1.2	0.2	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	7.9	1.3	1.2	10.2	5.7	3.9	0.9	3.9	7.3	0.6	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.2	9.8	5.5	64.3	14.9	13.6	59.4	53.6	57.5	45.6	49.0	41.8
LnGrp LOS	E	A	A	E	B	B	E	D	E	D	D	D
Approach Vol, veh/h	1064				1105				221		263	
Approach Delay, s/veh	19.0				16.5				58.4		44.2	
Approach LOS	B				B				E		D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.1	84.2	10.5	18.1	17.0	74.3	14.7	14.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	3.4	14.4	6.7	8.8	12.5	16.9	10.9	6.9				
Green Ext Time (p_c), s	0.1	15.4	0.3	0.6	0.1	15.7	0.3	0.4				
Intersection Summary												
HCM 7th Control Delay, s/veh	23.7											
HCM 7th LOS	C											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	770	90	40	795	215	130	15	65	140	10	100
Future Volume (veh/h)	150	770	90	40	795	215	130	15	65	140	10	100
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	158	811	95	42	837	226	137	16	68	147	11	105
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	186	2316	1126	76	2130	903	202	131	140	303	199	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.65	0.65	0.02	0.57	0.57	0.06	0.07	0.07	0.09	0.10	0.10
Unsig. Movement Delay												
Ln Grp Delay, s/veh	74.2	9.8	5.5	64.3	14.9	13.6	59.4	53.6	57.5	45.6	49.0	41.8
Ln Grp LOS	E	A	A	E	B	B	E	D	E	D	D	D
Approach Vol, veh/h		1064			1105			221			263	
Approach Delay, s/veh		19.0			16.5			58.4			44.2	
Approach LOS		B			B			E			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		7.1	84.2	10.5	18.1	17.0	74.3	14.7	14.0			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0			
Max Allow Headway (MAH), s		3.7	8.9	3.8	6.2	3.7	8.8	3.8	6.3			
Max Q Clear (g_c+I1), s		3.4	14.4	6.7	8.8	12.5	16.9	10.9	6.9			
Green Ext Time (g_e), s		0.1	15.4	0.3	0.6	0.1	15.7	0.3	0.4			
Prob of Phs Call (p_c)		0.75	1.00	1.00	1.00	0.99	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.00	0.58	0.00	0.01	1.00	0.72	0.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3456		3456		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3554		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1585		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	42	0	137	0	158	0	147	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	1.4	0.0	4.7	0.0	10.5	0.0	8.9	0.0
Cycle Q Clear Time (g_c), s	1.4	0.0	4.7	0.0	10.5	0.0	8.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1314	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	76	0	202	0	186	0	303	0
V/C Ratio (X)	0.55	0.00	0.68	0.00	0.85	0.00	0.49	0.00
Avail Cap (c_a), veh/h	446	0	619	0	230	0	457	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	58.1	0.0	55.4	0.0	52.8	0.0	44.4	0.0
Incr Delay (d2), s/veh	6.2	0.0	4.0	0.0	21.4	0.0	1.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.3	0.0	59.4	0.0	74.2	0.0	45.6	0.0
1st-Term Q (Q1), veh/ln	0.6	0.0	2.0	0.0	4.6	0.0	3.9	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.1	0.0	1.1	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.69	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	1.2	0.0	3.9	0.0	9.6	0.0	7.3	0.0
%ile Storage Ratio (RQ%)	0.08	0.00	0.31	0.00	0.90	0.00	1.12	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	811	0	11	0	837	0	16
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	12.4	0.0	0.6	0.0	14.9	0.0	0.9
Cycle Q Clear Time (g_c), s	0.0	12.4	0.0	0.6	0.0	14.9	0.0	0.9
Lane Grp Cap (c), veh/h	0	2316	0	199	0	2130	0	131
V/C Ratio (X)	0.00	0.35	0.00	0.06	0.00	0.39	0.00	0.12
Avail Cap (c_a), veh/h	0	2316	0	394	0	2130	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.4	0.0	48.7	0.0	14.3	0.0	52.7
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.2	0.0	0.5	0.0	0.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.8	0.0	49.0	0.0	14.9	0.0	53.6
1st-Term Q (Q1), veh/ln	0.0	4.3	0.0	0.3	0.0	5.9	0.0	0.5

HCM 7th Signalized Intersection Capacity Analysis 100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.78	0.00	1.80	0.00	1.66	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	7.9	0.0	0.6	0.0	10.2	0.0	0.9
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.03	0.00	0.29	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	95	0	105	0	226	0	68
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	2.2	0.0	6.8	0.0	8.6	0.0	4.9
Cycle Q Clear Time (g_c), s	0.0	2.2	0.0	6.8	0.0	8.6	0.0	4.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	7.0	0.0	12.5	0.0	0.0	0.0	2.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	1126	0	326	0	903	0	140
V/C Ratio (X)	0.00	0.08	0.00	0.32	0.00	0.25	0.00	0.48
Avail Cap (c_a), veh/h	0	1126	0	482	0	903	0	352
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	5.4	0.0	40.6	0.0	13.0	0.0	52.1
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.2	0.0	0.7	0.0	5.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.5	0.0	41.8	0.0	13.6	0.0	57.5
1st-Term Q (Q1), veh/ln	0.0	0.7	0.0	2.7	0.0	3.0	0.0	2.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.80	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	1.3	0.0	5.0	0.0	5.7	0.0	3.9
%ile Storage Ratio (RQ%)	0.00	0.18	0.00	0.77	0.00	0.73	0.00	0.10
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	23.7
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2050) Traffic Volumes
AM Peak Hour

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↗↗	↗		↗↗	↗			↗	↰		↗
Traffic Vol, veh/h	40	905	30	0	1015	40	0	0	25	5	0	45
Future Vol, veh/h	40	905	30	0	1015	40	0	0	25	5	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	953	32	0	1068	42	0	0	26	5	0	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1068	0	0	-	-	0	-	-	476	1629	-	534
Stage 1	-	-	-	-	-	-	-	-	-	1068	-	-
Stage 2	-	-	-	-	-	-	-	-	-	561	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	648	-	-	0	-	-	0	0	535	67	0	490
Stage 1	-	-	-	0	-	-	0	0	-	237	0	-
Stage 2	-	-	-	0	-	-	0	0	-	480	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	648	-	-	-	-	-	-	-	535	60	-	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	60	-	-
Stage 1	-	-	-	-	-	-	-	-	-	237	-	-
Stage 2	-	-	-	-	-	-	-	-	-	427	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.45	0	12.08	18.89
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	535	648	-	-	-	-	60	490
HCM Lane V/C Ratio	0.049	0.065	-	-	-	-	0.088	0.097
HCM Control Delay (s/veh)	12.1	10.9	-	-	-	-	70.7	13.1
HCM Lane LOS	B	B	-	-	-	-	F	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	-	-	0.3	0.3

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	660	165	235	720	215	240	1385	310	190	930	110
Future Volume (veh/h)	180	660	165	235	720	215	240	1385	310	190	930	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	189	695	174	247	758	226	253	1458	326	200	979	116
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	810	487	308	879	492	313	2459	866	261	2378	813
Arrive On Green	0.07	0.22	0.22	0.09	0.24	0.24	0.03	0.15	0.15	0.08	0.44	0.44
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	189	695	174	247	758	226	253	1458	326	200	979	116
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	7.0	23.2	11.1	9.1	25.3	14.9	9.5	32.9	20.4	7.4	16.1	5.0
Cycle Q Clear(g_c), s	7.0	23.2	11.1	9.1	25.3	14.9	9.5	32.9	20.4	7.4	16.1	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	810	487	308	879	492	313	2459	866	261	2378	813
V/C Ratio(X)	0.78	0.86	0.36	0.80	0.86	0.46	0.81	0.59	0.38	0.77	0.41	0.14
Avail Cap(c_a), veh/h	332	810	487	492	921	510	412	2459	866	518	2378	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.4	49.0	35.1	58.1	47.7	36.0	61.9	43.9	28.1	59.0	24.7	16.6
Incr Delay (d2), s/veh	7.7	9.9	0.9	4.9	9.0	1.4	8.7	1.1	1.2	4.7	0.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.9	17.4	7.8	7.5	18.5	9.9	8.3	22.6	13.8	6.0	11.1	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	67.1	58.9	36.0	63.0	56.7	37.5	70.7	45.0	29.4	63.7	25.2	17.0
LnGrp LOS	E	E	D	E	E	D	E	D	C	E	C	B
Approach Vol, veh/h	1058			1231			2037			1295		
Approach Delay, s/veh	56.6			54.5			45.7			30.4		
Approach LOS	E			D			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.3	65.5	16.1	34.1	16.3	63.5	13.7	36.6				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	9.4	34.9	11.1	25.2	11.5	18.1	9.0	27.3				
Green Ext Time (p_c), s	0.4	9.7	0.5	0.5	0.3	20.8	0.2	3.3				
Intersection Summary												
HCM 7th Control Delay, s/veh	46.1											
HCM 7th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	660	165	235	720	215	240	1385	310	190	930	110
Future Volume (veh/h)	180	660	165	235	720	215	240	1385	310	190	930	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	189	695	174	247	758	226	253	1458	326	200	979	116
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	244	810	487	308	879	492	313	2459	866	261	2378	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.07	0.22	0.22	0.09	0.24	0.24	0.03	0.15	0.15	0.08	0.44	0.44
Unsig. Movement Delay												
Ln Grp Delay, s/veh	67.1	58.9	36.0	63.0	56.7	37.5	70.7	45.0	29.4	63.7	25.2	17.0
Ln Grp LOS	E	E	D	E	E	D	E	D	C	E	C	B
Approach Vol, veh/h	1058			1231			2037			1295		
Approach Delay, s/veh	56.6			54.5			45.7			30.4		
Approach LOS	E			D			D			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	14.3	65.5	16.1	34.1	16.3	63.5	13.7	36.6				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.9	3.7	6.8				
Max Q Clear (g_c+I1), s	9.4	34.9	11.1	25.2	11.5	18.1	9.0	27.3				
Green Ext Time (g_e), s	0.4	9.7	0.5	0.5	0.3	20.8	0.2	3.3				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	0.00	0.99	0.06	1.00	0.79	0.59	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3		5		7						
Mvmt Sat Flow, veh/h	3456	3456		3456		3456						
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5375			3741			5375			3741		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1585			1585			1585			1585		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes

AM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	200	0	247	0	253	0	189	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	7.4	0.0	9.1	0.0	9.5	0.0	7.0	0.0
Cycle Q Clear Time (g_c), s	7.4	0.0	9.1	0.0	9.5	0.0	7.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	261	0	308	0	313	0	244	0
V/C Ratio (X)	0.77	0.00	0.80	0.00	0.81	0.00	0.78	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	59.0	0.0	58.1	0.0	61.9	0.0	59.4	0.0
Incr Delay (d2), s/veh	4.7	0.0	4.9	0.0	8.7	0.0	7.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	63.7	0.0	63.0	0.0	70.7	0.0	67.1	0.0
1st-Term Q (Q1), veh/ln	3.2	0.0	3.9	0.0	4.3	0.0	3.0	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.4	0.0	0.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.76	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	6.0	0.0	7.5	0.0	8.3	0.0	5.9	0.0
%ile Storage Ratio (RQ%)	0.83	0.00	1.02	0.00	0.70	0.00	0.94	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1458	0	695	0	979	0	758
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	32.9	0.0	23.2	0.0	16.1	0.0	25.3
Cycle Q Clear Time (g_c), s	0.0	32.9	0.0	23.2	0.0	16.1	0.0	25.3
Lane Grp Cap (c), veh/h	0	2459	0	810	0	2378	0	879
V/C Ratio (X)	0.00	0.59	0.00	0.86	0.00	0.41	0.00	0.86
Avail Cap (c_a), veh/h	0	2459	0	810	0	2378	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	43.9	0.0	49.0	0.0	24.7	0.0	47.7
Incr Delay (d2), s/veh	0.0	1.1	0.0	9.9	0.0	0.5	0.0	9.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	45.0	0.0	58.9	0.0	25.2	0.0	56.7
1st-Term Q (Q1), veh/ln	0.0	15.8	0.0	10.7	0.0	6.7	0.0	11.5

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	1.1	0.0	0.1	0.0	1.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.41	0.00	1.48	0.00	1.63	0.00	1.46
%ile Back of Q (95%), veh/ln	0.0	22.6	0.0	17.4	0.0	11.1	0.0	18.5
%ile Storage Ratio (RQ%)	0.00	0.89	0.00	1.01	0.00	0.30	0.00	0.31
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	326	0	174	0	116	0	226
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	20.4	0.0	11.1	0.0	5.0	0.0	14.9
Cycle Q Clear Time (g_c), s	0.0	20.4	0.0	11.1	0.0	5.0	0.0	14.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	11.6	0.0	11.8	0.0	9.2	0.0	9.8
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	866	0	487	0	813	0	492
V/C Ratio (X)	0.00	0.38	0.00	0.36	0.00	0.14	0.00	0.46
Avail Cap (c_a), veh/h	0	866	0	487	0	813	0	510
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	28.1	0.0	35.1	0.0	16.6	0.0	36.0
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.9	0.0	0.4	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	29.4	0.0	36.0	0.0	17.0	0.0	37.5
1st-Term Q (Q1), veh/ln	0.0	8.6	0.0	4.2	0.0	1.8	0.0	5.7
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.55	0.00	1.78	0.00	1.80	0.00	1.68
%ile Back of Q (95%), veh/ln	0.0	13.8	0.0	7.8	0.0	3.4	0.0	9.9
%ile Storage Ratio (RQ%)	0.00	2.06	0.00	0.45	0.00	0.63	0.00	0.54
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	46.1
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1	85	1	1	10	170	1905	15	30	1175	85
Future Volume (veh/h)	65	1	85	1	1	10	170	1905	15	30	1175	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	1	89	1	1	11	179	2005	16	32	1237	89
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	208	271	135	8	88	240	3822	30	203	3295	237
Arrive On Green	0.05	0.11	0.11	0.00	0.06	0.06	0.07	0.73	0.73	0.01	0.22	0.22
Sat Flow, veh/h	1781	1969	1547	1781	134	1472	3456	5225	42	1781	4862	350
Grp Volume(v), veh/h	68	1	89	1	0	12	179	1306	715	32	866	460
Grp Sat Flow(s),veh/h/ln	1781	1969	1547	1781	0	1605	1728	1702	1863	1781	1702	1807
Q Serve(g_s), s	4.5	0.1	6.5	0.1	0.0	0.9	6.6	21.7	21.8	0.7	28.0	28.0
Cycle Q Clear(g_c), s	4.5	0.1	6.5	0.1	0.0	0.9	6.6	21.7	21.8	0.7	28.0	28.0
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.02	1.00		0.19
Lane Grp Cap(c), veh/h	213	208	271	135	0	96	240	2490	1363	203	2307	1225
V/C Ratio(X)	0.32	0.00	0.33	0.01	0.00	0.12	0.75	0.52	0.52	0.16	0.38	0.38
Avail Cap(c_a), veh/h	383	333	369	333	0	222	598	2490	1363	263	2307	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	52.0	46.9	57.4	0.0	57.9	59.4	7.6	7.6	7.3	27.1	27.1
Incr Delay (d2), s/veh	0.9	0.0	1.5	0.0	0.0	1.2	4.6	0.8	1.4	0.4	0.5	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.8	0.1	4.8	0.1	0.0	0.7	5.4	11.1	12.2	0.5	18.8	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	53.0	52.0	48.4	57.4	0.0	59.1	63.9	8.4	9.1	7.6	27.6	28.0
LnGrp LOS	D	D	D	E		E	E	A	A	A	C	C
Approach Vol, veh/h	158			13			2200			1358		
Approach Delay, s/veh	50.4			59.0			13.1			27.3		
Approach LOS	D			E			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.6	101.1	3.6	19.8	12.5	94.1	9.6	13.8				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	60.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Q Clear Time (g_c+I2), s	12.7	23.8	2.1	8.5	8.6	30.0	6.5	2.9				
Green Ext Time (p_c), s	0.0	41.6	0.0	0.4	0.4	18.4	0.1	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh 20.0
HCM 7th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1	85	1	1	10	170	1905	15	30	1175	85
Future Volume (veh/h)	65	1	85	1	1	10	170	1905	15	30	1175	85
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	1	89	1	1	11	179	2005	16	32	1237	89
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	213	208	271	135	8	88	240	3822	30	203	3295	237
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Prop Arrive On Green	0.05	0.11	0.11	0.00	0.06	0.06	0.07	0.73	0.73	0.01	0.22	0.22
Unsig. Movement Delay												
Ln Grp Delay, s/veh	53.0	52.0	48.4	57.4	0.0	59.1	63.9	8.4	9.1	7.6	27.6	28.0
Ln Grp LOS	D	D	D	E		E	E	A	A	A	C	C
Approach Vol, veh/h	158			13			2200			1358		
Approach Delay, s/veh	50.4			59.0			13.1			27.3		
Approach LOS	D			E			B			C		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	5.6	101.1	3.6	19.8	12.5	94.1	9.6	13.8				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	2.7	23.8	2.1	8.5	8.6	30.0	6.5	2.9				
Green Ext Time (g_e), s	0.0	41.6	0.0	0.4	0.4	18.4	0.1	0.0				
Prob of Phs Call (p_c)	0.69	1.00	0.04	1.00	1.00	1.00	0.91	0.98				
Prob of Max Out (p_x)	0.94	0.93	0.00	0.01	0.00	0.85	0.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1781		1781		3456		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5225		1969		4862		134				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		42		1547		350		1472				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
AM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	32	0	1	0	179	0	68	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1728	0	1781	0
Q Serve Time (g_s), s	0.7	0.0	0.1	0.0	6.6	0.0	4.5	0.0
Cycle Q Clear Time (g_c), s	0.7	0.0	0.1	0.0	6.6	0.0	4.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	211	0	1307	0	0	0	1402	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	88.1	0.0	7.8	0.0	0.0	0.0	9.8	0.0
Perm LT Serve Time (g_u), s	73.3	0.0	7.8	0.0	0.0	0.0	6.9	0.0
Perm LT Q Serve Time (g_ps), s	2.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	203	0	135	0	240	0	213	0
V/C Ratio (X)	0.16	0.00	0.01	0.00	0.75	0.00	0.32	0.00
Avail Cap (c_a), veh/h	263	0	333	0	598	0	383	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	7.3	0.0	57.4	0.0	59.4	0.0	52.1	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.0	4.6	0.0	0.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	7.6	0.0	57.4	0.0	63.9	0.0	53.0	0.0
1st-Term Q (Q1), veh/ln	0.3	0.0	0.0	0.0	2.8	0.0	2.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.80	0.00	1.80	0.00
%ile Back of Q (95%), veh/ln	0.5	0.0	0.1	0.0	5.4	0.0	3.8	0.0
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.00	0.39	0.00	1.73	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1306	0	1	0	866	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	21.7	0.0	0.1	0.0	28.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	21.7	0.0	0.1	0.0	28.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	2490	0	208	0	2307	0	0
V/C Ratio (X)	0.00	0.52	0.00	0.00	0.00	0.38	0.00	0.00
Avail Cap (c_a), veh/h	0	2490	0	333	0	2307	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	7.6	0.0	52.0	0.0	27.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.0	0.0	0.0	0.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.4	0.0	52.0	0.0	27.6	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.5	0.0	0.0	0.0	12.7	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
AM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.63	0.00	1.80	0.00	1.46	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	11.1	0.0	0.1	0.0	18.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.01	0.00	0.74	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	715	0	89	0	460	0	12
Grp Sat Flow (s), veh/h/ln	0	1863	0	1547	0	1807	0	1605
Q Serve Time (g_s), s	0.0	21.8	0.0	6.5	0.0	28.0	0.0	0.9
Cycle Q Clear Time (g_c), s	0.0	21.8	0.0	6.5	0.0	28.0	0.0	0.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1547.4	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.02	0.00	1.00	0.00	0.19	0.00	0.92
Lane Grp Cap (c), veh/h	0	1363	0	271	0	1225	0	96
V/C Ratio (X)	0.00	0.52	0.00	0.33	0.00	0.38	0.00	0.12
Avail Cap (c_a), veh/h	0	1363	0	369	0	1225	0	222
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	7.6	0.0	46.9	0.0	27.1	0.0	57.9
Incr Delay (d2), s/veh	0.0	1.4	0.0	1.5	0.0	0.9	0.0	1.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.1	0.0	48.4	0.0	28.0	0.0	59.1
1st-Term Q (Q1), veh/ln	0.0	7.1	0.0	2.5	0.0	13.5	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.1	0.0	0.3	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.59	0.00	1.80	0.00	1.44	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	12.2	0.0	4.8	0.0	19.9	0.0	0.7
%ile Storage Ratio (RQ%)	0.00	0.17	0.00	1.22	0.00	0.78	0.00	0.06
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	20.0
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	2.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	110	1	70	185	1	40
Future Vol, veh/h	110	1	70	185	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	1	74	195	1	42
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	117	0	361	58
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	245	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1469	-	611	995
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1469	-	579	995
Mov Cap-2 Maneuver	-	-	-	-	579	-
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	732	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		2.25		8.85	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	978	-	-	988	-	
HCM Lane V/C Ratio	0.044	-	-	0.05	-	
HCM Control Delay (s/veh)	8.9	-	-	7.6	0.2	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.2	-	

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↗		↔			↔	
Traffic Vol, veh/h	1	75	1	1	125	60	1	1	1	35	1	10
Future Vol, veh/h	1	75	1	1	125	60	1	1	1	35	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	79	1	1	132	63	1	1	1	37	1	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	80	0	0	150	278	40	176	216	66
Stage 1	-	-	-	-	-	-	82	82	-	134	134	-
Stage 2	-	-	-	-	-	-	68	197	-	42	82	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1376	-	-	1516	-	-	803	628	1022	770	681	984
Stage 1	-	-	-	-	-	-	917	826	-	856	785	-
Stage 2	-	-	-	-	-	-	934	737	-	967	826	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1376	-	-	1516	-	-	792	627	1022	767	680	984
Mov Cap-2 Maneuver	-	-	-	-	-	-	792	627	-	767	680	-
Stage 1	-	-	-	-	-	-	917	826	-	855	784	-
Stage 2	-	-	-	-	-	-	922	736	-	964	825	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.1			0.04			9.62			9.77		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	782	46	-	-	29	-	-	803
HCM Lane V/C Ratio	0.004	0.001	-	-	0.001	-	-	0.06
HCM Control Delay (s/veh)	9.6	7.6	0	-	7.4	0	-	9.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	975	1	0	1060	0	1
Future Vol, veh/h	975	1	0	1060	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1026	1	0	1116	0	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	514
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	506
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	506
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	12.13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	506	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s/veh)	12.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	10	0	1980	1255	75
Future Vol, veh/h	0	10	0	1980	1255	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	0	2084	1321	79
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	661	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	347	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	347	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s/v15.68		0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	-		347	-		
HCM Lane V/C Ratio	-		0.03	-		
HCM Control Delay (s/veh)	-		15.7	-		
HCM Lane LOS	-		C	-		
HCM 95th %tile Q(veh)	-		0.1	-		

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	75	120	15	1	10
Future Vol, veh/h	1	75	120	15	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	79	126	16	1	11

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	142	0	0	176	71
Stage 1	-	-	-	134	-
Stage 2	-	-	-	42	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1438	-	-	797	977
Stage 1	-	-	-	878	-
Stage 2	-	-	-	976	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1438	-	-	796	977
Mov Cap-2 Maneuver	-	-	-	796	-
Stage 1	-	-	-	877	-
Stage 2	-	-	-	976	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.1	0	8.81
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	47	-	-	-	957
HCM Lane V/C Ratio	0.001	-	-	-	0.012
HCM Control Delay (s/veh)	7.5	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	75	120	10	1	1
Future Vol, veh/h	1	75	120	10	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	79	126	11	1	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	137	0	-	0	173	68
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	42	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1445	-	-	-	800	981
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	799	981
Mov Cap-2 Maneuver	-	-	-	-	799	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	976	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.1	0		9.1		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	47	-	-	-	881	
HCM Lane V/C Ratio	0.001	-	-	-	0.002	
HCM Control Delay (s/veh)	7.5	0	-	-	9.1	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	1030	175	305	885	215	415	150	345	235	105	245
Future Volume (veh/h)	260	1030	175	305	885	215	415	150	345	235	105	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	274	1084	184	321	932	226	437	158	363	247	111	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1396	855	381	1399	593	506	394	492	407	362	496
Arrive On Green	0.13	0.39	0.39	0.11	0.37	0.37	0.15	0.20	0.20	0.13	0.18	0.18
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	274	1084	184	321	932	226	437	158	363	247	111	258
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	15.5	32.0	7.3	10.9	24.9	12.5	14.8	8.4	24.0	13.3	5.9	16.0
Cycle Q Clear(g_c), s	15.5	32.0	7.3	10.9	24.9	12.5	14.8	8.4	24.0	13.3	5.9	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1396	855	381	1399	593	506	394	492	407	362	496
V/C Ratio(X)	1.19	0.78	0.22	0.84	0.67	0.38	0.86	0.40	0.74	0.61	0.31	0.52
Avail Cap(c_a), veh/h	230	1396	855	446	1399	593	619	394	492	494	394	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	31.8	14.4	52.4	31.3	27.4	50.1	41.8	37.0	33.0	42.4	33.8
Incr Delay (d2), s/veh	120.6	4.3	0.6	12.1	2.5	1.9	10.4	1.4	7.0	1.5	1.0	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.3	20.1	4.9	9.1	16.9	8.7	11.5	7.6	15.7	9.9	5.3	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	172.9	36.1	15.0	64.5	33.8	29.3	60.5	43.2	44.0	34.5	43.4	35.6
LnGrp LOS	F	D	B	E	C	C	E	D	D	C	D	D
Approach Vol, veh/h	1542			1479			958			616		
Approach Delay, s/veh	57.9			39.8			51.4			36.6		
Approach LOS	E			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	53.1	21.1	28.1	20.0	50.9	19.1	30.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0				
Max Q Clear Time (g_c+I1), s	12.9	34.0	16.8	18.0	17.5	26.9	15.3	26.0				
Green Ext Time (p_c), s	0.3	4.6	0.7	1.4	0.0	10.0	0.4	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh 47.9
HCM 7th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	1030	175	305	885	215	415	150	345	235	105	245
Future Volume (veh/h)	260	1030	175	305	885	215	415	150	345	235	105	245
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	274	1084	184	321	932	226	437	158	363	247	111	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1396	855	381	1399	593	506	394	492	407	362	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.39	0.39	0.11	0.37	0.37	0.15	0.20	0.20	0.13	0.18	0.18
Unsig. Movement Delay												
Ln Grp Delay, s/veh	172.9	36.1	15.0	64.5	33.8	29.3	60.5	43.2	44.0	34.5	43.4	35.6
Ln Grp LOS	F	D	B	E	C	C	E	D	D	C	D	D
Approach Vol, veh/h		1542			1479			958			616	
Approach Delay, s/veh		57.9			39.8			51.4			36.6	
Approach LOS		E			D			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		17.7	53.1	21.1	28.1	20.0	50.9	19.1	30.0			
Change Period (Y+Rc), s		4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0			
Max Green (Gmax), s		15.5	39.0	21.5	24.0	15.5	39.0	21.5	24.0			
Max Allow Headway (MAH), s		3.7	8.9	3.8	6.4	3.7	8.8	3.8	6.4			
Max Q Clear (g_c+I1), s		12.9	34.0	16.8	18.0	17.5	26.9	15.3	26.0			
Green Ext Time (g_e), s		0.3	4.6	0.7	1.4	0.0	10.0	0.4	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Prob of Max Out (p_x)		1.00	1.00	0.63	1.00	1.00	0.94	0.18	1.00			
Left-Turn Movement Data												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		3456		3456		1781		1781				
Through Movement Data												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			3554		1969		3741		1969			
Right-Turn Movement Data												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1585		1585		1585		1585			
Left Lane Group Data												
Assigned Mvmt		1	0	3	0	5	0	7	0			

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	321	0	437	0	274	0	247	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	10.9	0.0	14.8	0.0	15.5	0.0	13.3	0.0
Cycle Q Clear Time (g_c), s	10.9	0.0	14.8	0.0	15.5	0.0	13.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	881	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	22.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	381	0	506	0	230	0	407	0
V/C Ratio (X)	0.84	0.00	0.86	0.00	1.19	0.00	0.61	0.00
Avail Cap (c_a), veh/h	446	0	619	0	230	0	494	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	52.4	0.0	50.1	0.0	52.3	0.0	33.0	0.0
Incr Delay (d2), s/veh	12.1	0.0	10.4	0.0	120.6	0.0	1.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.5	0.0	60.5	0.0	172.9	0.0	34.5	0.0
1st-Term Q (Q1), veh/ln	4.7	0.0	6.4	0.0	6.8	0.0	5.7	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.7	0.0	7.7	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.71	0.00	1.61	0.00	1.54	0.00	1.68	0.00
%ile Back of Q (95%), veh/ln	9.1	0.0	11.5	0.0	22.3	0.0	9.9	0.0
%ile Storage Ratio (RQ%)	0.58	0.00	0.91	0.00	2.10	0.00	1.52	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	1084	0	111	0	932	0	158
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	32.0	0.0	5.9	0.0	24.9	0.0	8.4
Cycle Q Clear Time (g_c), s	0.0	32.0	0.0	5.9	0.0	24.9	0.0	8.4
Lane Grp Cap (c), veh/h	0	1396	0	362	0	1399	0	394
V/C Ratio (X)	0.00	0.78	0.00	0.31	0.00	0.67	0.00	0.40
Avail Cap (c_a), veh/h	0	1396	0	394	0	1399	0	394
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	31.8	0.0	42.4	0.0	31.3	0.0	41.8
Incr Delay (d2), s/veh	0.0	4.3	0.0	1.0	0.0	2.5	0.0	1.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.1	0.0	43.4	0.0	33.8	0.0	43.2
1st-Term Q (Q1), veh/ln	0.0	13.2	0.0	2.9	0.0	10.9	0.0	4.1

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.8	0.0	0.1	0.0	0.5	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.44	0.00	1.80	0.00	1.49	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	20.1	0.0	5.3	0.0	16.9	0.0	7.6
%ile Storage Ratio (RQ%)	0.00	0.42	0.00	0.30	0.00	0.48	0.00	0.20
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	184	0	258	0	226	0	363
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	7.3	0.0	16.0	0.0	12.5	0.0	24.0
Cycle Q Clear Time (g_c), s	0.0	7.3	0.0	16.0	0.0	12.5	0.0	24.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	17.6	0.0	15.5	0.0	0.0	0.0	13.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	855	0	496	0	593	0	492
V/C Ratio (X)	0.00	0.22	0.00	0.52	0.00	0.38	0.00	0.74
Avail Cap (c_a), veh/h	0	855	0	522	0	593	0	492
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	14.4	0.0	33.8	0.0	27.4	0.0	37.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	1.8	0.0	1.9	0.0	7.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.0	0.0	35.6	0.0	29.3	0.0	44.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	6.2	0.0	4.7	0.0	9.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.2	0.0	0.3	0.0	1.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.65	0.00	1.73	0.00	1.51
%ile Back of Q (95%), veh/ln	0.0	4.9	0.0	10.6	0.0	8.7	0.0	15.7
%ile Storage Ratio (RQ%)	0.00	0.67	0.00	1.63	0.00	1.11	0.00	0.41
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	47.9
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

Intersection												
Int Delay, s/veh	41.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱	↱↱	↱		↱↱	↱			↱	↱		↱
Traffic Vol, veh/h	130	1390	90	0	1295	130	0	0	165	40	0	120
Future Vol, veh/h	130	1390	90	0	1295	130	0	0	165	40	0	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	137	1463	95	0	1363	137	0	0	174	42	0	126

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1363	0	0	-	-	0	-	-	732	2368	-	682
Stage 1	-	-	-	-	-	-	-	-	-	1363	-	-
Stage 2	-	-	-	-	-	-	-	-	-	1005	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	500	-	-	0	-	-	0	0	364	~ 18	0	393
Stage 1	-	-	-	0	-	-	0	0	-	156	0	-
Stage 2	-	-	-	0	-	-	0	0	-	259	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	500	-	-	-	-	-	-	-	364	~ 7	-	393
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 7	-	-
Stage 1	-	-	-	-	-	-	-	-	-	156	-	-
Stage 2	-	-	-	-	-	-	-	-	-	98	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1.2	0	23.6	\$ 834.9
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	364	500	-	-	-	-	7	393
HCM Lane V/C Ratio	0.477	0.274	-	-	-	-	6.022	0.322
HCM Control Delay (s/veh)	23.6	14.9	-	-	-	-	\$ 3284.2	18.5
HCM Lane LOS	C	B	-	-	-	-	F	C
HCM 95th %tile Q(veh)	2.5	1.1	-	-	-	-	6.7	1.4

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary 300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	1030	285	430	985	270	290	1425	375	420	1545	285
Future Volume (veh/h)	330	1030	285	430	985	270	290	1425	375	420	1545	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	347	1084	300	453	1037	284	305	1500	395	442	1626	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	748	483	492	921	616	363	1899	786	493	2103	773
Arrive On Green	0.10	0.20	0.20	0.14	0.25	0.25	0.03	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	347	1084	300	453	1037	284	305	1500	395	442	1626	300
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	12.5	26.0	21.1	16.8	32.0	17.3	11.4	35.3	24.3	16.3	34.3	15.6
Cycle Q Clear(g_c), s	12.5	26.0	21.1	16.8	32.0	17.3	11.4	35.3	24.3	16.3	34.3	15.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	748	483	492	921	616	363	1899	786	493	2103	773
V/C Ratio(X)	1.04	1.45	0.62	0.92	1.13	0.46	0.84	0.79	0.50	0.90	0.77	0.39
Avail Cap(c_a), veh/h	332	748	483	492	921	616	412	1899	786	518	2103	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.8	52.0	38.7	55.0	49.0	29.6	61.7	52.7	31.0	54.8	34.5	21.1
Incr Delay (d2), s/veh	61.4	209.5	3.5	22.8	70.8	1.1	13.2	3.4	2.3	17.5	2.8	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.1	51.2	13.3	13.6	33.8	10.9	9.9	24.4	16.1	12.9	21.4	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	120.1	261.5	42.3	77.8	119.8	30.7	74.8	56.2	33.3	72.3	37.4	22.5
LnGrp LOS	F	F	D	E	F	C	E	E	C	E	D	C
Approach Vol, veh/h	1731				1774		2200				2368	
Approach Delay, s/veh	195.2				94.8		54.6				42.0	
Approach LOS	F				F		D				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.1	51.9	23.0	32.0	18.1	56.9	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Q Clear Time (g_c+I1), s	18.3	37.3	18.8	28.0	13.4	36.3	14.5	34.0				
Green Ext Time (p_c), s	0.2	7.5	0.0	0.0	0.2	12.3	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			89.9									
HCM 7th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	1030	285	430	985	270	290	1425	375	420	1545	285
Future Volume (veh/h)	330	1030	285	430	985	270	290	1425	375	420	1545	285
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	347	1084	300	453	1037	284	305	1500	395	442	1626	300
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	332	748	483	492	921	616	363	1899	786	493	2103	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.10	0.20	0.20	0.14	0.25	0.25	0.03	0.12	0.12	0.14	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	120.1	261.5	42.3	77.8	119.8	30.7	74.8	56.2	33.3	72.3	37.4	22.5
Ln Grp LOS	F	F	D	E	F	C	E	E	C	E	D	C
Approach Vol, veh/h	1731			1774			2200			2368		
Approach Delay, s/veh	195.2			94.8			54.6			42.0		
Approach LOS	F			F			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	23.1	51.9	23.0	32.0	18.1	56.9	17.0	38.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	19.5	45.0	18.5	26.0	15.5	49.0	12.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.8				
Max Q Clear (g_c+I1), s	18.3	37.3	18.8	28.0	13.4	36.3	14.5	34.0				
Green Ext Time (g_e), s	0.2	7.5	0.0	0.0	0.2	12.3	0.0	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	442	0	453	0	305	0	347	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	16.3	0.0	16.8	0.0	11.4	0.0	12.5	0.0
Cycle Q Clear Time (g_c), s	16.3	0.0	16.8	0.0	11.4	0.0	12.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	493	0	492	0	363	0	332	0
V/C Ratio (X)	0.90	0.00	0.92	0.00	0.84	0.00	1.04	0.00
Avail Cap (c_a), veh/h	518	0	492	0	412	0	332	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	54.8	0.0	55.0	0.0	61.7	0.0	58.8	0.0
Incr Delay (d2), s/veh	17.5	0.0	22.8	0.0	13.2	0.0	61.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	72.3	0.0	77.8	0.0	74.8	0.0	120.1	0.0
1st-Term Q (Q1), veh/ln	7.0	0.0	7.2	0.0	5.3	0.0	5.4	0.0
2nd-Term Q (Q2), veh/ln	1.2	0.0	1.6	0.0	0.7	0.0	2.8	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.57	0.00	1.55	0.00	1.67	0.00	1.60	0.00
%ile Back of Q (95%), veh/ln	12.9	0.0	13.6	0.0	9.9	0.0	13.1	0.0
%ile Storage Ratio (RQ%)	1.77	0.00	1.87	0.00	0.84	0.00	2.08	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1500	0	1084	0	1626	0	1037
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	35.3	0.0	26.0	0.0	34.3	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	35.3	0.0	26.0	0.0	34.3	0.0	32.0
Lane Grp Cap (c), veh/h	0	1899	0	748	0	2103	0	921
V/C Ratio (X)	0.00	0.79	0.00	1.45	0.00	0.77	0.00	1.13
Avail Cap (c_a), veh/h	0	1899	0	748	0	2103	0	921
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	52.7	0.0	52.0	0.0	34.5	0.0	49.0
Incr Delay (d2), s/veh	0.0	3.4	0.0	209.5	0.0	2.8	0.0	70.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	56.2	0.0	261.5	0.0	37.4	0.0	119.8
1st-Term Q (Q1), veh/ln	0.0	17.0	0.0	11.9	0.0	14.5	0.0	14.6

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	21.8	0.0	0.6	0.0	9.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.39	0.00	1.52	0.00	1.42	0.00	1.43
%ile Back of Q (95%), veh/ln	0.0	24.4	0.0	51.2	0.0	21.4	0.0	33.8
%ile Storage Ratio (RQ%)	0.00	0.96	0.00	2.97	0.00	0.57	0.00	0.57
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	84.0	0.0	0.0	0.0	29.1
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.3

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	395	0	300	0	300	0	284
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	24.3	0.0	21.1	0.0	15.6	0.0	17.3
Cycle Q Clear Time (g_c), s	0.0	24.3	0.0	21.1	0.0	15.6	0.0	17.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	18.5	0.0	13.6	0.0	12.5	0.0	18.6
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	786	0	483	0	773	0	616
V/C Ratio (X)	0.00	0.50	0.00	0.62	0.00	0.39	0.00	0.46
Avail Cap (c_a), veh/h	0	786	0	483	0	773	0	616
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	31.0	0.0	38.7	0.0	21.1	0.0	29.6
Incr Delay (d2), s/veh	0.0	2.3	0.0	3.5	0.0	1.5	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	33.3	0.0	42.3	0.0	22.5	0.0	30.7
1st-Term Q (Q1), veh/ln	0.0	10.2	0.0	8.0	0.0	5.6	0.0	6.5
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.0	0.5	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.50	0.00	1.56	0.00	1.67	0.00	1.63
%ile Back of Q (95%), veh/ln	0.0	16.1	0.0	13.3	0.0	9.9	0.0	10.9
%ile Storage Ratio (RQ%)	0.00	2.41	0.00	0.77	0.00	1.87	0.00	0.60
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	89.9
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1	290	5	1	50	405	1905	35	60	1965	145
Future Volume (veh/h)	175	1	290	5	1	50	405	1905	35	60	1965	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	184	1	305	5	1	53	426	2005	37	63	2068	153
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	333	481	130	2	98	489	3369	62	195	2618	192
Arrive On Green	0.11	0.17	0.17	0.00	0.06	0.06	0.14	0.65	0.65	0.02	0.36	0.36
Sat Flow, veh/h	1781	1969	1547	1781	29	1560	3456	5162	95	1781	4853	357
Grp Volume(v), veh/h	184	1	305	5	0	54	426	1322	720	63	1446	775
Grp Sat Flow(s),veh/h/ln	1781	1969	1547	1781	0	1590	1728	1702	1853	1781	1702	1806
Q Serve(g_s), s	12.2	0.1	22.0	0.3	0.0	4.3	15.7	28.7	28.7	2.1	49.3	50.0
Cycle Q Clear(g_c), s	12.2	0.1	22.0	0.3	0.0	4.3	15.7	28.7	28.7	2.1	49.3	50.0
Prop In Lane	1.00		1.00	1.00		0.98	1.00		0.05	1.00		0.20
Lane Grp Cap(c), veh/h	292	333	481	130	0	100	489	2222	1210	195	1836	974
V/C Ratio(X)	0.63	0.00	0.63	0.04	0.00	0.54	0.87	0.59	0.60	0.32	0.79	0.80
Avail Cap(c_a), veh/h	349	333	481	322	0	220	598	2222	1210	234	1836	974
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.9	44.9	38.5	56.8	0.0	59.1	54.7	12.8	12.8	13.8	34.9	35.1
Incr Delay (d2), s/veh	2.7	0.0	3.9	0.1	0.0	9.4	11.5	1.2	2.2	1.0	3.5	6.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.1	13.8	0.3	0.0	3.6	11.9	15.3	16.8	1.5	29.6	32.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	50.6	44.9	42.3	56.9	0.0	68.5	66.1	14.0	15.0	14.8	38.4	41.8
LnGrp LOS	D	D	D	E		E	E	B	B	B	D	D
Approach Vol, veh/h	490		59			2468			2284			
Approach Delay, s/veh	45.4		67.5			23.3			38.9			
Approach LOS	D		E			C			D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	90.8	4.0	28.0	21.9	76.1	17.8	14.2				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Q Clear Time (g_c+I1), s	14.1	30.7	2.3	24.0	17.7	52.0	14.2	6.3				
Green Ext Time (p_c), s	0.0	35.5	0.0	0.0	0.7	0.0	0.2	0.2				

Intersection Summary

HCM 7th Control Delay, s/veh	32.5
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1	290	5	1	50	405	1905	35	60	1965	145
Future Volume (veh/h)	175	1	290	5	1	50	405	1905	35	60	1965	145
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1826	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	184	1	305	5	1	53	426	2005	37	63	2068	153
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
Percent Heavy Veh, %	2	2	5	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	292	333	481	130	2	98	489	3369	62	195	2618	192
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Prop Arrive On Green	0.11	0.17	0.17	0.00	0.06	0.06	0.14	0.65	0.65	0.02	0.36	0.36
Unsig. Movement Delay												
Ln Grp Delay, s/veh	50.6	44.9	42.3	56.9	0.0	68.5	66.1	14.0	15.0	14.8	38.4	41.8
Ln Grp LOS	D	D	D	E		E	E	B	B	B	D	D
Approach Vol, veh/h	490			59			2468			2284		
Approach Delay, s/veh	45.4			67.5			23.3			38.9		
Approach LOS	D			E			C			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	7.2	90.8	4.0	28.0	21.9	76.1	17.8	14.2				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	14.5	22.0	22.5	52.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	4.1	30.7	2.3	24.0	17.7	52.0	14.2	6.3				
Green Ext Time (g_e), s	0.0	35.5	0.0	0.0	0.7	0.0	0.2	0.2				
Prob of Phs Call (p_c)	0.90	1.00	0.17	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.94	0.00	1.00	0.53	1.00	0.65	0.10				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1781		1781		3456		1781					
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	5162			1969			4853			29		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	95			1547			357			1560		
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes

PM Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	63	0	5	0	426	0	184	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	1728	0	1781	0
Q Serve Time (g_s), s	2.1	0.0	0.3	0.0	15.7	0.0	12.2	0.0
Cycle Q Clear Time (g_c), s	2.1	0.0	0.3	0.0	15.7	0.0	12.2	0.0
Perm LT Sat Flow (s_l), veh/h/ln	207	0	1073	0	0	0	1350	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	70.1	0.0	8.2	0.0	0.0	0.0	10.2	0.0
Perm LT Serve Time (g_u), s	56.1	0.0	8.2	0.0	0.0	0.0	3.9	0.0
Perm LT Q Serve Time (g_ps), s	6.2	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	195	0	130	0	489	0	292	0
V/C Ratio (X)	0.32	0.00	0.04	0.00	0.87	0.00	0.63	0.00
Avail Cap (c_a), veh/h	234	0	322	0	598	0	349	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	13.8	0.0	56.8	0.0	54.7	0.0	47.9	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.1	0.0	11.5	0.0	2.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	14.8	0.0	56.9	0.0	66.1	0.0	50.6	0.0
1st-Term Q (Q1), veh/ln	0.8	0.0	0.2	0.0	6.7	0.0	5.4	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.8	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.60	0.00	1.69	0.00
%ile Back of Q (95%), veh/ln	1.5	0.0	0.3	0.0	11.9	0.0	9.5	0.0
%ile Storage Ratio (RQ%)	0.15	0.00	0.02	0.00	0.87	0.00	4.40	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1322	0	1	0	1446	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	28.7	0.0	0.1	0.0	49.3	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	28.7	0.0	0.1	0.0	49.3	0.0	0.0
Lane Grp Cap (c), veh/h	0	2222	0	333	0	1836	0	0
V/C Ratio (X)	0.00	0.59	0.00	0.00	0.00	0.79	0.00	0.00
Avail Cap (c_a), veh/h	0	2222	0	333	0	1836	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.8	0.0	44.9	0.0	34.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.0	0.0	3.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	14.0	0.0	44.9	0.0	38.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	9.7	0.0	0.0	0.0	21.1	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
PM Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.9	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.52	0.00	1.80	0.00	1.35	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	15.3	0.0	0.1	0.0	29.6	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.21	0.00	0.01	0.00	1.17	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	720	0	305	0	775	0	54
Grp Sat Flow (s), veh/h/ln	0	1853	0	1547	0	1806	0	1590
Q Serve Time (g_s), s	0.0	28.7	0.0	22.0	0.0	50.0	0.0	4.3
Cycle Q Clear Time (g_c), s	0.0	28.7	0.0	22.0	0.0	50.0	0.0	4.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1547.4	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	18.4	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.05	0.00	1.00	0.00	0.20	0.00	0.98
Lane Grp Cap (c), veh/h	0	1210	0	481	0	974	0	100
V/C Ratio (X)	0.00	0.60	0.00	0.63	0.00	0.80	0.00	0.54
Avail Cap (c_a), veh/h	0	1210	0	481	0	974	0	220
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	12.8	0.0	38.5	0.0	35.1	0.0	59.1
Incr Delay (d2), s/veh	0.0	2.2	0.0	3.9	0.0	6.7	0.0	9.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.0	0.0	42.3	0.0	41.8	0.0	68.5
1st-Term Q (Q1), veh/ln	0.0	10.6	0.0	8.4	0.0	22.6	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.5	0.0	1.8	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.49	0.00	1.55	0.00	1.33	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	16.8	0.0	13.8	0.0	32.6	0.0	3.6
%ile Storage Ratio (RQ%)	0.00	0.24	0.00	3.51	0.00	1.28	0.00	0.28
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	32.5
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	2.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	400	1	130	420	1	65
Future Vol, veh/h	400	1	130	420	1	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	421	1	137	442	1	68
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	422	0	916	211
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	495	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1134	-	272	794
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1134	-	234	794
Mov Cap-2 Maneuver	-	-	-	-	234	-
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	499	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		2.59		10.16	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	767	-	-	851	-	
HCM Lane V/C Ratio	0.091	-	-	0.121	-	
HCM Control Delay (s/veh)	10.2	-	-	8.6	0.7	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0.4	-	

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↔		↔			↔	
Traffic Vol, veh/h	5	200	0	1	260	160	1	1	0	200	1	70
Future Vol, veh/h	5	200	0	1	260	160	1	1	0	200	1	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	211	0	1	274	168	1	1	0	211	1	74

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	442	0	0	211	0	0	361	665	105	392	497	137
Stage 1	-	-	-	-	-	-	221	221	-	276	276	-
Stage 2	-	-	-	-	-	-	139	444	-	116	221	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1114	-	-	1357	-	-	570	379	929	542	473	887
Stage 1	-	-	-	-	-	-	761	719	-	707	681	-
Stage 2	-	-	-	-	-	-	849	573	-	876	719	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1114	-	-	1357	-	-	519	377	929	537	470	887
Mov Cap-2 Maneuver	-	-	-	-	-	-	519	377	-	537	470	-
Stage 1	-	-	-	-	-	-	757	716	-	706	680	-
Stage 2	-	-	-	-	-	-	777	573	-	870	716	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s/v	0.24			0.02			13.29			16.41		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	436	88	-	-	14	-	-	597
HCM Lane V/C Ratio	0.005	0.005	-	-	0.001	-	-	0.477
HCM Control Delay (s/veh)	13.3	8.2	0	-	7.7	0	-	16.4
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	2.6

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1610	1	0	1415	0	1
Future Vol, veh/h	1610	1	0	1415	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1695	1	0	1489	0	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	848
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	305
Stage 1	-	-	0	-	-
Stage 2	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	305
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	16.85
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	305	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-
HCM Control Delay (s/veh)	16.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	70	0	2130	1995	265
Future Vol, veh/h	0	70	0	2130	1995	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	74	0	2242	2100	279

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1050	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.14	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.92	- -	- -
Pot Cap-1 Maneuver	0 192	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 192	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s/v34.95		0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 192	- -	- -
HCM Lane V/C Ratio	- 0.384	- -	- -
HCM Control Delay (s/veh)	- 35	- -	- -
HCM Lane LOS	- D	- -	- -
HCM 95th %tile Q(veh)	- 1.7	- -	- -

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	175	275	55	30	55
Future Vol, veh/h	5	175	275	55	30	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	184	289	58	32	58

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	347	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	-
Pot Cap-1 Maneuver	1208	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1208	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0.26	0	10.78
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	100	-	-	-	713
HCM Lane V/C Ratio	0.004	-	-	-	0.126
HCM Control Delay (s/veh)	8	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

HCM 7th TWSC
705: Ravinia Avenue/161st Street & Access F

Build (2050) Traffic Volumes
PM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	165	315	15	15	1
Future Vol, veh/h	1	165	315	15	15	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	174	332	16	16	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	347	0	-	0	428	174
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1208	-	-	-	555	840
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	924	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1208	-	-	-	554	840
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	924	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.06	0		11.55		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	22	-	-	-	566	
HCM Lane V/C Ratio	0.001	-	-	-	0.03	
HCM Control Delay (s/veh)	8	0	-	-	11.6	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

HCM 7th Signalized Intersection Summary

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	895	170	430	830	215	430	170	455	230	170	245
Future Volume (veh/h)	240	895	170	430	830	215	430	170	455	230	170	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	253	942	179	453	874	226	453	179	479	242	179	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1169	757	516	1205	511	514	485	627	405	432	595
Arrive On Green	0.16	0.33	0.33	0.05	0.11	0.11	0.15	0.25	0.25	0.12	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	3456	3741	1585	3456	1969	1585	1781	1969	1585
Grp Volume(v), veh/h	253	942	179	453	874	226	453	179	479	242	179	258
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1870	1585	1728	1969	1585	1781	1969	1585
Q Serve(g_s), s	18.2	31.5	8.6	16.9	29.4	17.4	16.7	9.8	32.0	13.5	10.2	15.8
Cycle Q Clear(g_c), s	18.2	31.5	8.6	16.9	29.4	17.4	16.7	9.8	32.0	13.5	10.2	15.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	278	1169	757	516	1205	511	514	485	627	405	432	595
V/C Ratio(X)	0.91	0.81	0.24	0.88	0.73	0.44	0.88	0.37	0.76	0.60	0.41	0.43
Avail Cap(c_a), veh/h	295	1169	757	572	1205	511	598	485	627	496	485	637
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	39.8	20.0	60.6	52.5	47.1	54.2	40.6	34.1	32.9	43.6	30.3
Incr Delay (d2), s/veh	29.7	6.0	0.7	13.6	3.8	2.8	12.9	1.0	6.6	1.4	1.4	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.5	20.6	6.1	13.7	21.8	12.4	12.9	8.6	20.3	10.0	8.9	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	83.7	45.8	20.7	74.3	56.3	49.9	67.1	41.6	40.6	34.3	44.9	31.4
LnGrp LOS	F	D	C	E	E	D	E	D	D	C	D	C
Approach Vol, veh/h	1374			1553			1111			679		
Approach Delay, s/veh	49.5			60.6			51.6			36.0		
Approach LOS	D			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.9	48.7	22.8	34.5	24.8	47.9	19.4	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Q Clear Time (g_c+I1), s	18.9	33.5	18.7	17.8	20.2	31.4	15.5	34.0				
Green Ext Time (p_c), s	0.5	0.5	0.7	3.2	0.1	2.3	0.4	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	51.7											
HCM 7th LOS	D											

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	895	170	430	830	215	430	170	455	230	170	245
Future Volume (veh/h)	240	895	170	430	830	215	430	170	455	230	170	245
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No				No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	253	942	179	453	874	226	453	179	479	242	179	258
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	278	1169	757	516	1205	511	514	485	627	405	432	595
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.16	0.33	0.33	0.05	0.11	0.11	0.15	0.25	0.25	0.12	0.22	0.22
Unsig. Movement Delay												
Ln Grp Delay, s/veh	83.7	45.8	20.7	74.3	56.3	49.9	67.1	41.6	40.6	34.3	44.9	31.4
Ln Grp LOS	F	D	C	E	E	D	E	D	D	C	D	C
Approach Vol, veh/h	1374			1553				1111			679	
Approach Delay, s/veh	49.5			60.6				51.6			36.0	
Approach LOS	D			E				D			D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	23.9	48.7	22.8	34.5	24.8	47.9	19.4	38.0				
Change Period (Y+Rc), s	4.5	6.0	3.5	6.0	4.5	6.0	3.5	6.0				
Max Green (Gmax), s	21.5	34.0	22.5	32.0	21.5	34.0	22.5	32.0				
Max Allow Headway (MAH), s	3.7	8.8	3.8	6.5	3.7	8.8	3.8	6.4				
Max Q Clear (g_c+I1), s	18.9	33.5	18.7	17.8	20.2	31.4	15.5	34.0				
Green Ext Time (g_e), s	0.5	0.5	0.7	3.2	0.1	2.3	0.4	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	1.00	0.23	1.00	1.00	0.10	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3456		3456		1781		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		3554		1969		3741		1969				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1585		1585		1585		1585				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	2	0	2	0	1	0	1	0
Grp Vol (v), veh/h	453	0	453	0	253	0	242	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1781	0	1781	0
Q Serve Time (g_s), s	16.9	0.0	16.7	0.0	18.2	0.0	13.5	0.0
Cycle Q Clear Time (g_c), s	16.9	0.0	16.7	0.0	18.2	0.0	13.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	776	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	22.2	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	516	0	514	0	278	0	405	0
V/C Ratio (X)	0.88	0.00	0.88	0.00	0.91	0.00	0.60	0.00
Avail Cap (c_a), veh/h	572	0	598	0	295	0	496	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	60.6	0.0	54.2	0.0	54.0	0.0	32.9	0.0
Incr Delay (d2), s/veh	13.6	0.0	12.9	0.0	29.7	0.0	1.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	74.3	0.0	67.1	0.0	83.7	0.0	34.3	0.0
1st-Term Q (Q1), veh/ln	7.9	0.0	7.3	0.0	8.0	0.0	5.8	0.0
2nd-Term Q (Q2), veh/ln	1.0	0.0	0.9	0.0	2.3	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.55	0.00	1.57	0.00	1.51	0.00	1.67	0.00
%ile Back of Q (95%), veh/ln	13.7	0.0	12.9	0.0	15.5	0.0	10.0	0.0
%ile Storage Ratio (RQ%)	0.87	0.00	1.02	0.00	1.46	0.00	1.54	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	942	0	179	0	874	0	179
Grp Sat Flow (s), veh/h/ln	0	1777	0	1969	0	1870	0	1969
Q Serve Time (g_s), s	0.0	31.5	0.0	10.2	0.0	29.4	0.0	9.8
Cycle Q Clear Time (g_c), s	0.0	31.5	0.0	10.2	0.0	29.4	0.0	9.8
Lane Grp Cap (c), veh/h	0	1169	0	432	0	1205	0	485
V/C Ratio (X)	0.00	0.81	0.00	0.41	0.00	0.73	0.00	0.37
Avail Cap (c_a), veh/h	0	1169	0	485	0	1205	0	485
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	39.8	0.0	43.6	0.0	52.5	0.0	40.6
Incr Delay (d2), s/veh	0.0	6.0	0.0	1.4	0.0	3.8	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	45.8	0.0	44.9	0.0	56.3	0.0	41.6
1st-Term Q (Q1), veh/ln	0.0	13.4	0.0	5.0	0.0	14.8	0.0	4.8

HCM 7th Signalized Intersection Capacity Analysis

100: Ravinia Avenue & 159th Street

Build (2050) Traffic Volumes

SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	1.0	0.0	0.2	0.0	0.6	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.43	0.00	1.72	0.00	1.42	0.00	1.74
%ile Back of Q (95%), veh/ln	0.0	20.6	0.0	8.9	0.0	21.8	0.0	8.6
%ile Storage Ratio (RQ%)	0.00	0.43	0.00	0.50	0.00	0.65	0.00	0.22
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R		R		R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	179	0	258	0	226	0	479
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	8.6	0.0	15.8	0.0	17.4	0.0	32.0
Cycle Q Clear Time (g_c), s	0.0	8.6	0.0	15.8	0.0	17.4	0.0	32.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	0.0	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	19.3	0.0	20.3	0.0	0.0	0.0	19.4
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	757	0	595	0	511	0	627
V/C Ratio (X)	0.00	0.24	0.00	0.43	0.00	0.44	0.00	0.76
Avail Cap (c_a), veh/h	0	757	0	637	0	511	0	627
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	20.0	0.0	30.3	0.0	47.1	0.0	34.1
Incr Delay (d2), s/veh	0.0	0.7	0.0	1.1	0.0	2.8	0.0	6.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	20.7	0.0	31.4	0.0	49.9	0.0	40.6
1st-Term Q (Q1), veh/ln	0.0	3.2	0.0	6.1	0.0	7.4	0.0	13.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	0.4	0.0	1.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.80	0.00	1.66	0.00	1.59	0.00	1.44
%ile Back of Q (95%), veh/ln	0.0	6.1	0.0	10.3	0.0	12.4	0.0	20.3
%ile Storage Ratio (RQ%)	0.00	0.83	0.00	1.59	0.00	1.58	0.00	0.53
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	51.7
HCM 7th LOS	D

HCM 7th TWSC
200: Access B/North Private Drive & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

Intersection												
Int Delay, s/veh	132.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱	↱↱	↱		↱↱	↱			↱	↱		↱
Traffic Vol, veh/h	115	1320	145	0	1260	185	0	0	240	70	0	165
Future Vol, veh/h	115	1320	145	0	1260	185	0	0	240	70	0	165
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	180	-	105	-	-	175	0	-	-	-	-	90
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	121	1389	153	0	1326	195	0	0	253	74	0	174

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1326	0	0	-	-	0	-	-	695	2263	-	663
Stage 1	-	-	-	-	-	-	-	-	-	1326	-	-
Stage 2	-	-	-	-	-	-	-	-	-	937	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	7.54	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	3.52	-	3.32
Pot Cap-1 Maneuver	517	-	-	0	-	-	0	0	385	~ 22	0	404
Stage 1	-	-	-	0	-	-	0	0	-	164	0	-
Stage 2	-	-	-	0	-	-	0	0	-	285	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	517	-	-	-	-	-	-	-	385	~ 6	-	404
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 6	-	-
Stage 1	-	-	-	-	-	-	-	-	-	164	-	-
Stage 2	-	-	-	-	-	-	-	-	-	75	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1.03	0	30.54	\$ 1935.76
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	385	517	-	-	-	-	6	404
HCM Lane V/C Ratio	0.657	0.234	-	-	-	-	12.618	0.43
HCM Control Delay (s/veh)	30.5	14.1	-	-	-	-	\$ 6450.3	20.5
HCM Lane LOS	D	B	-	-	-	-	F	C
HCM 95th %tile Q(veh)	4.5	0.9	-	-	-	-	11	2.1

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 7th Signalized Intersection Summary

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	450	920	260	500	805	410	255	1740	380	480	1530	330
Future Volume (veh/h)	450	920	260	500	805	410	255	1740	380	480	1530	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	474	968	274	526	847	432	268	1832	400	505	1611	347
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	465	743	468	577	863	624	334	1666	756	564	2022	810
Arrive On Green	0.13	0.20	0.20	0.17	0.23	0.23	0.03	0.10	0.10	0.16	0.38	0.38
Sat Flow, veh/h	3456	3741	1585	3456	3741	1585	3456	5375	1585	3456	5375	1585
Grp Volume(v), veh/h	474	968	274	526	847	432	268	1832	400	505	1611	347
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1728	1870	1585	1728	1792	1585	1728	1792	1585
Q Serve(g_s), s	17.5	25.8	19.1	19.4	29.3	29.5	10.0	40.3	24.4	18.6	34.7	17.8
Cycle Q Clear(g_c), s	17.5	25.8	19.1	19.4	29.3	29.5	10.0	40.3	24.4	18.6	34.7	17.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	465	743	468	577	863	624	334	1666	756	564	2022	810
V/C Ratio(X)	1.02	1.30	0.59	0.91	0.98	0.69	0.80	1.10	0.53	0.90	0.80	0.43
Avail Cap(c_a), veh/h	465	743	468	598	863	624	545	1666	756	625	2022	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	52.1	39.0	53.2	49.7	32.8	61.7	58.4	31.4	53.3	36.1	19.9
Incr Delay (d2), s/veh	46.6	146.4	3.0	18.0	26.1	4.2	4.5	54.6	2.6	14.7	3.4	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.0	40.3	12.3	14.9	23.2	17.4	8.4	38.8	16.2	14.0	21.8	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	102.8	198.5	42.0	71.2	75.8	37.0	66.1	112.9	34.1	68.0	39.5	21.6
LnGrp LOS	F	F	D	E	E	D	E	F	C	E	D	C
Approach Vol, veh/h	1716			1805			2500			2463		
Approach Delay, s/veh	147.1			65.2			95.3			42.8		
Approach LOS	F			E			F			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.7	46.3	26.2	31.8	17.1	54.9	22.0	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	23.5	38.0	22.5	25.0	20.5	41.0	17.5	30.0				
Max Q Clear Time (g_c+I1), s	20.6	42.3	21.4	27.8	12.0	36.7	19.5	31.5				
Green Ext Time (p_c), s	0.6	0.0	0.3	0.0	0.6	4.2	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	84.1											
HCM 7th LOS	F											
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	450	920	260	500	805	410	255	1740	380	480	1530	330
Future Volume (veh/h)	450	920	260	500	805	410	255	1740	380	480	1530	330
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1969	1870	1870	1969	1870	1870	1969	1870
Adj Flow Rate, veh/h	474	968	274	526	847	432	268	1832	400	505	1611	347
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	465	743	468	577	863	624	334	1666	756	564	2022	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Prop Arrive On Green	0.13	0.20	0.20	0.17	0.23	0.23	0.03	0.10	0.10	0.16	0.38	0.38
Unsig. Movement Delay												
Ln Grp Delay, s/veh	102.8	198.5	42.0	71.2	75.8	37.0	66.1	112.9	34.1	68.0	39.5	21.6
Ln Grp LOS	F	F	D	E	E	D	E	F	C	E	D	C
Approach Vol, veh/h	1716			1805			2500			2463		
Approach Delay, s/veh	147.1			65.2			95.3			42.8		
Approach LOS	F			E			F			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	25.7	46.3	26.2	31.8	17.1	54.9	22.0	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green (Gmax), s	23.5	38.0	22.5	25.0	20.5	41.0	17.5	30.0				
Max Allow Headway (MAH), s	3.7	8.8	3.7	6.8	3.7	8.8	3.7	6.7				
Max Q Clear (g_c+I1), s	20.6	42.3	21.4	27.8	12.0	36.7	19.5	31.5				
Green Ext Time (g_e), s	0.6	0.0	0.3	0.0	0.6	4.2	0.0	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	1.00	1.00	1.00	0.03	1.00	1.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1	3	5	7								
Mvmt Sat Flow, veh/h	3456	3456	3456	3456								
Through Movement Data												
Assigned Mvmt	2	4	6	8								
Mvmt Sat Flow, veh/h	5375	3741	5375	3741								
Right-Turn Movement Data												
Assigned Mvmt	12	14	16	18								
Mvmt Sat Flow, veh/h	1585	1585	1585	1585								
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)	
Lanes in Grp	2	0	2	0	2	0	2	0
Grp Vol (v), veh/h	505	0	526	0	268	0	474	0
Grp Sat Flow (s), veh/h/ln	1728	0	1728	0	1728	0	1728	0
Q Serve Time (g_s), s	18.6	0.0	19.4	0.0	10.0	0.0	17.5	0.0
Cycle Q Clear Time (g_c), s	18.6	0.0	19.4	0.0	10.0	0.0	17.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	564	0	577	0	334	0	465	0
V/C Ratio (X)	0.90	0.00	0.91	0.00	0.80	0.00	1.02	0.00
Avail Cap (c_a), veh/h	625	0	598	0	545	0	465	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	53.3	0.0	53.2	0.0	61.7	0.0	56.2	0.0
Incr Delay (d2), s/veh	14.7	0.0	18.0	0.0	4.5	0.0	46.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	68.0	0.0	71.2	0.0	66.1	0.0	102.8	0.0
1st-Term Q (Q1), veh/ln	7.9	0.0	8.3	0.0	4.6	0.0	7.5	0.0
2nd-Term Q (Q2), veh/ln	1.1	0.0	1.4	0.0	0.2	0.0	3.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.54	0.00	1.53	0.00	1.75	0.00	1.52	0.00
%ile Back of Q (95%), veh/ln	14.0	0.0	14.9	0.0	8.4	0.0	16.0	0.0
%ile Storage Ratio (RQ%)	1.93	0.00	2.04	0.00	0.71	0.00	2.53	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Middle Lane Group Data

Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T		T	
Lanes in Grp	0	3	0	2	0	3	0	2
Grp Vol (v), veh/h	0	1832	0	968	0	1611	0	847
Grp Sat Flow (s), veh/h/ln	0	1792	0	1870	0	1792	0	1870
Q Serve Time (g_s), s	0.0	40.3	0.0	25.8	0.0	34.7	0.0	29.3
Cycle Q Clear Time (g_c), s	0.0	40.3	0.0	25.8	0.0	34.7	0.0	29.3
Lane Grp Cap (c), veh/h	0	1666	0	743	0	2022	0	863
V/C Ratio (X)	0.00	1.10	0.00	1.30	0.00	0.80	0.00	0.98
Avail Cap (c_a), veh/h	0	1666	0	743	0	2022	0	863
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	58.4	0.0	52.1	0.0	36.1	0.0	49.7
Incr Delay (d2), s/veh	0.0	54.6	0.0	146.4	0.0	3.4	0.0	26.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	112.9	0.0	198.5	0.0	39.5	0.0	75.8
1st-Term Q (Q1), veh/ln	0.0	19.4	0.0	11.9	0.0	14.7	0.0	13.4

HCM 7th Signalized Intersection Capacity Analysis 300: LaGrange Road & 159th Street

Build (2050) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	8.4	0.0	15.1	0.0	0.6	0.0	3.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.39	0.00	1.50	0.00	1.42	0.00	1.40
%ile Back of Q (95%), veh/ln	0.0	38.8	0.0	40.3	0.0	21.8	0.0	23.2
%ile Storage Ratio (RQ%)	0.00	1.54	0.00	2.34	0.00	0.58	0.00	0.39
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	41.5	0.0	56.4	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	R		R		R		R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	400	0	274	0	347	0	432
Grp Sat Flow (s), veh/h/ln	0	1585	0	1585	0	1585	0	1585
Q Serve Time (g_s), s	0.0	24.4	0.0	19.1	0.0	17.8	0.0	29.5
Cycle Q Clear Time (g_c), s	0.0	24.4	0.0	19.1	0.0	17.8	0.0	29.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	1585.1	0.0	1585.1	0.0	1585.1	0.0	1585.1
Prot RT Eff Green (g_R), s	0.0	21.7	0.0	12.6	0.0	17.5	0.0	21.2
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	756	0	468	0	810	0	624
V/C Ratio (X)	0.00	0.53	0.00	0.59	0.00	0.43	0.00	0.69
Avail Cap (c_a), veh/h	0	756	0	468	0	810	0	624
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	31.4	0.0	39.0	0.0	19.9	0.0	32.8
Incr Delay (d2), s/veh	0.0	2.6	0.0	3.0	0.0	1.7	0.0	4.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	34.1	0.0	42.0	0.0	21.6	0.0	37.0
1st-Term Q (Q1), veh/ln	0.0	10.2	0.0	7.3	0.0	6.4	0.0	11.0
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.4	0.0	0.4	0.0	0.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.50	0.00	1.59	0.00	1.63	0.00	1.48
%ile Back of Q (95%), veh/ln	0.0	16.2	0.0	12.3	0.0	11.0	0.0	17.4
%ile Storage Ratio (RQ%)	0.00	2.42	0.00	0.71	0.00	2.07	0.00	0.96
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	84.1
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Summary

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
SAT Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	1	345	1	1	30	490	1980	30	40	1825	125
Future Volume (veh/h)	240	1	345	1	1	30	490	1980	30	40	1825	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	253	1	363	1	1	32	516	2084	32	42	1921	132
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Cap, veh/h	366	400	588	119	3	95	576	3256	50	165	2353	161
Arrive On Green	0.14	0.20	0.20	0.00	0.06	0.06	0.17	0.63	0.63	0.04	0.96	0.96
Sat Flow, veh/h	1781	1969	1585	1781	48	1544	3428	5181	79	1767	4880	334
Grp Volume(v), veh/h	253	1	363	1	0	33	516	1369	747	42	1338	715
Grp Sat Flow(s),veh/h/ln	1781	1969	1585	1781	0	1592	1714	1702	1856	1767	1702	1810
Q Serve(g_s), s	16.8	0.1	24.3	0.1	0.0	2.6	19.2	32.5	32.6	1.6	8.6	8.8
Cycle Q Clear(g_c), s	16.8	0.1	24.3	0.1	0.0	2.6	19.2	32.5	32.6	1.6	8.6	8.8
Prop In Lane	1.00		1.00	1.00		0.97	1.00		0.04	1.00		0.18
Lane Grp Cap(c), veh/h	366	400	588	119	0	98	576	2139	1166	165	1641	873
V/C Ratio(X)	0.69	0.00	0.62	0.01	0.00	0.34	0.90	0.64	0.64	0.25	0.82	0.82
Avail Cap(c_a), veh/h	366	400	588	276	0	220	646	2139	1166	216	1641	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	41.3	33.4	57.2	0.0	58.5	53.0	15.0	15.0	16.9	1.4	1.4
Incr Delay (d2), s/veh	5.4	0.0	2.9	0.0	0.0	4.3	14.2	1.5	2.7	0.8	4.6	8.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.6	0.0	14.9	0.1	0.0	2.1	14.2	17.3	19.2	1.2	3.2	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.7	41.3	36.2	57.2	0.0	62.7	67.2	16.5	17.7	17.7	5.9	9.8
LnGrp LOS	D	D	D	E		E	E	B	B	B	A	A
Approach Vol, veh/h	617			34			2632			2095		
Approach Delay, s/veh	42.6			62.5			26.8			7.5		
Approach LOS	D			E			C			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.3	87.7	3.6	32.4	25.3	68.7	22.0	14.0				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green Setting (Gmax), s	5.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Q Clear Time (g_c+I), s	13.6	34.6	2.1	26.3	21.2	10.8	18.8	4.6				
Green Ext Time (p_c), s	0.0	32.2	0.0	0.0	0.7	37.4	0.0	0.1				

Intersection Summary

HCM 7th Control Delay, s/veh	21.3
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	1	345	1	1	30	490	1980	30	40	1825	125
Future Volume (veh/h)	240	1	345	1	1	30	490	1980	30	40	1825	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1870	1969	1870	1870	1870	1870	1856	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	253	1	363	1	1	32	516	2084	32	42	1921	132
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
Percent Heavy Veh, %	2	2	2	2	2	2	3	2	2	3	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	366	400	588	119	3	95	576	3256	50	165	2353	161
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Prop Arrive On Green	0.14	0.20	0.20	0.00	0.06	0.06	0.17	0.63	0.63	0.04	0.96	0.96
Unsig. Movement Delay												
Ln Grp Delay, s/veh	51.7	41.3	36.2	57.2	0.0	62.7	67.2	16.5	17.7	17.7	5.9	9.8
Ln Grp LOS	D	D	D	E		E	E	B	B	B	A	A
Approach Vol, veh/h	617			34			2632			2095		
Approach Delay, s/veh	42.6			62.5			26.8			7.5		
Approach LOS	D			E			C			A		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Case No	1.1	4.0	1.1	3.0	2.0	4.0	1.1	4.0				
Phs Duration (G+Y+Rc), s	6.3	87.7	3.6	32.4	25.3	68.7	22.0	14.0				
Change Period (Y+Rc), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0				
Max Green (Gmax), s	6.5	68.0	11.5	25.0	24.5	50.0	18.5	18.0				
Max Allow Headway (MAH), s	3.7	8.9	3.8	6.1	3.7	9.0	3.8	7.6				
Max Q Clear (g_c+I1), s	3.6	34.6	2.1	26.3	21.2	10.8	18.8	4.6				
Green Ext Time (g_e), s	0.0	32.2	0.0	0.0	0.7	37.4	0.0	0.1				
Prob of Phs Call (p_c)	0.78	1.00	0.04	1.00	1.00	1.00	1.00	1.00				
Prob of Max Out (p_x)	1.00	0.96	0.00	1.00	1.00	0.95	1.00	0.02				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1767		1781		3428		1781					
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5181		1969		4880		48				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		79		1585		334		1544				
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	7	0				

HCM 7th Signalized Intersection Capacity Analysis

400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes

SAT Peak Hour

Lane Assignment	L (Pr/Pm)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)	
Lanes in Grp	1	0	1	0	2	0	1	0
Grp Vol (v), veh/h	42	0	1	0	516	0	253	0
Grp Sat Flow (s), veh/h/ln	1767	0	1781	0	1714	0	1781	0
Q Serve Time (g_s), s	1.6	0.0	0.1	0.0	19.2	0.0	16.8	0.0
Cycle Q Clear Time (g_c), s	1.6	0.0	0.1	0.0	19.2	0.0	16.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	191	0	1018	0	0	0	1376	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	62.7	0.0	8.0	0.0	0.0	0.0	10.0	0.0
Perm LT Serve Time (g_u), s	49.1	0.0	8.0	0.0	0.0	0.0	5.4	0.0
Perm LT Q Serve Time (g_ps), s	3.7	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	165	0	119	0	576	0	366	0
V/C Ratio (X)	0.25	0.00	0.01	0.00	0.90	0.00	0.69	0.00
Avail Cap (c_a), veh/h	216	0	276	0	646	0	366	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	16.9	0.0	57.2	0.0	53.0	0.0	46.3	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	14.2	0.0	5.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	17.7	0.0	57.2	0.0	67.2	0.0	51.7	0.0
1st-Term Q (Q1), veh/ln	0.6	0.0	0.0	0.0	8.0	0.0	7.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	1.1	0.0	0.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.80	0.00	1.80	0.00	1.54	0.00	1.58	0.00
%ile Back of Q (95%), veh/ln	1.2	0.0	0.1	0.0	14.2	0.0	12.6	0.0
%ile Storage Ratio (RQ%)	0.11	0.00	0.00	0.00	1.04	0.00	5.83	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T		T		T			
Lanes in Grp	0	2	0	1	0	2	0	0
Grp Vol (v), veh/h	0	1369	0	1	0	1338	0	0
Grp Sat Flow (s), veh/h/ln	0	1702	0	1969	0	1702	0	0
Q Serve Time (g_s), s	0.0	32.5	0.0	0.1	0.0	8.6	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	32.5	0.0	0.1	0.0	8.6	0.0	0.0
Lane Grp Cap (c), veh/h	0	2139	0	400	0	1641	0	0
V/C Ratio (X)	0.00	0.64	0.00	0.00	0.00	0.82	0.00	0.00
Avail Cap (c_a), veh/h	0	2139	0	400	0	1641	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	15.0	0.0	41.3	0.0	1.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.5	0.0	0.0	0.0	4.6	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.5	0.0	41.3	0.0	5.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	11.3	0.0	0.0	0.0	0.7	0.0	0.0

HCM 7th Signalized Intersection Capacity Analysis 400: LaGrange Road & 161st Street

Build (2050) Traffic Volumes
SAT Peak Hour

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	1.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.48	0.00	1.80	0.00	1.80	0.00	1.00
%ile Back of Q (95%), veh/ln	0.0	17.3	0.0	0.0	0.0	3.2	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.24	0.00	0.01	0.00	0.12	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R		R		T+R		T+R	
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	747	0	363	0	715	0	33
Grp Sat Flow (s), veh/h/ln	0	1856	0	1585	0	1810	0	1592
Q Serve Time (g_s), s	0.0	32.6	0.0	24.3	0.0	8.8	0.0	2.6
Cycle Q Clear Time (g_c), s	0.0	32.6	0.0	24.3	0.0	8.8	0.0	2.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	1585.1	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	21.8	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.04	0.00	1.00	0.00	0.18	0.00	0.97
Lane Grp Cap (c), veh/h	0	1166	0	588	0	873	0	98
V/C Ratio (X)	0.00	0.64	0.00	0.62	0.00	0.82	0.00	0.34
Avail Cap (c_a), veh/h	0	1166	0	588	0	873	0	220
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	15.0	0.0	33.4	0.0	1.4	0.0	58.5
Incr Delay (d2), s/veh	0.0	2.7	0.0	2.9	0.0	8.5	0.0	4.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	17.7	0.0	36.2	0.0	9.8	0.0	62.7
1st-Term Q (Q1), veh/ln	0.0	12.3	0.0	9.3	0.0	0.8	0.0	1.0
2nd-Term Q (Q2), veh/ln	0.0	0.9	0.0	0.5	0.0	2.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.45	0.00	1.52	0.00	1.80	0.00	1.80
%ile Back of Q (95%), veh/ln	0.0	19.2	0.0	14.9	0.0	5.1	0.0	2.1
%ile Storage Ratio (RQ%)	0.00	0.27	0.00	3.72	0.00	0.20	0.00	0.16
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 7th Control Delay, s/veh	21.3
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

HCM 7th TWSC
500: East Access & 161st Street

Build (2050) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	Y	
Traffic Vol, veh/h	540	1	60	555	1	45
Future Vol, veh/h	540	1	60	555	1	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	568	1	63	584	1	47

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	569	0	987	285
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	418	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	999	-	244	712
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	632	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	999	-	226	712
Mov Cap-2 Maneuver	-	-	-	-	226	-
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	1.36	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	680	-	-	351	-
HCM Lane V/C Ratio	0.071	-	-	0.063	-
HCM Control Delay (s/veh)	10.7	-	-	8.8	0.5
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

Intersection												
Int Delay, s/veh	13.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔	↔		↔			↔	
Traffic Vol, veh/h	10	215	1	10	295	250	1	1	15	310	1	105
Future Vol, veh/h	10	215	1	10	295	250	1	1	15	310	1	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	90	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	226	1	11	311	263	1	1	16	326	1	111

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	574	0	0	227	0	0	425	843	114	466	580	155
Stage 1	-	-	-	-	-	-	248	248	-	332	332	-
Stage 2	-	-	-	-	-	-	177	595	-	135	248	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	995	-	-	1338	-	-	513	299	917	480	424	863
Stage 1	-	-	-	-	-	-	734	700	-	656	643	-
Stage 2	-	-	-	-	-	-	808	491	-	855	700	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	995	-	-	1338	-	-	437	293	917	460	415	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	293	-	460	415	-
Stage 1	-	-	-	-	-	-	726	692	-	649	637	-
Stage 2	-	-	-	-	-	-	696	486	-	829	692	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.47	0.18	9.78	38.43
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	771	158	-	-	118	-	-	521
HCM Lane V/C Ratio	0.023	0.011	-	-	0.008	-	-	0.84
HCM Control Delay (s/veh)	9.8	8.7	0.1	-	7.7	0.1	-	38.4
HCM Lane LOS	A	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	8.6

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1580	1	0	1425	0	1
Future Vol, veh/h	1580	1	0	1425	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1663	1	0	1500	0	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 832
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	- 0	- 0 312
Stage 1	-	- 0	- 0 -
Stage 2	-	- 0	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 312
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	16.57
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	312	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-
HCM Control Delay (s/veh)	16.6	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	110	0	2250	1855	435
Future Vol, veh/h	0	110	0	2250	1855	435
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	185
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	116	0	2368	1953	458

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 976	- 0	- 0
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -
Critical Hdwy	- 7.14	- -	- -
Critical Hdwy Stg 1	- -	- -	- -
Critical Hdwy Stg 2	- -	- -	- -
Follow-up Hdwy	- 3.92	- -	- -
Pot Cap-1 Maneuver	0 215	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 215	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s/v	39.7	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 215	- -	- -
HCM Lane V/C Ratio	- 0.538	- -	- -
HCM Control Delay (s/veh)	- 39.7	- -	- -
HCM Lane LOS	- E	- -	- -
HCM 95th %tile Q(veh)	- 2.8	- -	- -

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	10	175	310	90	50	85
Future Vol, veh/h	10	175	310	90	50	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	184	326	95	53	89
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	421	0	-	0	487	211
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	113	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1135	-	-	-	510	795
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	899	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1135	-	-	-	505	795
Mov Cap-2 Maneuver	-	-	-	-	505	-
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	899	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.51	0		12.01		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	195	-	-	-	655	
HCM Lane V/C Ratio	0.009	-	-	-	0.217	
HCM Control Delay (s/veh)	8.2	0.1	-	-	12	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.8	

HCM 7th TWSC
705: Ravinia Avenue/161st Street & Access F

Build (2050) Traffic Volumes
SAT Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		Y	
Traffic Vol, veh/h	1	170	375	20	15	1
Future Vol, veh/h	1	170	375	20	15	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	179	395	21	16	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	416	0	-	0	497	208
Stage 1	-	-	-	-	405	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1140	-	-	-	502	798
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	922	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1140	-	-	-	502	798
Mov Cap-2 Maneuver	-	-	-	-	502	-
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	922	-
Approach	EB	WB		SB		
HCM Control Delay, s/v	0.06	0		12.24		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	21	-	-	-	514	
HCM Lane V/C Ratio	0.001	-	-	-	0.033	
HCM Control Delay (s/veh)	8.2	0	-	-	12.2	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	



Kimley»Horn

4201 Winfield Road | Suite 600 | Warrenville, IL 60555
630-487-5550